Hazard Mitigation Plan

Lafayette County, Wisconsin

Original Plan Date – September 2016

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Acronyms

ACE	Army Corps of Engineers
ADA	Americans with Disabilities Act
ALS	Advanced Life Support
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
BIA	Bureau of Indian Affairs
Bq	Becquerel, a unit of radioactivity
CAD	Computer Aided Dispatch
CAR	Communities At Risk
CBRNE	Chemical, Biological, Radiological, Nuclear, or Explosive
CDBG	Community Development Block Grant
CEMP	Comprehensive Emergency Management Plan
CERT	Community Emergency Response Team
CFR	Code of Federal Regulations
Ci	Curie, a unit of radioactivity
CI	City
CO	County
COAD	Community Organizations Active in Disaster
CO HWY	County Highway Department
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
FmHA	Farmers Home Administration
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
L	Liter
LE	Law Enforcement
LEPC	Local Emergency Planning Committee
LID	Land Information Department
LIDAR	Laser Imaging Detection and Ranging
LPDM	Lagrangian particle dispersion
LTPO	Long-Term Power Outage
LWC	Land and Water Conservation Department
MABAS	Mutual Aid Box Alarm System
MAP	FEMA’s Risk Mapping, Assessment and Planning
ME	Medical Examiner
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
P&Z	Planning and Zoning
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 Lafayette County Hazard Mitigation Plan is intended to provide strategies for reducing susceptibility to future damages to public and private infrastructure in the county. The Lafayette County Emergency Management Office self-funded the creation of this plan and submitted it for approval according to the guidelines established by the Federal Emergency Management Agency (FEMA) as administered by the state Department of Military Affairs - Wisconsin Emergency Management (WEM). The procedures used 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. The Federal Emergency Management Agency (FEMA) has rules in 44 CFR Part 206 Subpart M for implementing Section 409.

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 Lafayette 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 Lafayette 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

Plan Overview

The Lafayette County Hazard Mitigation Plan provides background information on Lafayette 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, including flood damage.

Previous Planning Efforts and Legal Basis

The Lafayette County Emergency Management Office has completed and regularly updates the Lafayette County Hazard Analysis. This Hazard Vulnerability Analysis (HVA) identifies all likely natural and technological hazards that might or have occurred within the county and is based on Wisconsin's HVA. The local HVA does not generally include detailed mitigation strategies for the identified hazards.

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

Lafayette County Code and Ordinances

Chapter 5	Comprehensive Zoning Ordinance
Chapter 5	Amended Non-Metallic Mining Reclamation Ordinance
Chapter 5	Floodplain Ordinance
Chapter 6-2	Shoreland/Wetland Zoning
Chapter 6-5	Land Subdivision Regulations

City of Cuba City Municipal Code [1]

Chapter 11	Building Code
Chapter 17	Zoning Code
Chapter 18	Subdivision and Platting

City of Darlington Municipal Code

Chapter 9	Zoning Code
Chapter 10	Building Regulations
Chapter 15	Subdivision and Platting
Chapter 17	Floodplain Zoning Code
Chapter 18	(Sub-Chapter II) Flood Proofing Historical Structures

City of Shullsburg Municipal Code [2]

Chapter 8	Public Works
Chapter 13	Municipal Utilities
Chapter 14	Building Code
Chapter 17	Zoning Code
Chapter 18	Subdivision & Platting
Chapter 20	Floodplain Zoning Code
Chapter 25	Construction & Effect of Ordinances

Village of Argyle Code of Ordinances

Title 13, Ch. 1	Zoning Code
Title 13, Ch. 2	Floodplain Zoning
Title 14, Ch. 1	Subdivision Regulations
Title 15, Ch. 1	Building Code
Title 15, Ch. 2	Construction Site and Storm Water Run-Off Management

Village of Belmont

Chapter 14	Zoning Code
Chapter 15	Subdivision and Platting
Chapter 16	Floodplain Zoning Code

[1] http://www.municode.com/Resources/gateway.asp?pid=12671&sid=49
[2] http://www.shullsburgwisconsin.org/shullsburgmunicipalcode.html

Village of Benton [3]
Zoning Code: District Standards

Village of Hazel Green
Chapter 14 Zoning Code
Chapter 15 Building Regulations

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

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 Management, Planning and Parks) 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

[3] http://www.bentonwi.us/wp/?page_id=6

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 Lafayette 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:

- Theresa Burgess, Lafayette County Emergency Management
- F. John Reichling, Lafayette County Emergency Management
- Jason King, Darlington Police Chief/Emergency Manager
- Tom Jean, Lafayette Co. Highway Commissioner
- Debbie Siegenthaler, Lafayette Co Public Health Administrator
- Steve Hubner, Lafayette Co. Planning and Zoning
- Mary Jean Ritchie, Lafayette Co. Planning and Zoning/GIS
- 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 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 the 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 F.

The committee met several times, first 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 plan was distributed to the County Emergency Management Directors from Grant, Iowa, and Green Counties. 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 comments can be viewed in Appendix F.

The Lafayette 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 workgroup also, after reviewing the draft plan, selected the potential mitigation projects, which are listed in Appendix D (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* booklet[4] 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 D. 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 was forwarded to FEMA for determination of approvability. Once deemed approvable

[4] Mitigation Ideas, FEMA-R5, 9/02

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 was passed by the Lafayette County Board, the Cities of Cuba City, Darlington, and Shullsburg and the Villages of Argyle, Belmont, Benton, Blanchardville, Gratiot, Hazel Green and South Wayne to accept this plan. Each of the 18 towns was also given the opportunity to 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 DATE.

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 Lafayette 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 legal public notices.

The process for integrating hazard mitigation actions into other planning mechanisms will be led by the County Emergency Management Director. As the director 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 G: Inter-Revision Updates. Lafayette County Emergency Management maintains responsibility and is the point of contact for all issues (e.g., monitoring, updating and evaluating the effectiveness) regarding this plan. Municipalities can contact the County Emergency Management Director to add updated local information to Appendix G 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 query if there are 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 an annual publically-noticed open meeting of the county's Emergency Management

committee. 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 D 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, the Lafayette County Land and Water Management and Planning and Parks Departments will use this plan as they update the Lafayette 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 County Planning Department and the municipalities will receive a copy. They have committed to using and referring to the mitigation plan as they complete their regularly scheduled reviews and updates of the aforementioned plans. Lafayette County Emergency Management will also refer to this plan in their emergency preparedness activities.

Physical Characteristics of Lafayette County

General Community Introduction

The first settlements in Lafayette County were made during the year 1824 and were due to the existence of the lead mines, which led to early development and stability of the region. The earliest settlements were made in 1825 between the present day Shullsburg and the “Ridge” (between the Fever and Pecatonica Rivers). In 1826, the towns of Benton and New Diggings saw their beginnings. Arrivals in other towns were necessarily limited, immigrations being mostly confined to sections of the county where ore could be obtained in paying quantities. Other early residents settled throughout various portions of the county, exchanging the courtesies of pioneer life and uniting in acts of pioneer safety in Argyle, Kendall, Wayne and elsewhere.

The entire southwest corner of the state of Wisconsin was originally part of Old Crawford County in the Michigan territory but in 1847 the Legislature divided the already organized Iowa County into two separate counties. The southern portion became Lafayette County, named after Marquis de Lafayette, hero of the Revolutionary War. Wisconsin became the 30th State in the Union in 1848. The first county seat was in Shullsburg but it was moved to Avon, just south of Darlington, in 1856. On March 28, 1861, the county seat was relocated to Darlington, where it remains to this day.

Not only were miners attracted to the region, but also farmers looking for good land, which they found in abundance. During those pioneer times, settlers used the fertile prairies and savannas as a means to pasture their animals and grow crops for their own use. The first attempt at farming is attributed to A.C. Ranson and Kingsley Olds whose corn crop planted in Gratiot's Grove, about two miles south of Shullsburg, fell victim to an early frost in 1827. From that humble and unsuccessful beginning, farming and agriculture in the county grew into the industry that still dominates.

One of the most interesting historic sites in Lafayette County is the County Courthouse. The Lafayette County Courthouse was built between 1905 and 1907 at a total cost of $136,556.17. When Mr. Matt Murphy of Benton, Wisconsin died in 1903, he bequeathed 70% of his estate to be used toward the construction of a County Courthouse. Today, Lafayette County has the distinction of having

the only Courthouse still in use in the United States that was paid for almost solely by one man. Lafayette County is also the home of Wisconsin's first State Capitol located just outside the Village of Belmont, Wisconsin. This Capitol and Supreme Court building were in use only once during the 1836 session before the Capitol moved to Madison. [5]

Plan Area

One simple way to describe the state of Wisconsin is to divide it into two parts: the Driftless Area and the Glaciated Region. A large part of the Driftless Area is hilly. It preserves most of the types of topography that formerly existed throughout Wisconsin. The Glaciated Region is mostly a plain. Glacial erosion and glacial deposition, wave work, postglacial stream erosion and other processes have greatly modified the topography originally made by the weathering and preglacial stream work. Lafayette County lies primarily within the Driftless Area. A small portion of the southeast corner of Lafayette County lies within the Glaciated Region. Lafayette County lies within the western upland geographical province.

Lafayette County is bordered on the west by Grant County, on the north by Iowa County, on the west by Green County and on the south by the State of Illinois. It is approximately 633.57 square miles.

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. Lafayette County contains the Cities of Prescott, Cuba City, Darlington and Shullsburg; the Villages of Argyle, Belmont, Benton, Blanchardville, Gratiot, Hazel Green and South Wayne and the Towns of Argyle, Belmont, Benton, Blanchard, Darlington, Elk Grove, Fayette, Gratiot, Kendall, Lamont, Monticello, New Diggings, Seymour, Shullsburg, Wayne, White Oak Springs, Willow Springs and Wiota. (See Appendix A for a map of Lafayette County.) Please note that the majority of the City of Cuba City is within the borders of Grant County and the municipality is fully represented as a whole (i.e., including both parts in Grant and Lafayette Counties) in the Grant County Hazard Mitigation Plan and that they will not specifically be referred to within the Lafayette County plan. The County and all municipalities

[5] Lafayette County Economic Development Corporation, History of La Fayette County by C.W. Butterfield, 1881 and http://www.co.lafayette.wi.gov/county

except for --- have adopted the plan (Copies of the adoptions can be found in Appendix C.)

Geology

The dominant bedrock in Lafayette County is Galena dolomite of Ordovician age. Consequently, most soils in the county overlie this bedrock. St. Peter sandstone underlies the Galena formation. Outcrops of this sandstone occur along the Pecatonica River and form its steep-sided valleys. Maquoketa shale and Niagara dolomite occur as mounds above the Galena dolomite. These formations once covered Lafayette County but they were removed by weathering and erosion. Only the Platte Mounds, near Belmont, and the prominent hills south of Shullsburg remain of these formations in the county.[6]

The Galena dolomite contains thick layers which contains a lot of chert (also called flint). The chert can be seen as layers or pods of white or light gray material within the tan or brown dolomite. Chert is a very hard mineral which makes this rock as an excellent material for making arrowheads, spear points and a myriad of other tools. The Galena contains a peculiar fossil called Receptaculites which resembles honeycomb, but it is believed to have been produced by a species of colonial blue-green algae.[7]

St. Peter sandstone is typically a white, massively bedded, medium-grained, well-sorted quartz sandstone, 12 to 107m thick, in places cross-bedded and in part of aeolian origin.[8] Niagara dolomite and Maquoketa shale may once have been a continuous surface formation. As a result of erosion, however, the dolomite has been dissected deeply and in places has worn away. Now there are only remnants of this capping. They occur in the northern part of the county, near Belmont, and in the southern part, near Shullsburg.[9]

Topography

Wisconsin lies in the upper Midwest between Lake Superior, the upper peninsula of Michigan, Lake Michigan and the Mississippi

[6] Soil Survey of Lafayette County, 1966
[7] http://www.janeaddamstrail.com/history_geology.htm
[8] Paull & Paull, 1977
[9] Soil Survey of Lafayette County, 1966

and Saint Croix Rivers. Its greatest length is 320 miles, 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.[10]

Lafayette County lies within the unglaciated part of Wisconsin in the western upland physiographic region of the state. In general, the county is a dissected plateau that has fairly road, rolling ridges and steep-sided valleys.

The Platte Mounds in the northwestern part of Lafayette County are the most prominent topographical feature in the county. These mounds rise 180 to 300 feet above the ground and are 1,200 to 1,500 feet above sea level. The bottom of this valley seldom exceeds one-half mile in width and it is widest where the river leaves the county in the Town of Wayne.

Drainage in Lafayette County is provided mainly by the Pecatonica and Galena Rivers and their tributaries. About three-fourths of the county is drained by the Pecatonica River and the rest is drained by

[10] http://www.uwex.edu/sco/state.html

the Galena River. Both rivers drain into the Mississippi River. Most parts of the county are well drained. Only in the bottom lands along the rivers or in depressions in those parts of the county that are underlain by shale bedrock are the soils poorly drained.

Rivers

The East and West Branch Pecatonica River, the Fever River, and the Yellowstone River all flow through Lafayette County and eventually drain into the Mississippi River. The Pecatonica River, whose name means “place of many canoes” starts in Iowa County and flows through Lafayette County into Illinois. The Pecatonica River is over 90 miles long. This is the longest unrestricted flow of water in the state of Wisconsin. The water moves at about 2.5 miles per hour. The river meanders back and forth in large loops across a broad valley. Catfish, walleye and occasional northern are the main game fish but there is also a plentiful population of carp, bass and panfish.

The Fever River is also known as the Galena River. The Lafayette portion of the Fever River is 29.4 miles long and flows south into Illinois. It is a popular for smallmouth bass fishing.

The Yellowstone River flows from Iowa County in the North southeast to the East Branch Pecatonica River. Yellowstone Lake is a 455-acre impoundment on the Yellowstone River. The lake has a good warm water fishery and experiences a high level of public use because it is within a state park.

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 [11] and minus 55°F.[12] 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

[11] Wisconsin Dells, 7/13/1936
[12] Couderay, 2/2 and 4/1996

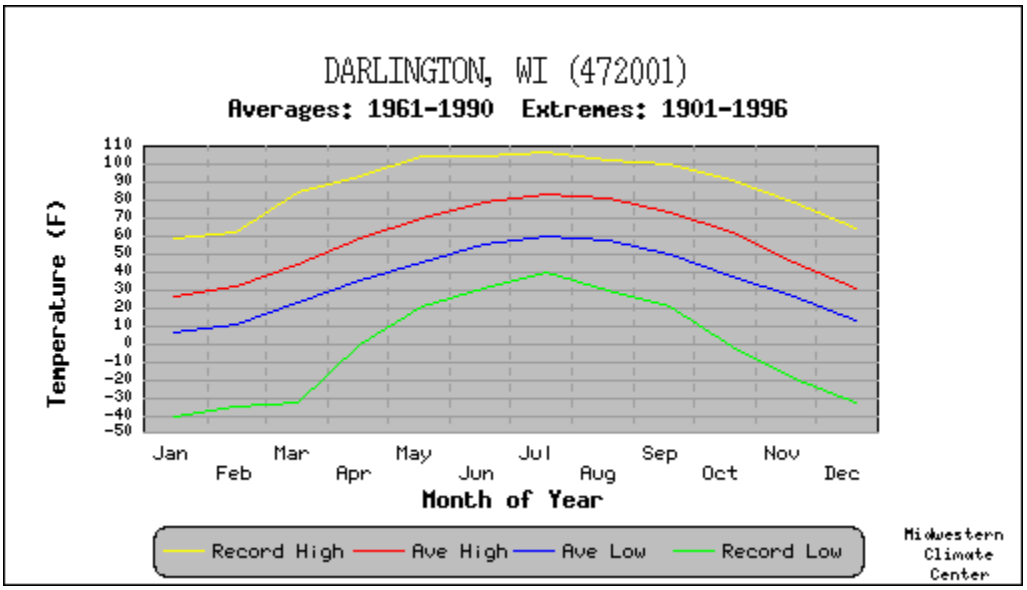
than in the adjacent lowlands. The mean dates of first snowfall of consequence (an inch or more) vary from early November in northern localities to early December in southern Wisconsin counties. Average annual duration of snow cover ranges from 85 days in southernmost Wisconsin to more than 140 days along Lake Superior. The snow cover acts as protective insulation for grasses, autumn seeded grains, alfalfa and other vegetation.

Climatological data for the Lafayette County area is summarized in "Surface Water Resources of Lafayette County." [13] The county has an average annual precipitation of about 34 to 35 inches with the majority (60%) occurring during the growing season (May through September.)

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. Lafayette County's growing season averages 144 days. Shallow lakes normally freeze in late November and remain frozen until late March or early April. [14]

Climate Normals [15]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Ave Daily High (F°)	25.9	31.4	43.7	58.4	70.0	79.1	83.0	80.8	72.6	61.6	45.2	30.5
Ave Daily Low (F°)	6.2	10.8	23.2	34.8	45.5	54.9	60.1	57.5	49.1	37.8	26.4	12.9
Growing Degree Days	1	3	41	162	356	529	660	603	401	206	43	4
Heating Degree Days	1519	1229	977	552	260	44	10	29	148	477	876	1342
Cooling Degree Days	0	0	0	0	37	104	214	156	25	6	0	0
Ave Precipitation (")	1.12	1.14	2.26	3.10	3.44	4.35	4.16	4.15	4.20	2.42	2.20	1.73
Ave Snowfall (")	8.3	7.3	7.5	2.5	0.1	0.0	0.0	0.0	0.0	0.2	2.6	9.2

[13] DNR, 1971
[14] http://www.uwex.edu/sco/state.html
[15] http://www.wisconline.com/counties/Lafayette/climate.html



Midwestern Regional Climate Center[16]

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

[16] http://mrcc.isws.illinois.edu/

rains of the thunderstorm type sometimes produce tributary flooding or flash flooding along the smaller streams and creeks.[17]

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.[18] The winter period normally lacks infiltration because of frozen ground.

The state is divided into 3 major river basins each identified by the primary waterbody into which the basin drains. In Wisconsin, they are the Lake Superior Basin, Mississippi River Basin and the Lake Michigan Basin. Lafayette County is located in the Mississippi River Basin. Water Management areas are hydrologically based subdivisions of the larger major basins of the state. Wisconsin has 24 Water Management Units. Lafayette County lies within the Grant-Platte and Sugar-Pecatonica Water Management Units.

Watersheds are used to manage water resources at the local level. They are a further hydrologic subdivision of the Water Management Units. The following 11 watersheds are located in Lafayette County: Little Platte River, Galena River, Upper West Branch Pecatonica River, Mineral Point and Sudan Branches, Middle Pecatonica River, Lower Pecatonica River, Yellowstone River, Upper East Branch Pecatonica River, Lower East Branch Pecatonica River, Gordon Creek and Jordan and Skinner Creeks.

There are 8 lakes in Lafayette County occupying approximately 565 acres (0.88 square miles). The East and West Branch Pecatonica River, the Fever River and the Yellowstone River all flow through Lafayette County and eventually drain into the Mississippi River

Groundwater is the water that occupies the spaces in between soil particles and rocks below the earth. Aquifers are water bearing geologic formations that contain groundwater. Geological formations have different physical and chemical properties which affect the quality of groundwater as well as its storage and transport. Bedrock aquifers consist of the consolidated material that underlies the soils and surficial deposits. In Lafayette County there

[17] http://www.uwex.edu/sco/state.html
[18] DeVaul, 1967

are dolomite, sandstone and shale bedrock types. The three types of dolomite found in the county are Silurian dolomite, Sinipee Group and Prairie du Chien Group. In dolomite, groundwater mainly occurs in fractures. In sandstone, water occurs in pore spaces between loosely cemented sand grains. Dolomites are excellent aquifers for water production because water moves through the cracks in the rock very easily, which also makes them susceptible to a variety of contamination because they have very little ability to attenuate contaminants especially in areas with very thin soils overlaying dolomite. Ancell Group is a type of sandstone found in the county. Sandstone is an excellent aquifer because it is very porous and is permeable allowing water to move through very easily. Generally, Maquoketa shale is not an aquifer because water does not move through the shale easily.

Soil Types

Soil is formed by weathering and other processes that act on parent material. The characteristics of the soil at any given point depend upon:

- Parent material
- Climate
- Living organisms
- Relief
- Time or age.

Lafayette County is in the Driftless Area of Wisconsin and it has therefore not been glaciated. The parent material from which the soils formed consists mainly of material derived from the weathering of rock in places and of material transported by wind, water or gravity and laid down as unconsolidated deposits of sand, silt and clay. Also, the parent material of a few of the soils is organic matter.

The rocks from which the parent material of the soils was derived are of the Ordovician period. They consist mainly of Galena dolomite but some of the soils formed in material derived from Niagara dolomite, Maquoketa shale and St. Peter sandstone. Of the material transported by wind, water or gravity, loess has been the most important in the formation of the soils in Lafayette County.

Loess, thought to be Peorian in age, covers most of the county and ranges from a few inches to six or more feet.

Soil morphology in Lafayette County is expressed generally in prominent horizons. The differentiation of horizons in soils of the county is the result of one or more of the following processes:

- Accumulation of organic matter
- Leaching of carbonates and soils
- Removal and subsequent accumulation of silicate clay minerals
- Reduction and transfer of iron.

Some organic matter has accumulated in the uppermost layers of all but a few soils in Lafayette County. Much of that organic material is in the form of humus. Leaching of carbonates and salts has occurred in almost all soils of the county.

There are nine soil associations in the county. Maps showing the locations of and additional information regarding these soils can be found in the Lafayette County Soil Survey. Briefly, these soil associations consist of the following:[19]

- Tama-Ashdale Association: Dark-colored, Deep Soils of the Limestone Uplands - This soil association consists of dark-colored, deep, and silty soils underlain by limestone. These soils are mostly on broad ridgetops and adjoining side slopes in the up-lands, but some areas are on narrow bottom lands. This association makes up about 30 percent of the county.
- Dodgeville-Sogn Association: Dark-colored, Moderately Deep to Shallow Soils of the Limestone Uplands - This soil association is made up of dark-colored, moderately deep to shallow, gently sloping to steep soils underlain by limestone. The areas are on ridges and side slopes in the eastern part of the county. These soils formed under prairie grasses in wind-laid silt that is underlain by limestone or red clay. This association makes up about 4 percent of the county.

[19] Lafayette County Soil Survey, 1966, http://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/wisconsin/lafayetteWI1966/lafayetteWI1966.pdf

- Fayette-Palsgrove Association: Light-colored, Deep Soils of the Limestone Uplands - This soil association consists of light-colored, deep soils. These soils are mostly on gently sloping, broad to narrow ridgetops and moderately steep to steep side slopes, but some are on narrow bottom lands. This association is chiefly in the southwestern part of the county. The soils formed mainly in wind-laid silt underlain by limestone. Many small piles of waste from lead and zinc mines are on the soils. The piles consist of gravelly and stony material and range from 2 to 20 acres in size. This soil association covers about 9 percent of the county.

- Dubuque-Sogn Association: Light-colored, Moderately Deep Soils and Dark-colored, Shallow Soils of the Limestone Uplands - The soils in this association are light-colored and moderately deep to shallow over limestone. These soils are mostly on ridges in the northern and eastern parts of the county. A small acreage is on narrow bottom lands of streams. The ridgetops in this association are narrower than those in the Fayette-Palsgrove association, and the slopes are steeper. Originally, the vegetation consisted of various kinds of hardwoods. This association makes up about 50 percent of the county.

- Tama-Muscatine-Sable Association: Dark-colored, Deep Soils of the Shale Uplands - In this association are dark-colored, deep, nearly level to sloping soils underlain by limestone or shale. These soils are on broad ridgetops southeast of Shullsburg and near the Platte Mounds. They formed under prairie grasses in 4 feet or more of wind-laid silt. Depth to bedrock ranges from 4 to 10 feet. This soil association covers about 1 percent of the county.

- Schapville-Calamine Association: Dark-colored, Moderately Deep to Shallow Soils of the Shale Uplands - This soil association consists of dark-colored, moderately deep to shallow soils underlain by shale. These soils are on ridgetops and steep slopes and in flat or depressed areas south of Shullsburg and in the Platte Mounds area. They formed under prairie grasses in wind-laid silt 15 to 50 inches thick over shale bedrock. The soils all have yellowish clay, weathered from the shale, in the lower part of the subsoil. This association occupies about 1 percent of the county.

- Derinda-Calamine Association: Light-colored, Moderately Deep to Shallow Soils of the Shale Uplands - In this soil association are light-colored, moderately deep to shallow soils underlain by shale. These soils are on ridgetops and steep slopes or are on level to gently sloping low areas. The areas are south of Shullsburg and near the Platte Mounds. The soils formed under various kinds of hardwoods in wind-laid silt 15 to 50 inches thick over shale bedrock. All of the soils have yellowish clay, weathered from the shale, in the lower part of the subsoil. This association makes up about 1 percent of the county.

- Hixton-Northfield-Stony and Rocky Land Association: Light-colored, Moderately Deep to Shallow Soils of Valley Slopes and Sandstone Uplands - This soil association consists mainly of light-colored, moderately deep to shallow soils and of stony and rocky land. The areas are mostly on steep side slopes along the Pecatonica River between Blanchardville and South Wayne. This association makes up about 1 percent of the county.

- Arenzville-Huntsville-Sable, Benches, Association: Soils of Stream Bottoms and Benches - This association consists of nearly level soils on bottom lands and of gently sloping soils on terraces. These soils are along the Pecatonica and Galena Rivers and their tributaries. This association makes up about 3 percent of the county.

Wetlands

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 recreational opportunities for wildlife watchers, anglers, hunters and boaters.[20]

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

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).

It is important to note that “wetlands” are not only associated with the presence of water. It is possible for a property to have standing water for a portion of the year but not be a wetland; it is also possible that a true wetland with all three of the above characteristics may never have water present above the land surface.

There are three main levels of jurisdiction (often overlapping) concerning wetlands in Lafayette County. These are the United States Army Corps of Engineers (all wetlands), the Wisconsin Department of Natural Resources (all shoreland wetlands) and the municipal zoning agencies.

According to the Wisconsin Department of Natural Resources, Lafayette County has approximately 3,116 acres of wetlands

(approximately 0.8% of its total area). This is 0.1% of the total statewide acreage of wetlands.[21]

Lafayette County is in an area in which most wetlands are associated primarily with the rivers and streams. The importance of glacial activity in forming lakes and wetlands is illustrated by the lack of these water bodies in the Driftless Area of southwestern Wisconsin. In fact, wetlands comprise only 1% of the land cover in Southwest Savanna landscape[22] and only 0.8% of Lafayette County.[23] Lafayette County has few wetlands not only due to being in the Driftless Area, but also because the area has experienced wetland draining for agricultural purposes. Due to the small number of wetlands in the County, most towns have no management strategies protecting wetlands, although some natural resource policies address general wetland protection. Most protection of wetlands in Lafayette County is at the federal level and is managed by the County.[24]

Land Use

The land in Lafayette County consists of residential, commercial, manufacturing, agricultural, undeveloped (formerly swamp/waste), ag-forest, forest and other (federal, state, county, school, cemetery). The total land area is 286,014 acres. Of the total land area in Lafayette County, 86% is classified as agricultural, 6% is classified as undeveloped and 4% is classified as ag-forest.

Natural areas in the county are Belmont Mound State Park and Yellowstone Lake State Park. The Pecatonica State Trail runs 10 miles through the picturesque Bonner Branch Valley, this county-operated trail links Belmont with Calamine and the 47-mile multi-use Cheese Country Trail. Blackhawk Memorial County Park is located near Woodford.

[21] http://dnr.wi.gov/topic/wetlands/acreage.html
[22] Wisconsin Land Legacy Report, 2002
[23] WI-DNR, 2006
[24] Lafayette County Comprehensive Plan, 2006

Vegetation

Lafayette County consists of mostly oak savanna. In the south-central and east-central portions of the county prairie bluegrass and composites are dominant. In the north-central and southeast portions of the county a small area of white, black and red oak is present.[25]

[25] http://www.wisconline.com/counties/Lafayette/index.html

Demographics

Human Settlement Patterns

Early 19th century Euro-American settlement in southwestern Wisconsin emphasized both mining and agriculture, but it was rich deposits of lead that accelerated settlement of the region (Schafer 1932). As a result, the region is referred to as the Wisconsin Lead Region, bordered by the Wisconsin River to the north, the Mississippi River to the west, the State of Illinois to the south and Green and Dane Counties to the east. Settlers who came to the Lead Region for mining rarely supported themselves solely through mining. Most needed to supplement their income as well as grow much of their own food by farming. Therefore, most immigrants who settled southwestern Wisconsin during the early 1800s were farming and mining.

By the time Euro-American settlers reached Wisconsin's lead mines, the landscape was already perforated with earlier, shallow diggings by the French and Indians.[26] During early European settlement of the Upper Mississippi River Valley, the French and Indians often traded with one another for a variety of goods. It is thought that the French settlers taught Indians the art of lead mining so that they could pay the Indians to mine lead for the French to then sell to other interested parties.[27] When other Euro-Americans arrived to the lead mines, they not only found these ancient diggings, but they also encountered Indians still engaged in extracting lead ore from the shallow diggings using stone picks, bone spades, wooden shovels, gun barrels for crowbars and occasionally Euro-American mining implements.[28]

By 1816, American mining in the lead district had begun but leasing of land for mining did not start until 1822.[29] In 1822 lead mining became more profitable due to tariff increase and global price increase resulting from increased global demand.[30] This produced a rush of immigrants to Wisconsin's lead region and the government's decision to lease the land for mining. By 1827 the upper Mississippi mines were out-producing all other lead mining

[26] Schafer 1932
[27] Schafer 1932
[28] Schafer 1932
[29] Schafer 1932
[30] Schafer 1932

regions in the United States. By 1840 Wisconsin's lead region produced 15,130,000 pounds of lead out of the nation's 31,240,000 pounds total output, equaling nearly 50% of the total production (Schafer 1932). Lead mining continued to increase steadily through 1847 and then gradually declined.[31] The decline in lead mining occurred because most of the shallow lead mines had been exploited and the remaining lead was deep below the ground surface. Additionally, the California Gold Rush of 1849 resulted in additional lead mining declines as the miners left Wisconsin to exploit the gold in California.

When Euro-Americans settled in Wisconsin's Lead Region, they set up diggings anywhere there was a sign of lead. This included prairies, gentle hill slopes and steep hill sides.[32] In addition, timber was a necessary product in the diggings and even more necessary if the miner wanted to smelt his own ore. In response, the government leased timber tracts to the miners, which resulted in rapid deforestation of the region.[33]

Neither the land used for mining nor timber was chosen based on environmental and economic sustainability. Mining and deforestation occurred on portions of the landscape that was extremely susceptible to erosion such as the steep hill sides. Farm land was also chosen without considering sustainability. Farmers would buy land based on soil quality rather than topography and erosion susceptibility.[34] Additionally, establishing a farm required timber harvesting to build fences, barns and other structures. The combination of lead mining and agriculture in the 19th century led to rapid rates of soil erosion.[35] However, it is important to point out that the impacts of mining on erosion are modest in comparison to the impacts of Euro-American agriculture throughout the 19th and early 20th centuries. Mining had minimal influences on flooding and overbank floodplain sedimentation but did significantly influence sedimentation on channel beds and point bars in channel reaches near large mining operations.[36] The presence of trace lead and zinc minerals in the eroded soils have proved to be useful tools estimating ages of historical sedimentation and flooding.[37]

[31] Schafer 1932
[32] Schafer 1932
[33] Schafer 1932
[34] Schafer 1932
[35] Knox 2001, 2006; Lecce 2001
[36] Adams 1940; Adams 1942
[37] Knox 2006

Farming in southwest Wisconsin initially included large numbers of hogs, especially of the "prairie racer" variety, and cattle for dairy (Schafer 1932). To feed the hogs and cattle and for their own sustainability farmers grew corn and wheat. Winter breakfasts commonly involved buckwheat as an ingredient.[38]

By around 1860, there were 1,534 farms in Lafayette County.[39] Lafayette County had 2.22 farms per square mile. During the same year, Grant County had only 1.94 farms per square mile. From 1850 to 1870, the concentration of farms in the three counties experiences a steep increase. This rapid increase in farm concentration represents the quick transition from mining to agriculture in the region.[40]

Population

According to the 2010 U.S. Census Bureau estimate, there are 16,836 people residing in Lafayette County. The county is considered entirely rural; there are no urban areas.

According to the 2010 U.S. census report, there are 6,513 households in Lafayette County with an average of 2.56 people per household. This is an increase of 302 households, or 4.9%, over the 2000 census when 6,211 households were reported. The 2008 U.S. census estimate states that the median household income is $49,850 and that the per capita income is $22,645. Approximately 9.9% of the people live below the poverty line. The 2010 census estimates also indicated that there are approximately 7,247 housing units within the county, 10% of which are multi-unit structures. 79.3% of homes are owned by the families residing in them and the median home value is $119,700.[41]

The population of Lafayette County rose from 16,137 to 16,836 between the 2000 and 2010 censuses. This is an increase of 699 people—a population growth rate of about 0.4%.[42]

According to the 2010 U.S. Census, the overwhelming majority of people in Lafayette County reported that they were white. People of Hispanic or Latino origin were counted as a subcategory of those

[38] Schafer 1932
[39] Schafer 1932
[40] Influence of Land Use Change on Grant River Hydrology, Grant County, Wisconsin; Greene
[41] http://quickfacts.census.gov/qfd/states/55/55065.html
[42] http://quickfacts.census.gov/qfd/states/55/55065.html

reporting that they were white, as another race or as two or more races. There are no Native American tribal lands located within Lafayette County.

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.

Lafayette County contains the Cities of Cuba City (Wards 6 and 7), Darlington and Shullsburg and the Villages of Argyle, Belmont, Benton, Blanchardville, Gratiot, Hazel Green (Ward 3) and South Wayne. There are also 18 towns including Argyle, Belmont, Benton, Blanchard, Darlington, Elk Grove, Fayette, Gratiot, Kendall, Lamont, Monticello, New Diggings, Seymour, Shullsburg, Wayne, White Oak, Willow Springs and Wiota.

Transportation Network

The County has a total of 1028.09 miles of roads. Of these, 272.54 are county miles and 755.55 are municipal miles, according to the January 2006 WISLR inventory. Lafayette County has a good transportation network. State and county roads connect the population centers. Cuba City is connected by STH 80 and CTH “H”. Darlington is connected by STH 23, STH 81, and CTH “F”. STH 11 and CTH “O” and CTH “U” run through Shullsburg. The Village of Argyle is connected by STH 78 and CTH “G”. Belmont is connected by US HWY 151 and CTH “G”. STH 11 and CTY “J” run through Benton. STH 78 and CTH F run through Blanchardville. Gratiot is connected by STH 11, STH 78 and CTH “K”. Hazel Green is connected by STH 11, STH 80 and CTH “W”. South Wayne is connected by STH 11 and CTH “D”. Lafayette 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.

Land Use and Development Trends

Lafayette County is primarily a rural community in the southwest portion of the state. The county has some natural areas that will not be developed and some rural farming areas as well as light manufacturing and other primarily service businesses that have chosen to locate in the area.

Permitting for construction projects is managed by incorporated municipalities (i.e., cities and villages) for projects within their own boundaries; Lafayette County permits development for unincorporated areas (i.e., the towns.) Due to its history of mining, portions of Lafayette County are honey-combed with old mining tunnels. Building codes include a requirement that the GIS overlay of these tunnels be used when planning future developments to reduce the risk of sinkhole formation under the weight of new structures.

Public Safety Support

Medical

The Lafayette County Sheriff's Department, 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. There is one hospital, Memorial Hospital of Lafayette County, a Level IV trauma center, located in Darlington. For additional services, patients may be sent to Platteville or Monroe. These hospitals will 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.

Lafayette County relies primarily on volunteers to provide pre-hospital emergency medical services at the EMT-Basic level to its service areas. Services within the county include: Argyle Emergency Medical Service, Belmont Ambulance Service, Blanchardville Fire Department, Rural Medical Ambulance Service (Darlington) and Shullsburg Ambulance Service.

Each of these departments provides regular 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.

Fire Service

Lafayette County includes nine separate fire districts (i.e., Argyle Adams, Belmont, Benton, Darlington, Gratiot, Shullsburg, South

Wayne, Wiota, Woodford) all of which are staffed by on-call volunteer firefighters who attend regularly-scheduled training activities. (See County First Responder Districts Map in Appendix A for district boundary details.)

Law Enforcement

Several departments in Lafayette County are responsible for law enforcement duties within the county. The Cities of Blanchardville and Darlington and Village of Blanchardville have full-time law enforcement officers. The Lafayette County Sheriff's Department provides deputies for the rest of the county. Also, the Wisconsin State Patrol provides limited coverage from their district office in DeForest.

Special Teams and Services

Lafayette County receives Level A hazmat services from the state-sponsored Hazardous Materials (HazMat) Response Team.[43] The Team Leader and all members have completed EPA 165.15 and maintained competency in required areas as set forth by SARA Title III, CFR 29, CFR 29, CFR 40, CFR 49. and NFPA 471. The team is on call 24-hours a day, responding to calls in the region as requested. There is no B-Level County HazMat team.

Other specialty teams and/or services in the county include:

- Snowmobile Patrol: The Wisconsin Department of Natural Resources patrols county snowmobile trails on a limited basis.
- K9 Unit: Provided by the Sheriff's Department and includes responding to increased calls for canine searches involving vehicles and schools and other buildings. They also provide awareness programs and demonstrations and participate in drug interdictions.
- The Gratiot Fire Department has two certified rescue divers.

[43] http://emergencymanagement.wi.gov/training/docs/hazmat_county_response_teams.pdf

Archaeological and Historical Resources

The Wisconsin Historical Society has a listing of archaeological sites that have been identified in Lafayette County; this list is available to governmental agencies upon request. The National Register of Historic Places also includes a listing of 10 locations in Lafayette County.[44] 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**
Benton Stone Water Tower	49 Water St.	Benton
First Capitol	N of Belmont off U.S. 151	Belmont
Gratiot House	S of Shullsburg on Rennick Rd.	Shullsburg
Lafayette County Courthouse	626 Main St.	Darlington
Main Street Historic District	Roughly bounded by Main, Ann, Louisa and Wells Sts.	Darlington
Mottley Family Farmstead	21496 Ivey Rd.	Willow Springs
Prairie Spring Hotel	WI 23 S	Willow Springs
St. Augustine Church	Off CR W	New Diggings
Star Theatre	200 S. North St.	Argyle
Water Street Commercial Historic District	Roughly Water St. from Judgement to Kennedy Sts. and Gratiot St. from Water to Church Sts.	Shullsburg

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

[44] http://www.wisconsinhistory.org/hp/register/welcome.asp

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 Lafayette 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 2011. 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.

The Lafayette County Emergency Management Director develops and annually updates a listing of all hazards that have occurred or could occur within the county. This listing includes the definition, frequency of occurrence and actions to mitigate the hazard. In general, the threat of most hazards is consistent throughout the county. The only hazard where there were differences identified within the county was for flooding and for that hazard, specific locations are identified.

For this plan the Lafayette 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. (See table below.)

Hazard	Likelihood of Occurrence*	Severity of Effects if It Does Happen*	Misc. Notes
Drought/Dust Storm	Low	Agriculture: Medium All else: Low	
Earthquake	Low	Low	
Flood – Flash Flood & River Flood	Very High	Medium	Darlington - mitigation actions have been taken to reduce Blanchardville - downtown can flood but is protected by a levy Other areas - not developed in areas of potential flooding
Flood – Dam Break	Low	Medium	Yellowstone Dam (453-acre 5 to 14-foot deep man-made lake) - regulated in Yellowstone State Park. Argyle is approximately 5 miles downstream. Water would likely flood farms and golf course.
Forest Fire	N/A	N/A	Few trees - mostly state parks
Wildfire	Medium	Medium	Crop, grass fires - small annual, especially in spring and fall
Karst	Very Low	N/A	
Mining Tunnels	Medium	Low/Medium	Shullsburg - on top of mining tunnels County has GIS overlays of mining tunnels to use in planning development
Severe Temperature	Medium	People: Medium Property: Very Low	
Hail	High	Medium	
Lightning	High	Medium	County communications tower in Darlington is regularly hit
Thunderstorm	High	Medium	
Tornado	Medium	High	

Hazard	Likelihood of Occurrence*	Severity of Effects if It Does Happen*	Misc. Notes
Derecho (High Wind)	Medium	High	
Winter Storm (Snow & Ice)	Medium	Medium	
Utility Failure	Low	Medium	Risk to business (e.g., cheese factory)
Manure Spill	Low/Medium	Low/Medium	Have had intentional releases so far (e.g., around 2010; DOJ charged), several in rural townships Concern with spill surface water (quality, flora, fauna) or contamination of water wells

*5 point scale = Very Low, Low, Medium, High, Very High

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. Lafayette 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 the County Planning and Zoning Department or they 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 utilizing this plan as they go about their preparedness activities.

Lafayette County and its municipalities have a history of identifying, planning and completing hazard mitigation projects including these, which received supplemental funding:

Community Development Block Grant (CDBG) Emergency Assistance Program (EAP) Projects:

- EAP #08-37 Lafayette County Lafayette $247,920 LiDAR

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 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 the areas of the state requested by the governor.[45]

    - DR-874 1990 Darlington, City Lafayette $605,572. Part of a larger project funded under DR-994; acquisition of 12 commercial structures; floodproofing of 19 commercial structures. Additional $178,608 provided locally (used for
    - match in DR-994); local match was purchase of land for business park
    - DR-994 1993 Darlington, City Lafayette $4,175,790 Acquisition of 12 commercial structures; floodproofing of 19 commercial structures $178,608 local match for purchase of business park; $282,084 provided by CDBG; $187,744
    - provided by DNR
    - DR-1238 1998 Darlington, City Lafayette $117,478 Floodproofing of 1 commercial structure Partially funded by program revenue from Pierce County DR-994 project

- PDM - The Pre-Disaster Mitigation (PDM) program is authorized by Section 203 of the Stafford Act, 42 U.S.C. 5133. The PDM program is designed to assist States, Territories, Indian Tribal governments, and local communities to implement a sustained pre-disaster natural hazard mitigation program to reduce overall

[45] http://www.fema.gov/hazard-mitigation-grant-program

risk to the population and structures from future hazard events, while also reducing reliance on Federal funding from future major disaster declarations.[46]

- Pre-Disaster Mitigation (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 Darlington, City Lafayette $ - Acquisition of 1 residential structure Project owner rejected offer; funds returned
  - 2005C State of Wisconsin All $182,010 Development of structure inventory database
  - 2005C WEM All $88,480 Technical assistance Personnel, travel, and supplies
  - 2006C Darlington, City Lafayette $65,000 Acquisition of 1 residential structure
  - 2006C WEM All $22,141 Technical assistance Personnel, travel, and supplies
  - 2007C WEM All $70,092 Technical assistance Personnel, travel, and supplies
  - 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
  - 2002 Darlington, City Lafayette $14,700 New Plan is approved
  - 2005C Lafayette County Lafayette $14,000 New Never completed, funds returned
  - 2007C WEM All $402,574 Update Agreement with UW for HAZUS flood risk assessment
  - 2008C Darlington, City Lafayette $19,597 Update is approved

[46] http://www.fema.gov/pre-disaster-mitigation-grant-program

- 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.[47]

    - Flood Mitigation Assistance (FMA) Projects Funded in the State
        - 1997 Darlington, City Lafayette $156,133 Acquisition of 1 commercial structure
        - 1998 Darlington, City Lafayette $420,001 Floodproofing of 1 commercial structure and partial funding for acquisition of 1 repetitive loss commercial structure. Supplemented by FMA 2000 funds; local match provided by global match
        - funds under DR-994
        - 2000 Darlington, City Lafayette $151,213 See 1998, Darlington, City above Local match provided by DNR Urban
        - Rivers Grant
        - 2002 Darlington, City Lafayette $152,167 Acquisition of Darlington Firehouse Located in the Pecatonica River
        - floodplain
        - 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
        - 2009 Darlington, City Lafayette $153,000 Acquisition of 1 commercial structure
        - 2010 WEM All $8,994 Technical assistance to subgrantees Personnel, travel, supplies

[47] http://www.fema.gov/flood-mitigation-assistance-program

- 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.[48]

    - List of Communities with Repetitive Loss Properties
        - LAFAYETTE COUNTY CID #550223 total 1 remaining 1

- 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. [49]

- 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 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

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

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.[50]

- CDBG – The U.S. Department of Housing and Urban Development (HUD) Community Development Block Grant-Disaster (CDBG) 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).[51]

    - FY95-0037 Darlington, City Lafayette $355,584 Provide professional project management for business relocation, acquisition and demolition; floodproof 41 downtown businesses

- 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.[52]

    - 2006-07 MFC-33216-06 Darlington, City Lafayette $1,715.00 Property acquisition
    - 2010-11 MFC-33216-10 Darlington, City Lafayette $542,360.00 Flood proofing

[50] http://www.fema.gov/public-assistance-local-state-tribal-and-non-profit/hazard-mitigation-funding-under-section-406-0

[51] http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/communitydevelopment/programs/drsi

[52] http://dnr.wi.gov/Aid/MunFloodControl.html

- 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.[53]

[53] 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 Lafayette 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 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 planning goals of 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 Lafayette 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 public alert and notifications limitations. Lafayette County has some siren coverage, with each municipality listed below owning and operating the number of sirens indicated:

- Belmont (2)
- Benton (2)
- Argyle (1)
- Blanchardville (1)
- South Wayne (1)
- Wiota (1)
- Shullsburg (1)
- Gratiot (1)
- Darlington (3)
- Woodford (1)

While there are other means of notification (NOAA Weather Alert radios, broadcast media), Lafayette County has a large number of citizens involved in outdoor labor (e.g., farming) that rely on sirens for timely notification of impending disasters. The lack of sirens could impact safety by not providing the citizens timely and adequate alert and notification of impending disasters and the actions that can be taken to help protect themselves, their families and their property. It is a continuing challenge to ensure that emergency services can notify the public in a timely manner. Because of the nature of modern society, adequate notification requires multiple outlets but managing the usage, cost, and updates of these systems is an ongoing project for all communities.

Another vulnerability is the fact that not all agencies that work together in disaster response and recovery can communicate with one another (i.e., are interoperable). Local first response agencies are generally able to communicate with one another but communications-related issues will remain ongoing challenges as technologies evolve and departments acquire equipment suitable for their response.

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.

Public Alert and Notification

Public alert and notification plans are vital in a time of crisis to reduce property damage and human casualties. An advance plan allows the appropriate authorities to perform their emergency duties in an efficient manner.

Lafayette County will maintain the following:

- Facilities, systems and procedures to activate warning and communication capabilities,
- Systems to support communications, including:
    - Sirens to warn the public
    - Telephone and radio to notify public personnel
    - Local television, radio and newspaper to spread warning information
    - Local law enforcement, fire and rescue communications
    - An emergency communications center,

- The Lafayette County Sheriff's Office to receive and distribute warning information to the public and emergency management agencies.

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, Lafayette County will continue to promote increased use of these radios among the public by suggesting that individuals purchase these radios at local retailers. The county will also purchase weather alert radios and provide to the Village of Belmont and Town of Benton to be sold at their municipal halls. The county will be reimbursed for any sales of the radios.

Methods for notification of the special needs populations include door-to-door warnings, foreign language media messages and closed-caption television messages. Other notices and procedures can be found in Lafayette County's Emergency Operations Plan which is reviewed and updated on a regular schedule.

Lafayette County should be capable of the following:

- Disseminate emergency warning and notification to the public though its county-wide warning systems;
- Support emergency management operations;
- Provide adequate warning and communication systems;
- Plan for alternative means and resources in the event of a warning or communication system breakdown.

Lafayette County will prepare facilities, systems and procedures to activate warning and communication. During an emergency, Lafayette County will deliver prompt and accurate warnings to businesses and residents. As part of the communications improvement process, the following projects will be pursued as funding, from the regular budget or grants, becomes available:

- Upgrade municipally-owned sirens in Belmont, Benton, Argyle, Blanchardville, South Wayne, Wiota, Shullsburg, Gratiot, Darlington and Woodford. Each siren upgrade will cost approximately $25,000.

- Conduct a feasibility study and cost benefit analysis for installing a Reverse 9-1-1 communications system in the county. The project has previously been reviewed and determined to be cost-prohibitive; staff will continue to monitor to see if it becomes feasible and also consider other alternative notification methods such as Nixle.

- Replace countywide communications equipment (all communications equipment for fire, law enforcement, EMS, public works and first responders, including mobiles and portables; put computers in all response vehicles; no towers). The estimated project cost is $800,000 to $1 Million and a FEMA Fire Grant has been submitted; the county is awaiting response.

Interoperable Communications

The county budget to maintain communications systems has thus far been sufficient and as technology improves and additional interoperability grant funding is made available, Lafayette County Emergency Management, the dispatch center, and the county's municipalities will monitor and improve the system as able.

Website

Currently, geographic information system (GIS) mapping data is not available from the Lafayette County website and there is no webpage for emergency management or special, immediate disaster information. In recognition of the importance of this communication tool, especially in pre-planning activities, emergency management and county offices will review their web pages to ensure that important information and links for general preparedness topics are available. Potential links include partners such as the American Red Cross, Homeland Security/FEMA and Wisconsin Emergency Management. One potential complication is that the county does not have the ability to make changes to the website themselves; they use the state's hosting services and need to provide changes to the state. Once the pages are updated, they

should be publicized to let the community know of the upgraded resource.

Preparedness

Lafayette County has a comprehensive preparedness program and will work with its municipalities to complete the following preparedness programs that will also support mitigation goals:

- Develop, enhance and implement education programs aimed at mitigating natural hazards and reducing the risk to citizens, public agencies, private property owners, businesses, and schools. They will work with the schools in the county to promote hazard mitigation education and awareness; and discuss ways to better integrate mitigation into the curriculum. This training and education will be ongoing.
- Create displays for use at public events such as the health fair, public awareness day and the county fair.
- Maintain the county's internet and social media presence and continue to provide hazard-related information that is easily accessible.

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 Lafayette 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 Lafayette County. This assertion is further bolstered by the fact that there is very little irrigation done within the county and that the soils in Lafayette County are not prone to blowing. 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 streamflow 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 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.[54]

SPI Values[55]	
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

[54] http://www.ncdc.noaa.gov/oa/climate/research/prelim/drought/spi.htm
[55] http://www.drought.unl.edu/whatis/indices.htm#spi

shown in terms of negative numbers and excess moisture is reflected by positive figures. The future incidence of drought is highly unpredictable and may also be localized, making it difficult to determine probability with any accuracy.

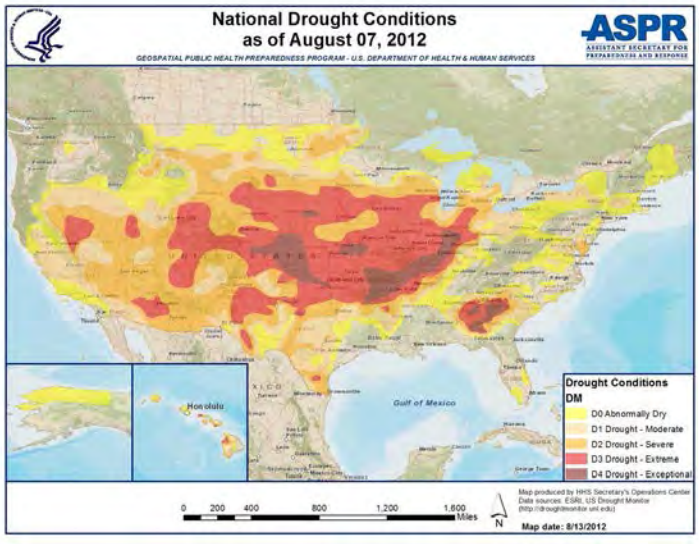
Drought conditions may vary from below-normal precipitation for a few weeks to a severe lack of normal precipitation for several months. Drought primarily affects agricultural areas because the amount and timing of rainfall has a significant impact on crop production. The severity of a drought cannot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

Frequency of Occurrence

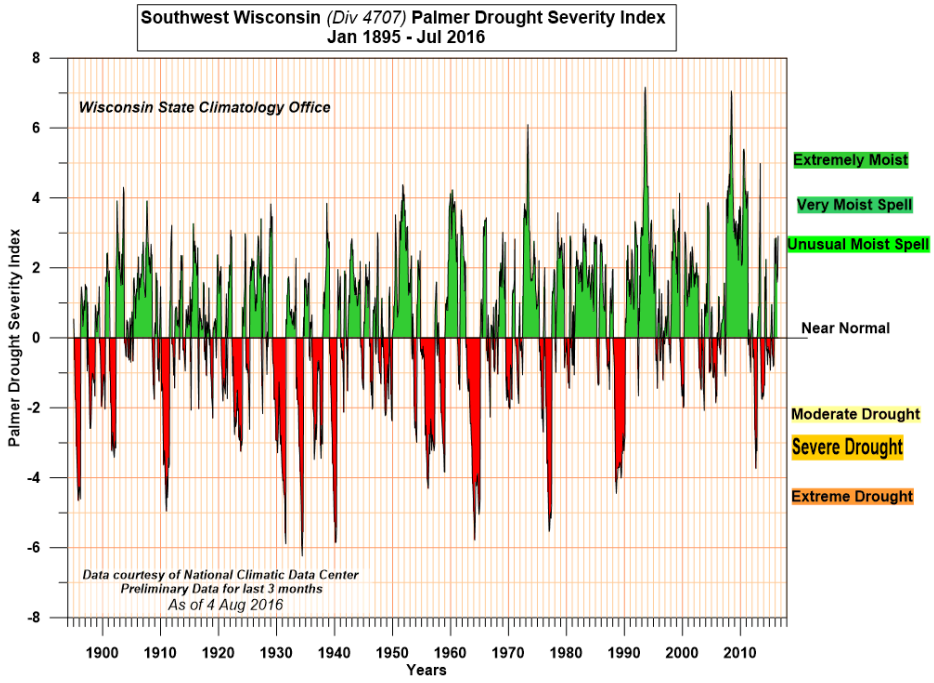
Drought is a relatively common phenomenon in Wisconsin and has occurred statewide in 1895, 1910, 1939, 1948, 1958, 1976, 1988, 1992, 2003 and 2005. The 1976 drought received a Presidential Emergency Declaration with damage to 64 Wisconsin counties, including Lafayette. Estimated losses of $624 million primarily affected the agricultural sector. Reports show that Lafayette County was as affected as the rest of the state in this drought, receiving money for emergency feed programs for livestock and other affected constituents. 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 than half the country as well as increases in heat related illnesses and deaths. July, 2012 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 U. S. 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 Lafayette County in the D3 – Extreme Drought category.[56]

[56] 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 July, 2016 in Southwest Wisconsin, which includes Lafayette County follows[57]:



[57] http://www.aos.wisc.edu/~sco/clim-watch/graphics/pdsi-ts-07-l.gif

As can be seen from the frequency table above, Lafayette 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 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, streamflow, ground water, and crop data to perform short-term and long-term forecasts."[58]

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. A table showing the drought events recorded by the National Weather Service for Lafayette County between 1 January 1996 and 31 August 2016[59] can be found in Appendix B.

The county has not experienced any dust storms since 1950. Considering past occurrences, it can be surmised that Lafayette County has a medium probability of drought occurrence in the future and the likelihood of damage due to drought is considered medium for agricultural losses and low for other types of losses. The probability of dust storm and damages due to dust storms would be very low.

Vulnerability

Droughts and dust storms could impact Lafayette County disproportionately because a large portion of the land area is used for agricultural activities. 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 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

[58] State of Wisconsin Hazard Mitigation Plan, p. 3-100
[59] http://www.ncdc.noaa.gov/stormevents/

an important part of the Lafayette County economy and that the losses could be staggering:

- Average size of farms: 284 acres
- Average value of agricultural products sold per farm: $109,057
- Average value of crops sold per acre for harvested cropland: $169.11
- The value of livestock, poultry, and their products as a percentage of the total market value of agricultural products sold: 70.88%
- Harvested cropland as a percentage of land in farms: 66.02%
- Average number of cattle and calves per 100 acres of all land in farms: 26.22
- Corn for grain: 96,178 harvested acres
- All wheat for grain: 419 harvested acres
- Soybeans for beans: 54,948 harvested acres
- Vegetables: 8 harvested acres
- Land in orchards: 48 acres[60]

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 Lafayette County, the population that lives outside of the cities and villages are generally on well water. There could also be a safety risk during dust storms if they are severe enough to reduce the visibility of the roadways for drivers.

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.

[60] http://www.city-data.com/county/Lafayette_County-WI.html

Some Lafayette County communities have adopted water usage regulations and/or outdoor burning restrictions during drought conditions but in general, mitigation strategies for periods of drought include preparing informational releases and plans for farmers and homeowners that can be used if needed.

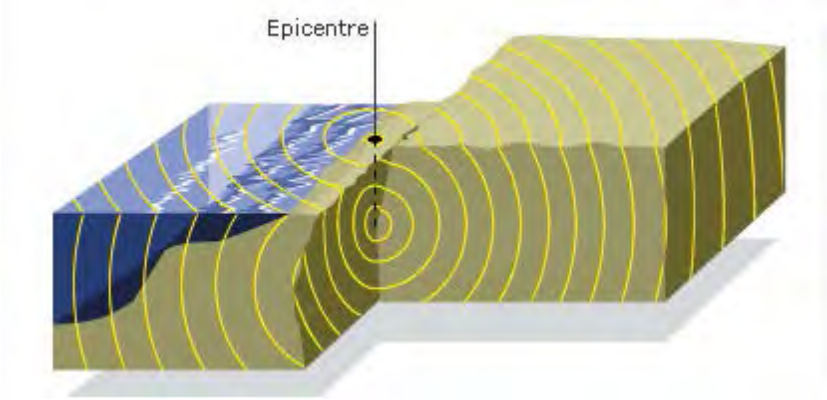
Lafayette County farmers can contact the University of Wisconsin Extension Office and the local offices of the U.S. Department of Agriculture for information and guidance related to drought and dust storms. Various federal and state publications are available regarding ground water movement, the hydrologic cycle, irrigation methods and topsoil conservation. These agencies are also the lead agencies for obtaining emergency food and water supplies for agricultural use and for providing information regarding crop insurance.

Municipalities and the county will work together to ensure that drought considerations are included in emergency plans and will provide emergency information to homeowners as needed. The Emergency Management Department will provide a link on the county disaster preparedness website to the National Weather Service to all county residents, including farmers.

The hazard mitigation strategies listed above primarily involve providing information on water conservation measures and crop insurance to farmers and the public. Water conservation will ensure that the resource is available for critical residential, business and agricultural uses (e.g., drinking, food irrigation, manufacturing, firefighting) and good farming practices may help prevent erosion of the rich topsoil found in Lafayette 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).[61]



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 principle 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 Modified Mercalli Intensity (MMI) Scale

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

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:[62]

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.

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

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

Frequency of Occurrence

Earthquakes that have affected Wisconsin from 1899 to 2004 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

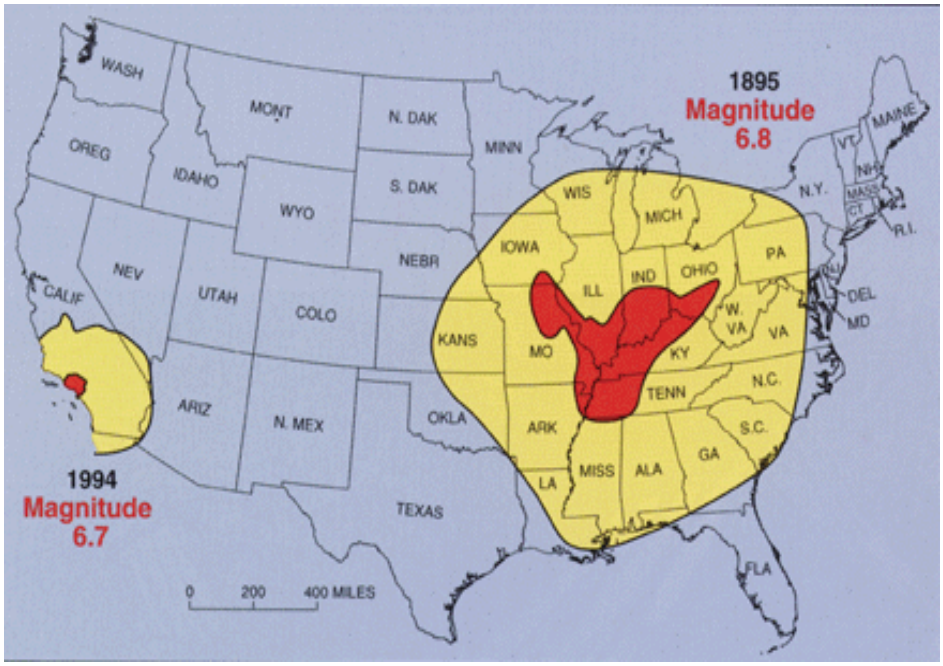
In an article (published in 2012) in the Milwaukee Journal-Sentinel:[63]

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

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


1895
Magnitude
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Carbondale
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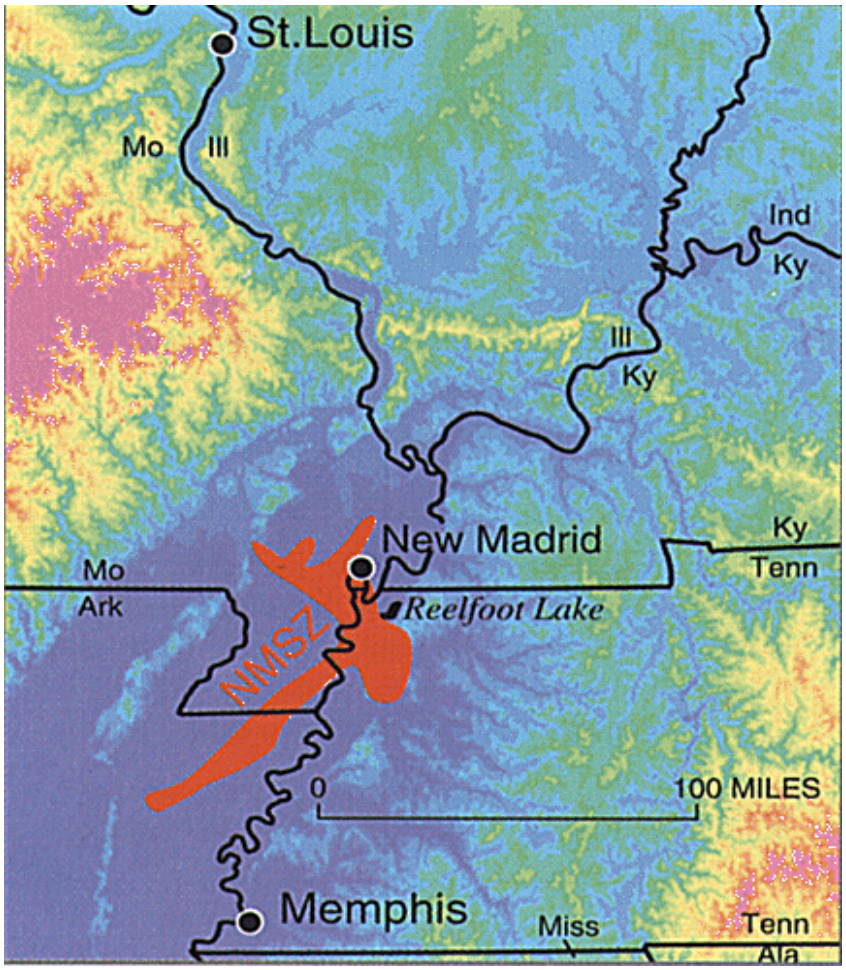
KENTUCKY
Sikeston
Paducah
New Madrid
Reelfoot Lake
Jonesboro
TENNESSEE
ARKANSAS
Memphis



As seen on the map in Appendix A, the earthquake threat to Lafayette County is considered low (the 50-year acceleration probability is 4%.) 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.

Vulnerability

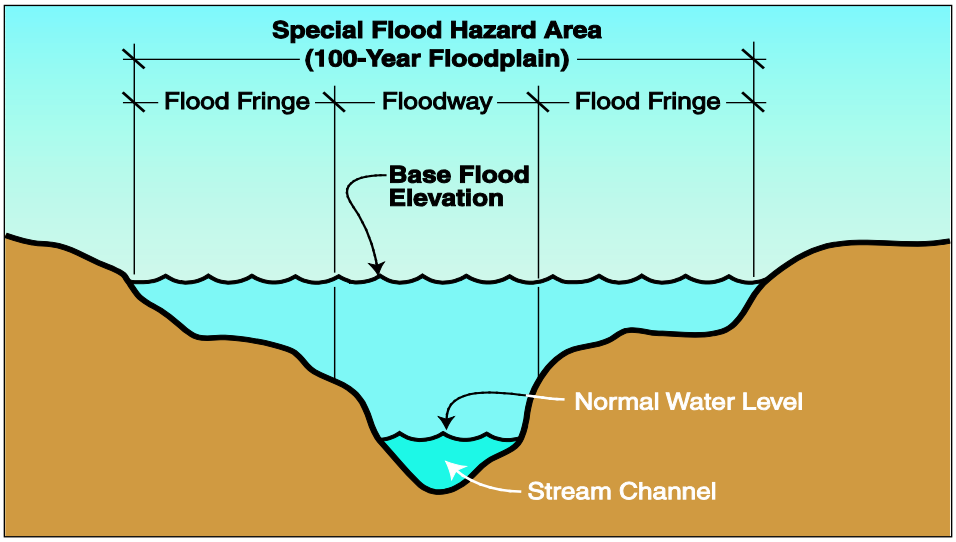
Any impact in the community from earthquake would likely be due to a few broken windows and personal effects that fell in the earthquake. The damage to critical infrastructure and buildings would be negligible.

Hazard Mitigation Strategies

Since Lafayette County is not likely to suffer directly from a severe earthquake, the community impacts are not considered significant and mitigation planning for this hazard is not necessary. The goal for this section of the plan is therefore to educate on the very low risks of earthquake damage in Lafayette County.

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.[64]



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

[64] FEMA, August 2001

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 are 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. Generally the sandy, stony, silty soils in Lafayette County are less prone to flooding than the heavier clay soils that can be found in other parts of the state. There is concern regarding the loss of topsoil and erosion due to flooding.

Terms commonly used when referring to flooding are "100-year flood" and "flood plain." A "100-year flood" is defined as the flood water level that can be expected to occur or to be exceeded in a given location once every 100 years. There is a one percent chance of a flood of such magnitude or greater occurring in any given year.

Flood Probability Terms Table[65]

Flood Recurrence Intervals	Percent Chance of Occurrence Annually
10 year	10.0%
50 year	2.0%
100 year	1.0%
500 year	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; aa dam failure is a failure of the dam that causes downstream flooding.

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

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.

The Wisconsin DNR database lists the following small, uncontrolled agricultural dams in Lafayette County: [66]

Dam Official Name (Popular Name)	Size	Lat	Long	Owner Type	Waterway Name (Downstream City)
ANDERSON,HENRY	SMALL	42.7091897	-89.8701161	PRIVATE	NO WATERWAY
ARGYLE	SMALL	42.7013566	-89.8687644	VILLAGE	EAST BRANCH PECATONICA
ATTEN, CRIS	SMALL	42.6312085	90.3002951	CITY	U/N TRIBUTARY TO MADDEN BR
BALLARD,RICHARD	SMALL	42.8051818	-90.0885695	PRIVATE	TR-OTTER CREEK
BARNES,FRANKLIN	SMALL	42.7625675	-89.8451517	PRIVATE	TR-SAWMILL CREEK
BERG, BYRON	SMALL	42.7984389	-89.8815987	PRIVATE	INTERMITTENT STREAM
BLANCHARDVILLE	SMALL	42.8112231	-89.8619894	TOWN	EAST BRANCH PECATONICA
BRUNN, CARL	SMALL	42.675197	-90.4161465	PRIVATE	UNNAMED
BUSS,WILLIAM	SMALL	42.7816223	-90.404755	PRIVATE	NO WATERWAY
CASSIDY, S. H.	SMALL	42.6477128	-90.3049191	PRIVATE	TR GALENA
DAY, JACK	SMALL	42.7191693	-90.0484722	PRIVATE	TR-GRAVEL RUN CREEK
DUNN, PAT	SMALL	42.6080242	-89.8815881	PRIVATE	TR-PECATONICA RIVER
EVENSTAD, HOMER	SMALL	42.68769	-90.1756201	PRIVATE	TR-PECATONICA RIVER
EVENSTAD,HOMER	SMALL	42.7071969	-90.1988781	PRIVATE	NO WATERWAY
EVERETT MAU	SMALL	42.5713398	-90.3347537	PRIVATE	TRIB. TO SCHULLSBURG BRANCH
FLOGEL	SMALL	42.7595802	90.4147619	PRIVATE	U/N Trib. to Rountree Br.
GOBRACHT, JOHN	LARGE	42.7913969	-90.3992464	PRIVATE	TR-PLATTE MOUNDS BRANCH
GOBRECHT, CARL	SMALL	42.8110394	-90.4137746	PRIVATE	TR-MOUNDS BRANCH CREEK
HIDDEN VALLEY FARMS	LARGE	42.7798	-90.26388	PRIVATE	NON NAV TRIB
HIDDEN VALLEY LAKE	LARGE	42.748918	-89.9456728	PRIVATE	VAN METER CREEK
HUTCHINSON	LARGE	42.8144576	-90.2052248	PRIVATE	TR MINERAL POINT BRANCH
JOHNSON,EDWARD	SMALL	42.8013193	-89.8621833	PRIVATE	TR-EAST BR-PECATONICA RIVER
JONES, CHARLES A	SMALL	42.7889721	-90.1204534	PRIVATE	TR-OTTER CREEK
KIES,GARY	SMALL	42.7816635	-90.422732	PRIVATE	TR-MOUNDS BRANCH
MARR,ROBERT	SMALL	42.7966329	-90.2219732	PRIVATE	UNNAMED
MCNETT	LARGE	42.7777421	-90.2938288	PRIVATE	COTTAGE INN BRANCH-PECATONICA
METZ NO.1	LARGE	42.5641566	-90.0939103	PRIVATE	TR WOLF CREEK
METZ NO.2	LARGE	42.5625792	-90.0900738	PRIVATE	TR-WOLF CREEK
MEYLOR,JAMES	SMALL	42.7456544	-90.1335251	PRIVATE	TR-PECATONICA RIVER
NIEMANN, RONALD	SMALL	42.8081649	-89.9086316	PRIVATE	TRIB TO E BR PECATONICA RIVER
OHNSTAD, DAVE	SMALL	42.6418225	-90.1096605	PRIVATE	TRIB TO AMES BRANCH, PECATONI
RIECHERS, LEO H	SMALL	42.6549178	-90.3202256	PRIVATE	NO WATERWAY
RUEGSEGGER,RUSSELL	SMALL	42.6189666	-89.905344	PRIVATE	TR-PECATONICA RIVER
RUSSELL BROTHERS	SMALL	42.5142605	90.1898558	PRIVATE	U/N Trib. to West Fork River
SAALSAA, PAUL	SMALL	42.6636666	-89.9982204	PRIVATE	UNNAMED

[66] http://dnr.wi.gov/damsafety/search.aspx

Dam Official Name (Popular Name)	Size	Lat	Long	Owner Type	Waterway Name (Downstream City)
SCHUETZ, MRS JOHN	SMALL	42.7332807	-90.1006725	PRIVATE	WILLOW CREEK
STEINHOFF,LEONARD	SMALL	42.7670202	-90.3021711	PRIVATE	TR-WHITESIDE BRANCH
STOCKER,ART	SMALL	42.5788982	-90.2959173	PRIVATE	TR-SCHULLSBURG BRANCH
STONE, JERRY	SMALL	42.7986907	-90.0967411	PRIVATE	TR-OTTER CREEK
WAITE,GILBERT	SMALL	42.7824033	-90.345378	PRIVATE	UNNAMED
WILLIAMS, ALVIN	SMALL	42.6203097	-90.0615642	PRIVATE	TR-PECATONICA RIVER
WONG, LILLIAN	SMALL	42.7769161	-89.8644918	PRIVATE	UNNAMED
WRIGHT-PALZKILL	SMALL	42.8032763	-90.2892472	PRIVATE	TR PECATONICA
YELLOWSTONE	LARGE	42.7572054	-89.9575271	DNR	YELLOWSTONE

Most of these dams are small, private, mill-type dams and are under the jurisdiction of the DNR. The dams in Lafayette County are considered low-hazard but most could not 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 Lafayette County.

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 streambank 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 Lafayette County, there is concern about ensuring the stabilization of the shorelines.

Watersheds

Lafayette County has eleven watersheds. They are:

- Little Platte River Watershed
- Galena River Watershed
- Upper West Branch Pecatonica River Watershed
- Mineral Point and Sudan Branches Watershed

- Middle Pecatonica River Watershed
- Lower Pecatonica River Watershed
- Yellowstone River Watershed
- Upper East Branch Pecatonica River Watershed
- Lower East Branch Pecatonica River Watershed
- Gordon Creek Watershed
- Jordan and Skinner Creeks Watershed

The maps in Attachment A show the watershed boundaries and 100-year flood plains for the entire county. The roads and structures (e.g., houses, businesses, barns, garages) located in the 100-year flood plain are at risk and could be damaged during periods of severe floods. Following is a brief description of each watershed:

Little Platte River Watershed

The Little Platte River watershed lies in eastern Grant County, northwestern Lafayette County, and southwestern Iowa County. Approximately 75 percent of the surface area in the watershed is either cropland or pasture. There are about 17 abandoned mines and about the same number of known mine waste piles in the watershed. What effect, if any, these mines and wastes piles have on water quality, habitat, or fisheries is unknown. The river and tributaries in the watershed are the Little Platte River, Blockhouse Creek, Mounds Branch, Rountree Branch, and Snowden Branch.[67]

The only village located in the Lafayette County portion of this watershed is Belmont. The roads located in this watershed are CTH B and CTH B.

[67] http://dnr.wi.gov/water/watershedsearch.aspx

Galena River Watershed

The Galena River Watershed lies in southwestern Lafayette County and southern Grant County. It is a large watershed of about 242 square miles. Of the 260 miles of streams in the watershed, 115 stream miles are classified as warm water sport fishery. Thirty-five miles of the Galena River are considered Exceptional Resource Waters (ERW) under state administrative rules. The existing biological uses of about 120 miles of smaller streams in the watershed have not been formally determined.

There are four incorporated communities in the watershed with permitted wastewater discharges to surface water. They are Cuba City (2,043), Benton (903), Hazel Green (1,207) and Shullsburg (1,268). Each community's wastewater treatment plant is in good operating condition and Benton's plant was newly constructed in 1998.[68]

The highways in this watershed are STH 11, STH 81 and STH 128. The county roads are CTH X, CTH H, CTH Q, CTH J, CTH I, CTH W, CTH O, CTH A, CTH U, CTH P, and CTH PP .

Upper West Branch Pecatonica River Watershed

The Upper West Branch Pecatonica River watershed is in southwestern Iowa and northwestern Lafayette counties. The principle land use in the watershed is agriculture, dominated by row crop cultivation.

There are no towns in the Lafayette County portion of this watershed. The highways located in this watershed include USH 151 and CTH O.

Mineral Point and Sudan Branches Watershed

The Mineral Point and Sudan Branches watershed in southwest Iowa County and a very small part of northwest Lafayette County is dominated by agricultural land uses. Mineral Point, Linden and Bloomfield Manor discharge to surface water in the watershed. Historically, mining was a major industry in the Mineral Point area. Mine waste piles, called roaster piles, remaining from the lead, zinc and copper mining have degraded water quality.

[68] Wisconsin Department of Natural Resources PUB-WT-660 2001 May, 2001

CTH O runs through the Lafayette County portion of this watershed and no villages are located in the Lafayette County portion of this watershed.

Middle Pecatonica River Watershed

The Middle Pecatonica River watershed in central Lafayette County is dominated by agricultural land uses. Two municipal permittees discharge to surface water in the watershed: Belmont and Darlington. Little is known about water quality or in-stream habitat of streams in this watershed. The slender madtom, an endangered fish species in Wisconsin, has been found in four streams in the watershed: Bonner Branch, Cottage Inn Branch, Otter Branch and Wood Branch.[69]

The cities located in this watershed include Darlington and Belmont. The highways in this watershed are USH 151, STH 11, STH 23 and STH 81. The county roads are CTH G, CTH C, CTH O, CTH Z, CTH U, CTH K, CTH S, CTH M, CTH F and CTH E.

Lower Pecatonica River Watershed

The Lower Pecatonica River watershed is in southeastern Lafayette County. It is an agricultural watershed. As with many other watersheds in the basin, the DNR lacks water quality data about its streams. Some high-quality wetlands exist along the Pecatonica River, including oxbow lake, shallow water marsh, lowland forest and southern sedge meadow wetland complexes. Wetlands along streams in this watershed should be protected because there are few acres of wetlands in this region.

The villages located in this watershed include Gratiot and South Wayne. The highways in this watershed are STH 11, STH 23, STH 78, STH 81 and STH 176. The county roads are CTH N, CTH B, CTH D, CTH M, CTH K, CTH P, CTH KK and CTH DD.

Yellowstone River Watershed

The Yellowstone River watershed is in northeastern Lafayette County and southern Iowa County. The watershed's land use is dominated by agricultural. A significant portion of publicly owned

[69] Fago, 1982

land exists in the watershed: about 800 acres in Yellowstone Lake State Park and 4,000 acres in the Yellowstone Wildlife Area.[70] The addition of 2,200 acres to the wildlife area and its management for wildlife have probably reduced the impacts of polluted runoff on Steiner Branch, Yellowstone River and Yellowstone Lake.

There are no cities located in the Lafayette County portion of this watershed. The county roads are CTH S, CTH F, CTH N and CTH G.

Upper East Branch Pecatonica River Watershed

The Upper East Branch Pecatonica River watershed lies in eastern Iowa County and a very small portion of western Dane County and northeastern Lafayette County. The dominant land use is agricultural.

There are no cities or roadways located in the small portion of the Upper East Branch Pecatonica River Watershed that lies in Lafayette County.

Lower East Branch Pecatonica River Watershed

The Lower East Branch Pecatonica River watershed, in the western part of Green County and northeastern Lafayette County, is a priority watershed project under the Wisconsin Nonpoint Source Water Pollution Abatement Program. A number of smaller trout streams in the watershed[71] are affected by polluted runoff. Two permitted facilities discharge to surface water in the watershed: the Villages of Argyle and Blanchardville.

The villages located in this watershed include Blanchardville and Argyle. The highways in this watershed are STH 78 and STH 81. The county roads are CTH A, CTH C, CTH M, CTH N and CTH Y.

Gordon Creek Watershed

The Gordon Creek Watershed, in southwestern Dane, northwestern Green, southeastern Iowa, and the northeastern tip of Lafayette counties, is an agricultural watershed in the driftless part of the state, with no incorporated areas in it. Polluted runoff problems

[70] Howard, 1994
[71] WDNR, 1980

exist in the watershed, but the extent of the problem has not been fully evaluated.

A small portion of Blanchardville is located in this watershed. STH 78 runs through the Lafayette County portion of this watershed.

Jordon and Skinner Creeks Watershed

The Jordan and Skinner Creeks watershed is located in southwest Green County and the southeast tip of Lafayette County. Agriculture is the dominant land use in the Jordan and Skinner Creeks watershed.

There are no cities or villages located in the Lafayette County portion of this watershed. STH 176 and CTH B run through the Lafayette County portion of this watershed.

Floodplain Regulations

Floodplain regulations have been in place in the cities, towns and villages of Lafayette 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, Lafayette 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.

Lafayette County does have a history of flooding problems. Since 1969, Lafayette County has been included in the following Presidential Disaster Declaration requests for flooding:

- FEMA 264-DR-WI: On July 11, 1969, the President declared a major disaster as a result of severe storms and flooding. Lafayette County was eligible for both Public and Individual Assistance as well as Hazard Mitigation.

- FEMA 496-DR-WI: On March 23, 1976, the President declared a major disaster as a result of severe storms, icing, wind and flooding. Lafayette County was eligible for both Public and Individual Assistance as well as Hazard Mitigation.

- FEMA 559-DR-WI: On July 7, 1978, the President declared a major disaster as a result of severe storms, hail, flooding and tornadoes. Lafayette County was eligible for both Public and Individual Assistance as well as Hazard Mitigation.

- FEMA 874-DR-WI: On July 13, 1990, the President declared a major disaster as a result of severe storms, tornadoes and flooding. Lafayette County was eligible for both Public and Individual Assistance as well as Hazard Mitigation.

- FEMA 994-DR-WI: On July 2, 1993, the President declared a major disaster as a result of severe storms, tornadoes and flooding. Lafayette County was eligible for both Public and Individual Assistance as well as Hazard Mitigation.

- FEMA-1332-DR-WI: On June 24, 2000, the President declared a major disaster as a result of severe storms, tornadoes and flooding that began on May 26. Lafayette

County was eligible for both Public and Individual Assistance as well as Hazard Mitigation.

- FEMA-1526-DR-WI: On June 18, 2004, the President declared a major disaster as a result of severe storms and flooding that began on May 19. Lafayette County was eligible for Individual Assistance as well as Hazard Mitigation.

- FEMA 1768-DR-WI: On June 14, 2008, the President declared a major disaster as a result of severe storms, tornadoes and flooding. Lafayette County was eligible for Public Assistance as well as Hazard Mitigation.

Tables showing the flood events, including flash flooding, recorded by the National Weather Service for Lafayette County between 1 January 1996 and 31 August 2016[72] can be found in Appendix B.

The following list summarizes damages attributed to flooding in Lafayette County by the National Flood Insurance Program through 31 December 2012:[73]

Lafayette County NFIP Loss Claims				
Jurisdiction	**Total Loss**	**Closed Loss**	**Closed Without Payment**	**Total Payments**
Village of Belmont	1	1	0	$3,323.03
City of Darlington	56	46	10	$505,922.36
Lafayette County	4	4	0	$22,796.91

Following is a list of repetitive loss properties attributed to flooding in Lafayette County by the National Flood Insurance Program (NFIP):

[72] http://www.ncdc.noaa.gov/stormevents/
[73] http://bsa.nfipstat.fema.gov/reports/1040.htm

Darlington

- River Street
- Wells Street
- E. Alice Street
- Washington Street
- Main Street – 7 properties

Cuba City

- County Road H

A careful review of the geography and history of flooding in Lafayette County leads to a belief that there is a high probability of flooding in the future and a high probability of damage and losses due to flooding.

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 driers.) 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.

Hazard Mitigation Strategies

Lafayette 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[74], the following communities participate in the program.

- Lafayette County
- Cities of Darlington and Shullsburg
- Villages of Argyle, Belmont, Benton, Blanchardville, Gratiot, and South Wayne

There are no areas in Lafayette County which have had special flood areas identified by FEMA but are not in the NFIP program. One hazard mitigation strategy selected is to inform the public about the availability of flood insurance; this task will be carried out by the County Emergency Management Office.

The plan is intended to identify areas that are particularly susceptible to flooding, assess the risks, analyze the potential for mitigation and recommend mitigation strategies where appropriate. The goals of this plan are:

- Goal 1: To reduce, in a cost effective manner, the loss of lives and property due to these events. Another part of this goal is to promote safety and health in areas that have been or are prone to be flooded.

[74] https://www.fema.gov/national-flood-insurance-program-community-status-book

- Goal 2: To preserve and enhance the quality of life throughout Lafayette County by identifying potential property damage risks and recommending appropriate mitigation strategies to minimize potential property damage during/due to flooding.

- Goal 3: To promote countywide planning that avoids transferring the risk from one community to an adjacent community.

- Goal 4: To ensure that all communities in Lafayette County participate in the NFIP so that all county residents have access to affordable flood insurance coverage.

- Goal 5: To identify potential funding sources for mitigation projects and form the basis for project grant applications through FEMA's Pre-Disaster Mitigation (PDM) and/or Flood Mitigation Assistance (FMA) programs.

Short term actions that can lessen the effects of flooding include:

- Issuance of early warnings through flood advisory bulletins,

- Dissemination of instructions to the public through the media.

- Preparation of congregate care facilities.

- Evacuation of people and property.

Temporary protective measures such as sandbagging, protection of buildings and other structures and cut-off of gas and electricity may also be implemented. Presently, Lafayette County maintains a limited stock of sandbags to assist with flood containment.

Emergency Management Department will be placing a link on the website for flood preparedness material and monitoring. In addition, via a link on the website, information will be provided to citizens about the purchase of flood insurance.

The Main Street bridge (State Highways 23 and 81) in the City of Darlington typically shuts down when there is 15 feet of water due to a storm sewer back-up. Finding a solution would mean being able to keep the bridge and highway open more consistently. The addition of shut-off valves and some bridge reengineering are planned possible solutions.

This ¼ mile stretch of County H in Blanchardville is generally one of the first to flood in the area. Flooding goes into the park and has the potential to shut down STH 78. There is a dyke on the upstream side of Blanchardville. The pool has flooded once before and it cost $20K to clean and disinfect. Possible solutions include:

- Road elevation - McKellor Park
- McKellor Pool - Cement wall around pool with a stainless steel door

Cheese Country Recreational Trail includes isolated spots that tend to flood. The trail is 47 miles long and brings many people into the county. It is owned by the Pecatonica Rail Transit Commission which includes representation from Rock, Iowa, Lafayette and Green Counties. FEMA has previously paid to have the trail repaired back to the previous condition but parts continue to flood over. The county has also spent $500-600K in repairs. Possible solutions include capping the existing grade (thin concrete with stone) so water can flow over. There was a LIDAR flight in 2012 (of the whole county – two foot contours). Six inch orthophotos were taken.

For the Pecatonica River at Calamine, the Lafayette County Emergency Management Department is exploring the feasibility of purchasing and installing flood gauges. Currently, the Sheriff's Department manually records the height, difference and time for the dam area.

Also, the Pecatonica River must be kept free of debris. The county has previously received funding from FEMA to clean out the river during the winter, although the work was not completely funded. The county receives $1,700 each year from the Fish and Game Habitat Program to cut the log jam; the county has a $1,700 match required by this grant.

In addition, relocation of the county fairgrounds is under consideration by the Lafayette County Board. The grounds are located next to the Pecatonica River; some work filling in has been done in the past but due to DNR restrictions the county has been unable to raise certain parts of the grounds. The fair has been flooded out before, requiring a change in location of events. Flooding to the fairgrounds would have a huge economic impact and FEMA's PDM and FMA grants are potential funding sources for a buyout to this end.

The current emphasis in flood mitigation is on long-range actions. Such actions include the adoption of proper flood plain zoning ordinances and land use planning as well as continuing to increase the county's GIS mapping capabilities. There are several communities within the county that are engaging in a comprehensive planning process. The county should become involved with these communities and their processes to ensure data sharing and consistency between the communities. The Zoning Department will lead this effort and may apply for a comprehensive planning grant to assist with the additional costs.

There is a need for review and updating of some flood-related data, information and projects in the county including plans, training, exercising and public information.

It has been shown that flood plain management reduces the cost of damages attributed to flooding. The Lafayette County Zoning Department enforces county zoning ordinances related to flood plains.

The Lafayette County Highway Department plans to work with the municipal public works departments to pre-identify areas, particularly roads, shoulders, culverts, etc. that are prone to damage due to flooding events. These areas of concern will be evaluated and mitigation strategies and potential funding sources will be identified. If any project appears as if it might pass the criteria for application, grant funding will be requested. The others will be considered for improvements during the regular budget cycle as the community can afford it.

Lafayette County has a history of expensive damages to buildings and infrastructure due to floods. In addition to the strategies listed above that deal with public information and planning, the community can make current and future buildings and infrastructure more disaster-resistant by:

- Using its maps and hydrology studies to ensure that properties at risk are identified and, as available, appropriate grants are sought and secured to mitigate losses. Good data also ensures that decision-makers can create and enforce appropriate zoning and/or building regulations to make any new structures disaster-resistant.

- Target old structures for buy-out and convert the land to open, public lands. This also eliminates future damages by preventing building on this land.

- Pre-identifying infrastructure (roads, bridges, culverts, shoulders) prone to flooding and directing current and future budgetary dollars to making the infrastructure disaster-resistant as it is scheduled for routine maintenance.

- Completing amendments/revisions to the Flood Rate Insurance Maps (FIRMs) as necessary.

- Continuing to work with and support the Wisconsin Department of Natural Resources (DNR) as they provide education to the municipalities regarding restrictions on development/road work in floodplains.

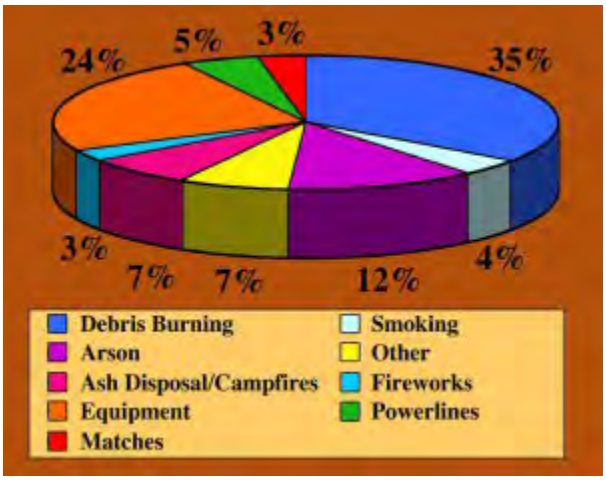
Wildfires

The wildfire season in Lafayette 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

According to the DNR, there are approximately 1,500 fires annually that 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.[75]



Yellowstone Lake State Park and Belmont Mound State Park are the only natural areas in Lafayette County. Local fire departments are responsible for fire protection in these open acreage areas.

[75] http://dnr.wi.gov/org/land/forestry/fire/fire-ps.htm

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 for a wildfire fire in Lafayette County is low. The probability of damage from wildfire is also considered low. 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 each in crop and property damage.

Vulnerability

Wildfires can impact the ecology of the open lands. Lafayette County, which has only two natural park areas, would not be greatly impacted by a wildfire although 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 MCDs 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 in 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.[76]

As can be seen on the map in Appendix A there are no communities in Lafayette County that were identified as Communities at Risk – High, Communities at Risk – Very High or Community-of-Concern.

Hazard Mitigation Strategies

Government at all levels is developing mitigation programs in fire control and fire-fighting tactics with the goal of protecting lives and property from loss due to wildfire. Local fire departments attend regular trainings on fire-fighting tactics to keep their skills honed. The County Emergency Management Office assists local departments and their staff with available grant applications for training, exercising, equipment and planning as able and requested.

The emergency management office also partners with the local fire departments to provide information about fire safety and other

[76] Wisconsin State Hazard Mitigation Plan

mitigation strategies (e.g., burn bans during droughts, benefits of prescribed burns, protecting structures from wildfires), especially during Fire Safety Week in October of each year.

The Wisconsin Department of Natural Resources (DNR) does not have a forestry office in Lafayette County and also does not pre-stage resources (e.g., rangers, equipment, supplies) there. If there was a large wildfire for which local firefighters would request state assistance, the DNR may be able to provide limited assistance based upon their deployment level at that time.

The hazard mitigation strategies listed above primarily involve providing information on general fire safety measures to the public for residential and commercial structures and providing ongoing training to the firefighters who fight these types of fires. These measures provide basic fire safety information but, since Lafayette County has few forested areas (primarily parks and other non-inhabited recreational areas) and most open areas are utilized for agriculture with no buildings or infrastructure on them, there is no need to have measures designed to reduce damages to existing or future buildings and infrastructure.

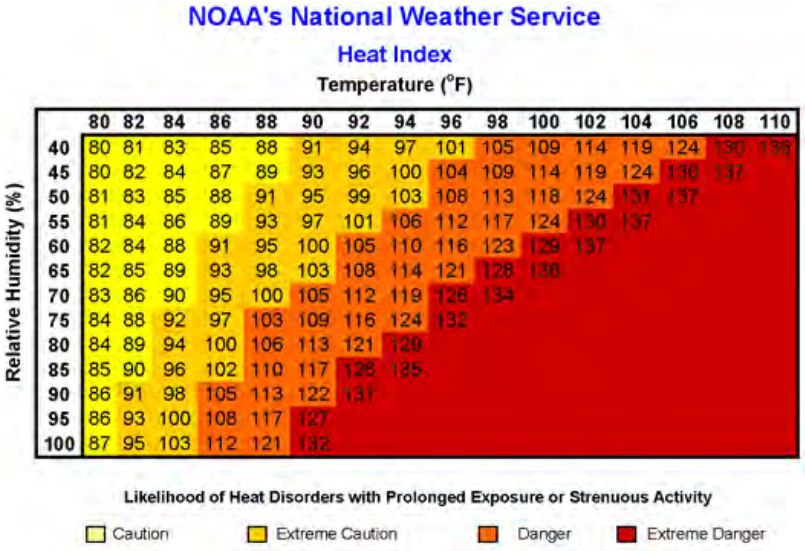
Severe Temperatures

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: [77]

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 exhaustion likely; heat stroke possible with prolonged exposure and physical activity.	105-130

[77] FEMA, 1997; NWS, 1997

Heat Index and Disorders Table			
Danger Category		**Heat Disorders**	**Apparent Temperatures [°F]**
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

FEMA, 1997; NWS, 1997

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.

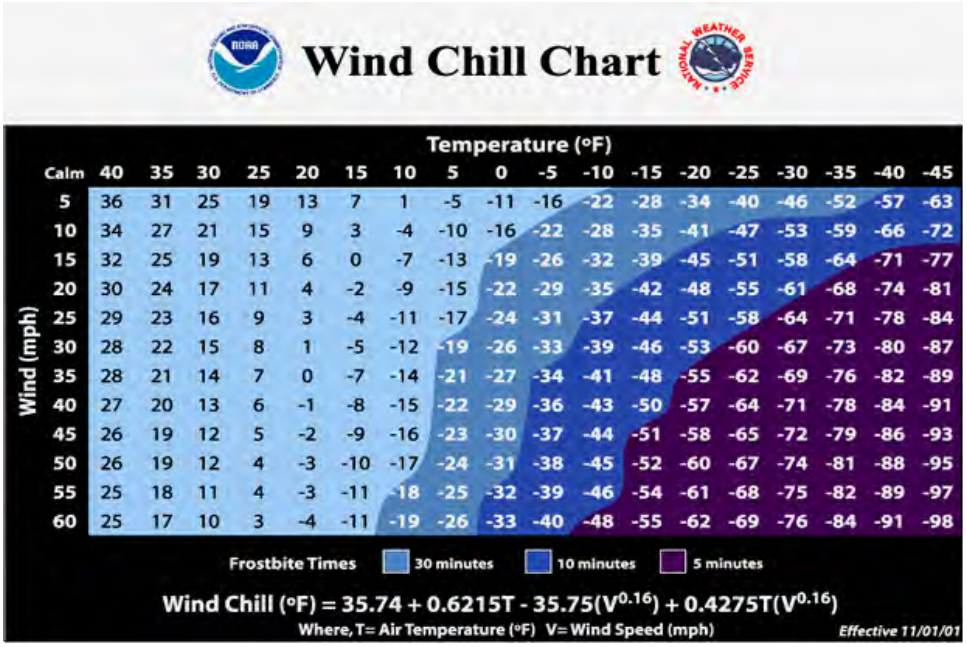
- Heat Cramps – muscular cramping brought on by exercising in warmer weather than one is accustomed to, no lasting effect.

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.[78]

[78] National Weather Service: http://www.nws.noaa.gov/om/windchill/index.shtml



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°F 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. A table showing the excessive heat events recorded by the National Weather Service in Lafayette County between 1 January 1996 and 31 August 2016 can be found in Appendix B.[79]

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, Lafayette 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 air conditioning).

Frequency of Occurrence: Cold

Wisconsin regularly has extreme cold temperatures as part of its winter climate. A table showing the severe cold events, including wind chills, which have been recorded by the National Weather Service in Lafayette County between 1 January 1996 and 31 August 2016 can be found in Appendix B.[80]

As can be seen in the table of cold and extreme cold temperature events, there are few years where a cold event does not occur in Lafayette County and extreme cold happens once or twice, on

[79] http://www.ncdc.noaa.gov/stormevents/
[80] http://www.ncdc.noaa.gov/stormevents/

average, per decade. After examining this data, the workgroup believed that cold and/or extreme cold has a medium likelihood of occurrence in any given year. Since there are no crops out during the winter and most properties (homes, businesses, barns) are insulated for this climate, the loss of property due to temperature extremes is not high although individuals may suffer damage due to water main breaks and other such problems. They further believed that the loss of life or injury to people has a medium likelihood of occurrence among the general population when there are cold/extreme cold weather events. Again, 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.

Temperature extremes, both cold and hot, have a medium likelihood of occurrence in any given year. The loss of property due to temperature extremes is not likely but loss of life or injury to people has a medium likelihood of occurrence.

Vulnerability

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 Lafayette County social services agencies are aware of many of these people who reside in its 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.

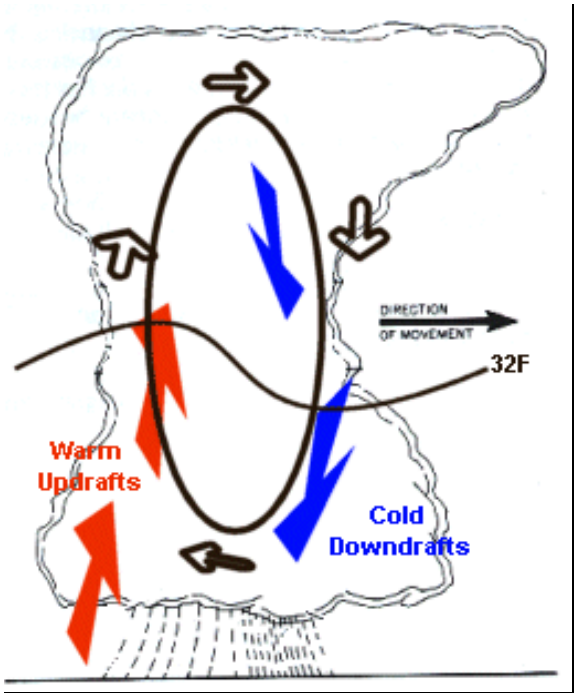
Hazard Mitigation Strategies

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 Lafayette County Emergency Management Office participates in the statewide public information campaigns for Winter and Heat Awareness Weeks each year and will provide links to personal preparedness information on its website.

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: [81]



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

[81] 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 [82]	
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. According to the Wisconsin State Hazard Mitigation Plan, from 1982 – 2007, Lafayette County reported 43 hail events but fortunately none have led to loss of life or injury. Lafayette County, as can be seen in the map in Appendix A, has an above average probability of hail occurrence in Wisconsin. As a result, the likelihood of damage due to hail is considered moderate.

[82] NWS, January 10, 2003

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 Lafayette County between 1 January 1996 and 31 August 2016 can be found in Appendix B.[83]

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, with Lafayette County having a hailstorm usually at least once per year. With that understanding, it was decided that the probability of hail is high.

Vulnerability

NWS loss tables show that property damage has ranged from $0 to $6,920,000 (2009). 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.

[83] http://www.ncdc.noaa.gov/stormevents/

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.

The County Extension Agent distributes information on various hail insurance options. In the event of major damage, a team composed of county and federal agricultural agency representatives and the county emergency management director have primary responsibility for assessing and documenting hail damage.

The Lafayette County Emergency Management Office provides hail information to the public as part of the spring severe weather awareness week. The office also provides information about hail in displays in the courthouse and on the website. Federal emergency assistance is available in the form of low-interest loans when a Presidential Disaster is declared or when the FmHA declares that a county is eligible for aid. Damage from hailstorms alone is generally not extensive enough to invoke a disaster declaration.

The hazard mitigation strategies listed above primarily involve providing information on safety measures and insurance to the public for agricultural concerns and residential and commercial structures. 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, although 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.[84]

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°F (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 do hurricanes or tornadoes.

[84] 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. Lafayette location within it. This was determined by recognizing that lightning usually happens in conjunction with thunderstorms, and that Wisconsin and Lafayette County generally have several severe thunderstorms per summer. The likelihood of damage due to lightning is considered medium for the more rural areas of the county and low for the more urban areas of the county.

A table showing the lightning events recorded by the National Weather Service (NWS) in Lafayette County between 1 January 1996 and 31 August 2016 can be found in Appendix B.[85] As can be seen, property damage from lightning events has ranged from nothing to $30,000 and there was no crop damage reported. 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.

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.

[85] http://www.ncdc.noaa.gov/stormevents/

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 assets 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 Lafayette County Emergency Management Office has awareness and educational materials that inform the public of safety procedures to follow during a lightning storm. Severe summer weather safety information is also emphasized during Tornado Awareness Week.

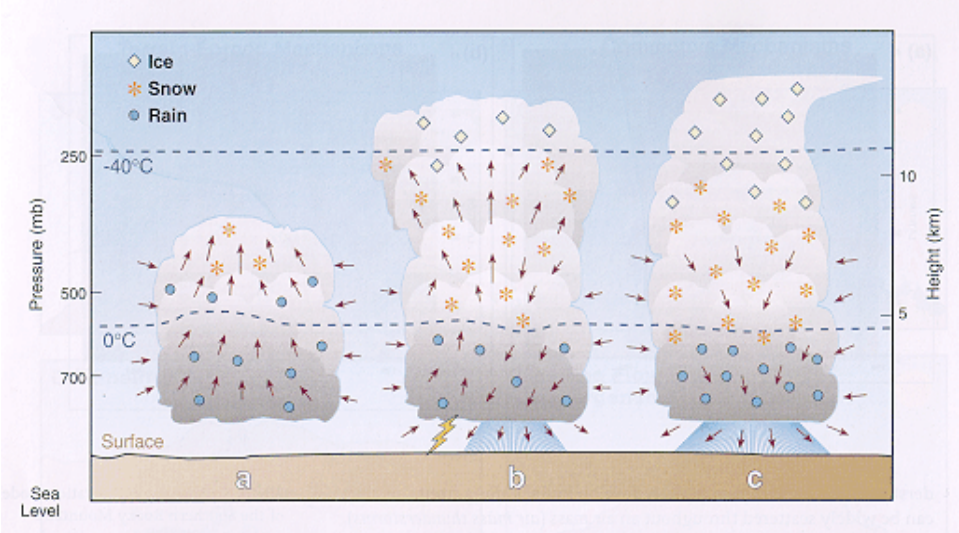
Storms: Thunderstorms

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

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. [86]



Physical Characteristics

A thunderstorm often is born, grows, reaches maturity and dies in a thirty-minute period. The individual thunderstorm cell often travels

[86] National Weather Service - Flagstaff

between thirty and fifty miles per hour. Strong frontal systems may 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 Lafayette County, average between 30 and 40 thunderstorm days per year although a portion of southwestern and south-central Wisconsin, which includes Lafayette County, average 40 to 50 thunderstorm days per year. In Lafayette 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 Lafayette County is high as these storms usually occur one or more times each year during the summer in Wisconsin and Lafayette County.

Damage from thunderstorms usually is a result of the hail, lightning, damaging 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. Although one can see from the historical data listed below, property and crop damage occurs frequently in thunderstorms and can range from $1,000 (1996) to $1.2 million (2011) per storm with combined property and crop damages in the $5,000 - $30,000 range being the most common.

A table showing the thunderstorms that have been recorded in Lafayette County by the National Weather Service between 1 January 1996 and 31 August 2016 can be found in Appendix B.[87]

[87] http://www.ncdc.noaa.gov/stormevents/

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. Lafayette County's thunderstorm vulnerabilities due to associated hail, lightning, winds and flood waters are discussed in the other hazard chapters of this plan.

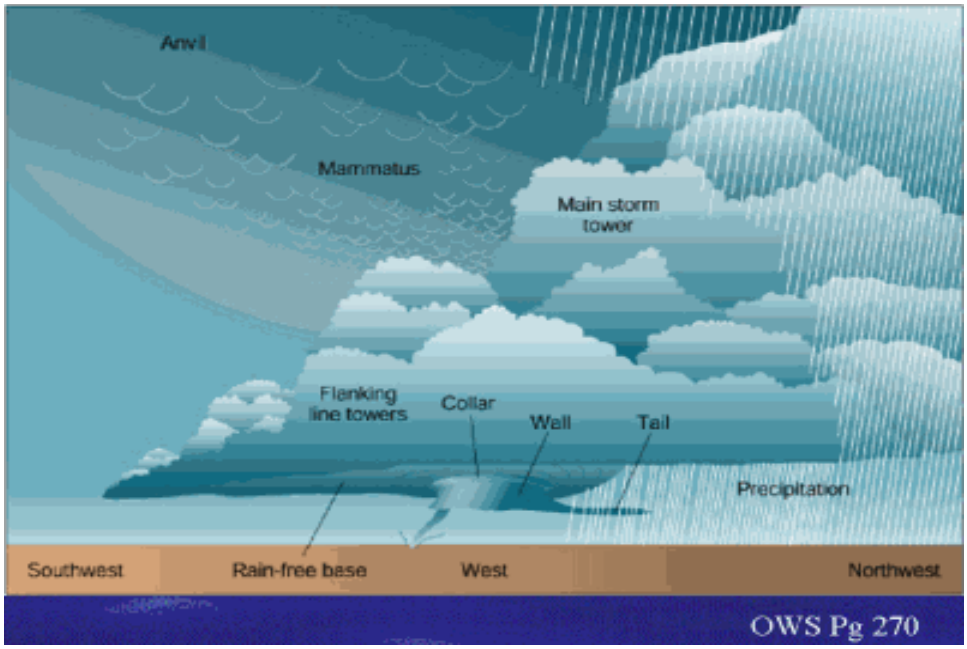
Hazard Mitigation Strategies

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 Lafayette County Emergency Management Office has developed severe weather safety information that it disseminates to the public with the goal of protecting the lives and property of citizens. During Tornado Awareness Week there is extensive media coverage of safety tips. Additionally, the department assists the National Weather Service (NWS) in conducting tornado spotter training programs and in organizing local tornado spotter networks.

The damage to buildings and infrastructure in a thunderstorm is from 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.

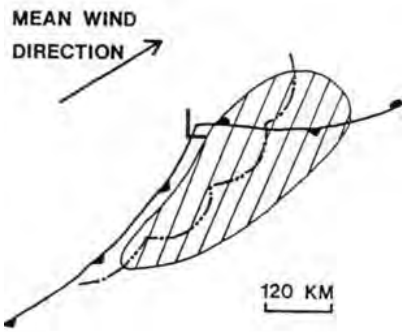


A derecho is a widespread, long-lived, violent, convectively-induced straight-line windstorm that is associated with a fast-moving band of severe thunderstorms usually taking the form of a bow echo. Derechos blow in the direction of movement of their associated storms; this is similar to a gust front 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.

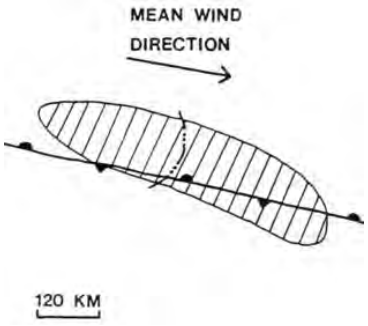
The traditional criteria that distinguish a derecho from a severe thunderstorm are *sustained* winds of 58 mph during the storm as opposed to gusts, high and/or rapidly increasing forward speed and geographic extent (typically 250 nautical miles in length). In addition, they have a distinctive appearance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

- 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.[88]



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 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.

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

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 [89]		
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

Downburst Characteristics

Downburst damage is often highly localized but resembles damage caused by a tornado. In some cases, even an experienced

[89] FEMA, 1997

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 4 July 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 to map 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, which includes Lafayette County, 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 tornadoes and high wind events which have been recorded by the National Weather Service in Lafayette County between 1 January 1996 and 31 August 2016 can be found in Appendix B.[90] The probability of Lafayette County being struck by a tornado in the future is high and the likelihood of damage from future tornadoes is also high. All parts of Lafayette County are equally susceptible to tornadoes.

[90] http://www.ncdc.noaa.gov/stormevents/

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; Lafayette County has several 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 none of the listed facilities below provides 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	
Park Name	**Location**
Sunset Terrace	Darlington, WI
Pine Ridge Mobile Home Park	Argyle, WI

Campgrounds	
Campground Name	**Location**
Lake Joy Campground	Belmont
McKellar Park	Blanchardville
Wolf Creek Campground	Gratiot
Pecatonica River Trails Campground	Darlington
Yellowstone Lake Campground	Rural Argyle

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; 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.

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. Lafayette County has a history of damage to buildings and infrastructure due to tornadoes and high winds. Some strategies below will deal with public information and alert and notification while others will enable the community to make current and future buildings and infrastructure more disaster-resistant by enacting more “bricks and mortar” solutions.

An effective warning system is the single most important resource for alerting the public to a tornado hazard, which is critical to the main goal of saving lives and reducing property losses. Forecasting of tornadoes is difficult, however, because of the suddenness of their onset, their relatively short duration, the extreme variability of a tornado striking area, limited knowledge of tornado dynamics and the limitations of the weather observation system.

Sirens are currently in the following locations:

- VI of Belmont (2)
- TN of Benton (2)
- TN of Argyle (1)
- VI of Blanchardville (1)
- VI of South Wayne (1)
- TN of Wiota (1)
- CI of Shullsburg (1)
- VI of Gratiot (1)
- CI of Darlington (3)
- TN of Woodford (1)

The sirens are owned, maintained and regularly tested by the municipalities in which they are located. Municipalities should regularly explore the need to upgrade early warning sirens as the need arises and/or as funding is available.

The Emergency Management Office promotes the use of NOAA weather radios for public alert and notification. The office also continues to evaluate various technologies to determine if they can be effectively integrated into the county's alert and notification systems.

During the past several years, there has been a statewide Tornado Awareness Week in late March or April. Media information packets are distributed to reemphasize and alert the public to tornado warning procedures. Lafayette County actively promotes tornado safety public information as well as other summer severe weather public awareness and educational efforts, including applicable links on the county website. Lafayette County also assists the National Weather Service with sponsoring tornado spotter training and in organizing local tornado spotter networks.

As part of the tornado preparedness program, the county plans to work with the municipalities to identify governmental and private buildings that can be used as tornado shelters. Most municipalities in Lafayette County have adopted the state's uniform building codes. Lafayette County would like to encourage the enforcement of these local building codes that improve a current or future structure's ability to withstand greater wind velocities. This should be facilitated by the fact that in late 2003, the Governor signed a law requiring municipalities to use a uniform building code inspector.

The county recognizes that mobile home parks and campgrounds are particularly vulnerable locations for people and property during a tornado. To help mitigate the danger, the county is considering projects that include:

- Providing information to builders and owners of manufactured and mobile homes regarding the use of tie-downs with ground anchors. These relatively inexpensive strategies reduce the damage to these homes in lower F-scale tornadoes.
- Identifying and constructing tornado shelters in mobile home parks and campgrounds as grant funding is available. The U. S. Department of Commerce Community Development Block Grants may be an avenue to achieve the necessary funding. If grant funding is not available, park owners will be encouraged to plan shelters on their properties. Locations for possible studies include Sunset Terrace and McKeller Park.

Finally, to help protect farm buildings from damage and to help prevent topsoil erosion due to high winds over open fields, the Land Conservation Department will continue to provide information about planting windbreaks upon owner request.

Storms: Winter

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

Picture of snow drifts after the "Groundhog Day Blizzard" in 2011.[91]

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.

[91] http://readywisconsin.wi.gov/news/Top%20Weather%20Events%20in%20Wisconsin%20for%202011.pdf

- 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.

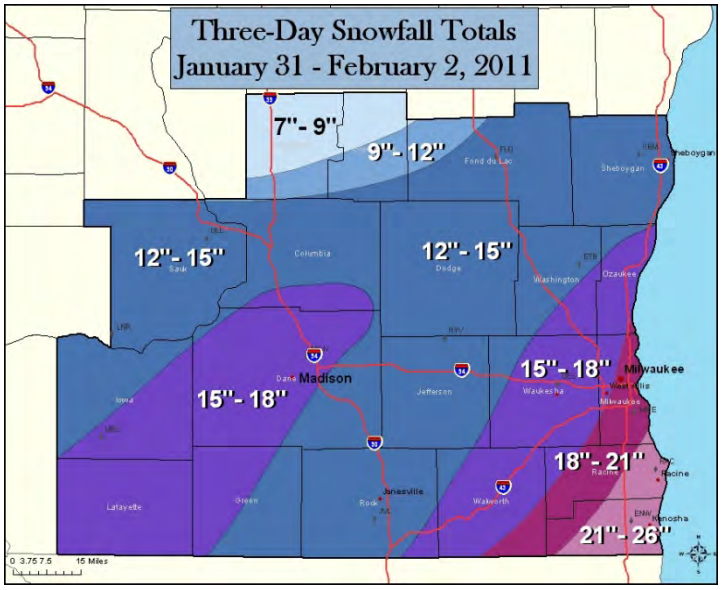
Damage from ice storms can occur when more than half of an inch of rain freezes on trees and utility wires, especially if the rain is accompanied by high winds. Another danger comes from accumulation of frozen rain pellets on the ground during a sleet storm, which can make driving hazardous.

Frequency of Occurrence

Annual snowfall in Wisconsin varies between thirty inches in southern counties to one hundred inches in the north. Lafayette County averages 30-40 inches of snowfall 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, 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. Lafayette County received from 15 up to 18 inches associated with this three-day storm. It should be noted that there were two additional large snow storms that occurred in late February and late March of 2011.[92]



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.

The probability that there will be severe winter storms in Lafayette County is medium and the likelihood that those storms will cause significant damage is also medium. Tables showing the winter storm events, including snow and ice events, which have been recorded by the National Weather Service in Lafayette County between 1 January 1996 and 31 August 2016 can be found in Appendix B.[93]

[92] http://readywisconsin.wi.gov/news/Top%20Weather%20Events%20in%20Wisconsin%20for%202011.pdf and http://www.crh.noaa.gov/mkx/?n=020211_blizzard

[93] http://www.ncdc.noaa.gov/stormevents/

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. Communities prepare for severe winter weather by ensuring that plowing and sanding equipment is operational and available to handle potential emergencies. Funding is budgeted for the overtime hours of extra personnel but in a large emergency this may not be adequate. Redundant communication modes (e.g., radio, telephone) exist between government, police, fire, EMS, hospitals and highway departments. The Lafayette County Emergency Operations Plan provides for coordination of public safety support agencies such as the American Red Cross and for resource acquisitions during winter emergencies.

Winter safety information is prepared and distributed to the media and the public by the Lafayette County Emergency Management Office during Winter Awareness Week in November. Preparedness information is also available from display racks in the courthouse and the website. During a storm, the public is advised to monitor local radio, television and NOAA weather alert radios for up-to-date forecasts.

The hazard mitigation strategies listed above primarily involve providing information on general safety measures to the public. These measures provide basic safety information but, since the response to winter storms is primarily a government and/or corporate function comprised of tasks such as clearing roads of

snow and ice and repairing downed utility lines, there are few measures that can be employed to reduce damages to existing or future buildings and infrastructure.

Utility Failure

A utility emergency is a disruption to the building services, usually defined as electrical power, water, natural gas and/or sewage, which 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.

Utility providers to Lafayette County include:

- Electricity: Dairyland Power Coop and WE energies
- Natural Gas: Alliant Energy
- Telephone: TDS Telecom
- Water/Sewer: Each municipality (i.e., city or village) has its own municipal provider. Approximately 90% of the county relies on individual wells and septic systems for service.

Thunderstorms with lightning are a possible cause 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.

The water and sewage systems are most often a function of a municipal system and are usually found in more urbanized areas. Rural water is often provided by individual wells found on each property and sewage is managed by a septic system, also found on each individual property. 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

Lafayette County has several 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 Lafayette County, brown-outs (i.e., times when, because of high power demand, areas are purposefully turned off of the power grid) are not a strategy used by the power companies that provide service.

In general, Lafayette County has a medium likelihood of utility failures with a low risk of damage, death, or injury due to a loss. 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 special 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 Lafayette County. People, especially special 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. 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, extreme temperatures reduce the production volume of and products such as milk may not be able to be properly stored. Modern farms also require on 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

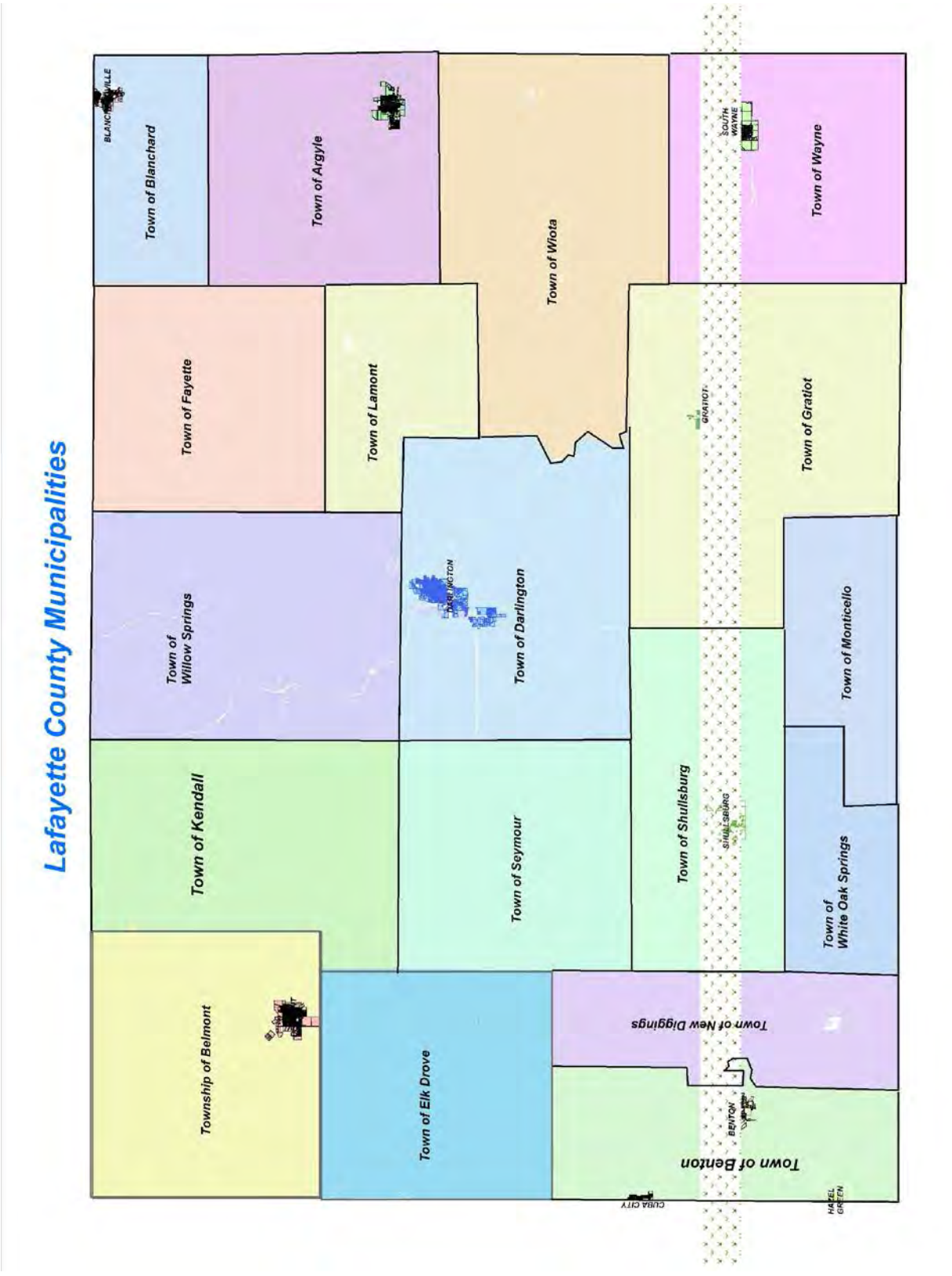
The goal of utility failure mitigation activities is to reduce, in a cost effective manner, the loss of lives and property due to these events. Lafayette County has worked directly with the utility companies and emergency management responders in formulating emergency management plans. During a fuel or power shortage, residents, schools, industry and businesses will be asked to take measures to conserve fuel. If the fuel shortage reaches a critical stage, all non-essential facilities will be closed down and contingency plans will be put into effect.

In the event of a prolonged power outage Lafayette County has generators available to provide power for radio communication and Emergency Operations Center (EOC) operation. However, the county will review power needs for emergency operations and provide generators/hook-ups as need for critical infrastructure. Locations of concern include the county/city EOC located at 627 Main Street in the City of Darlington; and the Blanchardville Village Hall, which has no generator (explore installation of a panel).

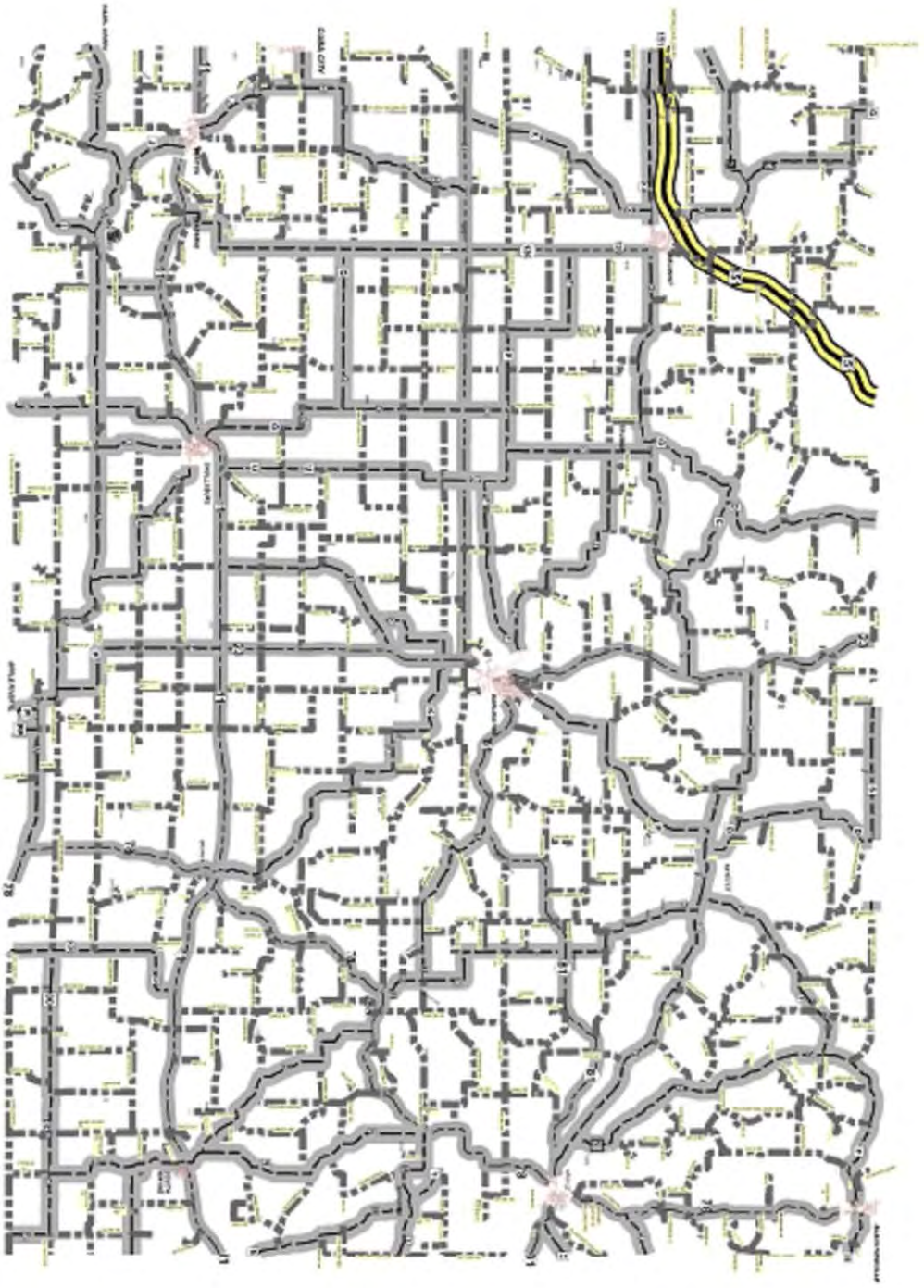
Evacuation and shelter arrangements have been prepared in case of a severe power outage. It should be noted that schools are often top choices as community disaster shelters but few of the county's schools have back-up generators.

Appendix A: Maps

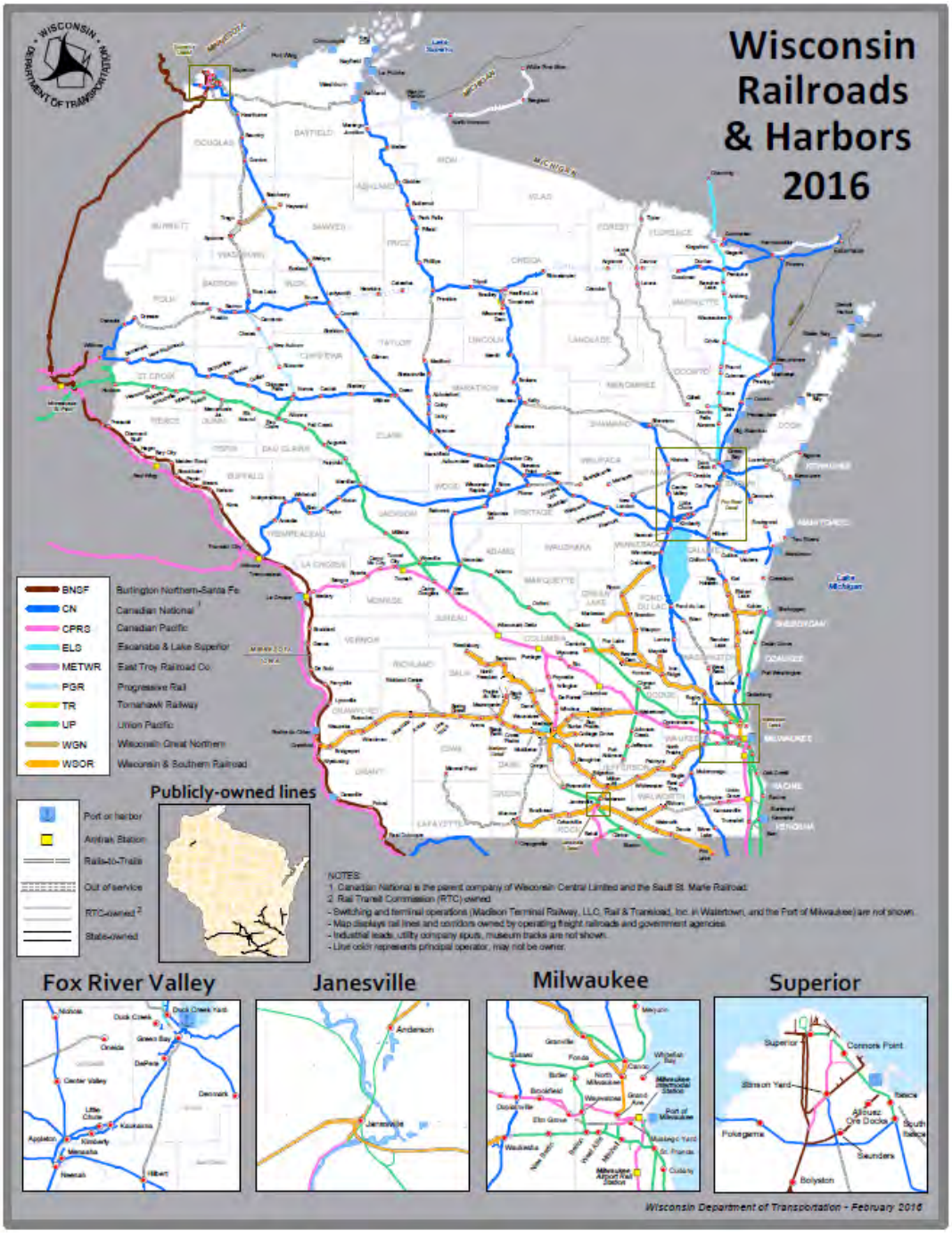
Map of County Municipal Divisions



Map of County Road Network

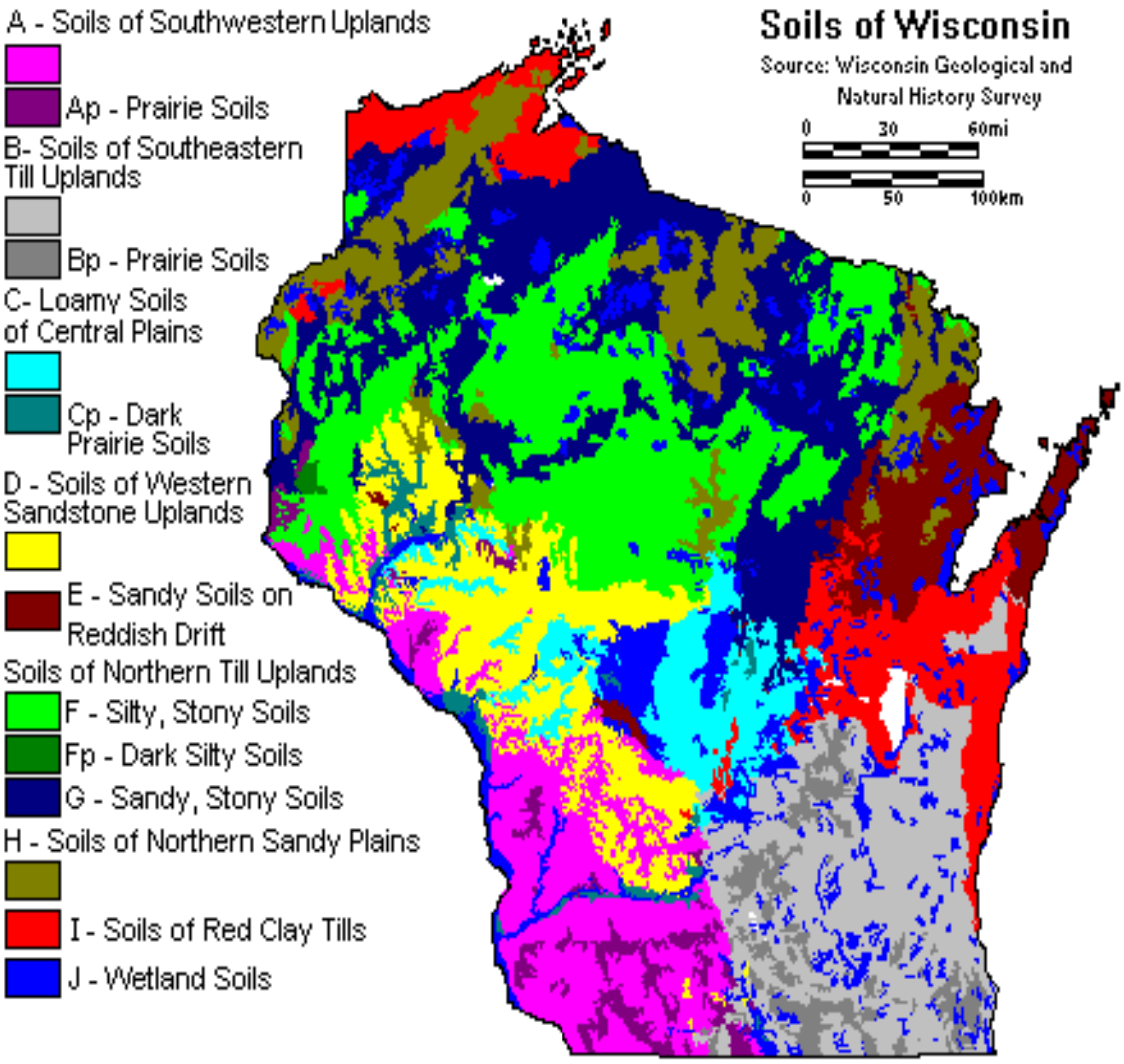


Wisconsin Railroads and Harbors[94]



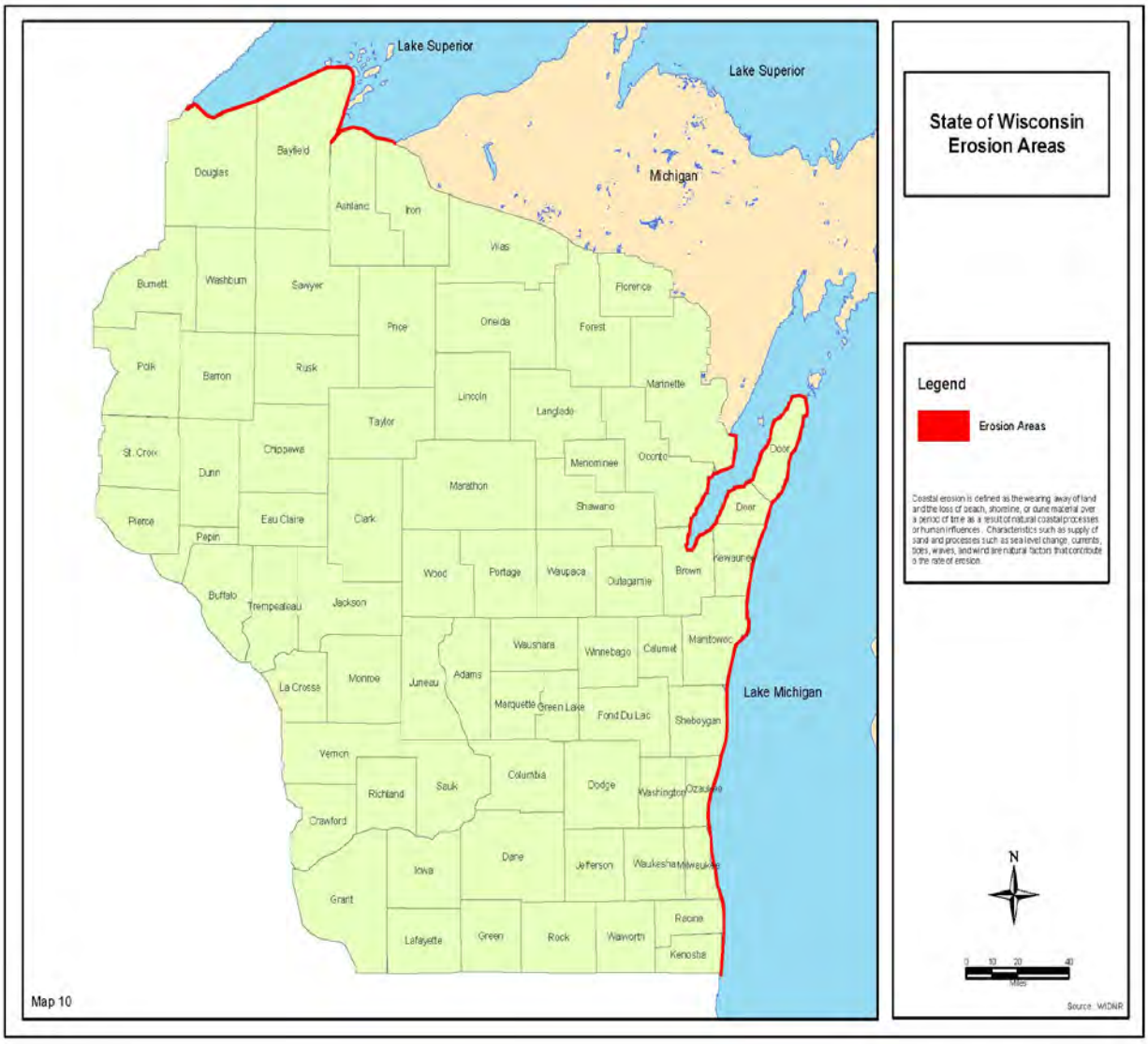
[94] http://wisconsindot.gov/Documents/travel/rail/railmap.pdf

Soils Types [95]



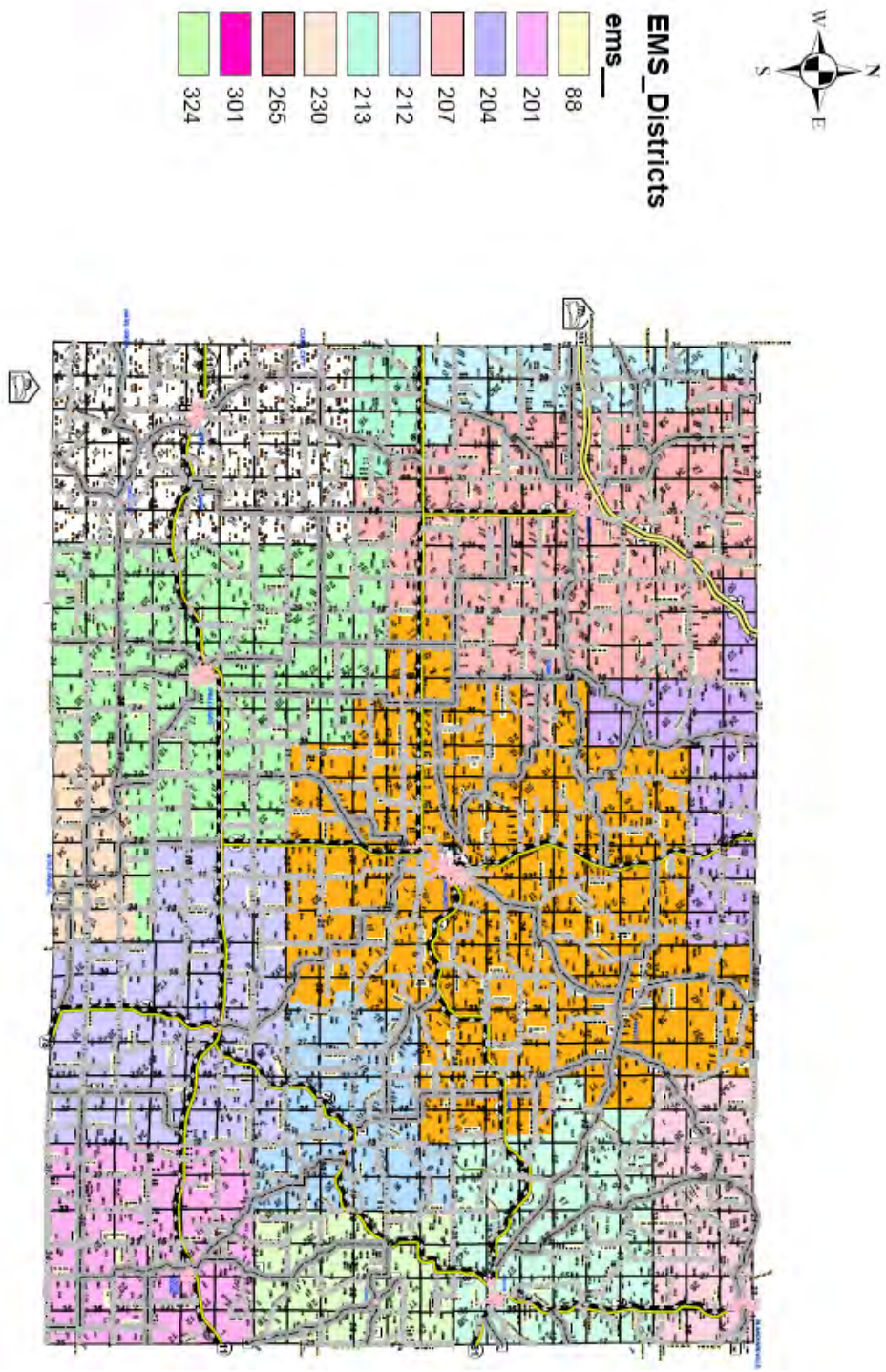
[95] *Soils of Wisconsin* compiled by F. D. Hole, 1973; Wisconsin Geological and Natural History Survey Map, scale (approx.) 1: 3,150,000.

Erosion Areas in Wisconsin[96]

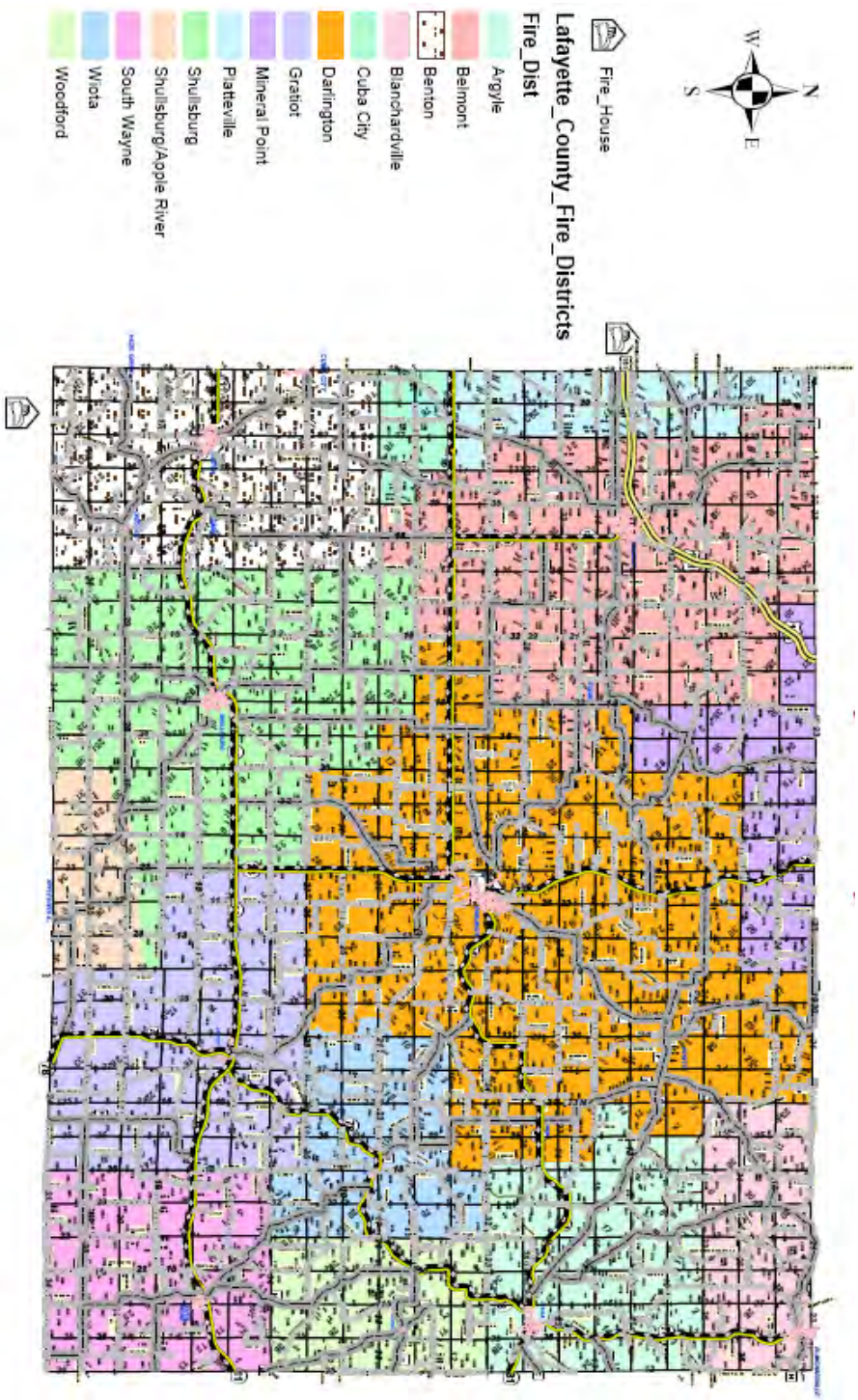


[96] Wisconsin State Hazard Mitigation Plan

County EMS Districts

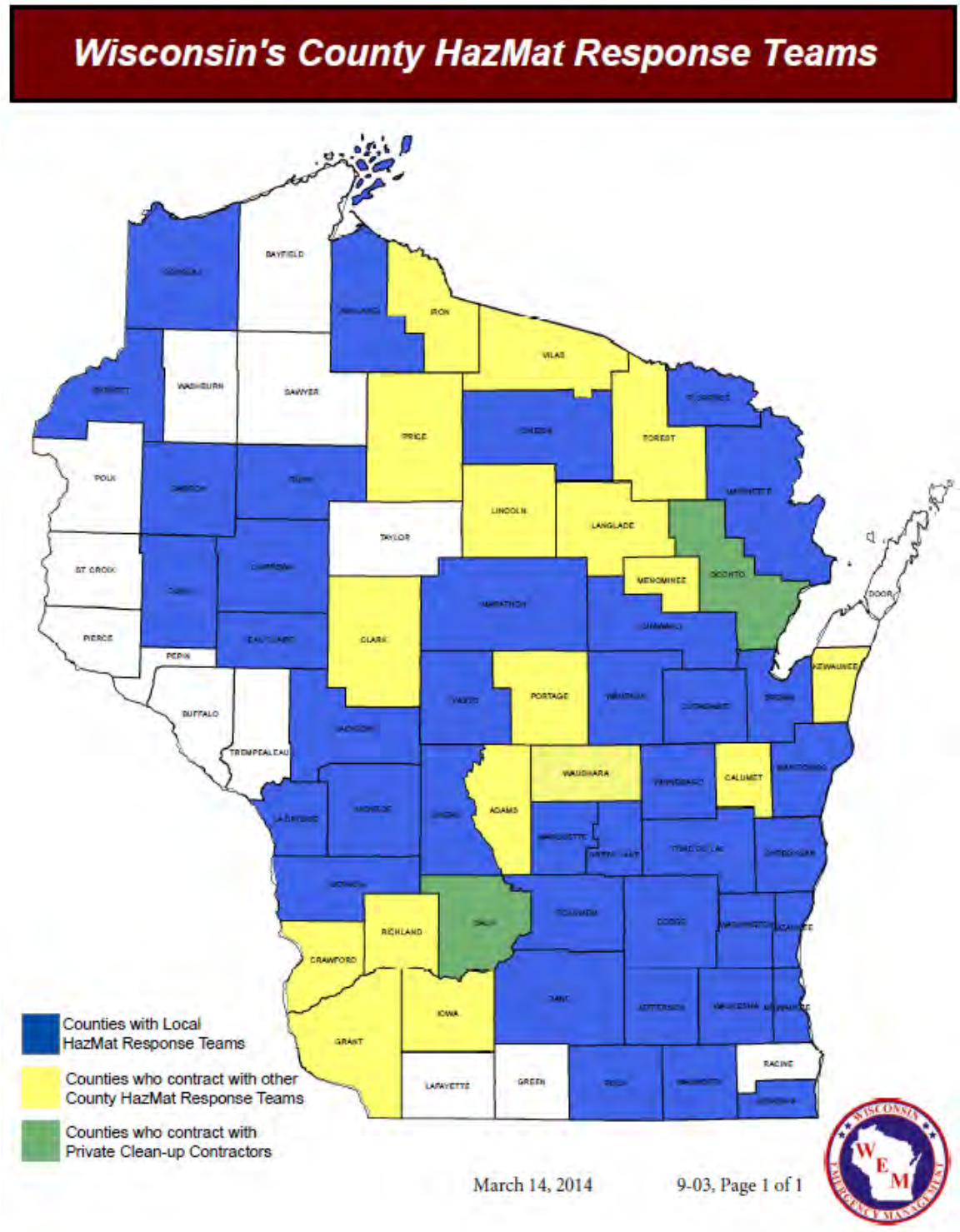


County Fire Districts

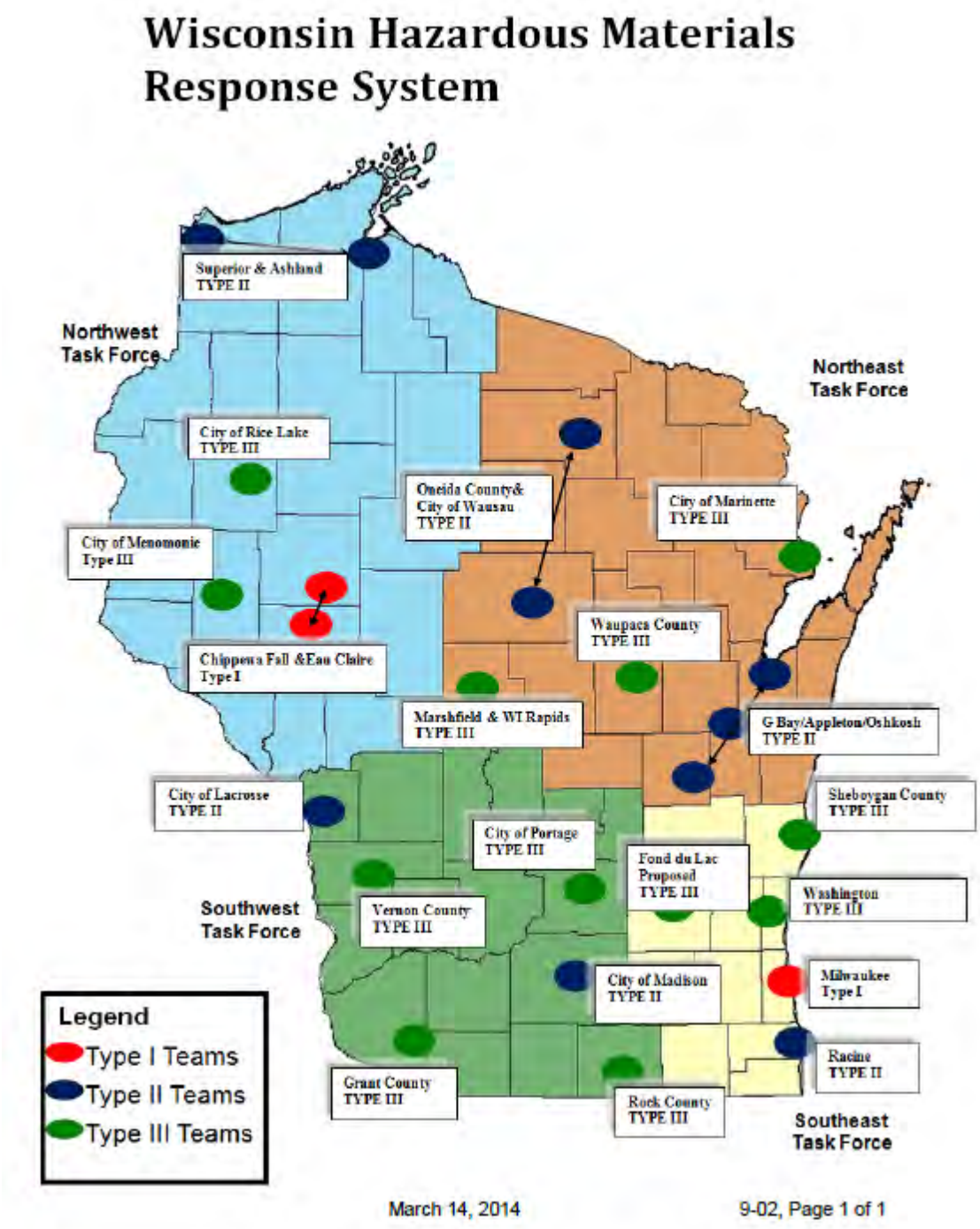


Appendix A: Maps

County HazMat Teams Map

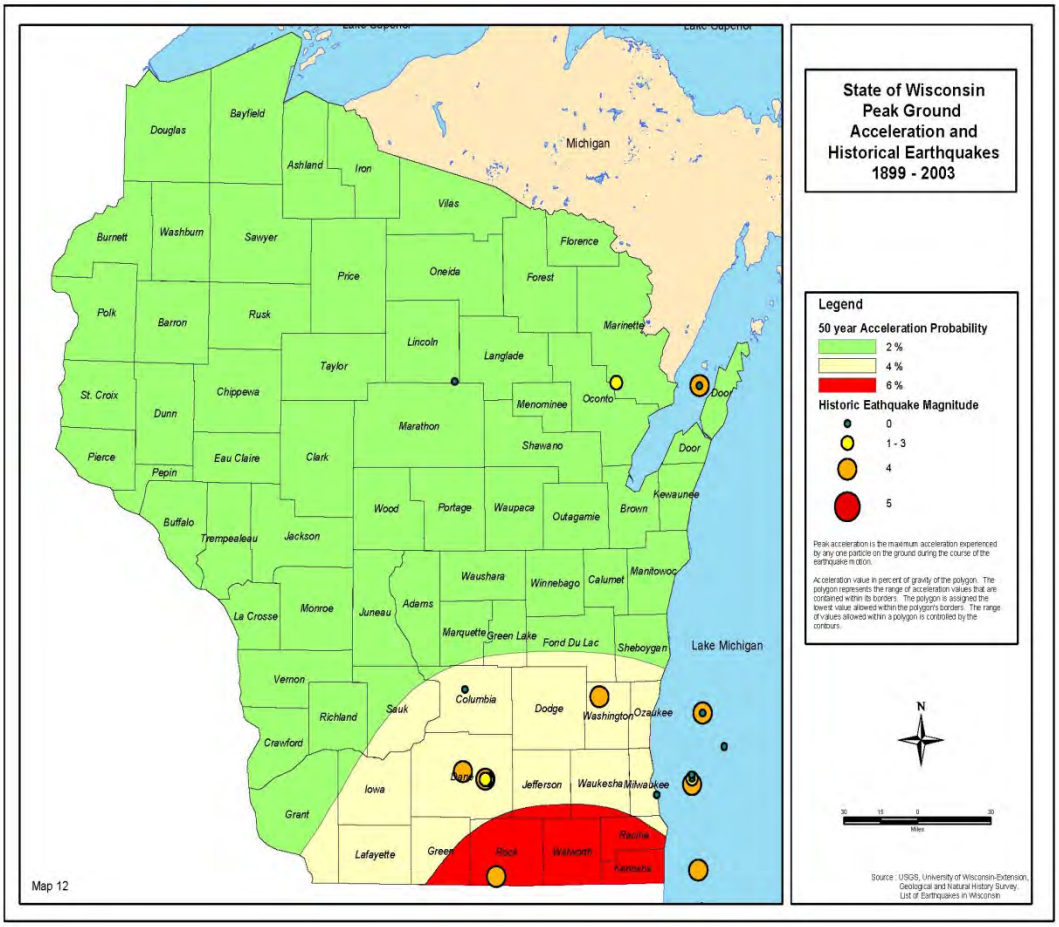


Wisconsin HazMat Response System Map



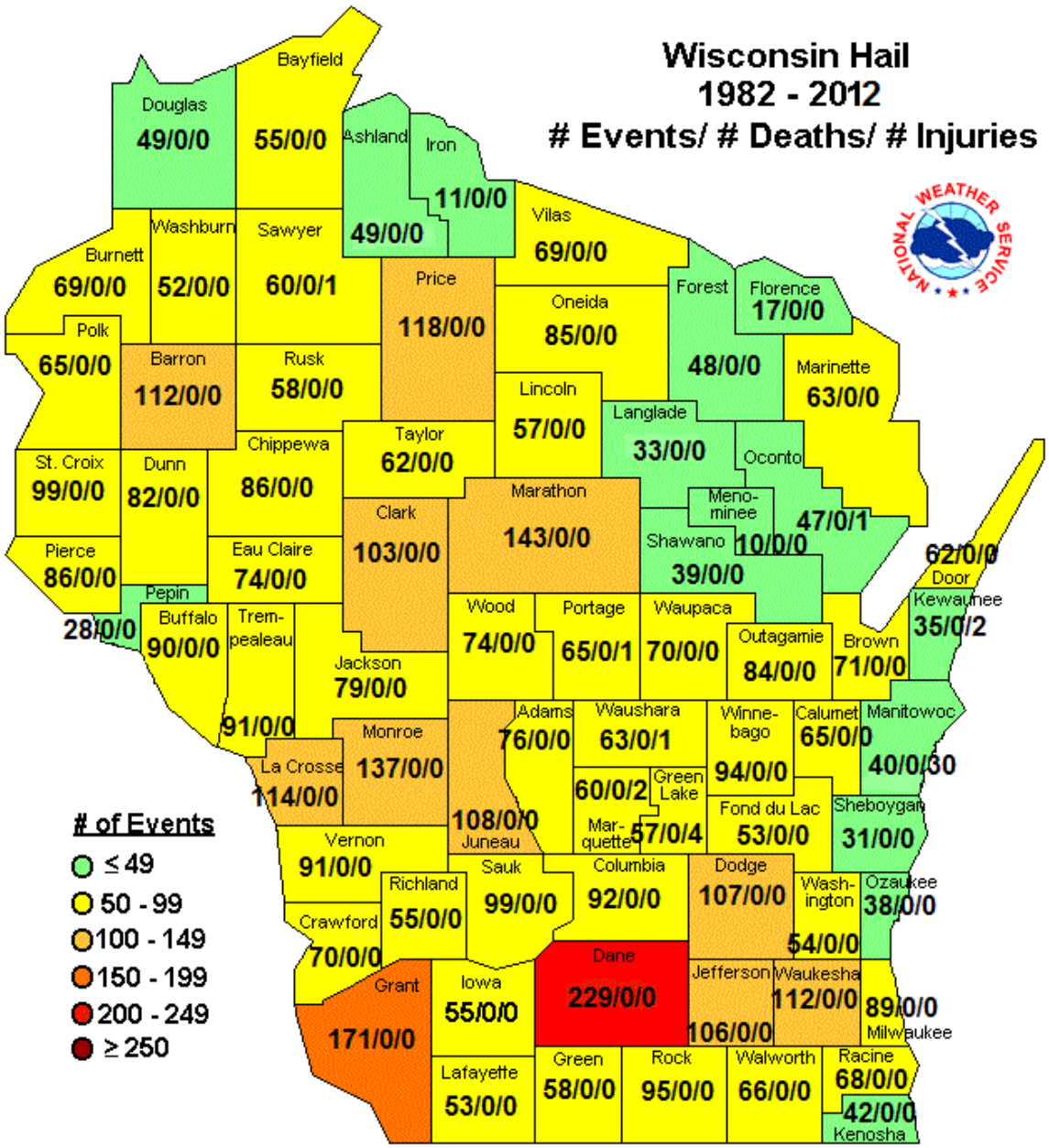
Earthquakes in Wisconsin [97]

Peak Ground Acceleration Contours and Historical Earthquakes in Wisconsin



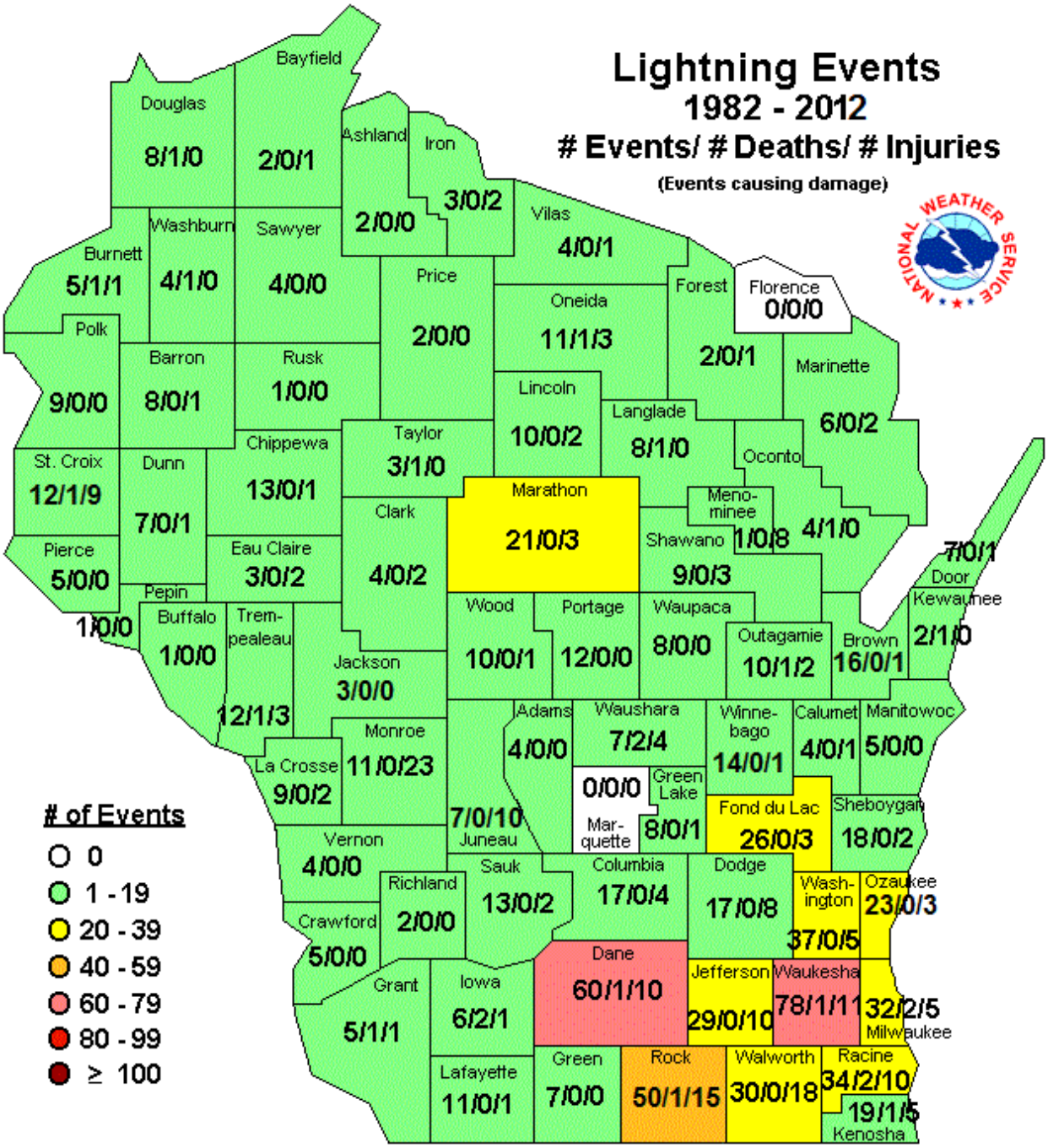
[97] Wisconsin State Hazard Mitigation Plan

Wisconsin Hail[98]



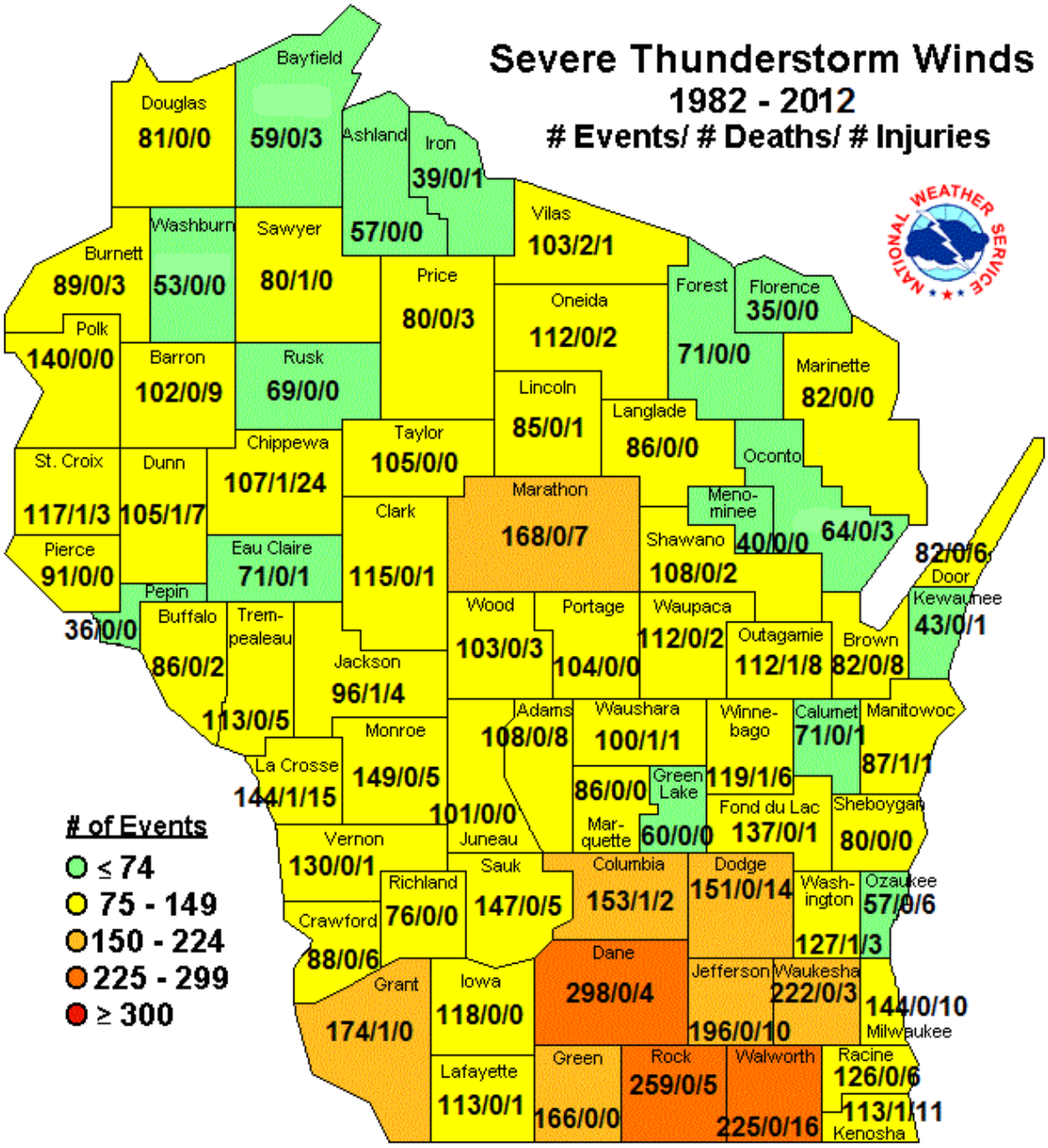
[98] The National Weather Service and Wisconsin Emergency Management

Wisconsin Lightning[99]



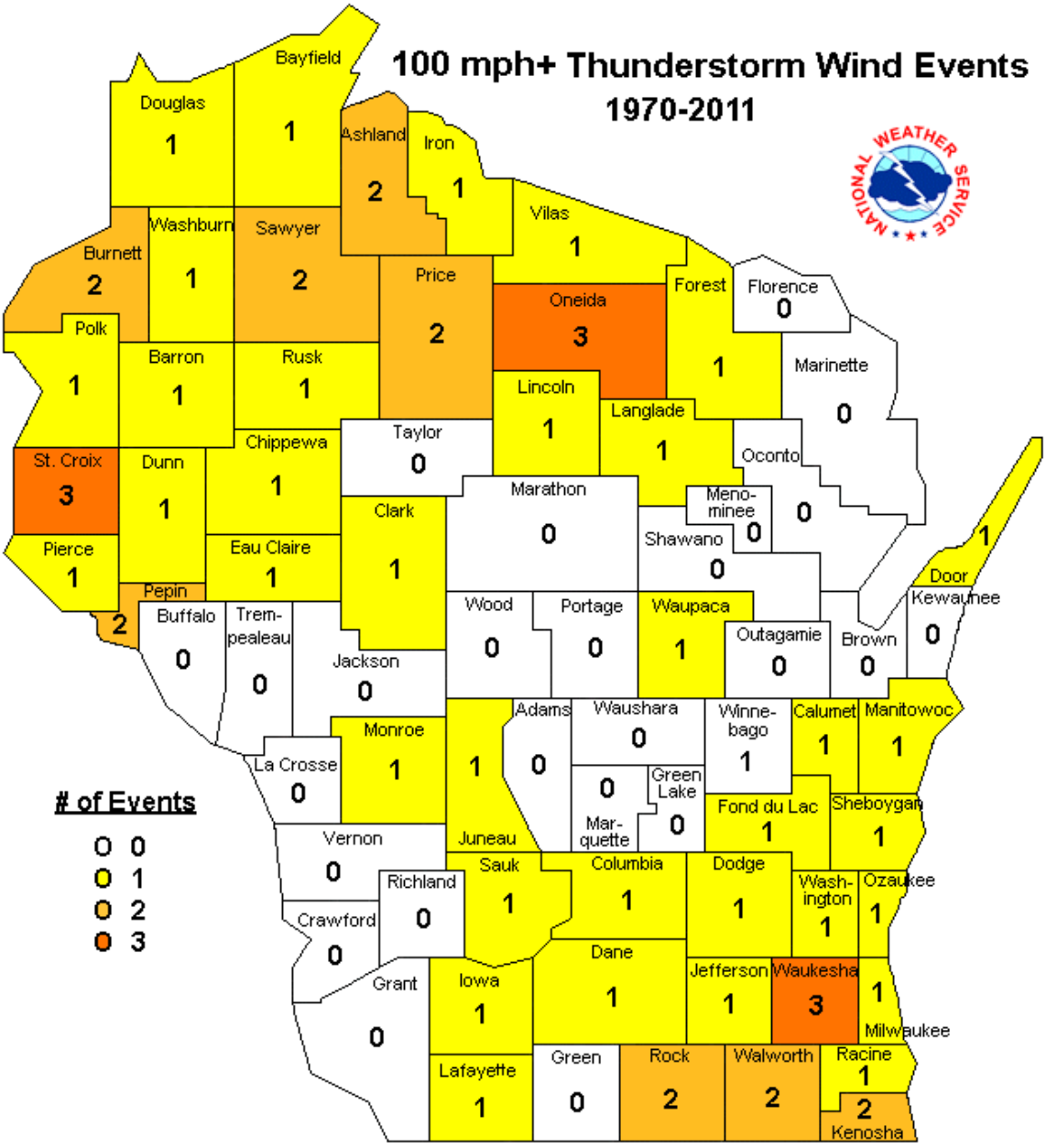
[99] The National Weather Service and Wisconsin Emergency Management

Wisconsin Severe Thunderstorm Winds[100]



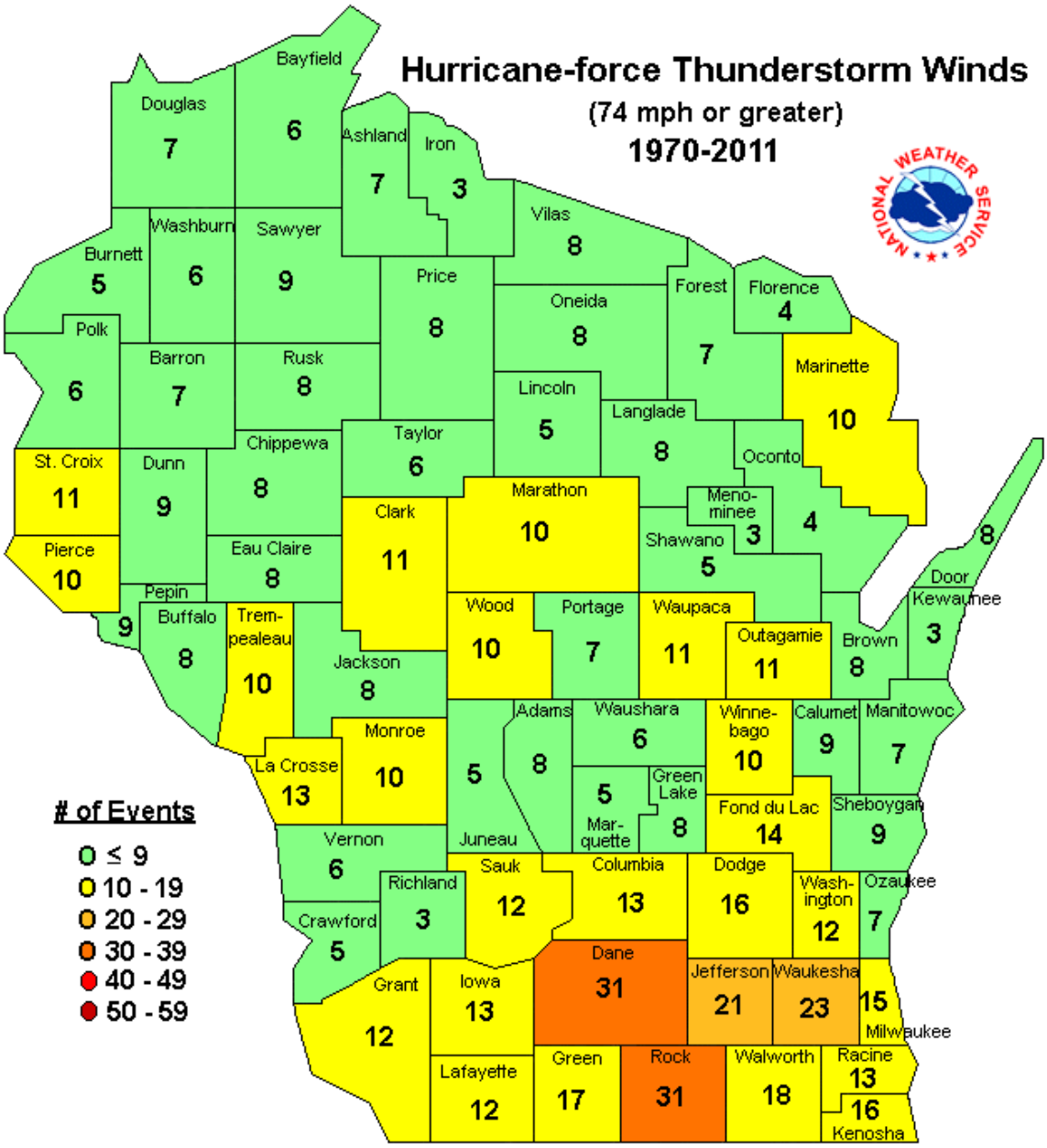
[100] The National Weather Service and Wisconsin Emergency Management

Wisconsin 100+ mph Thunderstorm Wind Events[101]



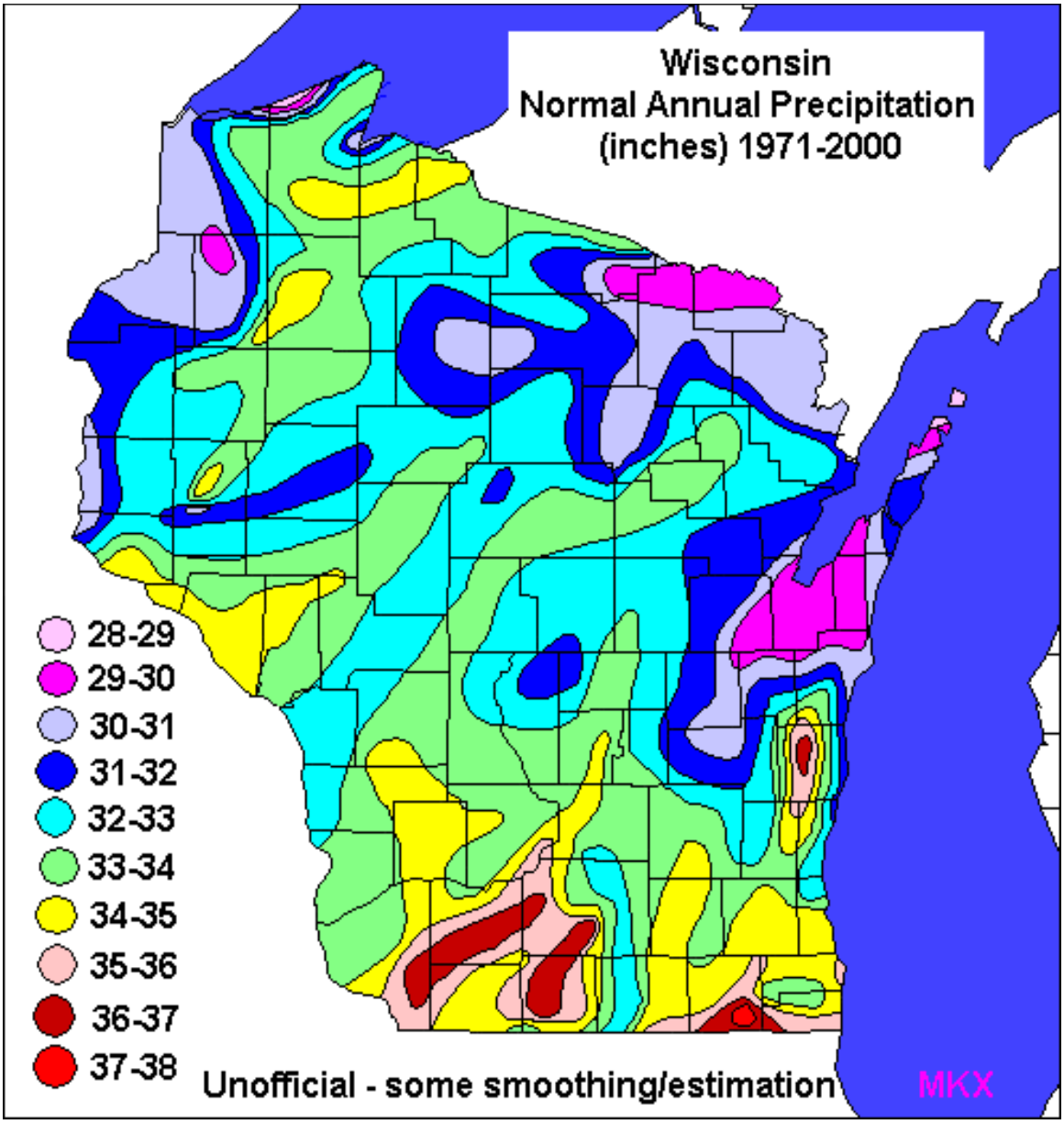
[101] The National Weather Service and Wisconsin Emergency Management

Wisconsin Hurricane-force (74+ mph) Thunderstorm Winds[102]



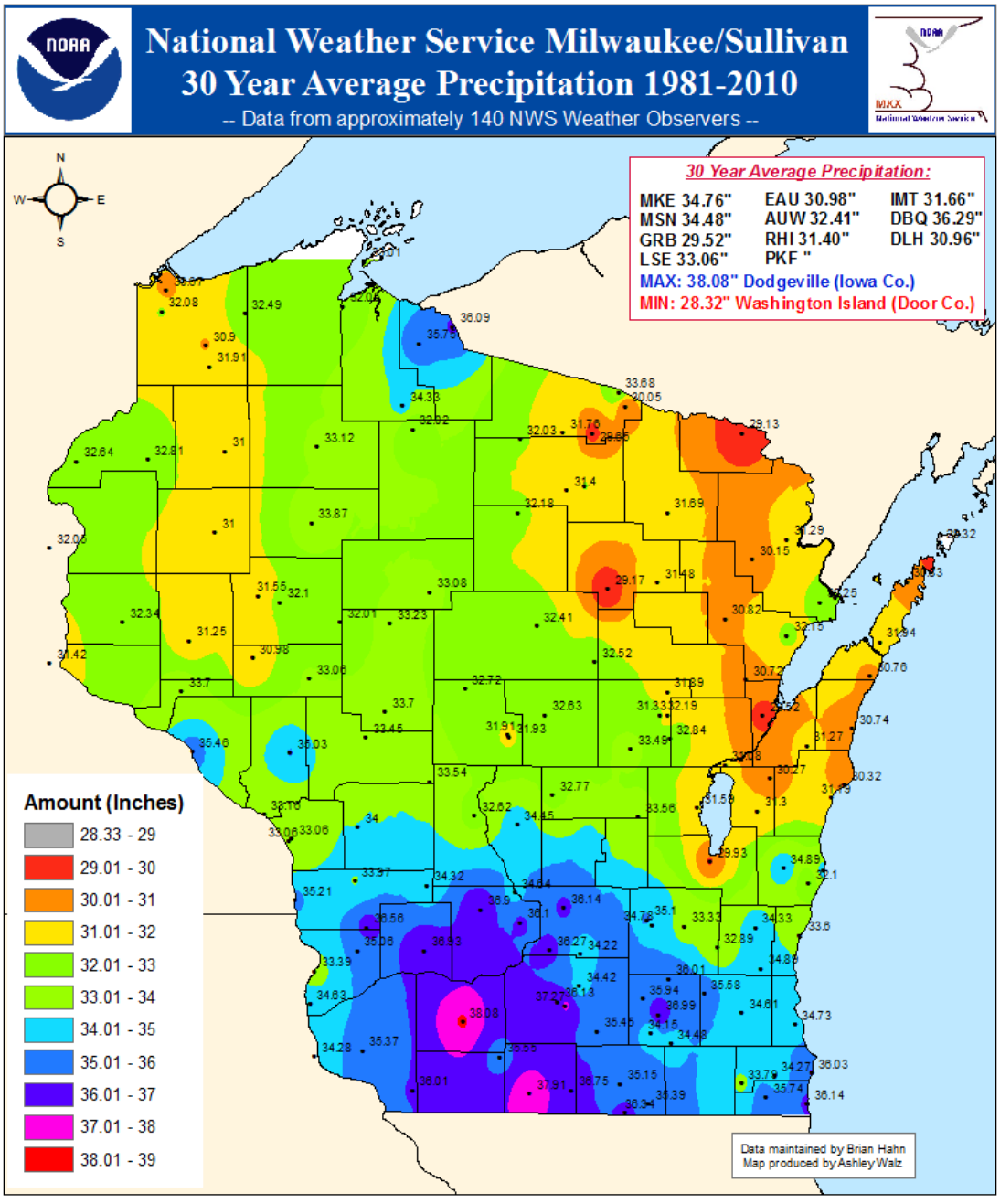
[102] The National Weather Service and Wisconsin Emergency Management

Wisconsin Annual Precipitation[103]



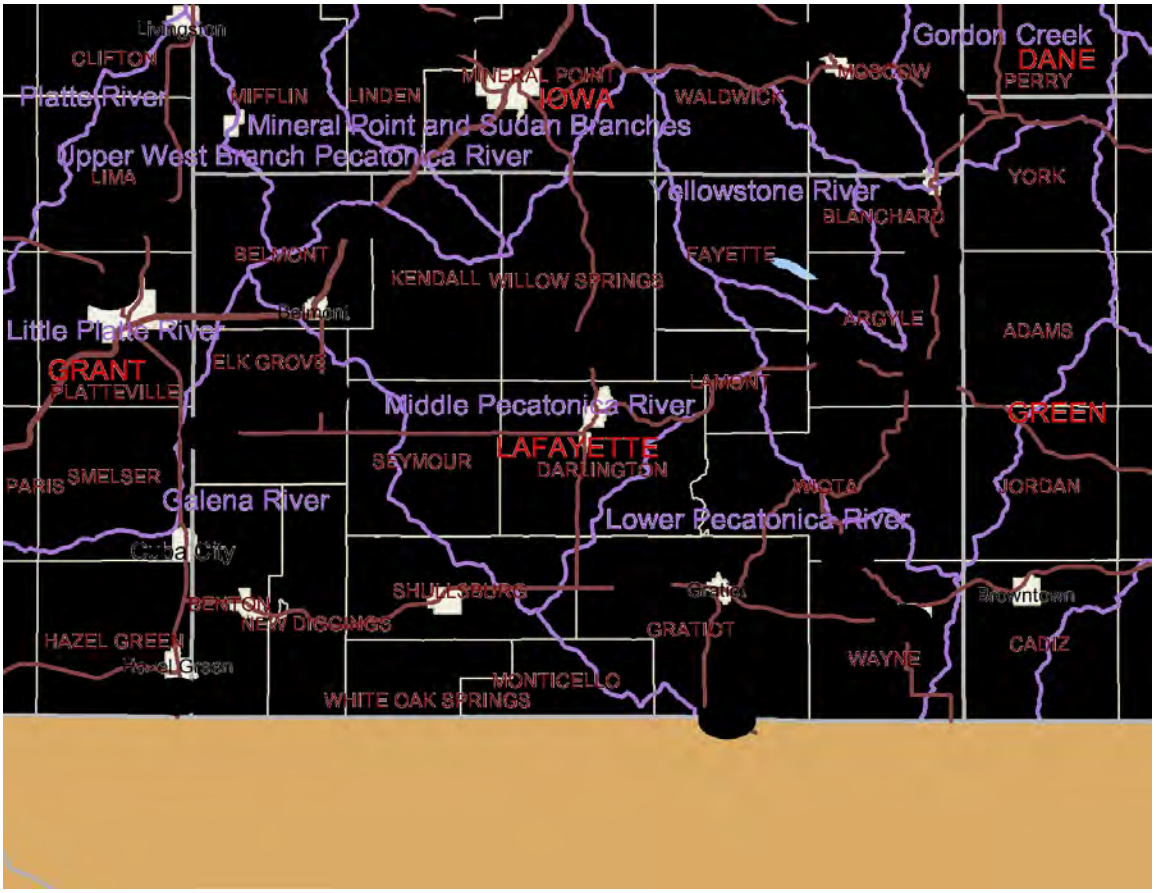
[103] http://www.crh.noaa.gov/mkx/climate/wipcpn.gif

Wisconsin 30-Year Average Precipitation [104]



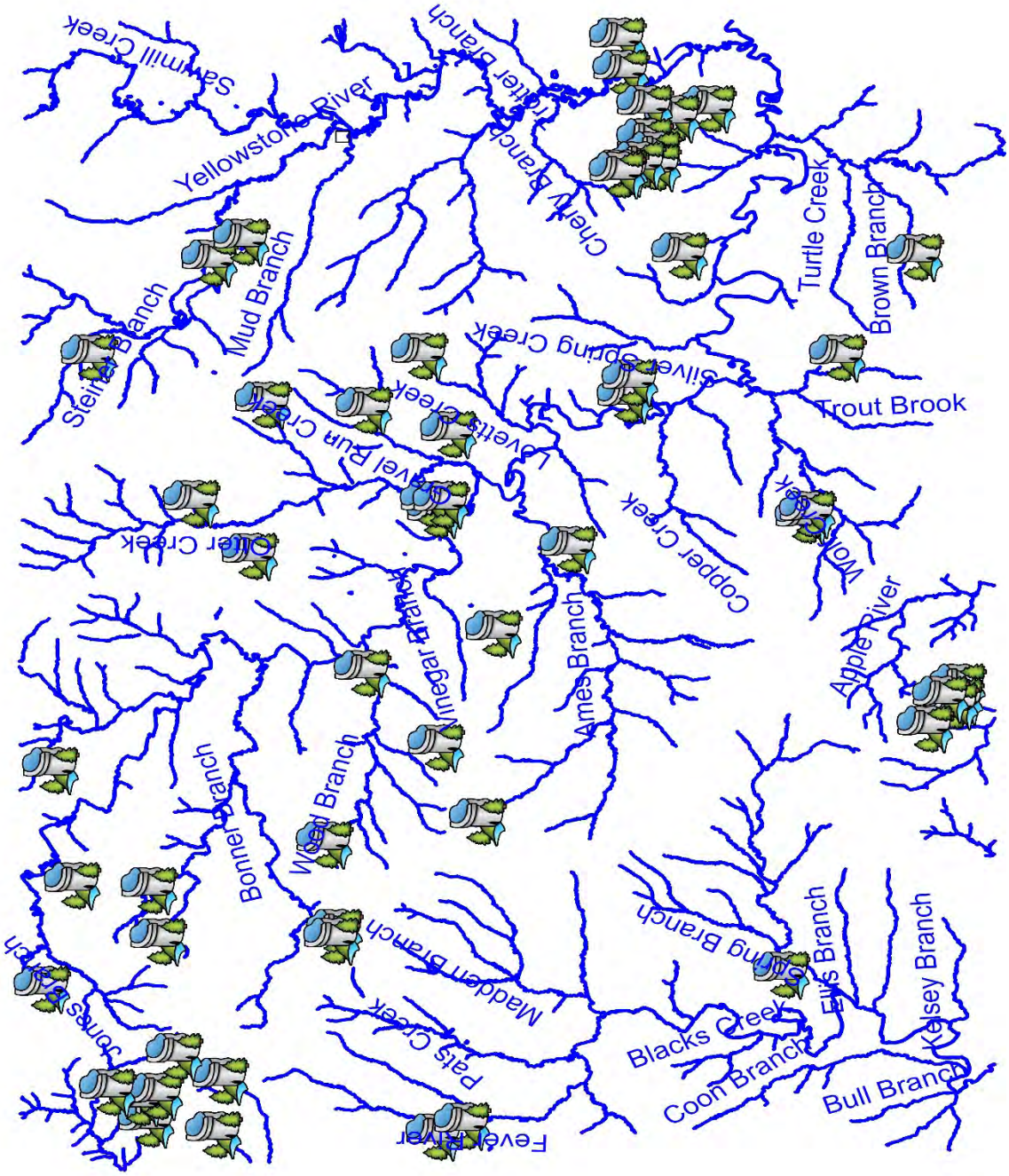
[104] The National Weather Service

County Watersheds [105]

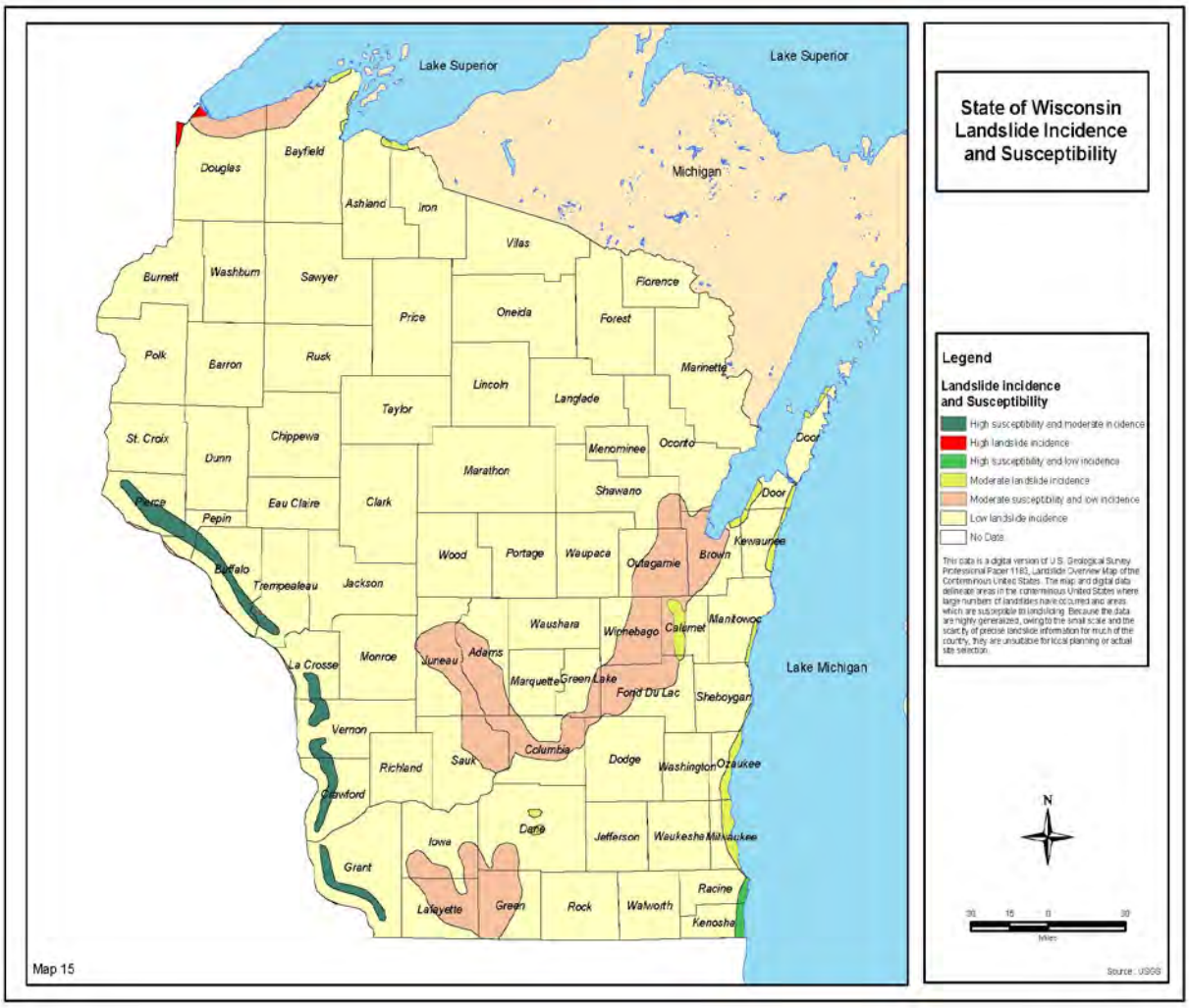


[105] http://maps.dnr.state.wi.us/imf/dnrimf.jsp?site=SurfaceWaterViewer

Lafayette County Dams

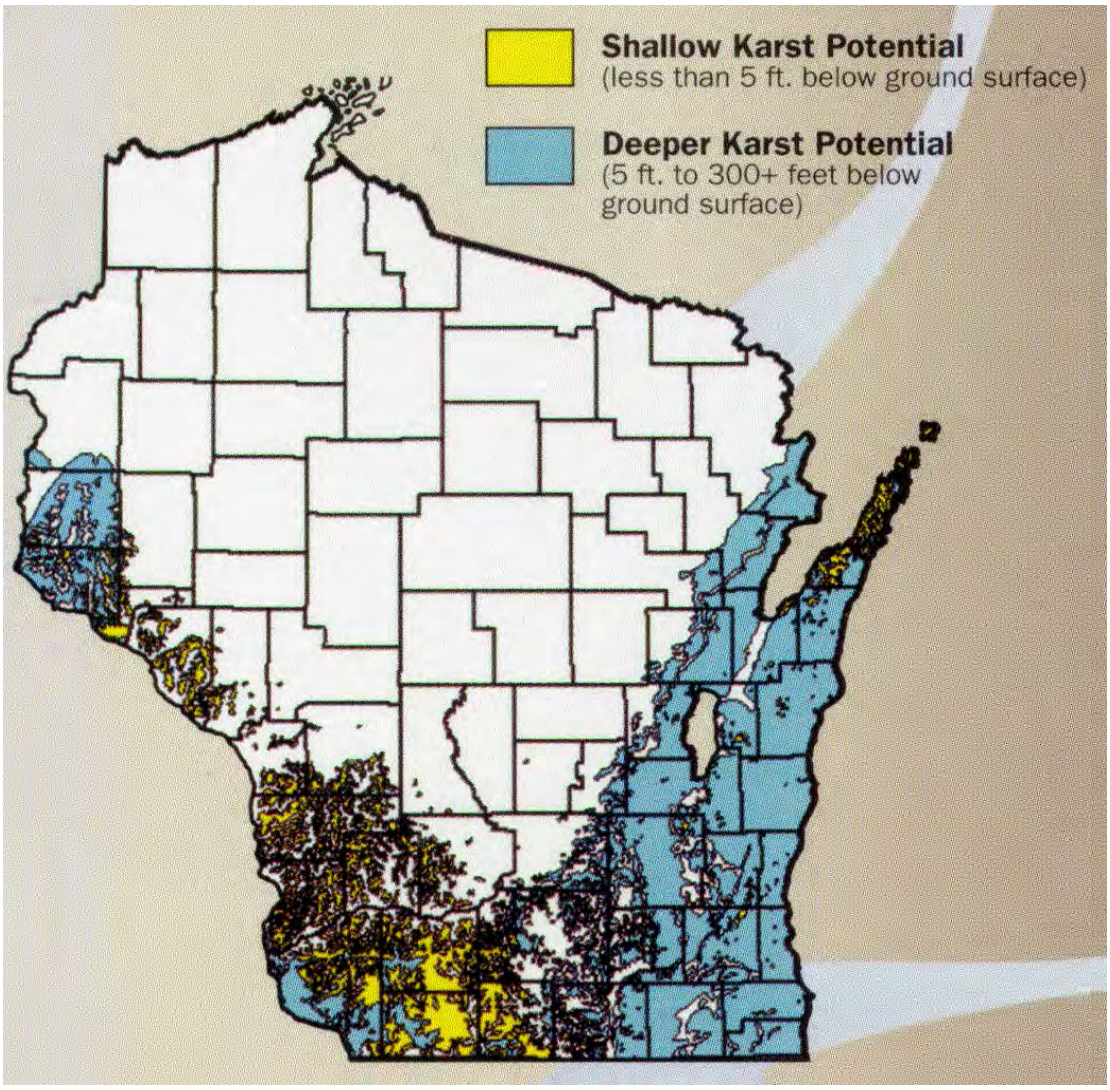


Landslide Incidence and Susceptibility [106]



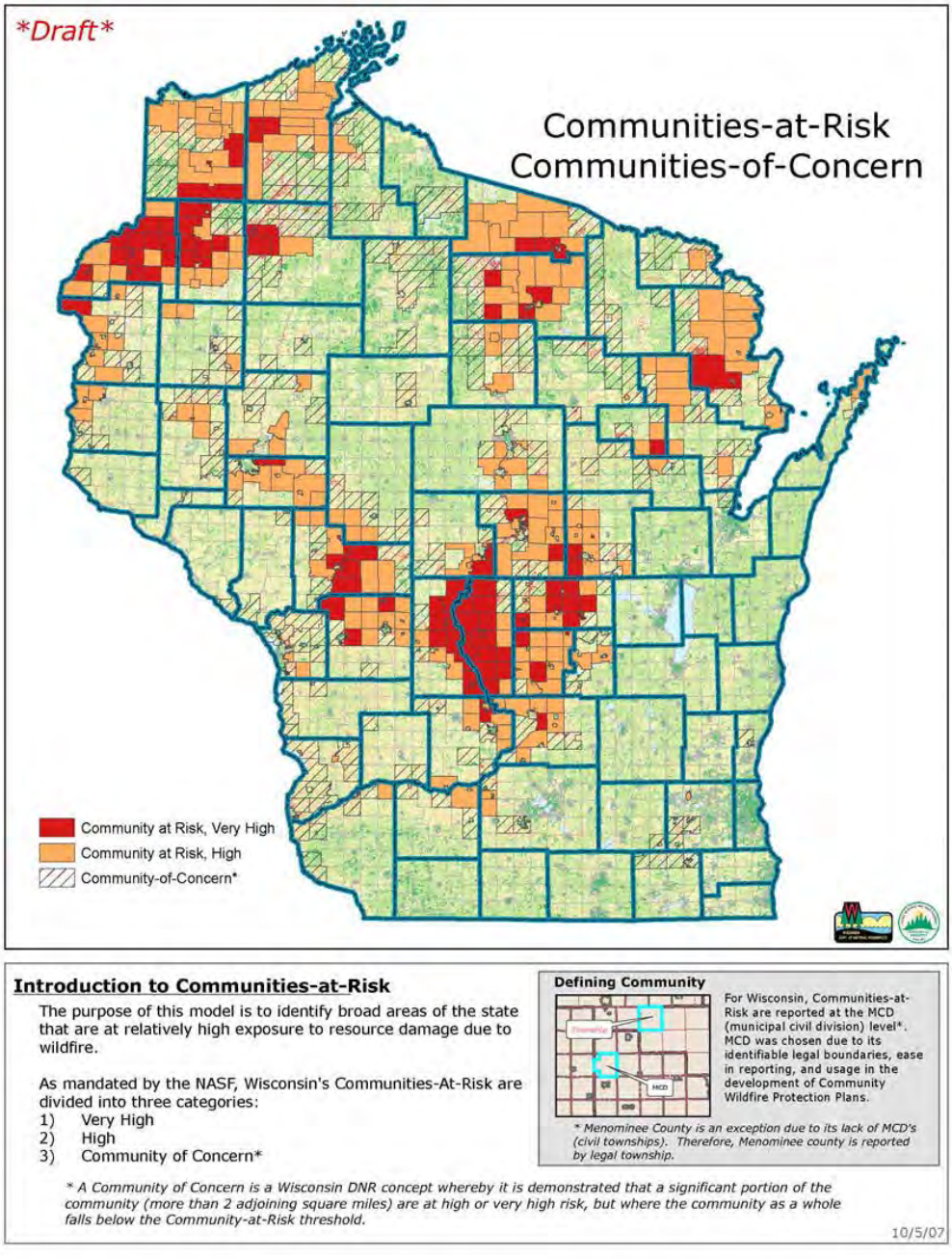
[106] Wisconsin State Hazard Mitigation Plan

Karst Potential [107]



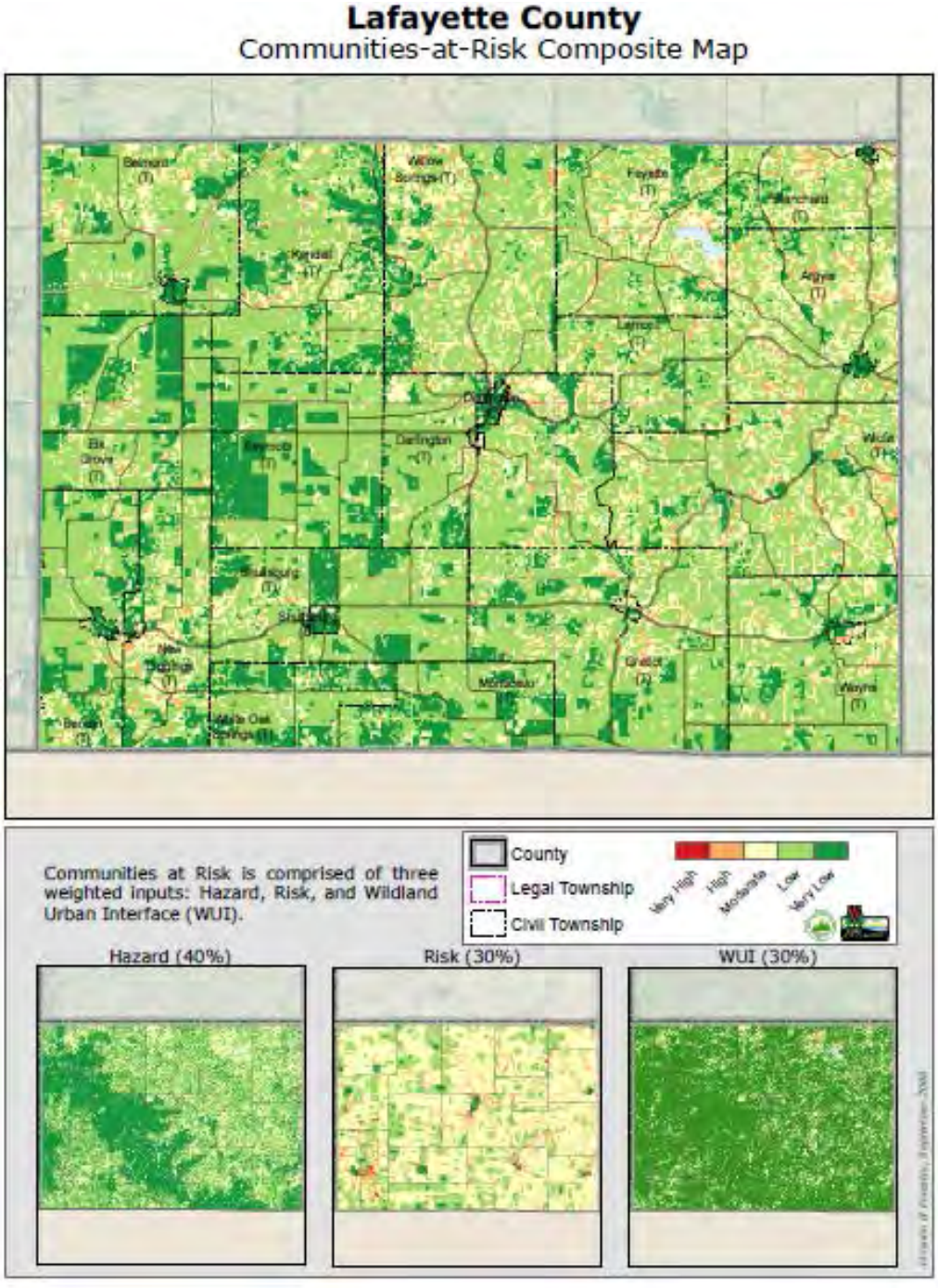
[107] Wisconsin State Hazard Mitigation Plan

Wildfire Communities at Risk[108]



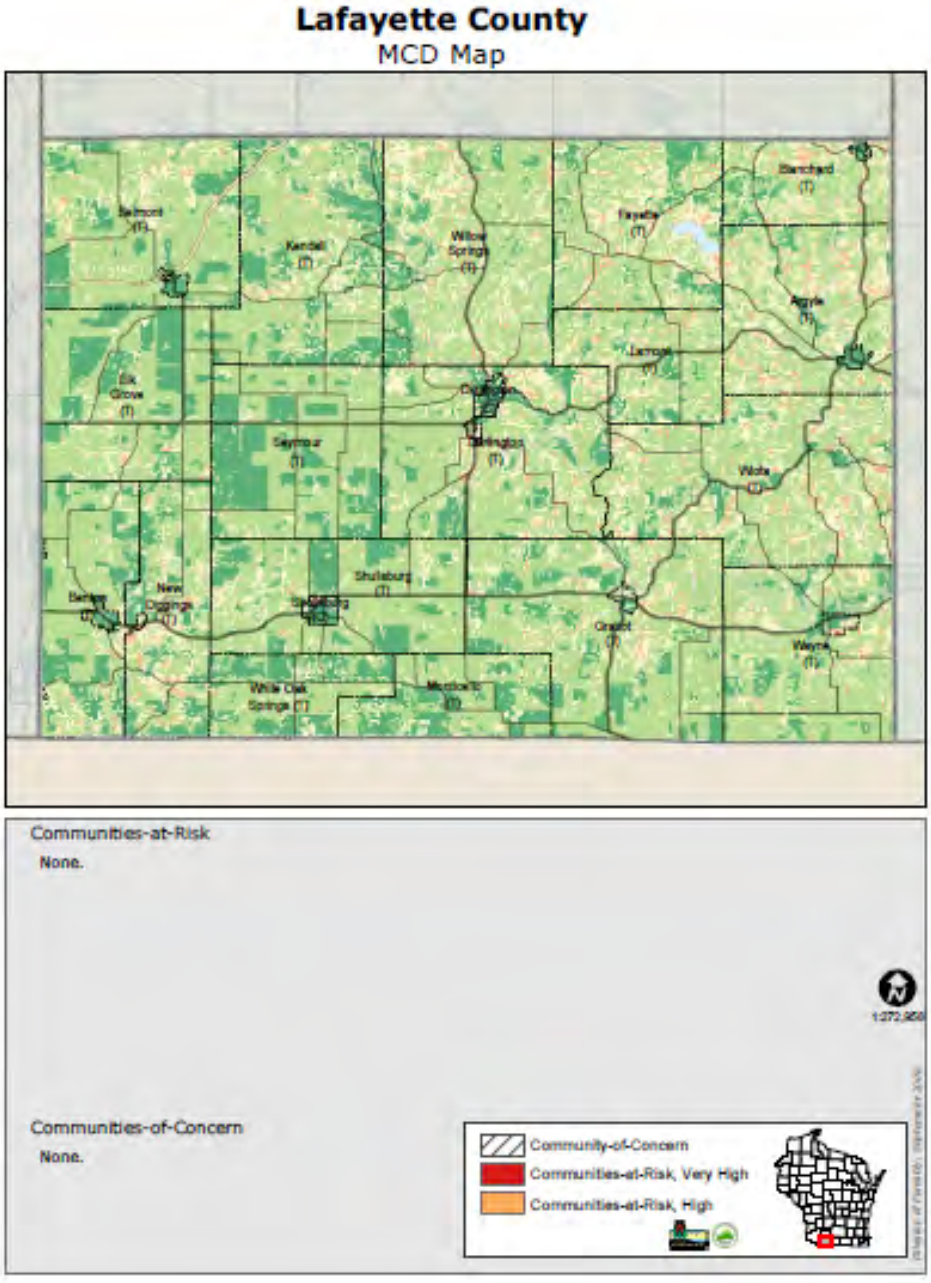
[108] Wisconsin Department of Natural Resources

Lafayette County Communities at Risk Composite[109]



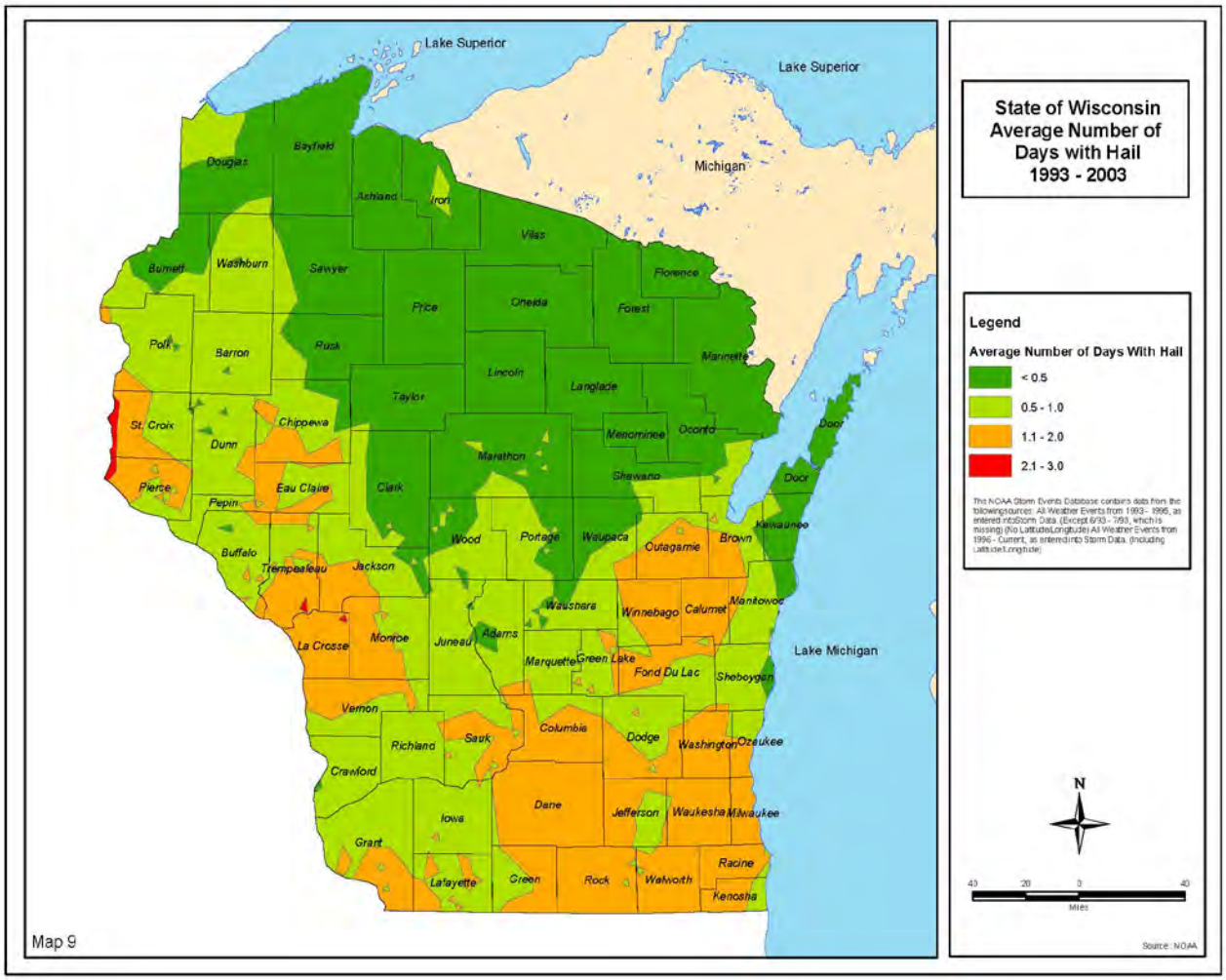
[109] Wisconsin Department of Natural Resources

Lafayette County Communities at Risk Municipal Map[110]



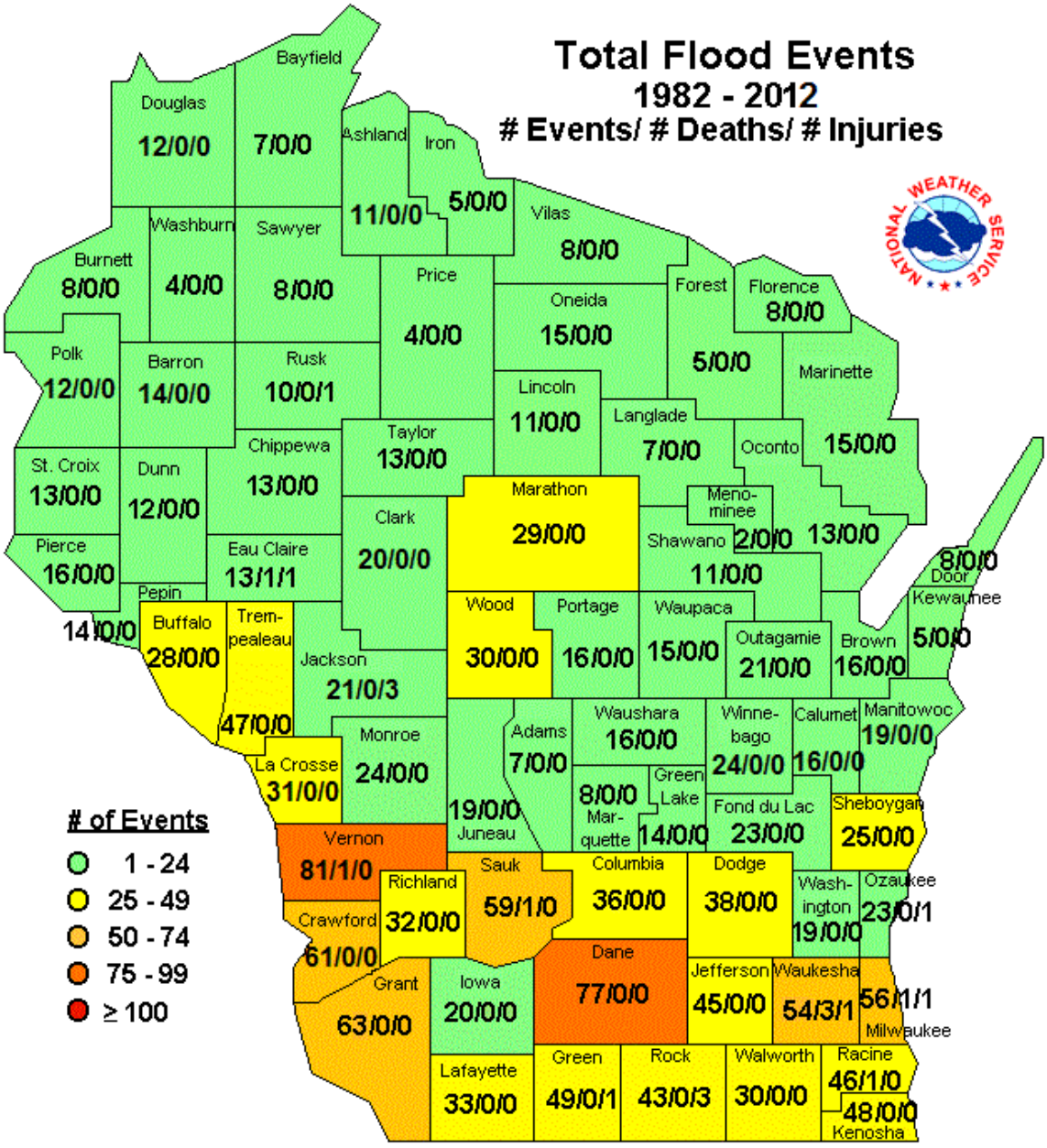
[110] Wisconsin Department of Natural Resources

County Days With Hail [111]



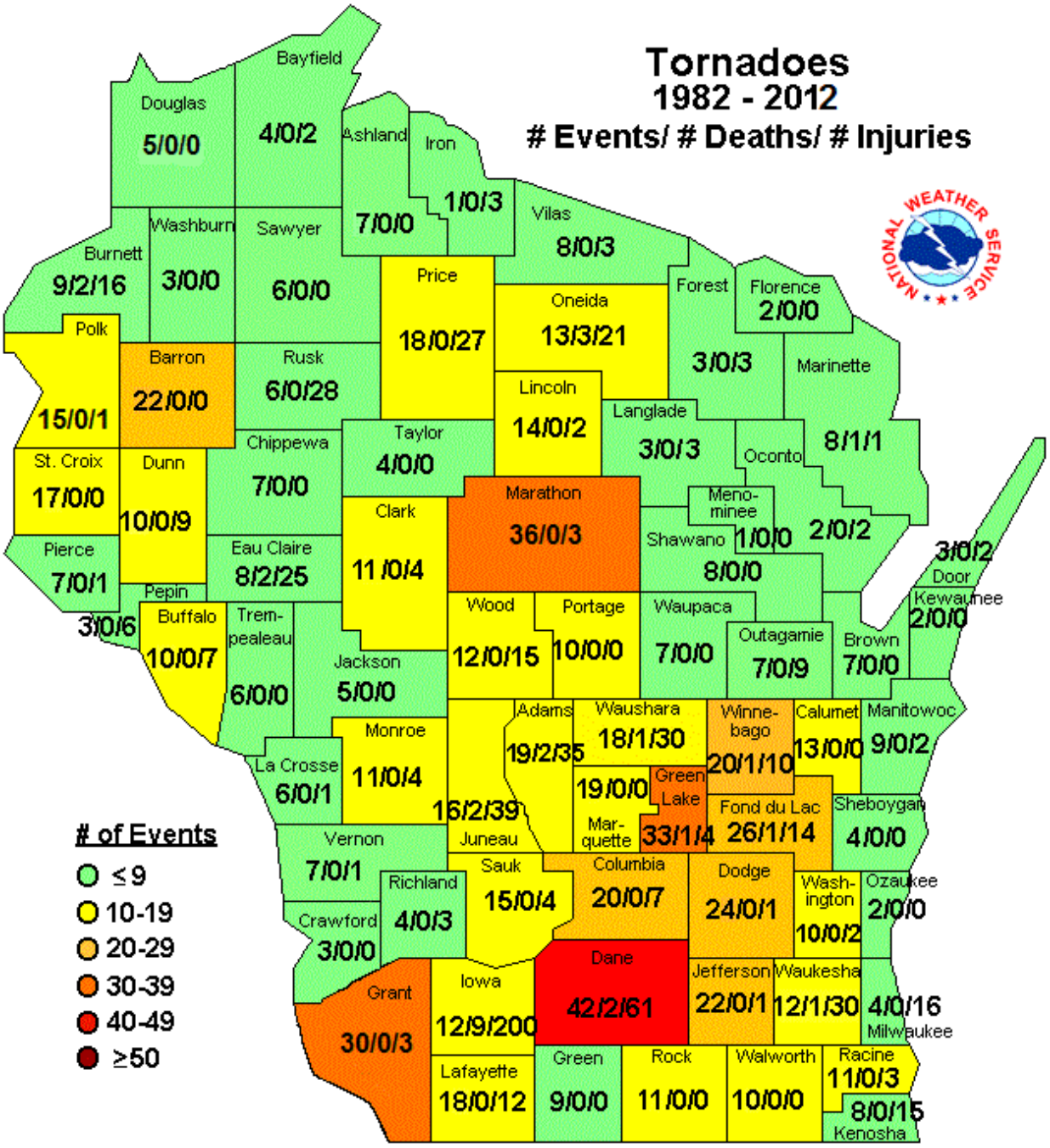
[111] State of Wisconsin Hazard Mitigation Plan

Wisconsin Total Flood Events[112]



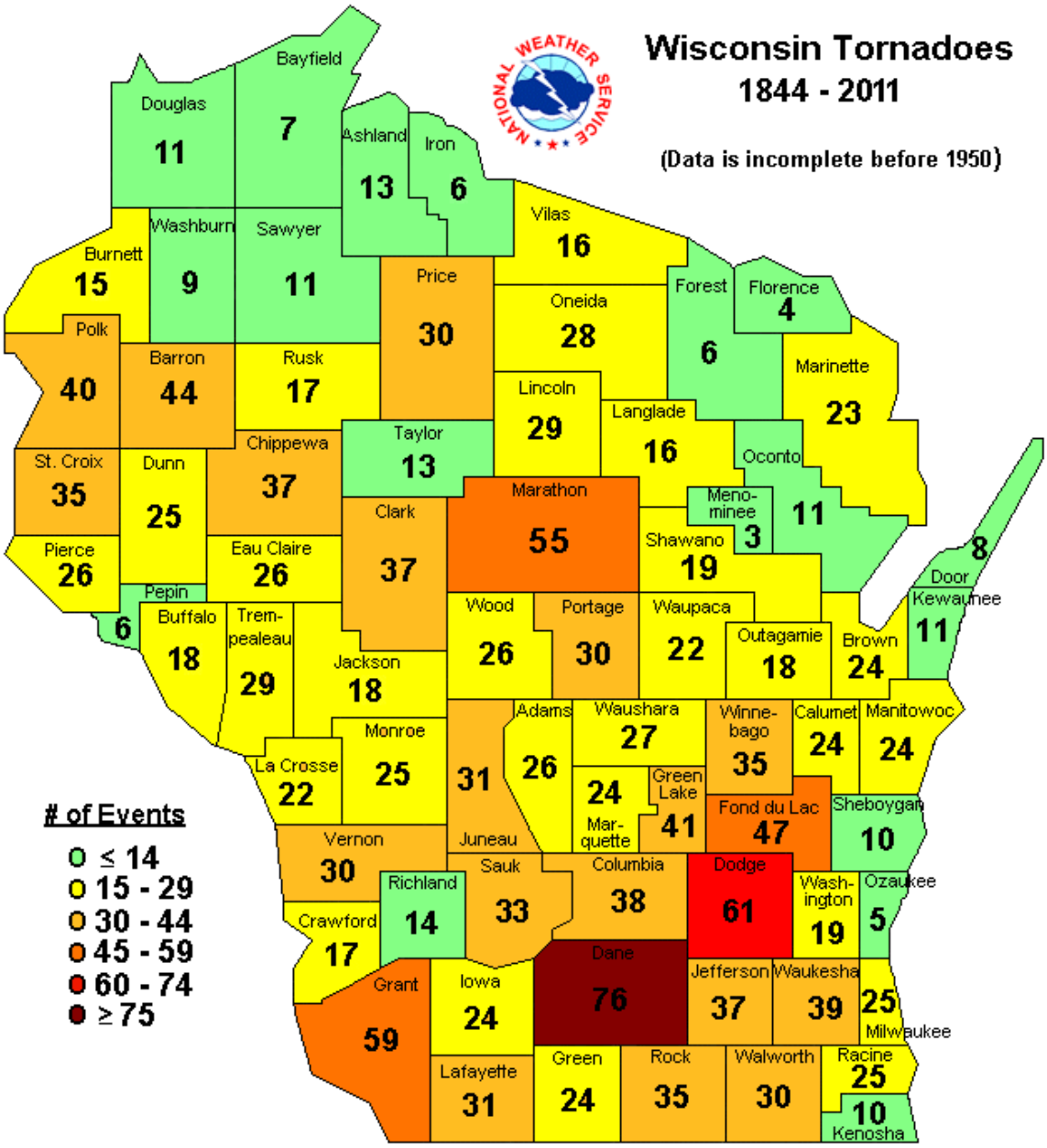
[112] The National Weather Service and Wisconsin Emergency Management

Wisconsin Tornadoes[113]



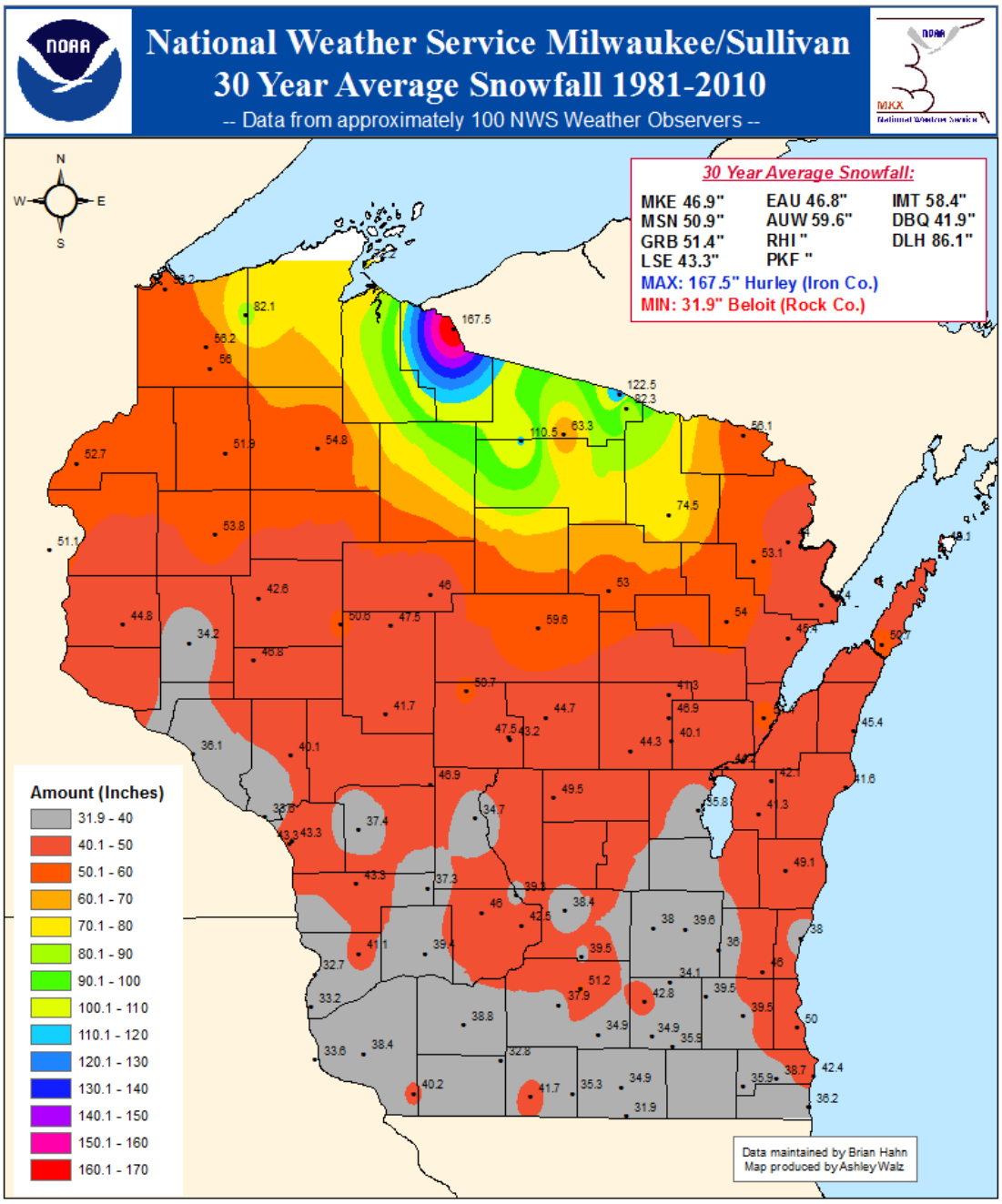
[113] The National Weather Service and Wisconsin Emergency Management

Wisconsin Tornadoes (1844-2011)[114]



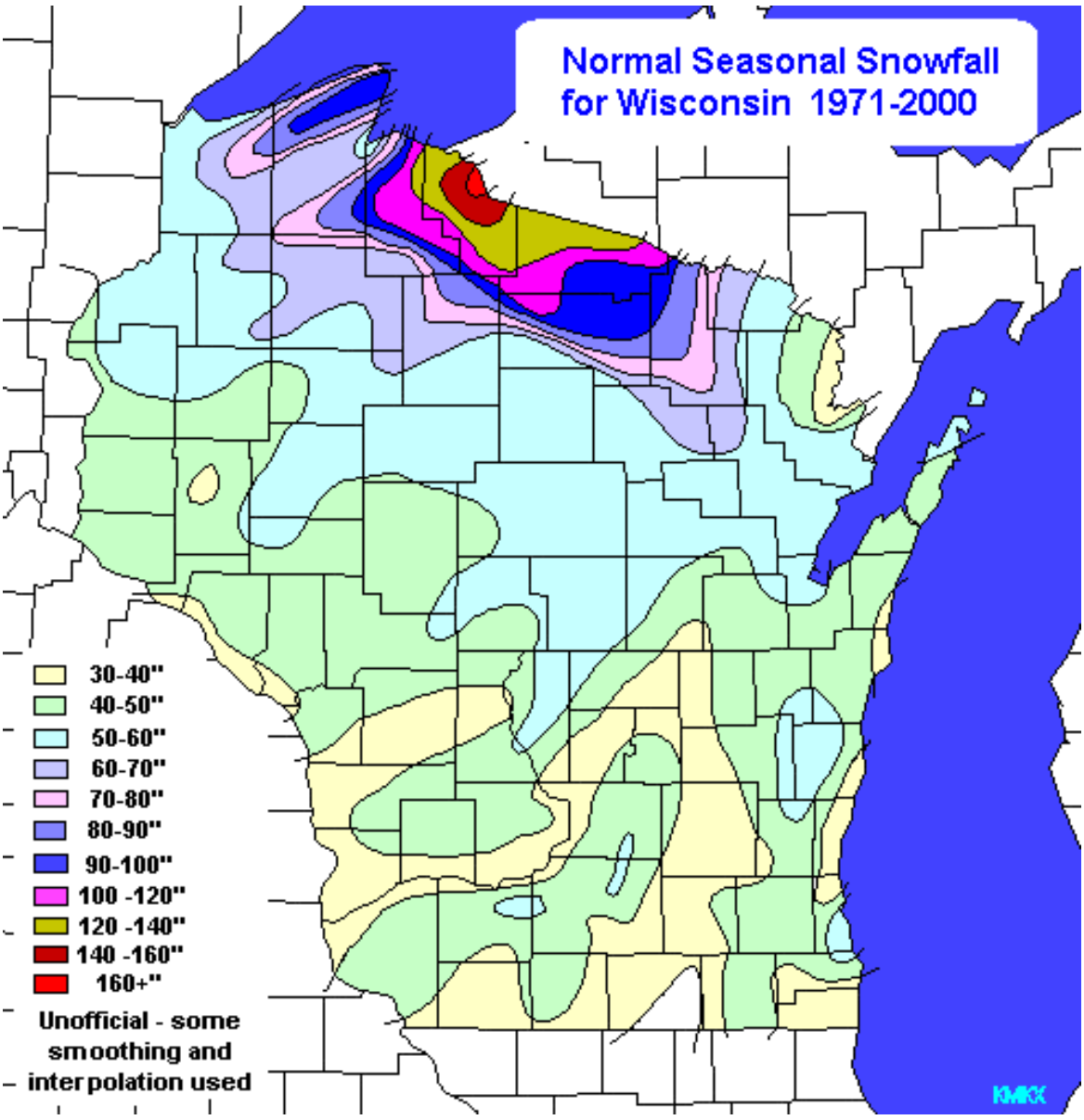
[114] The National Weather Service and Wisconsin Emergency Management

Wisconsin 30-Year Average Snowfall[115]



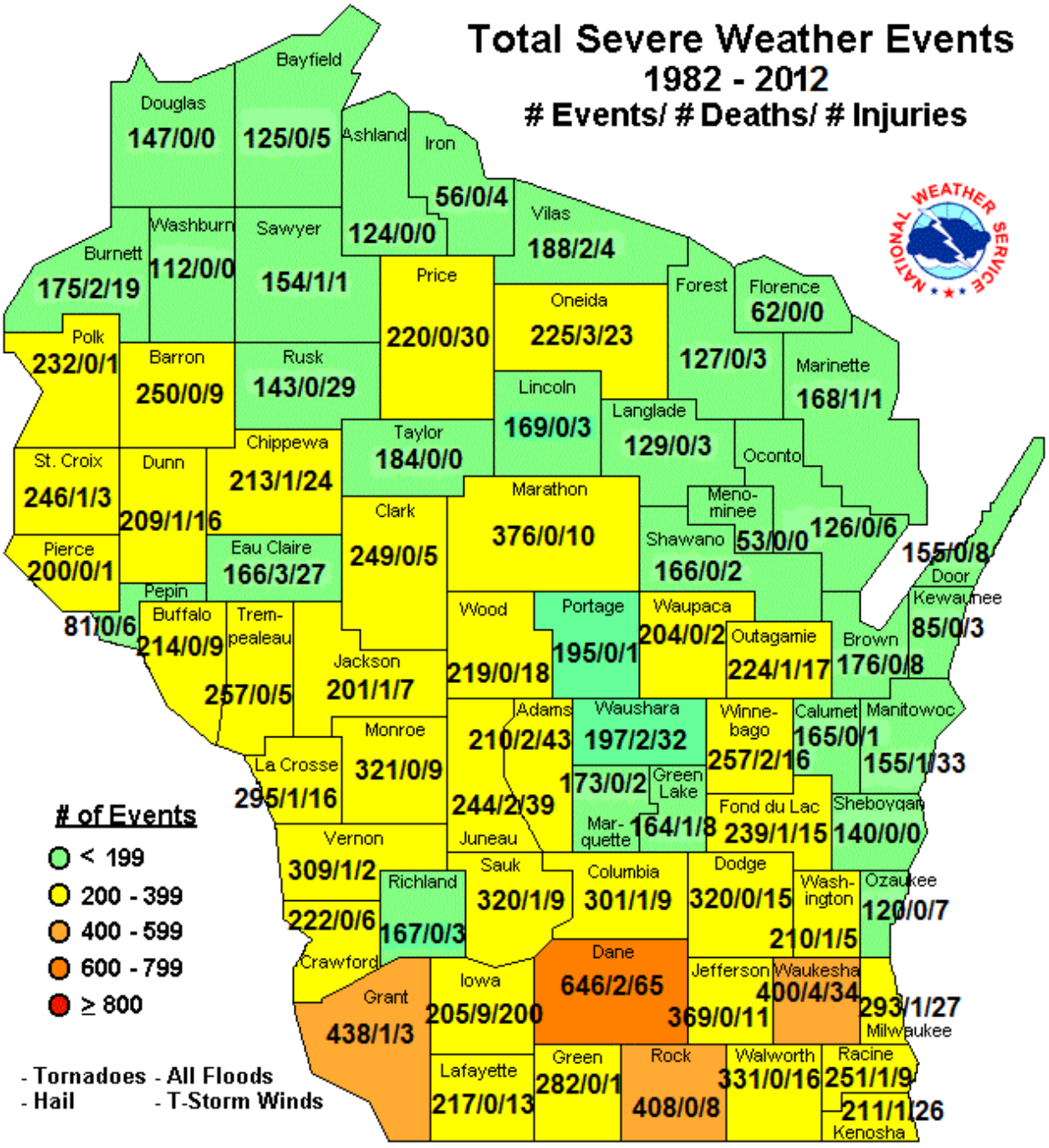
[115] The National Weather Service

Wisconsin Average Seasonal Snowfall[116]



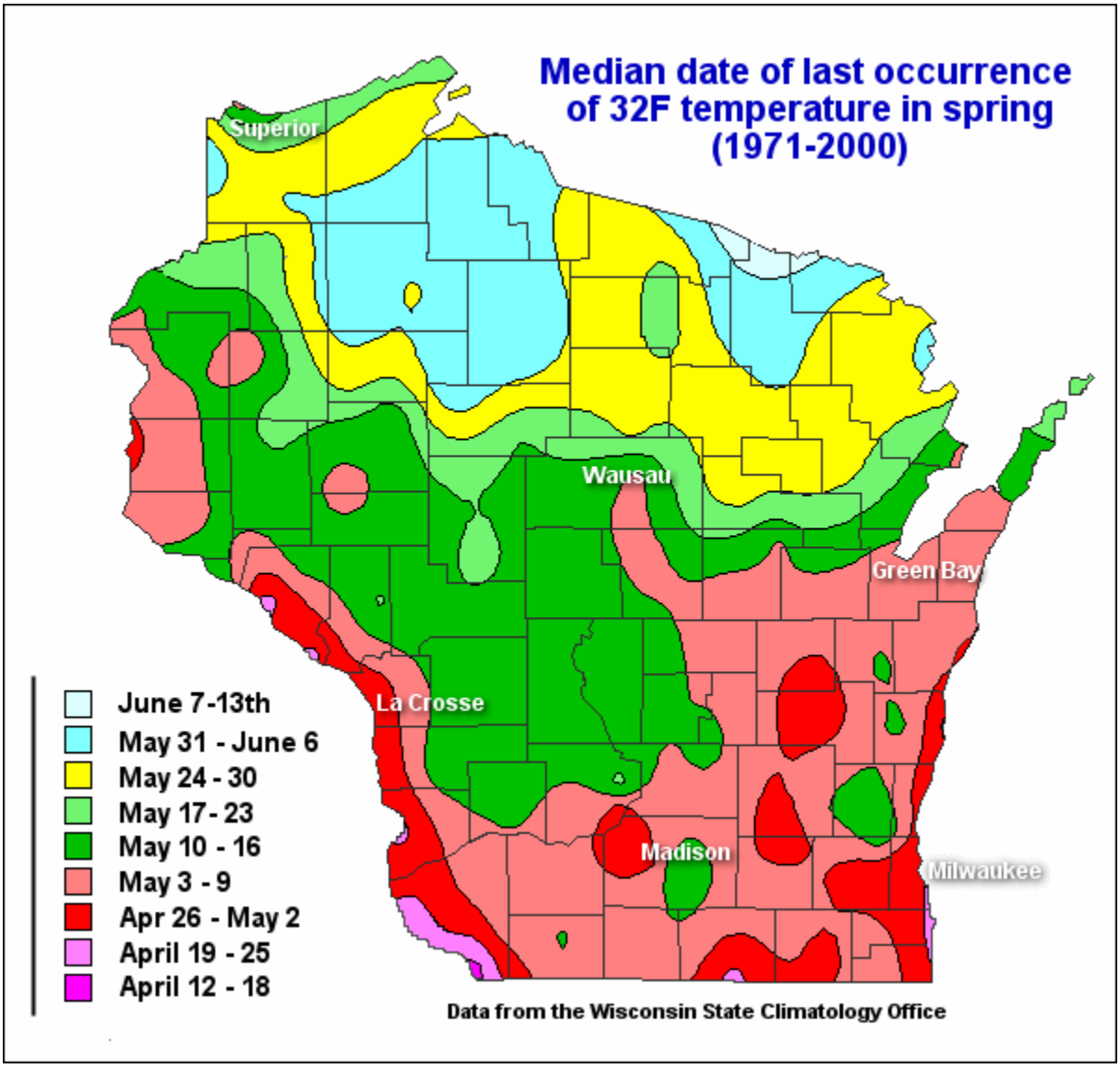
[116] http://www.crh.noaa.gov/mkx/climate/wisnow.gif

Wisconsin Total Severe Weather Events[117]



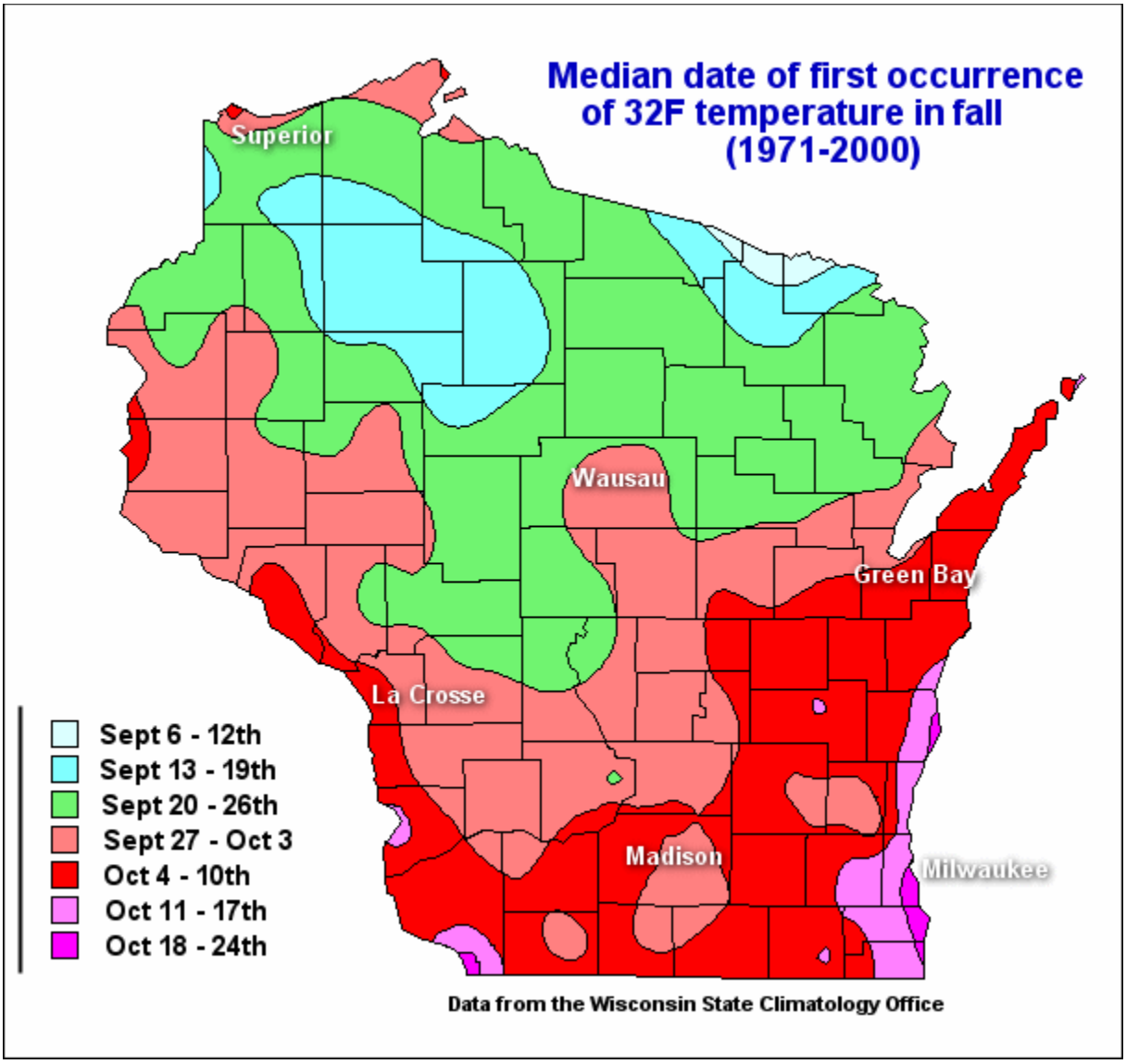
[117] The National Weather Service and Wisconsin Emergency Management

Median Date of Last Freeze[118]



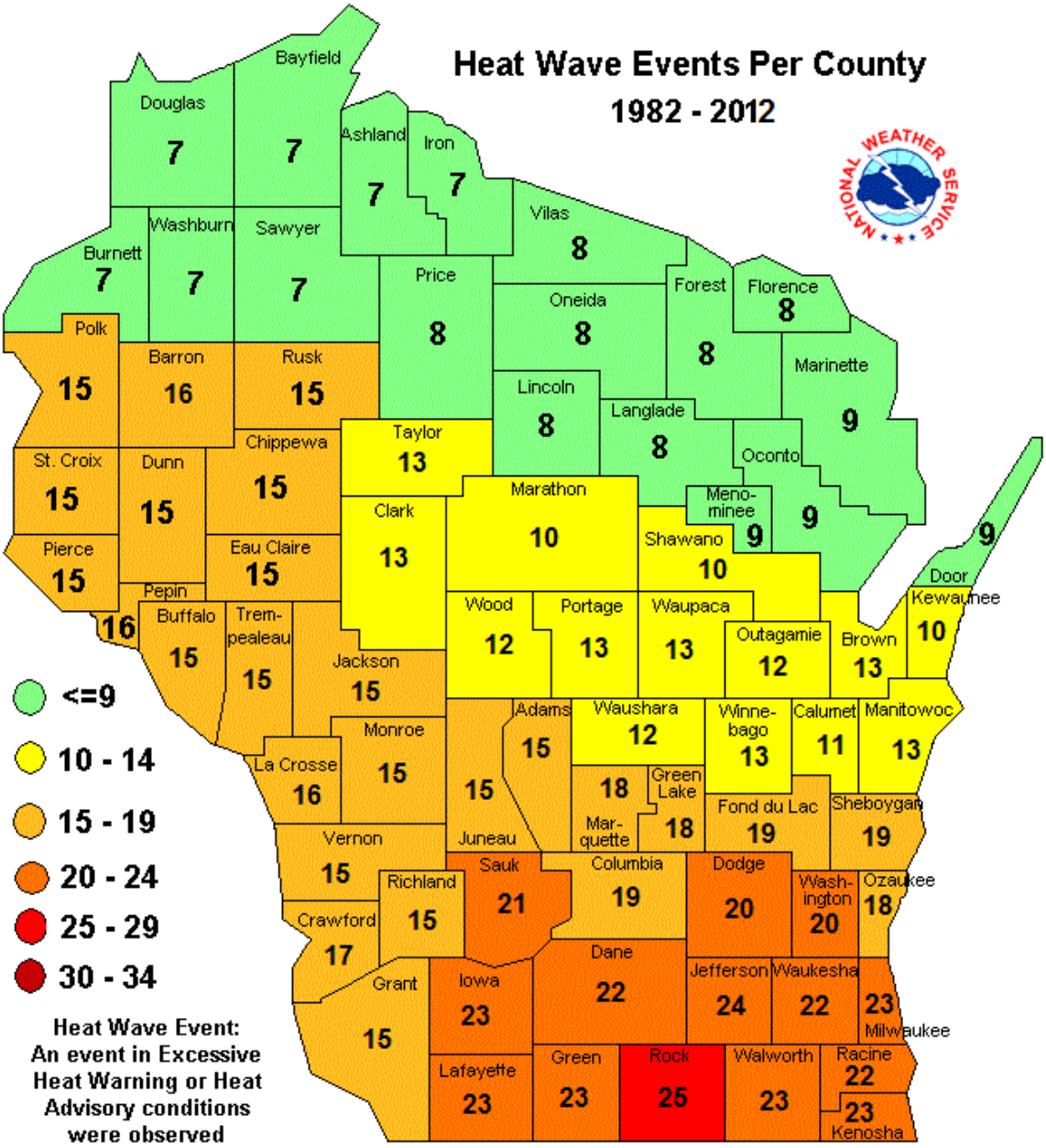
[118] http://www.crh.noaa.gov/mkx/climate/lastfrost.gif

Median Date of First Freeze[119]



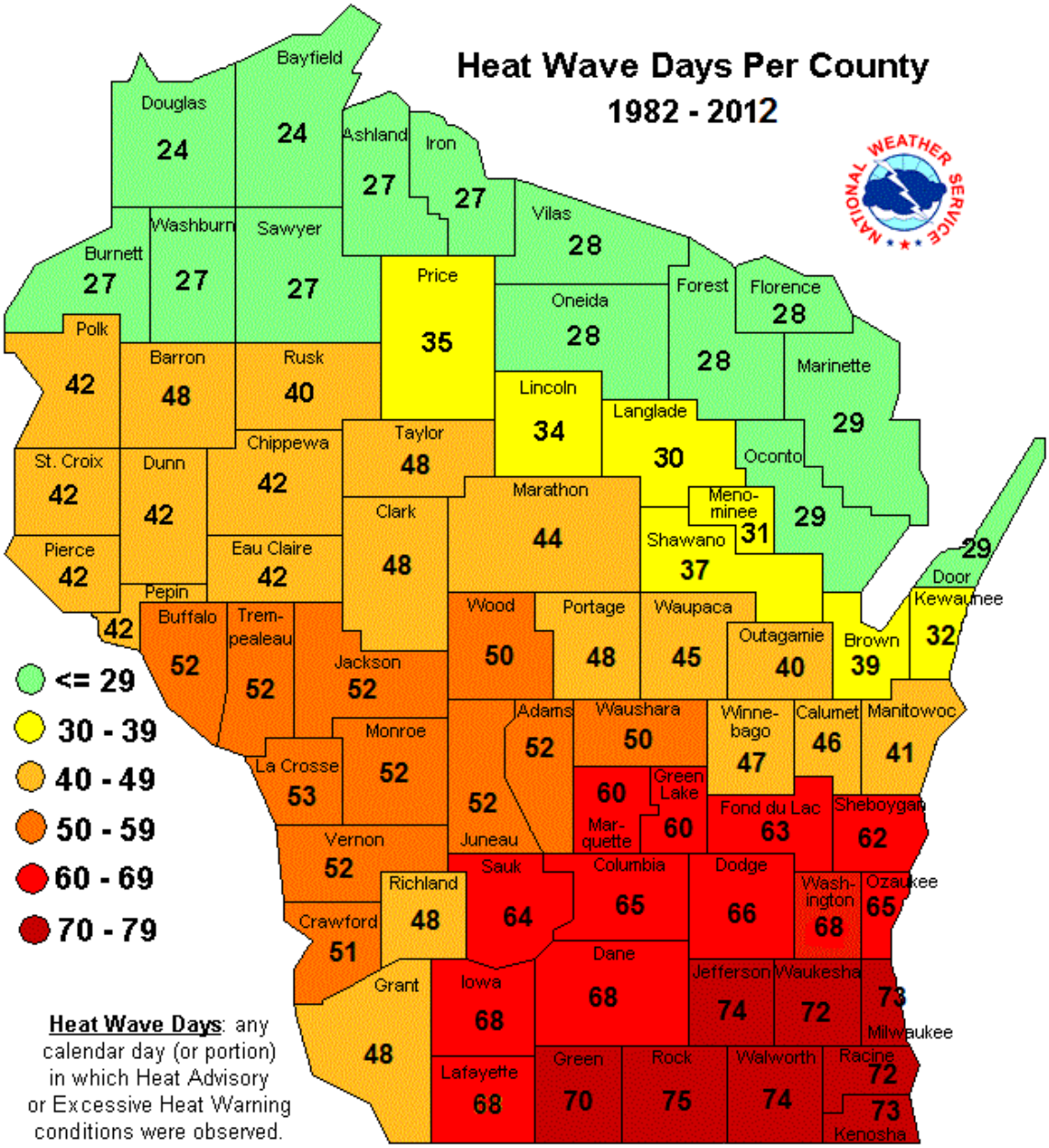
[119] http://www.crh.noaa.gov/mkx/climate/firstfrost.gif

Wisconsin Heat Wave Events[120]



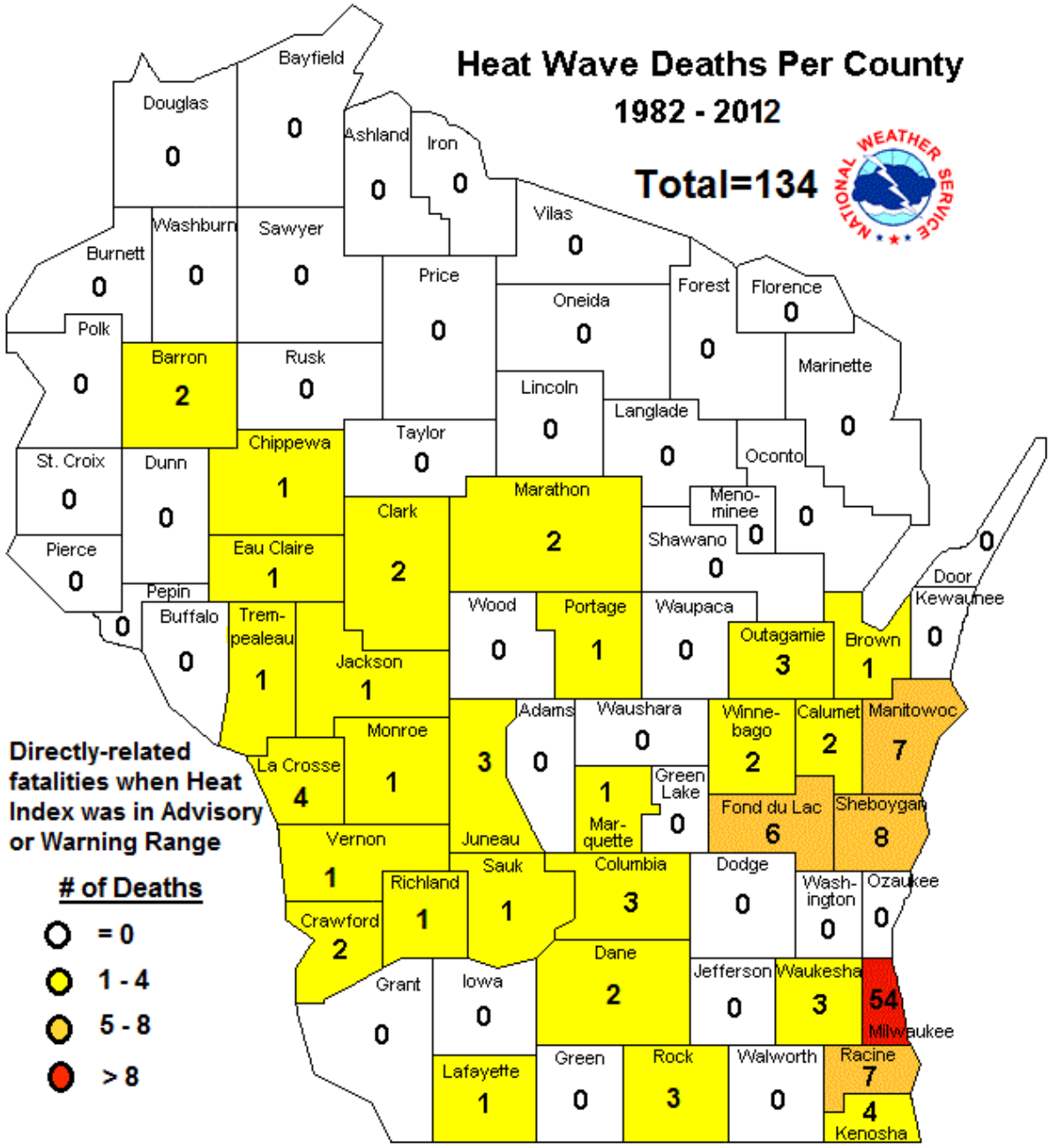
[120] The National Weather Service and Wisconsin Emergency Management

Wisconsin Heat Wave Days[121]



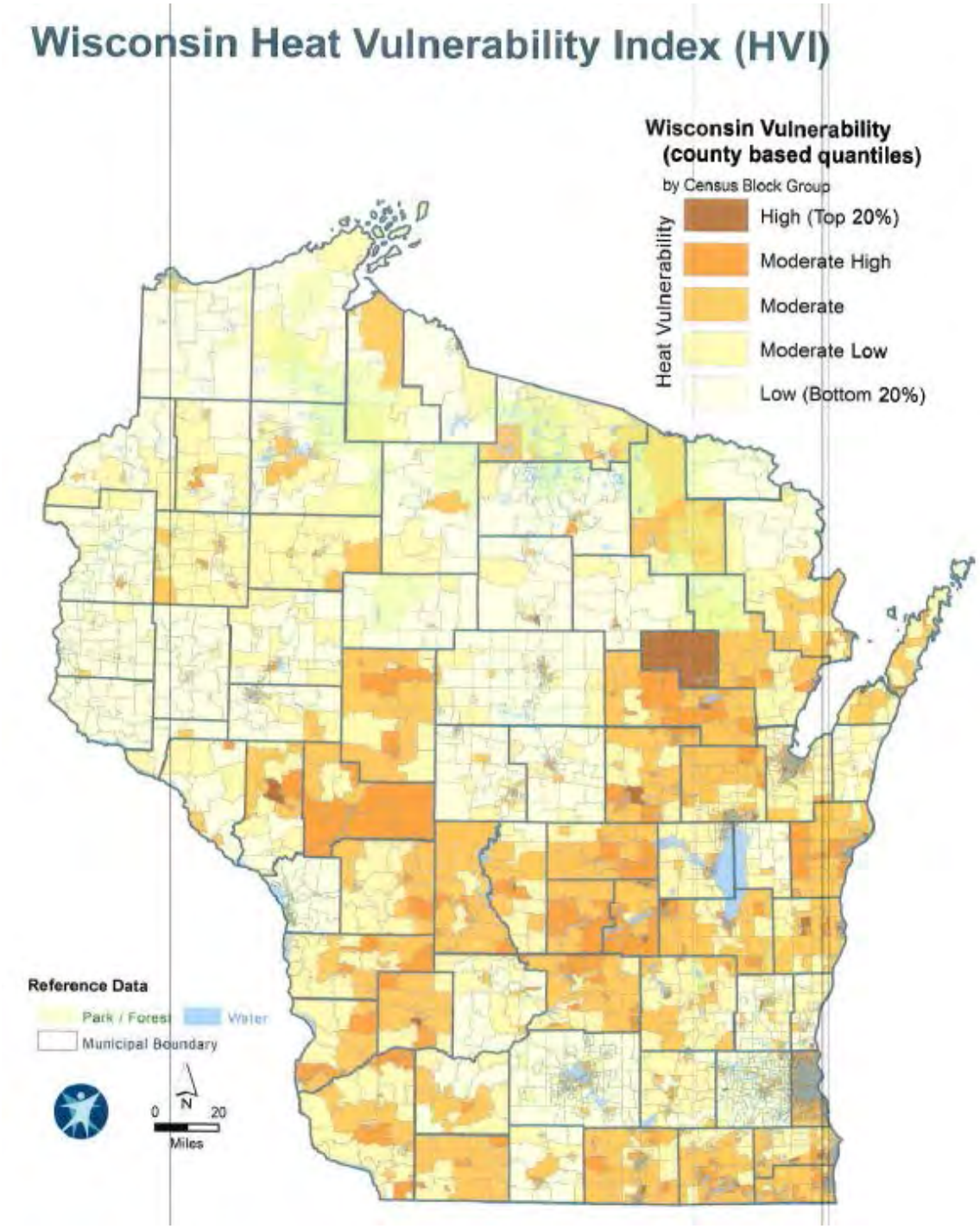
[121] The National Weather Service and Wisconsin Emergency Management

Wisconsin Heat Wave Deaths[122]



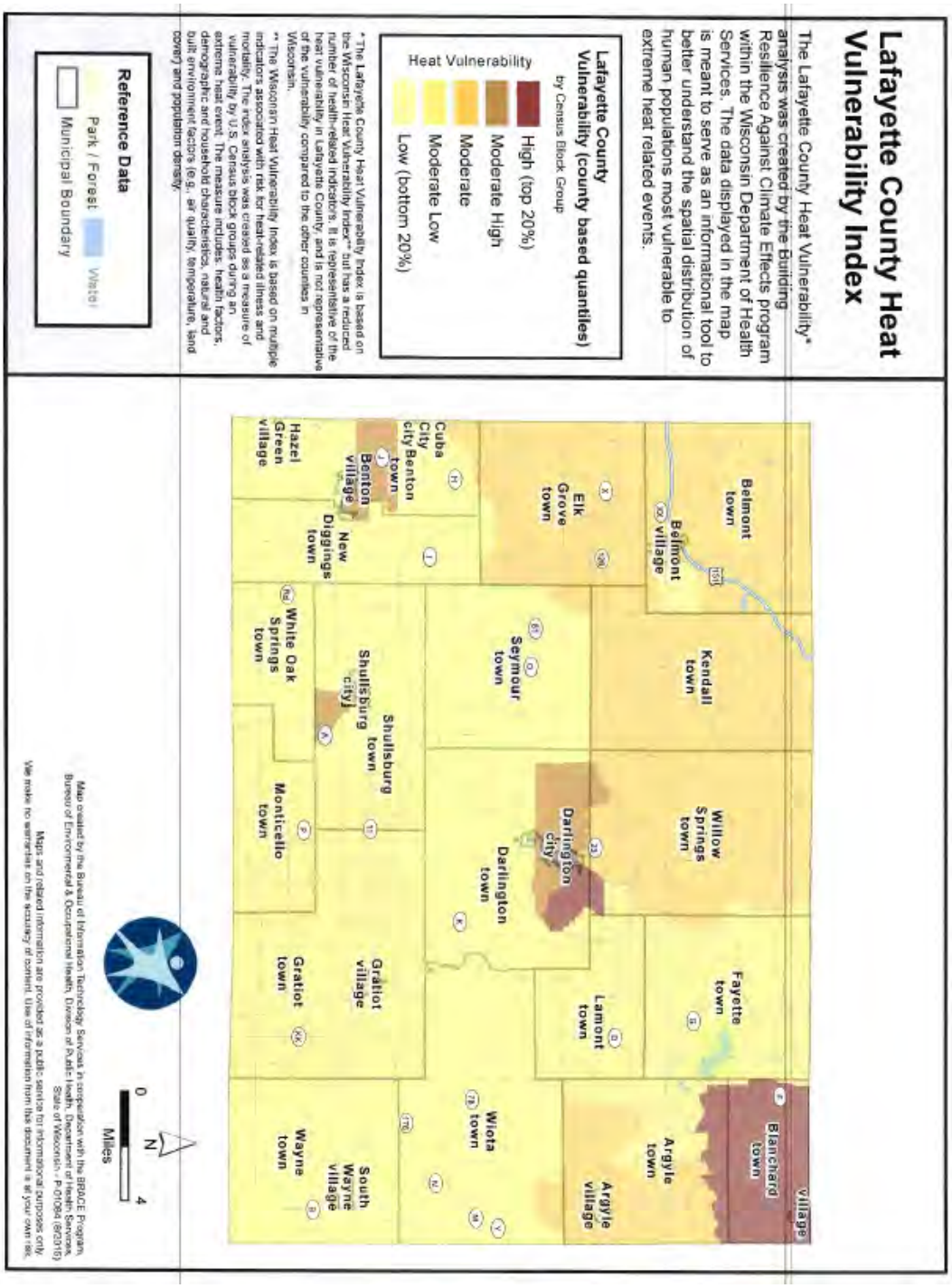
[122] The National Weather Service and Wisconsin Emergency Management

Wisconsin Heat Vulnerability Index[123]



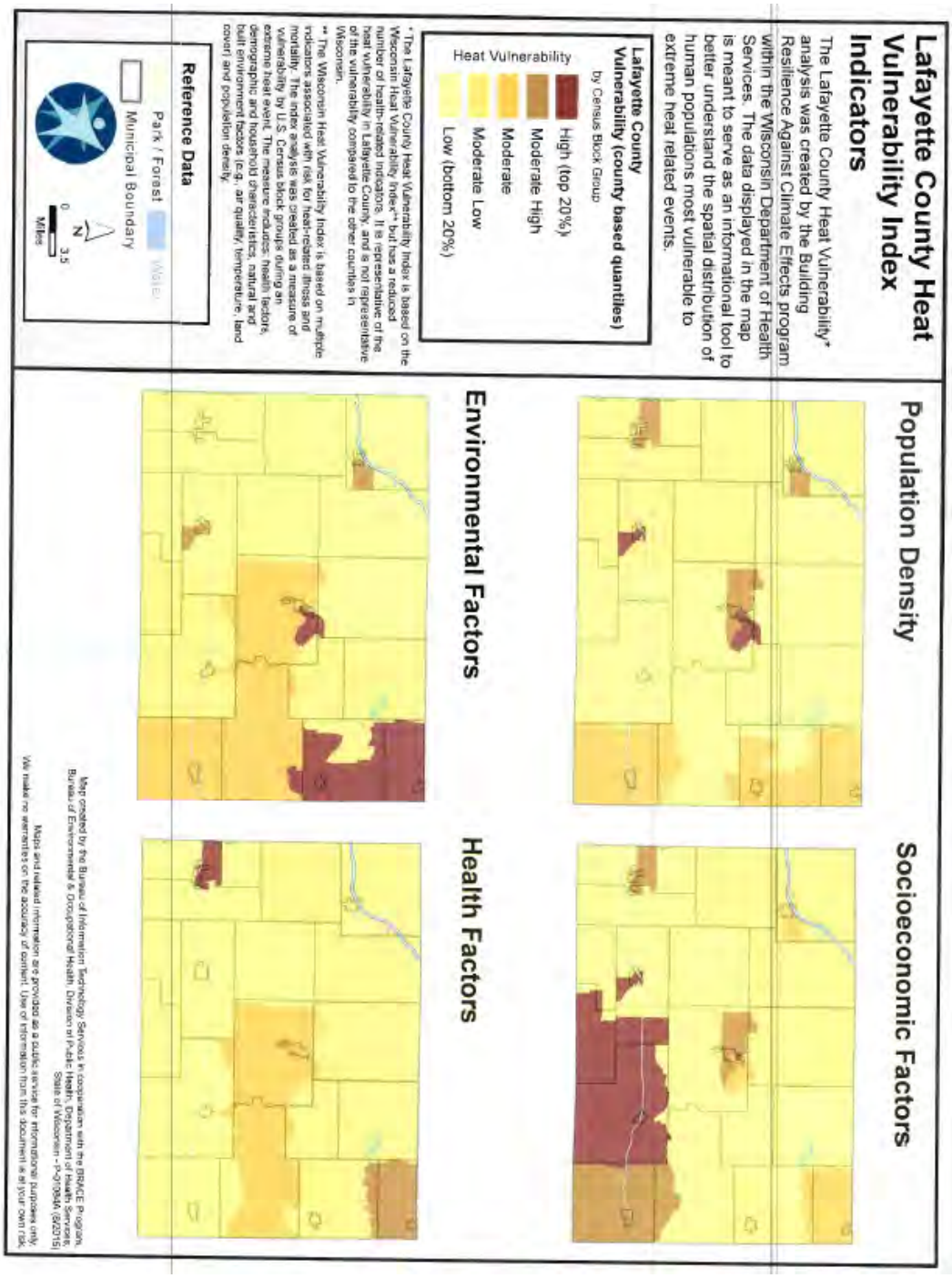
[123] https://www.dhs.wisconsin.gov/images/map-hvi-wi.jpg

Lafayette County Heat Vulnerability Index[124]



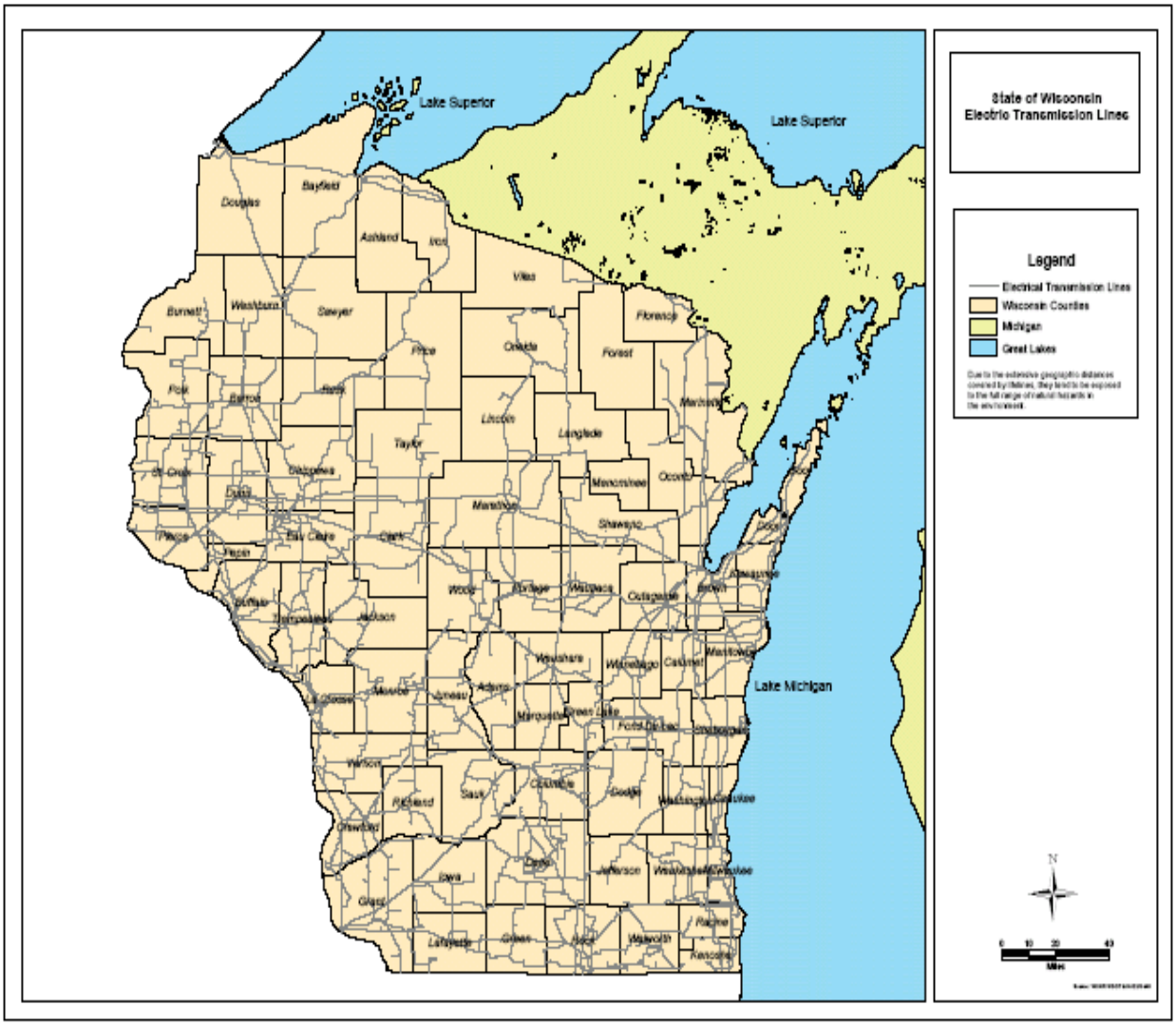
[124] https://www.dhs.wisconsin.gov/publications/p01084-lafayette.pdf

Lafayette County Heat Vulnerability Index Indicators[125]



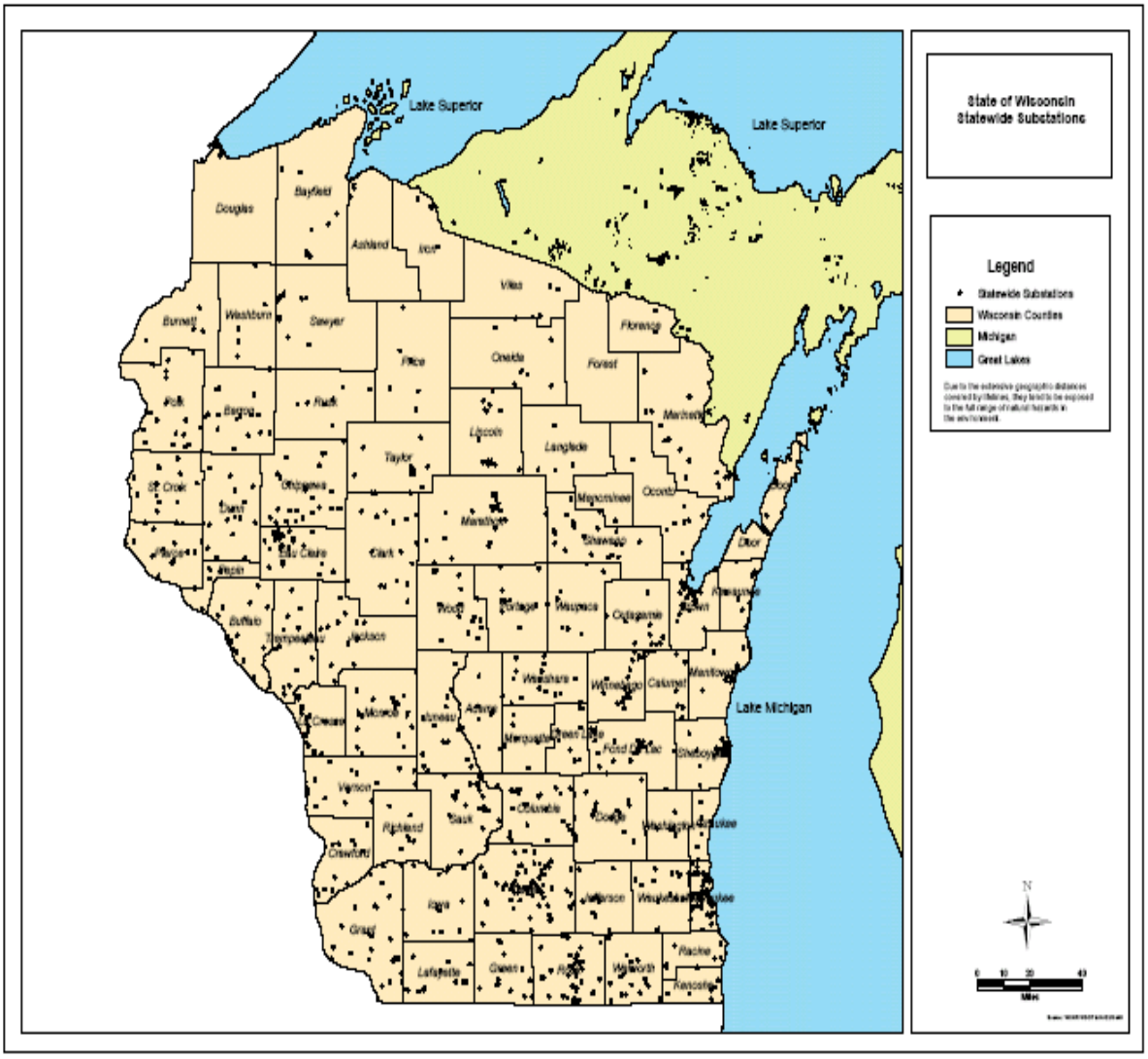
[125] https://www.dhs.wisconsin.gov/publications/p01084a-lafayette.pdf

Electric Transmission Lines [126]



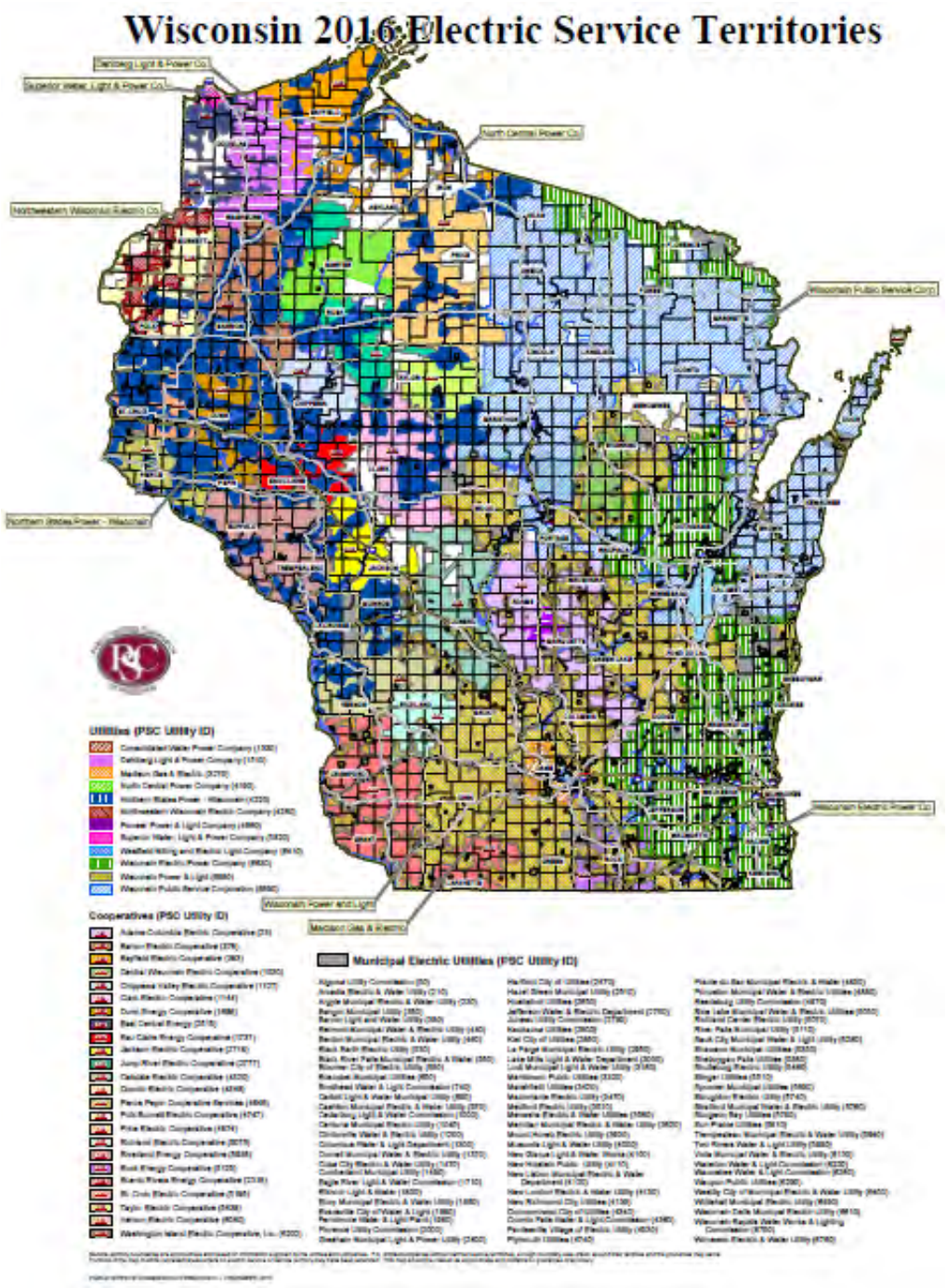
[126] Wisconsin State Hazard Mitigation Plan

Electrical Substations[127]



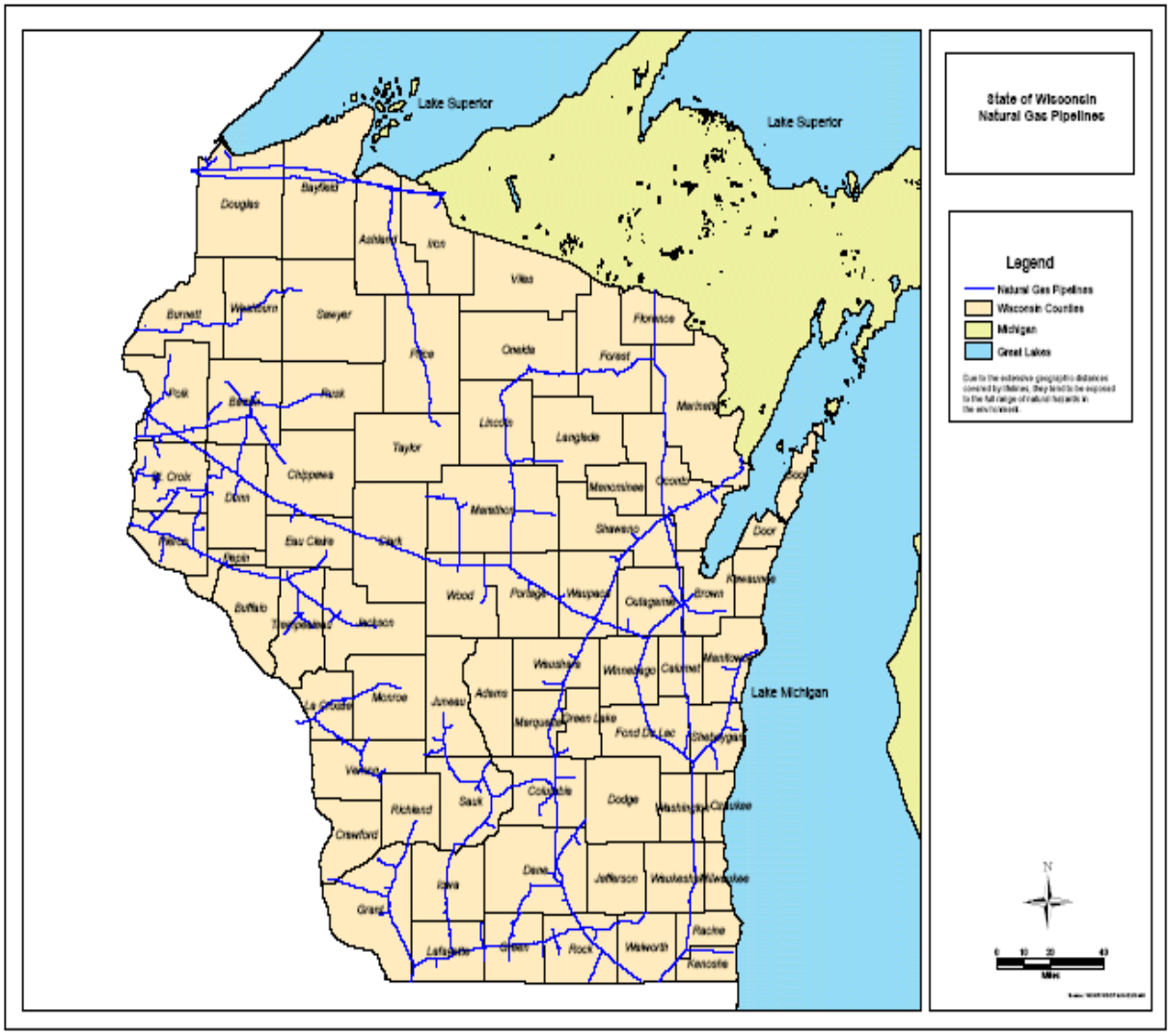
[127] Wisconsin State Hazard Mitigation Plan

Wisconsin Electric Service Territories[128]



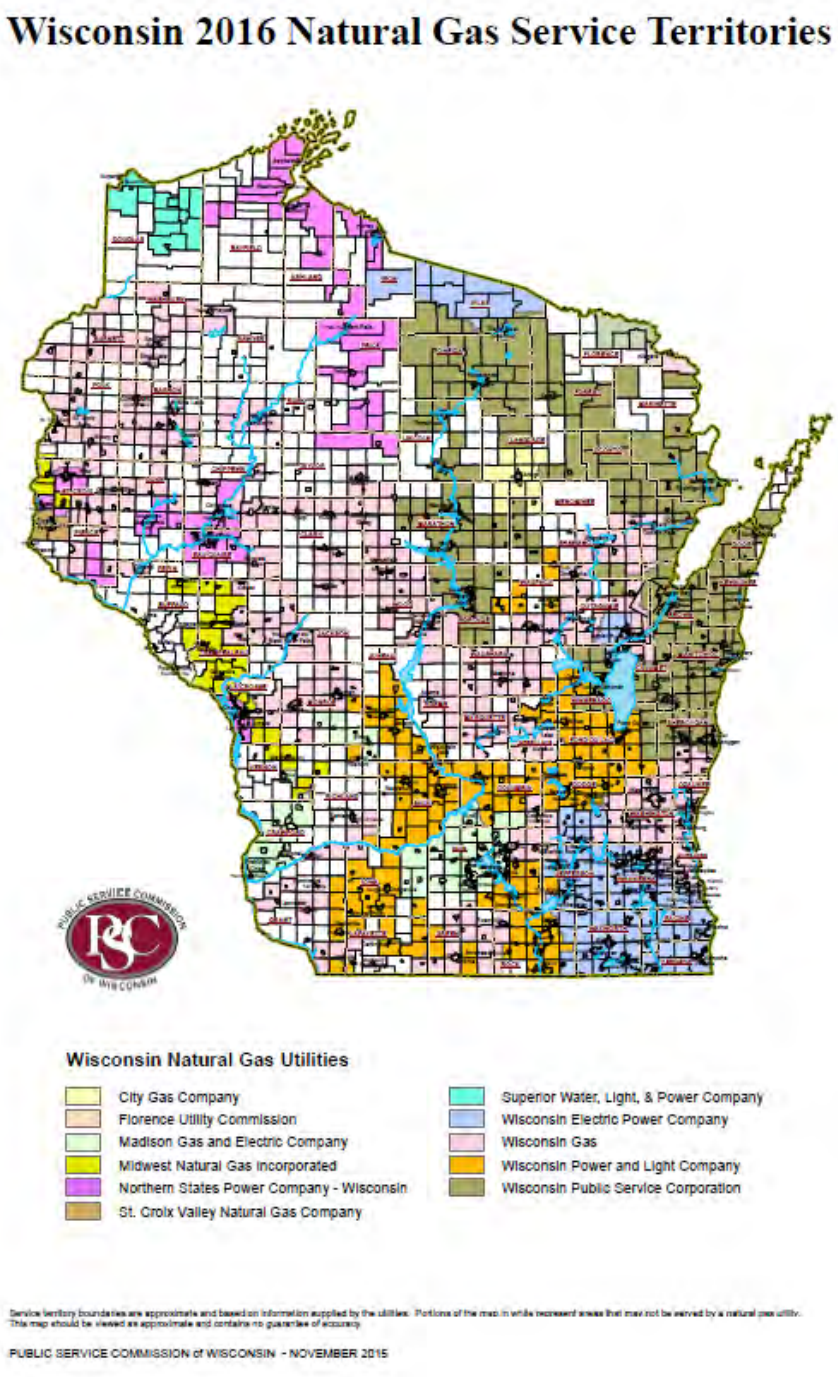
[128] http://www.psc.wi.gov/utilityinfo/maps/documents/largeElectricMap.pdf

Natural Gas Pipelines [129]



[129] Wisconsin State Hazard Mitigation Plan

Wisconsin Natural Gas Service Territories[130]



[130] http://psc.wi.gov/utilityinfo/maps/documents/medGasMap.pdf

Wastewater Facilities [131]

[131] Wisconsin State Hazard Mitigation Plan

Appendix B: Frequency of Occurrence

The following tables detail Lafayette County's event occurrence statistics as reported by the National Weather Service including human loss and injury and property damage estimates from 1 January 1996 through 30 November 2013. [132]

BLIZZARD					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Lafayette County	1/29/1996	0	0	0	0
Lafayette County	2/24/2007	0	0	0	0
Lafayette County	12/11/2010	0	0	0	0
Lafayette County	2/1/2011	0	0	0	0
Lafayette County	12/20/2012	0	0	0	0
Lafayette County	1/26/2014	0	0	0	0

COLD/WIND CHILL					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Lafayette County	1/30/1996	1	0	0	0
Lafayette County	1/31/1996	0	0	0	0
Lafayette County	2/1/1996	0	0	0	0
Lafayette County	1/17/1997	0	0	0	0
Lafayette County	1/5/1999	0	0	0	0
Lafayette County	12/18/2005	0	0	0	0
Lafayette County	2/17/2006	0	0	0	0
Lafayette County	2/18/2006	0	0	0	0
Lafayette County	2/3/2007	0	0	$1000	0
Lafayette County	1/19/2008	0	0	0	0
Lafayette County	1/30/2008	0	0	0	0
Lafayette County	12/15/2008	0	0	0	0
Lafayette County	12/21/2008	0	0	0	0
Lafayette County	1/13/2009	0	0	0	0
Lafayette County	1/14/2009	0	0	0	0

[132] http://www.ncdc.noaa.gov/stormevents/

COLD/WIND CHILL					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Lafayette County	1/24/2009	0	0	0	0
Lafayette County	1/21/2011	0	0	0	0
Lafayette County	1/21/2013	0	0	0	0
Lafayette County	1/27/2014	0	0	0	0
Lafayette County	1/7/2015	0	0	0	0
Lafayette County	1/9/2015	0	0	0	0

DENSE FOG					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Lafayette County	12/03/1999	0	0	0	0
Lafayette County	12/13/1999	0	0	0	0
Lafayette County	01/09/2000	0	0	0	0
Lafayette County	02/25/2000	0	0	0	0
Lafayette County	03/20/2000	0	0	0	0
Lafayette County	07/05/2000	0	0	0	0
Lafayette County	08/22/2000	0	0	0	0
Lafayette County	08/24/2000	0	0	0	0
Lafayette County	10/23/2000	0	0	0	0
Lafayette County	10/25/2000	0	0	0	0
Lafayette County	01/12/2001	0	0	0	0
Lafayette County	01/14/2001	0	0	0	0
Lafayette County	02/24/2001	0	0	0	0
Lafayette County	03/22/2001	0	0	0	0
Lafayette County	04/06/2001	0	0	0	0
Lafayette County	04/07/2001	0	0	0	0
Lafayette County	08/03/2001	0	0	0	0
Lafayette County	08/22/2001	0	0	0	0
Lafayette County	09/29/2001	0	0	0	0
Lafayette County	11/15/2001	0	0	0	0
Lafayette County	12/02/2001	0	0	0	0
Lafayette County	12/16/2001	0	0	0	0
Lafayette County	02/20/2002	0	0	0	0
Lafayette County	04/13/2002	0	0	0	0
Lafayette County	03/20/2003	0	0	0	0
Lafayette County	03/23/2003	0	0	0	0

DENSE FOG					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Lafayette County	10/12/2004	0	0	0	0
Lafayette County	10/28/2004	0	0	0	0
Lafayette County	12/06/2004	0	0	0	0
Lafayette County	12/09/2004	0	0	0	0
Lafayette County	01/11/2005	0	0	0	0
Lafayette County	01/12/2005	0	0	0	0
Lafayette County	12/26/2005	0	0	0	0
Lafayette County	12/27/2005	0	0	0	0
Lafayette County	03/06/2006	0	0	0	0
Lafayette County	03/08/2006	0	0	0	0
Lafayette County	03/09/2006	0	0	0	0
Lafayette County	03/29/2006	0	0	0	0
Lafayette County	05/09/2006	0	0	0	0
Lafayette County	03/09/2007	0	0	0	0
Lafayette County	03/23/2007	0	0	0	0
Lafayette County	11/19/2007	0	0	0	0
Lafayette County	12/19/2007	0	0	0	0
Lafayette County	12/21/2007	0	0	0	0
Lafayette County	01/05/2008	0	0	0	0
Lafayette County	01/07/2008	0	0	0	0
Lafayette County	02/04/2008	0	0	0	0
Lafayette County	12/26/2008	0	0	0	0
Lafayette County	03/10/2009	0	0	0	0
Lafayette County	03/07/2010	0	0	0	0
Lafayette County	03/10/2010	0	0	0	0
Lafayette County	05/21/2010	0	0	0	0
Lafayette County	07/11/2010	0	0	0	0
Lafayette County	12/29/2010	0	0	0	0
Lafayette County	12/14/2011	0	0	0	0
Lafayette County	01/23/2012	0	0	0	0
Lafayette County	01/26/2012	0	0	0	0
Lafayette County	02/01/2012	0	0	0	0
Lafayette County	02/02/2012	0	0	0	0
Lafayette County	03/24/2012	0	0	0	0
Lafayette County	08/26/2012	0	0	0	0
Lafayette County	10/23/2012	0	0	0	0

DENSE FOG					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Lafayette County	11/20/2012	0	0	0	0
Lafayette County	12/02/2012	0	0	0	0
Lafayette County	01/11/2013	0	0	0	0
Lafayette County	12/03/2013	0	0	0	0

DROUGHT					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Lafayette County	08/01/2002	0	0	0	$100K
Lafayette County	08/01/2003	0	0	0	0
Lafayette County	09/01/2003	0	0	0	0
Lafayette County	10/01/2003	0	0	0	0
Lafayette County	11/01/2003	0	0	0	0
Lafayette County	12/01/2003	0	0	0	0
Lafayette County	07/01/2005	0	0	0	0
Lafayette County	08/01/2005	0	0	0	0
Lafayette County	09/01/2005	0	0	0	0
Lafayette County	10/01/2005	0	0	0	0
Lafayette County	11/01/2005	0	0	0	0
Lafayette County	06/26/2012	0	0	0	0
Lafayette County	07/01/2012	0	0	0	0
Lafayette County	08/01/2012	0	0	0	0
Lafayette County	09/01/2012	0	0	0	0
Lafayette County	10/01/2012	0	0	0	0
Lafayette County	11/01/2012	0	0	0	0

EXTREME COLD/WINDCHILL					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Lafayette County	01/30/1996	0	0	0	0
Lafayette County	01/31/1996	0	0	0	0
Lafayette County	02/01/1996	0	0	0	0
Lafayette County	01/17/1997	0	0	0	0
Lafayette County	01/05/1999	0	0	0	0
Lafayette County	12/18/2005	0	0	0	0
Lafayette County	02/17/2006	0	0	0	0

EXTREME COLD/WINDCHILL					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Lafayette County	02/18/2006	0	0	0	0
Lafayette County	02/03/2007	0	0	$1000	0
Lafayette County	01/19/2008	0	0	0	0
Lafayette County	01/30/2008	0	0	0	0
Lafayette County	02/10/2008	0	0	0	0
Lafayette County	12/15/2008	0	0	0	0
Lafayette County	12/21/2008	0	0	0	0
Lafayette County	01/13/2009	0	0	0	0
Lafayette County	01/14/2009	0	0	0	0
Lafayette County	01/15/2009	0	0	0	0
Lafayette County	01/24/2009	0	0	0	0
Lafayette County	01/21/2011	0	0	0	0
Lafayette County	01/21/2012	0	0	0	0
Lafayette County	1/6/2014	0	0	0	0

FLASH FLOOD					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Blanchardville	07/18/1996	0	0	$480K	$100
South Portion of County	05/16/1999	0	0	$250K	$500
South Portion of County	05/31/2000	0	0	$50K	$50
Argyle	09/11/2000	0	0	$10K	0
Darlington	06/04/2002	0	0	$5000	0
Benton	05/22/2004	0	0	$100K	$200
Darlington	05/22/2004	0	0	0	0
Darlington	08/18/2007	0	0	$100K	$500K
Shullsburg	08/22/2007	0	0	$50K	$200K
Darlington	06/12/2008	0	0	$462K	$300K
Benton	07/10/2008	0	0	$10K	0
New Digging	07/24/2009	0	0	$30K	0
Belmont	07/27/2009	0	0	$30K	0
New Digging	08/09/2009	0	0	$20K	$50
South Wayne	6/11/2015	0	0	$1000	$1000

Appendix B: Frequency of Occurrence

FLOOD					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Lafayette County	02/18/1997	0	0	$5000	$10K
Calamine	3/30/1998	0	0	0	0
Elk Grove	6/18/1998	0	0	0	0
Lafayette County	04/23/1999	0	0	$5000	0
Benton	8/22/2002	0	0	0	0
Lafayette County	05/22/2004	0	0	$50K	$50K
Lafayette County	06/01/2004	0	0	$500K	$1M
South Wayne	03/11/2013	0	0	$5000	$1000
Yellowstone Lake State Park	03/11/2013	0	0	$5000	$1000
Yellowstone Lake State Park	06/22/2013	0	0	$8000	$5000

FUNNEL CLOUD					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Benton	5/28/1998	0	0	0	0
Argyle	6/10/2000	0	0	0	0
Belmont	3/31/2007	0	0	0	0
South Wayne	9/25/2011	0	0	0	0

HAIL						
Location	*Date*	*Diameter (Inches)*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Darlington	06/23/1996	1.25	0	0	0	0
New Digging	05/18/1997	0.88	0	0	0	0
Belmont	07/02/1997	2.00	0	0	$1000	0
Darlington	05/15/1998	0.75	0	0	0	0
Woodford	05/19/1998	1.75	0	0	0	0
Benton	05/28/1998	0.75	0	0	$12K	0
Benton	05/16/1999	1.00	0	0	0	0
South Wayne	05/16/1999	1.00	0	0	0	0
Argyle	07/20/1999	0.75	0	0	0	0
Darlington	07/28/1999	1.00	0	0	0	0
Shullsburg	05/08/2000	1.00	0	0	0	0
Benton	05/11/2000	1.75	0	0	$10K	0

HAIL						
Location	*Date*	*Diameter (Inches)*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Gratiot	05/11/2000	1.25	0	0	$5000	0
Belmont	05/17/2000	0.75	0	0	0	0
Belmont	05/17/2000	1.75	0	0	$2000	0
Darlington	05/31/2000	0.75	0	0	0	0
Belmont	09/11/2000	1.00	0	0	$20K	0
Shullsburg	07/03/2001	0.75	0	0	0	$50K
Belmont	04/18/2002	1.00	0	0	$500	0
Belmont	04/18/2002	1.75	0	0	$3000	0
Darlington	08/02/2003	0.75	0	0	0	0
Benton	05/07/2004	1.00	0	0	0	0
Darlington	03/30/2005	0.75	0	0	0	0
Darlington	03/30/2005	1.25	0	0	0	0
Darlington	03/30/2005	1.00	0	0	0	0
Darlington	04/13/2006	2.00	0	0	$2.38M	0
Belmont	04/13/2006	1.00	0	0	0	0
Belmont	04/13/2006	2.00	0	0	0	0
South Wayne	07/22/2006	1.00	0	0	0	0
Argyle	07/22/2006	0.75	0	0	0	0
South Wayne	07/22/2006	1.00	0	0	0	0
Leslie	07/17/2007	0.75	0	0	0	0
Woodford	07/17/2007	0.75	0	0	0	0
Benton	05/25/2008	1.00	0	0	0	0
Argyle	06/12/2008	0.88	0	0	0	0
Belmont	07/24/2009	2.75	0	0	$500K	$6.42M
Benton	07/24/2009	2.75	0	0	$500K	$6.42M
Shullsburg	04/05/2010	0.88	0	0	0	0
Belmont	04/03/2011	1.75	0	0	0	0
Darlington	04/03/2011	1.75	0	0	0	0
Gratiot	04/03/2011	1.75	0	0	0	0
Argyle	06/08/2011	0.75	0	0	0	0
Belmont	09/05/2012	0.75	0	0	0	0

HEAT					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Statewide	06/14/1994	0	0	0	0
Statewide	10/12/1995	0	0	0	0

HEAT					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Lafayette County	11/23/1998	0	0	0	0
Lafayette County	12/01/1998	0	0	0	0
Lafayette County	07/04/1999	0	0	0	0
Lafayette County	07/29/1999	0	0	0	0
Lafayette County	11/08/1999	0	0	0	0
Lafayette County	11/13/1999	0	0	0	0
Lafayette County	07/31/2001	0	0	0	0
Lafayette County	08/06/2001	0	0	0	0
Lafayette County	04/15/2002	0	0	0	0
Lafayette County	06/30/2002	0	0	0	0
Lafayette County	07/01/2002	0	0	0	0
Lafayette County	07/08/2002	0	0	0	0
Lafayette County	07/21/2002	0	0	0	0
Lafayette County	07/30/2006	0	0	0	0
Lafayette County	08/01/2006	0	0	0	0
Lafayette County	06/23/2009	0	0	0	0
Lafayette County	07/14/2010	0	0	0	0
Lafayette County	08/11/2010	0	0	0	0
Lafayette County	06/07/2011	0	0	0	0
Lafayette County	07/01/2011	0	0	0	0
Lafayette County	07/17/2011	0	0	0	0
Lafayette County	07/21/2011	0	0	0	0
Lafayette County	06/28/2012	0	0	0	0
Lafayette County	07/01/2012	0	0	0	0
Lafayette County	07/16/2012	0	0	0	0
Lafayette County	07/18/2012	0	0	0	0
Lafayette County	07/23/2012	0	0	0	0
Lafayette County	07/25/2012	0	0	0	0
Lafayette County	07/16/2013	0	0	0	0
Lafayette County	08/30/2013	0	0	0	0
Lafayette County	7/22/2014	0	0	0	0

HEAVY SNOW					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Lafayette County	1/26/1996	0	0	0	0
Lafayette County	12/25/1996	0	0	0	0
Lafayette County	2/4/1997	0	0	0	0
Lafayette County	12/11/2000	0	0	0	0
Lafayette County	12/18/2000	0	0	0	0
Lafayette County	3/2/2002	0	0	0	0
Lafayette County	2/5/2004	0	0	0	0

HIGH WIND						
Location	*Date*	*Speed*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Lafayette County	4/6/1997		0	1	75K	0
Lafayette County	11/10/1998		0	0	310K	100K
Lafayette County	4/7/2001	50 knots. E	0	0	0	0
Lafayette County	11/13/2005	52 knots. MG	0	0	10K	0
Lafayette County	10/26/2010	50 knots. EG	0	0	15K	0
Lafayette County	1/19/2013	50 knots. EG	0	0	15K	0
Lafayette County	4/10/2013	51 knots. EG	0	0	0	0
Lafayette County	3/16/2016	50 knots. EG	0	0	10K	0

E = Estimated; G = Gusts; M = Maximum.

ICE STORM					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Lafayette County	12/23/1996	0	0	0	0
Lafayette County	12/23/2009	0	0	0	0

LIGHTNING					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Belmont	05/18/1997	0	0	$17K	0
Darlington	06/15/1997	0	0	$10K	0
Shullsburg	06/29/1998	0	0	$4K	0
South Wayne	06/01/2000	0	0	$3K	0
South Wayne	09/11/2000	0	0	$30K	0

LIGHTNING					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Argyle	06/30/2005	0	0	0	0
Argyle	06/21/2007	0	0	$10K	0

STRONG WIND						
Location	*Date*	*Speed*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Lafayette County	5/24/2000		0	0	0	0
Lafayette County	6/16/2000		0	0	$5K	0
Lafayette County	10/24/2001		0	0	0	0
Lafayette County	12/5/2001		0	0	$5K	0
Lafayette County	11/12/2003	43 knots. MG	0	0	$3K	0
Lafayette County	3/14/2004	40 knots. MG	0	0	$2K	0
Lafayette County	4/18/2004	43 knots. MG	0	0	$5K	0
Lafayette County	12/12/2004	43 knots. EG	0	0	$1K	0
Lafayette County	1/24/2006	39 knots. EG	0	0	$5K	0
Lafayette County	3/13/2006	39 knots. EG	0	0	$5K	0
Lafayette County	3/31/2006	39 knots. EG	0	0	$2K	0
Lafayette County	5/24/2007	39 knots. EG	0	0	$2K	0
Lafayette County	11/5/2007	39 knots. EG	0	0	$5K	0
Lafayette County	10/26/2008	39 knots. EG	0	0	$2K	0
Lafayette County	10/6/2009	39 knots. EG	0	0	$5K	0
Lafayette County	5/5/2010	39 knots. EG	0	0	$10K	0
Lafayette County	9/7/2010	39 knots. MG	0	0	$5K	0
Lafayette County	4/15/2011	39 knots. EG	0	0	$3K	0
Lafayette County	5/15/2011	39 knots. EG	0	0	$5K	0
Lafayette County	9/29/2011	43 knots. EG	0	0	$2K	0

STRONG WIND						
Location	*Date*	*Speed*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Lafayette County	1/1/2012	39 knots. EG	0	0	$1K	0
Lafayette County	4/2/2016	43 knots. EG	0	0	$50K	0

E = Estimated; G = Gusts; M = Maximum.

THUNDERSTORM WIND						
Location	*Date*	*Speed*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Shullsburg	6/23/1996		0	0	3K	0
Woodford	6/29/1996		0	0	18K	0
Argyle	7/8/1996		0	0	1K	0
Gratiot	4/5/1997		0	0	100K	0
Darlington	4/5/1997		0	0	400K	0
Belmont	6/15/1997		0	0	1K	0
Lamont	6/15/1997		0	0	5K	0
South Wayne	6/20/1997		0	0	5K	0
Benton	6/21/1997		0	0	3K	0
Gratiot	6/21/1997		0	0	1K	0
Shullsburg	9/16/1997		0	0	13K	0
South Wayne	9/16/1997		0	0	1K	0
Seymour Corners	5/28/1998		0	0	3K	0
South Wayne	5/28/1998		0	0	8K	0
Lafayette County	5/31/1998		0	0	875K	100K
Benton	6/18/1998		0	0	1K	0
Belmont	6/28/1998		0	0	2K	0
Lamont	6/28/1998		0	0	3K	0
Darlington	7/19/1998		0	0	20K	0
Argyle	7/20/1998		0	0	2K	0
South Wayne	7/20/1998		0	0	4K	0
Shullsburg	2/11/1999		0	0	3K	0
Belmont	6/1/2000		0	0	15K	0
Gratiot	7/10/2000		0	0	15K	0
Shullsburg	8/17/2000		0	0	2K	0
Lamont	9/11/2000		0	0	2K	0
Shullsburg	6/14/2001	52 knots. E	0	0	0	0
Benton	9/7/2001	56 knots. E	0	0	0	0
Gratiot	4/18/2002	56 knots. E	0	0	0	0
Leadmine	8/21/2002	56 knots. E	0	0	0	0
Gratiot	8/21/2002	56 knots. E	0	0	0	0

THUNDERSTORM WIND						
Location	*Date*	*Speed*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Lamont	8/21/2002	70 knots. E	0	0	110K	0
Benton	7/8/2003	56 knots. EG	0	0	0	0
Belmont	5/21/2004	52 knots. EG	0	0	0	0
Belmont	8/26/2004	56 knots. EG	0	0	0	0
Gratiot	8/26/2004	52 knots. EG	0	0	0	0
Argyle	9/23/2004	56 knots. EG	0	0	10K	0
Belmont	10/29/2004	52 knots. EG	0	0	0	0
Benton	6/4/2005	56 knots. EG	0	0	5K	0
Argyle	6/4/2005	52 knots. EG	0	0	0	0
Shullsburg	8/18/2005	70 knots. EG	0	0	500K	0
South Wayne	8/18/2005	70 knots. EG	0	0	100K	0
Argyle	8/18/2005	70 knots. EG	0	0	100K	0
South Wayne	6/21/2006	50 knots. EG	0	0	0	0
South Wayne	7/17/2006	52 knots. EG	0	0	2K	0
Belmont	7/20/2006	65 knots. EG	0	0	5K	0
Argyle	7/20/2006	65 knots. EG	0	0	20K	0
Shullsburg	7/20/2006	65 knots. EG	0	0	5K	0
Argyle	8/24/2006	52 knots. EG	0	0	0	0
Shullsburg	8/25/2006	52 knots. EG	0	0	0	0
Argyle	7/3/2007	56 knots. EG	0	0	5K	0
Belmont	8/12/2007	52 knots. EG	0	0	0	0
Lamont	8/14/2007	52 knots. EG	0	0	2K	0
Belmont	8/22/2007	52 knots. EG	0	0	25K	0
Belmont	5/25/2008	56 knots. EG	0	0	0	0

THUNDERSTORM WIND						
Location	*Date*	*Speed*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Argyle	6/8/2008	50 knots. EG	0	0	0	0
Gratiot	6/8/2008	50 knots. EG	0	0	0	0
Belmont	7/7/2008	50 knots. EG	0	0	0	0
Belmont	7/31/2008	56 knots. EG	0	0	0	0
Benton	6/19/2009	65 knots. EG	0	0	5K	0
Shullsburg	6/19/2009	56 knots. EG	0	0	0	0
Belmont	7/24/2009	78 knots. EG	0	0	10K	0
Benton	7/24/2009	78 knots. EG	0	0	0	0
Darlington	7/27/2009	65 knots. EG	0	0	0	15K
Calamine	8/9/2009	65 knots. EG	0	0	0	0
Yellowstone Lake State Park	8/9/2009	65 knots. EG	0	0	50K	0
South Wayne	6/18/2010	56 knots. EG	0	0	0	0
New Digging	6/23/2010	56 knots. EG	0	0	0	0
Darlington	6/23/2010	56 knots. EG	0	0	0	0
Belmont	7/11/2011	65 knots. EG	0	0	200K	10M
Darlington	7/24/2012	56 knots. EG	0	0	10K	0
Gratiot	7/24/2012	56 knots. EG	0	0	0	0
Shullsburg	7/25/2012	56 knots. EG	0	0	0	0
Darlington	7/25/2012	56 knots. EG	0	0	0	0
South Wayne	7/25/2012	56 knots. EG	0	0	0	0
Argyle	7/25/2012	56 knots. EG	0	0	0	0
Darlington	9/4/2012	56 knots. EG	0	0	2K	0
New Digging	9/4/2012	56 knots. EG	0	0	2K	0
South Wayne	5/19/2013	56 knots. EG	0	0	5K	0

Appendix B: Frequency of Occurrence

THUNDERSTORM WIND						
Location	*Date*	*Speed*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Yellowstone Lake State Park	5/30/2013	43 knots. EG	0	0	5K	0
Belmont	6/22/2013	52 knots. EG	0	0	2K	0
Darlington	6/26/2013	53 knots. MG	0	0	5K	0
Benton	9/19/2013	55 knots. EG	0	0	40K	0
Woodford	6/1/2014	78 knots. EG	0	0	45K	0
Leslie	6/16/2014	70 knots. EG	0	0	30K	0
Darlington Airport	6/16/2014	70 knots. EG	0	0	30K	0
Fayette	6/16/2014	70 knots. EG	0	0	30K	0
Wiota	6/30/2014	65 knots. EG	0	0	25K	0
Ipswich	6/22/2015	78 knots. EG	0	0	100K	0

E = Estimated; G = Gusts; M = Maximum.

TORNADO						
Location	*Date*	*Strength*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Benton	5/15/1998	F2	0	11	1.7M	140K
Calamine	6/1/2000	F1	0	0	100K	0
Belmont	5/10/2003	F1	0	1	200K	0
Shullsburg	6/1/2007	EF0	0	0	0	0
Dunbarton	6/1/2007	EF0	0	0	0	0
Seymour Corners	7/24/2009	EF0	0	0	100K	10K
New Digging	7/24/2009	EF0	0	0	50K	10K
Gratiot	7/27/2009	EF0	0	0	0	0
Gratiot	6/21/2010	EF1	0	0	15K	0
Leslie	6/16/2014	EF1	0	0	1.5M	0
Leslie	6/16/2014	EF1	0	0	30K	0

WINTER STORM					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Lafayette County	3/8/1998	0	0	0	0
Lafayette County	1/2/1999	0	0	0	0
Lafayette County	3/8/1999	0	0	0	0
Lafayette County	2/17/2000	0	0	0	0
Lafayette County	4/7/2000	0	0	0	0
Lafayette County	1/6/2005	0	0	0	0
Lafayette County	1/22/2005	0	0	0	0
Lafayette County	2/16/2006	0	0	0	0
Lafayette County	2/25/2007	0	0	0	0
Lafayette County	4/11/2007	0	0	$10K	0
Lafayette County	12/1/2007	0	0	0	0
Lafayette County	12/11/2007	0	0	0	0
Lafayette County	12/22/2007	0	0	0	0
Lafayette County	1/29/2008	0	0	0	0
Lafayette County	2/5/2008	0	0	0	0
Lafayette County	2/17/2008	0	0	0	0
Lafayette County	3/21/2008	0	0	0	0
Lafayette County	12/8/2008	0	0	0	0
Lafayette County	12/18/2008	0	0	0	0
Lafayette County	12/20/2008	0	0	0	0
Lafayette County	2/21/2009	0	0	0	0
Lafayette County	12/8/2009	0	0	0	0
Lafayette County	1/7/2010	0	0	0	0
Lafayette County	1/30/2013	0	0	0	0
Lafayette County	3/5/2013	0	0	0	0
Lafayette County	12/22/2013	0	0	0	0
Lafayette County	2/1/2015	0	0	0	0
Lafayette County	3/22/2015	0	0	0	0
Lafayette County	11/20/2015	0	0	0	0
Lafayette County	12/28/2015	0	0	0	0

WINTER WEATHER					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Lafayette County	2/3/2003	0	0	0	0
Lafayette County	4/7/2003	0	0	0	0
Lafayette County	12/10/2003	0	0	0	0
Lafayette County	1/4/2004	0	0	0	0
Lafayette County	1/16/2004	0	0	0	0
Lafayette County	2/8/2004	0	0	0	0
Lafayette County	12/18/2004	0	0	0	0
Lafayette County	11/15/2005	0	0	0	0
Lafayette County	11/10/2006	0	0	0	0
Lafayette County	1/12/2007	0	0	0	0
Lafayette County	1/14/2007	0	0	0	0
Lafayette County	1/21/2007	0	0	0	0
Lafayette County	3/2/2007	0	0	0	0
Lafayette County	11/21/2007	0	0	0	0
Lafayette County	12/4/2007	0	0	0	0
Lafayette County	12/23/2007	0	0	0	0
Lafayette County	12/28/2007	0	0	0	0
Lafayette County	1/16/2008	0	0	0	0
Lafayette County	1/21/2008	0	0	0	0
Lafayette County	2/9/2008	0	0	0	0
Lafayette County	2/11/2008	0	0	0	0
Lafayette County	2/25/2008	0	0	0	0
Lafayette County	11/24/2008	0	0	0	0
Lafayette County	12/3/2008	0	0	0	0
Lafayette County	12/16/2008	0	0	0	0
Lafayette County	12/23/2008	0	0	0	0
Lafayette County	12/24/2008	0	0	0	0
Lafayette County	12/25/2008	0	0	0	0
Lafayette County	12/27/2008	0	0	0	0
Lafayette County	1/9/2009	0	0	0	0
Lafayette County	1/9/2009	0	0	0	0
Lafayette County	1/12/2009	0	0	0	0
Lafayette County	2/26/2009	0	0	0	0
Lafayette County	3/28/2009	0	0	0	0
Lafayette County	2/8/2010	0	0	0	0
Lafayette County	3/19/2010	0	0	0	0

WINTER WEATHER					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Lafayette County	12/3/2010	0	0	0	0
Lafayette County	12/20/2010	0	0	0	0
Lafayette County	1/17/2011	0	0	0	0
Lafayette County	2/21/2011	0	0	0	0
Lafayette County	11/9/2011	0	0	0	0
Lafayette County	1/12/2012	0	0	0	0
Lafayette County	1/17/2012	0	0	0	0
Lafayette County	1/20/2012	0	0	0	0
Lafayette County	1/22/2012	0	0	0	0
Lafayette County	2/23/2012	0	0	0	0
Lafayette County	3/2/2012	0	0	0	0
Lafayette County	1/27/2013	0	0	0	0
Lafayette County	2/3/2013	0	0	0	0
Lafayette County	2/7/2013	0	0	0	0
Lafayette County	2/21/2013	0	0	0	0
Lafayette County	2/26/2013	0	0	0	0
Lafayette County	3/18/2013	0	0	0	0
Lafayette County	11/25/2013	0	0	0	0
Lafayette County	12/8/2013	0	0	0	0
Lafayette County	12/19/2013	0	0	0	0
Lafayette County	12/31/2013	0	0	0	0
Lafayette County	1/10/2014	0	0	0	0
Lafayette County	1/14/2014	0	0	0	0
Lafayette County	1/18/2014	0	0	0	0
Lafayette County	1/24/2014	0	0	0	0
Lafayette County	1/26/2014	0	0	0	0
Lafayette County	2/13/2014	0	0	0	0
Lafayette County	2/17/2014	0	0	0	0
Lafayette County	3/4/2014	0	0	0	0
Lafayette County	11/21/2014	0	0	0	0
Lafayette County	11/24/2014	0	0	0	0
Lafayette County	12/8/2014	0	0	0	0
Lafayette County	1/8/2015	0	0	0	0
Lafayette County	3/3/2015	0	0	0	0
Lafayette County	2/14/2016	0	0	0	0
Lafayette County	2/29/2016	0	0	0	0

Appendix B: Frequency of Occurrence

WINTER WEATHER					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
Lafayette County	3/1/2016	0	0	0	0

Appendix C: Plan Adoption

This plan has been adopted by Lafayette County and its major municipal bodies including

(note which municipalities did NOT adopt the plan)

Appendix D: 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	Grants as available	EM Dept.	On-going	Low-Medium	Lafayette Co.; CIs Cuba City, Darlington, & Shullsburg; VIs Argyle, Belmont, Benton, Blanchardville, Gratiot, Hazel Green & South Wayne; & TNs Argyle, Belmont, Benton, Blanchard, Darlington, Elk Grove, Fayette, Gratiot, Kendall, Lamont, Monticello, New Diggings, Seymour, Shullsburg, Wayne, White Oak Springs, Willow Springs & Wiota.	Currently, residents are advised to purchase radios at local retailers.
	Fire Department will promote NOAA	Grants as	Village Admin /	2019	Medium	VI Belmont, TN	County EM will buy and

	weather radio sales	available	Fire Department			Benton	provide to village halls (for sale and reimbursement).
	Explore upgrading area early warning siren, as need arises and funding is available: • Belmont has 2 • Benton has 2 • Argyle has 1 • Blanchardville has 1 • South Wayne has 1 • Wiota has 1 • Shullsburg has 1 • Gratiot has 1 • Darlington has 3 • Woodford has 1	As funding available; Each siren would require $25,000 to upgrade	Belmont Benton Argyle Blanchardville South Wayne Wiota Shullsburg Gratiot Darlington Woodford	On-going	High	VI Belmont TN Benton TN Argyle VI Blanchardville VI South Wayne TN Wiota CI Shullsburg VI Gratiot CI Darlington TN Woodford	All sirens are owned by and are the responsibility of the individual municipalities. TN Belmont – Exploring putting in one more siren for better coverage near schools and the cheese factory, a major employer in the community.
	Create an Emergency Management Department webpage within the current county webpage with links to the ARC, Homeland Security/FEMA, WEM especially focusing on preparedness bulletins. Publicize the website to show the community what is there.	Covered by Dept. annual budget	EM Dept. and County Clerk's Office	On-going	Low	Lafayette Co.; CIs Cuba City, Darlington, & Shullsburg; VIs Argyle, Belmont, Benton, Blanchardville, Gratiot, Hazel Green & South Wayne; & TNs Argyle, Belmont, Benton, Blanchard, Darlington, Elk	The county does not have the ability to make changes to the website themselves; they use the state's hosting services and need to provide changes to the state. The Sheriff's Department is using Facebook and will add Emergency Management.

						Grove, Fayette, Gratiot, Kendall, Lamont, Monticello, New Diggings, Seymour, Shullsburg, Wayne, White Oak Springs, Willow Springs & Wiota.	
	Conduct a feasibility study and cost benefit analysis for installing a Reverse 9-1-1 communications system in the county	Covered by Dept. annual budget or as grants are available	EM Dept./Sheriff's Dept.	2014	Medium	Lafayette Co.; CIs Cuba City, Darlington, & Shullsburg; VIs Argyle, Belmont, Benton, Blanchardville, Gratiot, Hazel Green & South Wayne; & TNs Argyle, Belmont, Benton, Blanchard, Darlington, Elk Grove, Fayette, Gratiot, Kendall, Lamont, Monticello, New Diggings, Seymour, Shullsburg, Wayne, White Oak Springs, Willow Springs & Wiota.	Considering Nixle. Will review study results for final determination.
	Replace countywide communications equipment (all communications equipment for fire, law enforcement,	$800K-1M / FEMA Fire Grant	EM Dept.	2013 (this is when narrow	High	Lafayette Co.; CIs Cuba City, Darlington, &	Grant has already been submitted to FEMA. Grant was received.

	EMS, public works and first responders, including mobiles and portables; put computers in all response vehicles; no towers).	FEMA Fire Grant	EM Dept.	banding will be required 2017-2018	High	Shullsburg; VIs Argyle, Belmont, Benton, Blanchardville, Gratiot, Hazel Green & South Wayne; & TNs Argyle, Belmont, Benton, Blanchard, Darlington, Elk Grove, Fayette, Gratiot, Kendall, Lamont, Monticello, New Diggings, Seymour, Shullsburg, Wayne, White Oak Springs, Willow Springs & Wiota.	County has computers and communications updated. Computers not in all vehicles. Get communications directly into vehicles.
Drought and Dust Storms	Provide a link on the county disaster preparedness website to the National Weather Service.	Covered by Dept. annual budget	EM Dept. and County Clerk's Office	On-going	Low	Lafayette Co.; CIs Cuba City, Darlington, & Shullsburg; VIs Argyle, Belmont, Benton, Blanchardville, Gratiot, Hazel Green & South Wayne; & TNs Argyle, Belmont, Benton, Blanchard, Darlington, Elk Grove, Fayette, Gratiot, Kendall, Lamont,	

						Monticello, New Diggings, Seymour, Shullsburg, Wayne, White Oak Springs, Willow Springs & Wiota.	
	County should be prepared to provide information to farmers during times of drought	Covered by Dept. annual budget	UW-Ext./USDA	As needed	Low	Lafayette Co.; CIs Cuba City, Darlington, & Shullsburg; VIs Argyle, Belmont, Benton, Blanchardville, Gratiot, Hazel Green & South Wayne; & TNs Argyle, Belmont, Benton, Blanchard, Darlington, Elk Grove, Fayette, Gratiot, Kendall, Lamont, Monticello, New Diggings, Seymour, Shullsburg, Wayne, White Oak Springs, Willow Springs & Wiota.	
	Inform farmers on purchasing crop insurance	Covered by Dept. annual budget	UW-Ext./USDA	On-going	Low	Lafayette Co.; CIs Cuba City, Darlington, & Shullsburg; VIs Argyle, Belmont, Benton,	

						Blanchardville, Gratiot, Hazel Green & South Wayne; & TNs Argyle, Belmont, Benton, Blanchard, Darlington, Elk Grove, Fayette, Gratiot, Kendall, Lamont, Monticello, New Diggings, Seymour, Shullsburg, Wayne, White Oak Springs, Willow Springs & Wiota.	
Flooding and Dam Failure	*Place a link on the EM Dept. website for flood preparedness material and monitoring.	Covered by Dept. annual budget	EM Dept. and County Clerk's Office	On-going	Low	Lafayette Co.; CIs Cuba City, Darlington, & Shullsburg; VIs Argyle, Belmont, Benton, Blanchardville, Gratiot, Hazel Green & South Wayne; & TNs Argyle, Belmont, Benton, Blanchard, Darlington, Elk Grove, Fayette, Gratiot, Kendall, Lamont, Monticello, New Diggings, Seymour,	Links to include National Flood Insurance Program.

						Shullsburg, Wayne, White Oak Springs, Willow Springs & Wiota.	
	Identify, study and implement (as funding allows) improvements to reduce flooding on roadways, possibly including:					Lafayette Co.; CIs Cuba City, Darlington, & Shullsburg; VIs Argyle, Belmont, Benton, Blanchardville, Gratiot, Hazel Green & South Wayne; & TNs Argyle, Belmont, Benton, Blanchard, Darlington, Elk Grove, Fayette, Gratiot, Kendall, Lamont, Monticello, New Diggings, Seymour, Shullsburg, Wayne, White Oak Springs, Willow Springs & Wiota.	
	Main Street (State Highways 23 and 81) in the City of Darlington. Possible solutions include: • Shut-off valves • Engineering on bridge	As funding allows	EM Dept. and Highway Dept.	On-going	Medium Low	CI Darlington	The bridge typically shuts down when there is 15 feet of water; this is only a storm sewer back-up. Finding a solution would mean being able to keep the bridge and highway open longer.
	County H in Blanchardville		EM Dept.,	2011	Low		This ¼ mile stretch is generally

	Possible solutions include: • Road elevation / McKellor Park • McKellor Pool - Cement wall around pool with a stainless steel door Cheese Country Recreational Trail – isolated spots tend to flood. Possible Solutions include: • Cap existing grade (thin concrete with stone) so water can flow over. • Had LIDAR flight in 2012 (whole county) – 2' contours. • 6" resolution orthos	 $250K – As funding allows $50K $500K $247K $62K	Highway Dept. and VI Blanchardville EM Dept. and Tri-County Trail Commission Land Records Land Records	 2012 2012 2015	 Low Low High High	VI Blanchardville Lafayette Co	one of the first to flood. Flooding goes into the park and has the potential to shut down STH 78. There is a dyke on the upstream side of Blanchardville. The pool has flooded once before and it cost $20K to clean and disinfect. The trail is 47 miles long and brings in a lot of people. It is owned by the Pecatonica Rail Transit Commission. The Commission includes Rock, Iowa, Lafayette and Green Counties. FEMA has previously paid to have the trail repaired back to the previous condition but parts continue to flood over. The county has also spent $500-600K in repairs. FEMA Grants and Wisconsin grant from recording fees may help fund.
	*Continue increasing the county's GIS mapping capabilities. (e.g., update official floodplain maps, collect information on flood prone areas).	Cost to be determined	Land Records	As funding available / On-going	Medium	Lafayette Co.; CIs Cuba City, Darlington, & Shullsburg; VIs Argyle, Belmont, Benton, Blanchardville, Gratiot, Hazel Green & South Wayne; & TNs Argyle, Belmont, Benton, Blanchard, Darlington, Elk	The county continually looks for ways to increase their mapping capabilities.

						Grove, Fayette, Gratiot, Kendall, Lamont, Monticello, New Diggings, Seymour, Shullsburg, Wayne, White Oak Springs, Willow Springs & Wiota.	
	Explore the feasibility of purchasing and installing flood gauges at the Pecatonica River at Calamine.	$10K	EM Dept.	As funding available	Medium	CI Darlington	The EM Department has talked with the National Weather Service about this in the past but they have not been very receptive. Currently, the Sheriff's Department manually records the height, difference and time. The USGS has a gauge at Darlington (online) but additional warning time would be nice.
	*Complete amendments/revisions to the Flood Rate Insurance Maps(FIRMs) as necessary	Cost to be determined	Land Records	On-going	Medium	Lafayette Co.; CIs Cuba City, Darlington, & Shullsburg; VIs Argyle, Belmont, Benton, Blanchardville, Gratiot, Hazel Green & South Wayne; & TNs Argyle, Belmont, Benton, Blanchard, Darlington, Elk Grove, Fayette,	This is an ongoing maintenance activity. In the process of digitizing. Working to get USGS topo maps.

						Gratiot, Kendall, Lamont, Monticello, New Diggings, Seymour, Shullsburg, Wayne, White Oak Springs, Willow Springs & Wiota.	
	*Continue to explore if residents express an interest in flood mitigation measures (e.g., buyouts, elevations, floodproofing, etc.) countywide. One potential target area includes: • Relocation of county fairgrounds.	Covered by Dept. annual budget $2M	Land Records/ EM Dept. County Board	Ongoing 2019	High Low	Lafayette Co.; CIs Cuba City, Darlington, & Shullsburg; VIs Argyle, Belmont, Benton, Blanchardville, Gratiot, Hazel Green & South Wayne; & TNs Argyle, Belmont, Benton, Blanchard, Darlington, Elk Grove, Fayette, Gratiot, Kendall, Lamont, Monticello, New Diggings, Seymour, Shullsburg, Wayne, White Oak Springs, Willow Springs & Wiota.	Located right next to the Pecatonica River; some work (filling in) has been done in the past but due to DNR restrictions they were unable to raise certain parts. The fair has been flooded out before and the location has been moved. Flooding to the fairgrounds would have a huge economic impact. FEMA's PDM & FMA grants are potential funding sources for buyout.
	*Provide information to citizens about the purchase of flood insurance	Covered by Dept. annual budget	EM Dept. and County Clerk's Office	On-going	Low	Lafayette Co.; CIs Cuba City, Darlington, & Shullsburg; VIs	Link will be made available on the website

						Argyle, Belmont, Benton, Blanchardville, Gratiot, Hazel Green & South Wayne; & TNs Argyle, Belmont, Benton, Blanchard, Darlington, Elk Grove, Fayette, Gratiot, Kendall, Lamont, Monticello, New Diggings, Seymour, Shullsburg, Wayne, White Oak Springs, Willow Springs & Wiota.	

	Review and update preparedness measures (plans, training, exercising, public information) regarding county dams.	Cost to be determined based on project needs	EM Dept. and Zoning	On-going	Low	Lafayette Co.; CIs Cuba City, Darlington, & Shullsburg; VIs Argyle, Belmont, Benton, Blanchardville, Gratiot, Hazel Green & South Wayne; & TNs Argyle, Belmont, Benton, Blanchard, Darlington, Elk Grove, Fayette, Gratiot, Kendall, Lamont, Monticello, New Diggings, Seymour, Shullsburg, Wayne, White Oak Springs, Willow Springs & Wiota.	
	Keep the Pecatonica River clear of debris.	As funding allows	Zoning	On-going	Medium -High	Lafayette Co.; CIs Cuba City, Darlington, & Shullsburg; VIs Argyle, Belmont, Benton, Blanchardville, Gratiot, Hazel Green & South Wayne; & TNs Argyle, Belmont, Benton, Blanchard, Darlington, Elk	The county has previously received funding from FEMA to clean out the river during the winter. However, it was not completely funded. The county receives $1,700 each year from the Fish and Game Habitat Program to cut the log jam. County has $1,700 match, which is not always used for clearing.

						Grove, Fayette, Gratiot, Kendall, Lamont, Monticello, New Diggings, Seymour, Shullsburg, Wayne, White Oak Springs, Willow Springs & Wiota.	
	Continue to work with and support the DNR as they provide education to the municipalities regarding restrictions on development/road work in floodplains.	Covered by Dept. annual budget	EM Dept., Zoning Dept. Municipalities	On-going	High	Lafayette Co.; CIs Cuba City, Darlington, & Shullsburg; VIs Argyle, Belmont, Benton, Blanchardville, Gratiot, Hazel Green & South Wayne; & TNs Argyle, Belmont, Benton, Blanchard, Darlington, Elk Grove, Fayette, Gratiot, Kendall, Lamont, Monticello, New Diggings, Seymour, Shullsburg, Wayne, White Oak Springs, Willow Springs & Wiota.	Municipalities are mandated to have ordinances.
Forest Fires and Wildfires	Continue to provide outreach efforts to homeowners on protecting homes and structures from wildfires	Costs vary	Local Fire Departments	On-going	Low	Lafayette Co.; CIs Cuba City, Darlington, &	

						Shullsburg; VIs Argyle, Belmont, Benton, Blanchardville, Gratiot, Hazel Green & South Wayne; & TNs Argyle, Belmont, Benton, Blanchard, Darlington, Elk Grove, Fayette, Gratiot, Kendall, Lamont, Monticello, New Diggings, Seymour, Shullsburg, Wayne, White Oak Springs, Willow Springs & Wiota.	
	Provide ample training for volunteer fire fighters for larger fires	Costs vary	Local Fire Departments, EM Dept.	On-going	Low	Lafayette Co.; CIs Cuba City, Darlington, & Shullsburg; VIs Argyle, Belmont, Benton, Blanchardville, Gratiot, Hazel Green & South Wayne; & TNs Argyle, Belmont, Benton, Blanchard, Darlington, Elk Grove, Fayette, Gratiot, Kendall, Lamont,	

						Monticello, New Diggings, Seymour, Shullsburg, Wayne, White Oak Springs, Willow Springs & Wiota.	
Severe Temperatures	Continue public informational campaigns about severe weather on the website and during Winter and Heat Awareness Weeks.	Covered by budget	EM Dept.	On-going	Low	Lafayette Co.; CIs Cuba City, Darlington, & Shullsburg; VIs Argyle, Belmont, Benton, Blanchardville, Gratiot, Hazel Green & South Wayne; & TNs Argyle, Belmont, Benton, Blanchard, Darlington, Elk Grove, Fayette, Gratiot, Kendall, Lamont, Monticello, New Diggings, Seymour, Shullsburg, Wayne, White Oak Springs, Willow Springs & Wiota.	Done in annual campaigns in Fall and Spring.
Storms: Hail	Place hail storm safety materials, on the website and during severe weather week.	Covered by Dept. annual budget	EM Dept. and County Clerk's Office	On-going	Low	Lafayette Co.; CIs Cuba City, Darlington, & Shullsburg; VIs Argyle, Belmont, Benton,	Also done in annual campaigns.

						Blanchardville, Gratiot, Hazel Green & South Wayne; & TNs Argyle, Belmont, Benton, Blanchard, Darlington, Elk Grove, Fayette, Gratiot, Kendall, Lamont, Monticello, New Diggings, Seymour, Shullsburg, Wayne, White Oak Springs, Willow Springs & Wiota.	
Storms: Lightning	Place lightning safety materials on the website and during severe weather week.	Covered by Dept. annual budget	EM Dept. and County Clerk's Office	On-going	Low	Lafayette Co.; CIs Cuba City, Darlington, & Shullsburg; VIs Argyle, Belmont, Benton, Blanchardville, Gratiot, Hazel Green & South Wayne; & TNs Argyle, Belmont, Benton, Blanchard, Darlington, Elk Grove, Fayette, Gratiot, Kendall, Lamont, Monticello, New Diggings, Seymour,	Also done in annual campaigns.

						Shullsburg, Wayne, White Oak Springs, Willow Springs & Wiota.	
Storms: Thunderstorm	Place thunderstorm safety materials on the website and during severe weather week.	Covered by Dept. annual budget	EM Dept. and County Clerk's Office	On-going	Low	Lafayette Co.; CIs Cuba City, Darlington, & Shullsburg; VIs Argyle, Belmont, Benton, Blanchardville, Gratiot, Hazel Green & South Wayne; & TNs Argyle, Belmont, Benton, Blanchard, Darlington, Elk Grove, Fayette, Gratiot, Kendall, Lamont, Monticello, New Diggings, Seymour, Shullsburg, Wayne, White Oak Springs, Willow Springs & Wiota.	Also done in annual campaigns.
Storms: Tornadoes and High Winds	Promote tornado awareness, including safety measures.	Covered by Dept. annual budget	EM Dept. and County Clerk's Office	On-going	Medium	Lafayette Co.; CIs Cuba City, Darlington, & Shullsburg; VIs Argyle, Belmont, Benton, Blanchardville, Gratiot, Hazel Green & South	Done during Tornado Awareness Week in April. Information will be included on the website for homes, schools and business safety measures

						Wayne; & TNs Argyle, Belmont, Benton, Blanchard, Darlington, Elk Grove, Fayette, Gratiot, Kendall, Lamont, Monticello, New Diggings, Seymour, Shullsburg, Wayne, White Oak Springs, Willow Springs & Wiota.	
	Continue to provide annual Weather Spotter training.	NWS funded	EM Dept.	On-going / Annual	High	Lafayette Co.; CIs Cuba City, Darlington, & Shullsburg; VIs Argyle, Belmont, Benton, Blanchardville, Gratiot, Hazel Green & South Wayne; & TNs Argyle, Belmont, Benton, Blanchard, Darlington, Elk Grove, Fayette, Gratiot, Kendall, Lamont, Monticello, New Diggings, Seymour, Shullsburg, Wayne, White Oak Springs,	Training is offered in the spring and is delivered by the NWS.

						Willow Springs & Wiota.	
	Explore upgrading or building tornado shelters in areas where deficient, especially in mobile home parks and campgrounds. Locations for study include: • Sunset Terrace • McKeller Park	 FEMA/WEM Grant FEMA/WEM Grant	 City Police Dept. Village Parks Dept.	 2019 2019	 High High	 CI Darlington VI Blanchardville	Use Department of Commerce's CDBG for funding assistance.
Storms: Winter	Promote winter hazards awareness, including home and travel safety measures (including website.)	Covered by Dept. annual budget	EM Dept. and County Clerk's Office	On-going	Medium	Lafayette Co.; CIs Cuba City, Darlington, & Shullsburg; VIs Argyle, Belmont, Benton, Blanchardville, Gratiot, Hazel Green & South Wayne; & TNs Argyle, Belmont, Benton, Blanchard, Darlington, Elk Grove, Fayette, Gratiot, Kendall, Lamont, Monticello, New Diggings, Seymour, Shullsburg, Wayne, White Oak Springs, Willow Springs & Wiota.	Done during Winter Weather Awareness Week in November.
Utility Failure	Review power needs for emergency		EM Dept.	2019	High	Lafayette Co.;	County has 2 generators at the

	operations and provide generators/hook-ups as needed to critical infrastructure. Locations of concern include:					CIs Cuba City, Darlington, & Shullsburg; VIs Argyle, Belmont, Benton, Blanchardville, Gratiot, Hazel Green & South Wayne; & TNs Argyle, Belmont, Benton, Blanchard, Darlington, Elk Grove, Fayette, Gratiot, Kendall, Lamont, Monticello, New Diggings, Seymour, Shullsburg, Wayne, White Oak Springs, Willow Springs & Wiota.	tower. TN Benton has a portable generator. VI Belmont has generators at the fire department and city hall.
	• County/City EOC located at 627 Main Street in the CI Darlington.	$5K - $180K	CI Darlington Police Dept.		Very High	CI Darlington	The courthouse does have back-up power. Generator would help sustain continuity of operations. This location is also an American Red Cross shelter. Would like hard install for building (an old school that can be EOC or shelter). Explore panel.
	• Village Hall has no generator for power outage. Explore installing a panel.	~$5,000	Village Fire Dept.		High / Very High	VI Blanchardville	The location serves as the Fire Dept. / Village Hall / Library / Police Dept. / cooling shelter

EM Dept. = Lafayette County Emergency Management Department

UW Ext = University of Wisconsin – Lafayette County Extension Office
* Supports the National Flood Insurance Program (NFIP) goals.

Appendix E: Flood Mitigation Supporting Documentation - HAZUS

Lafayette County Vulnerability Report

Identify Hazards[133]

Lafayette County is located in southwestern Wisconsin and borders on the Wisconsin – Illinois state line. The county is bordered by Grant County to the west, Iowa County to the north, Green County to the east and Stephenson and Jo Daviess Counties, Illinois to the southeast and southwest respectively. According to the 2000 U.S. Census, the population of Lafayette County is 16,137.

The county's climate is classified as continental. There are four distinct seasons. The summers are warm with hot, humid periods, and the winters are relatively long, cold, and snowy. The average annual rainfall is 32 inches. The average temperature varies from 18 degrees Fahrenheit (°F) in January to 72°F in July.

Heavy summer rains and/or snowmelt have caused significant floods on the Pecatonica and Galena Rivers. The steep uplands of the watersheds can result in rapidly rising floodwater peaks, particularly in the tributaries. The past flooding on the Pecatonica River has been summarized in a table below, which shows the five highest flood events during the period of record from 1940 to 1993. The dates of these events suggest that the major events were due to heavy rainfall.

Date (month/year)	Flow (cfs)
July 1950	22,000
April 1959	10,700
June 1969	16,000
June 1990	18,300
July 1993	12,400

The Pecatonica River and the East Branch Pecatonica River are mature rivers, with well-defined floodplains, gentle slope, and slow meanders. The other studied streams are much steeper, without well-defined floodplains. The floodplains include residential, commercial and agricultural development.

[133] From the revised November 5, 2003 Lafayette County FIS report

HAZUS-MH Hazard Analysis

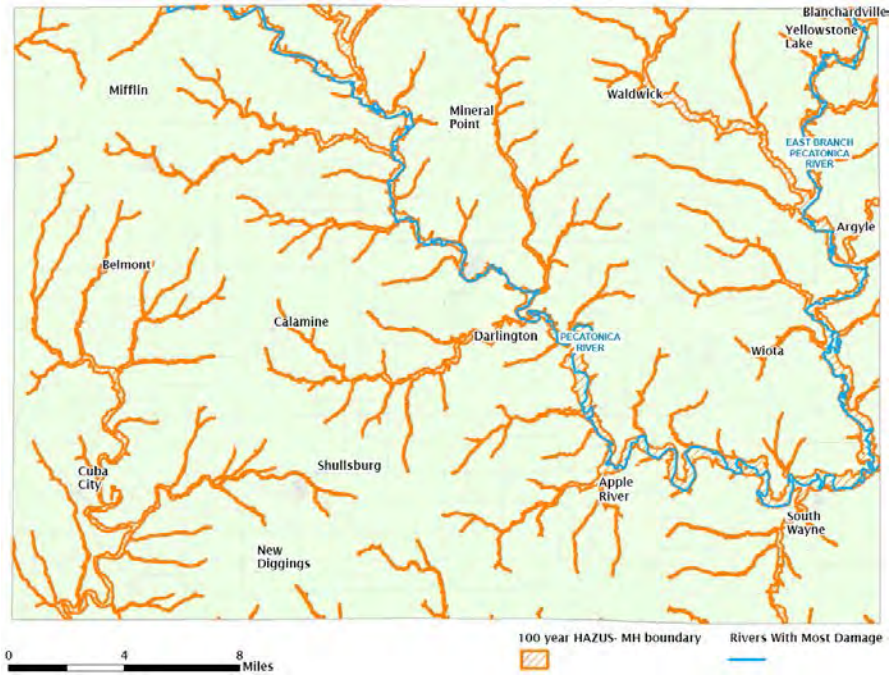
Flood analysis for Lafayette County was performed using HAZUS-MH MR3 released in July 2007. The bundled aggregated general building stock was updated to Dun & Bradstreet 2006. Building valuations were updated to R.S. Means 2006. Building counts based on census housing unit counts are available for RES1 (single-family dwellings) and RES2 (manufactured housing) instead of calculated building counts.

The site specific inventory (specifically Schools, Hospitals, Emergency Operation Centers/EOCs, Fire Stations and Police Stations) was updated using the best available statewide information.

HAZUS-MH was used to generate the flood depth grid for a 100-year return period calculated for one square mile drainage areas. The riverine model was determined from a user provided USGS 30m DEM and peak discharge values obtained for 24 reaches tabulated in the 2003 Lafayette County Flood Insurance Study.

Figure 1 depicts the flood boundary from the HAZUS-MH analysis. The majority of damages due to flooding occur along the Pecatonica River and the East Branch Pecatonica River.

Figure 1: Lafayette County HAZUS-MH Analysis (100-Year Flood)



HAZUS-MH Aggregate Loss Analysis

HAZUS-MH was used to estimate the damages for a 100-year flood event in Lafayette County. An estimated seven buildings will be damaged totaling in $27.6 million in building losses and $12.7 million in total economic losses. The total estimated number of damaged buildings, total building losses and estimated total economic losses are shown in Table 1.

HAZUS-MH estimates one census block with losses exceeding $1 million. The distribution of losses is shown in Figure 2.

HAZUS-MH aggregate loss analysis is evenly distributed across a census block. Census blocks of concern should be reviewed in more detail to determine the actual percentage of facilities that fall within the flood hazard areas. The aggregate losses reported in this study may be overstated. Examples are provided in Figure 3.

Table 1: Lafayette County Total Economic Loss - 100-Year Flood

General Occupancy	Estimated Total Buildings	Total Damaged Buildings	Total Building Exposure X 1000	Total Economic Loss X 1000	Building Loss X 1000
Agricultural	0	0	$85,195	$3,138	$808
Commercial	29	0	$155,960	$6,338	$1,550
Education	1	0	$32,136	$827	$112
Government	0	0	$12,836	$221	$24
Industrial	2	0	$38,213	$1,580	$494
Religious/Non-Profit	2	0	$22,195	$470	$56
Residential	6,075	7	$867,976	$15,039	$9,692
Total	**6,109**	**7**	**$1,214,511**	**$27,613**	**$12,736**

The reported building counts should be interpreted as degrees of loss rather than as exact numbers of buildings exposed to flooding. These numbers were derived from aggregate building inventories which are assumed to be dispersed evenly across census blocks. HAZUS-MH requires that a predetermined amount of square footage of a typical building sustain damage in order to produce a damaged building count. If only a minimal amount of damage to buildings is predicted, it is possible to see zero damaged building counts while also seeing economic losses.

Figure 2: Lafayette County Total Economic Loss - 100-Year Flood

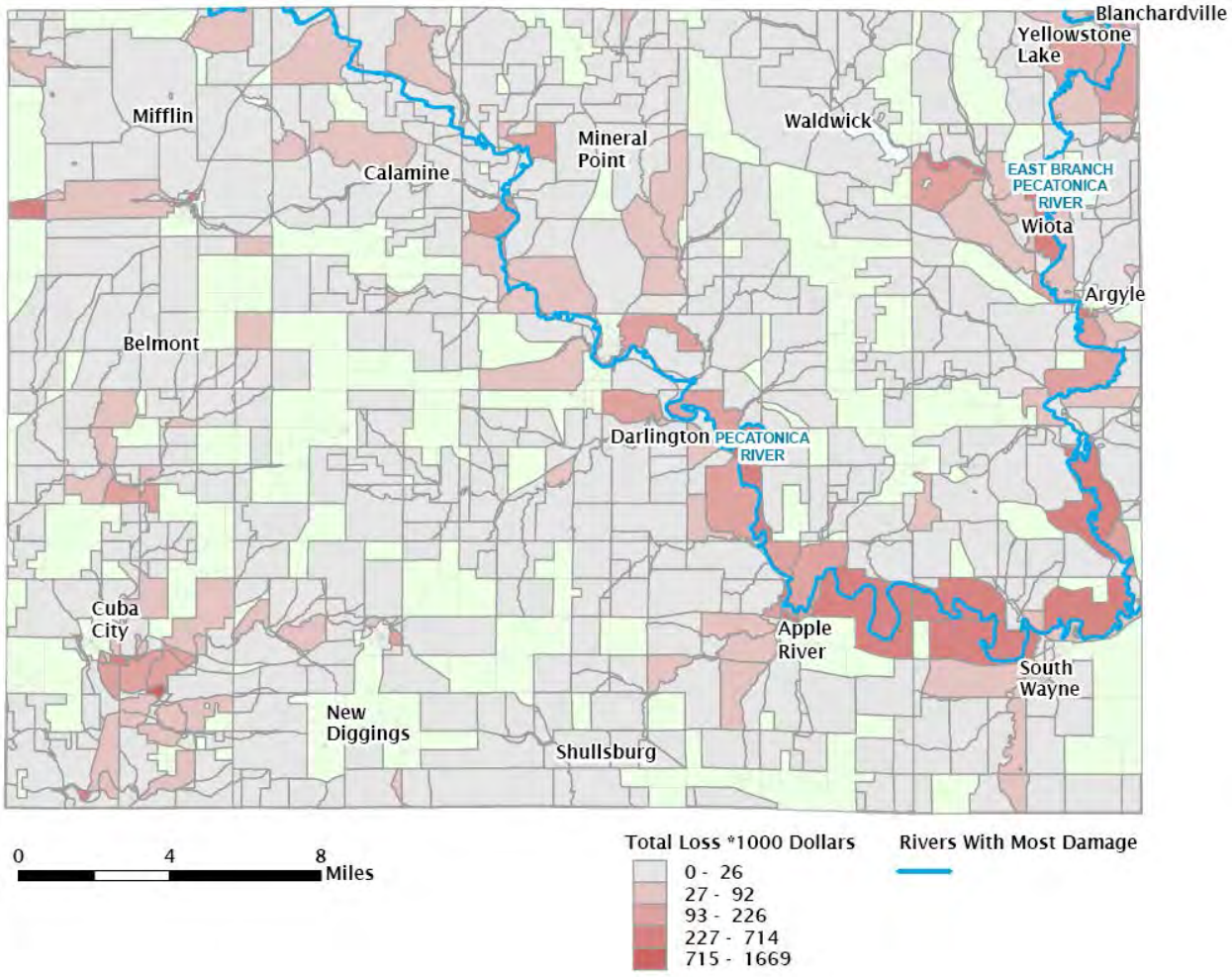


Figure 3a: Flood Damage Exposure near Cuba City

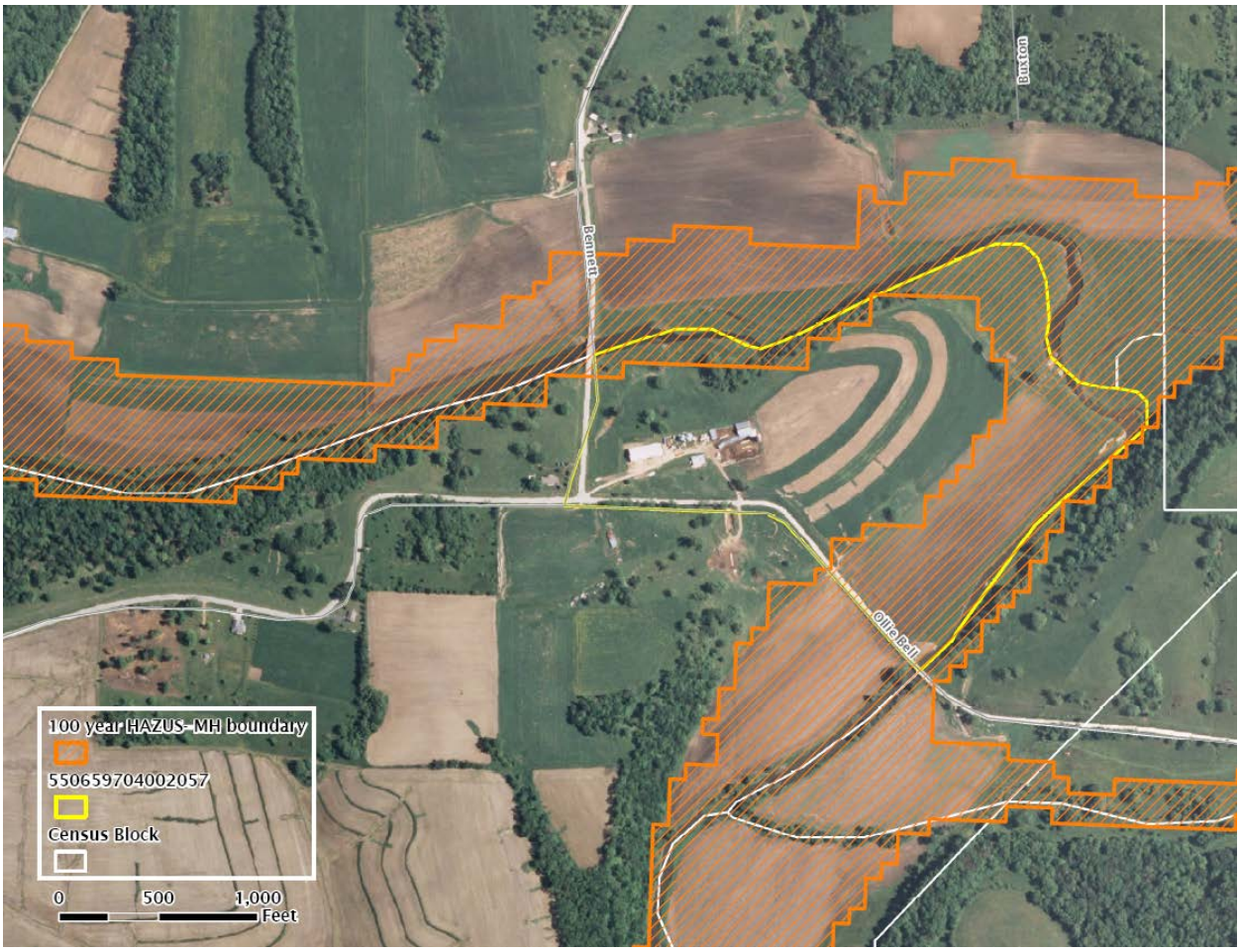


Figure 3a shows census blocks overlaid with the flood boundary and orthophoto of Cuba City. HAZUS-MH estimates that census block 550659704002057 has a building loss of $320 thousand with a combined replacement cost of $921 thousand. However, while the orthophoto does show significant flooding in this census block, no buildings are at risk.

Figure 3b: Flood Damage Exposure in Apple River

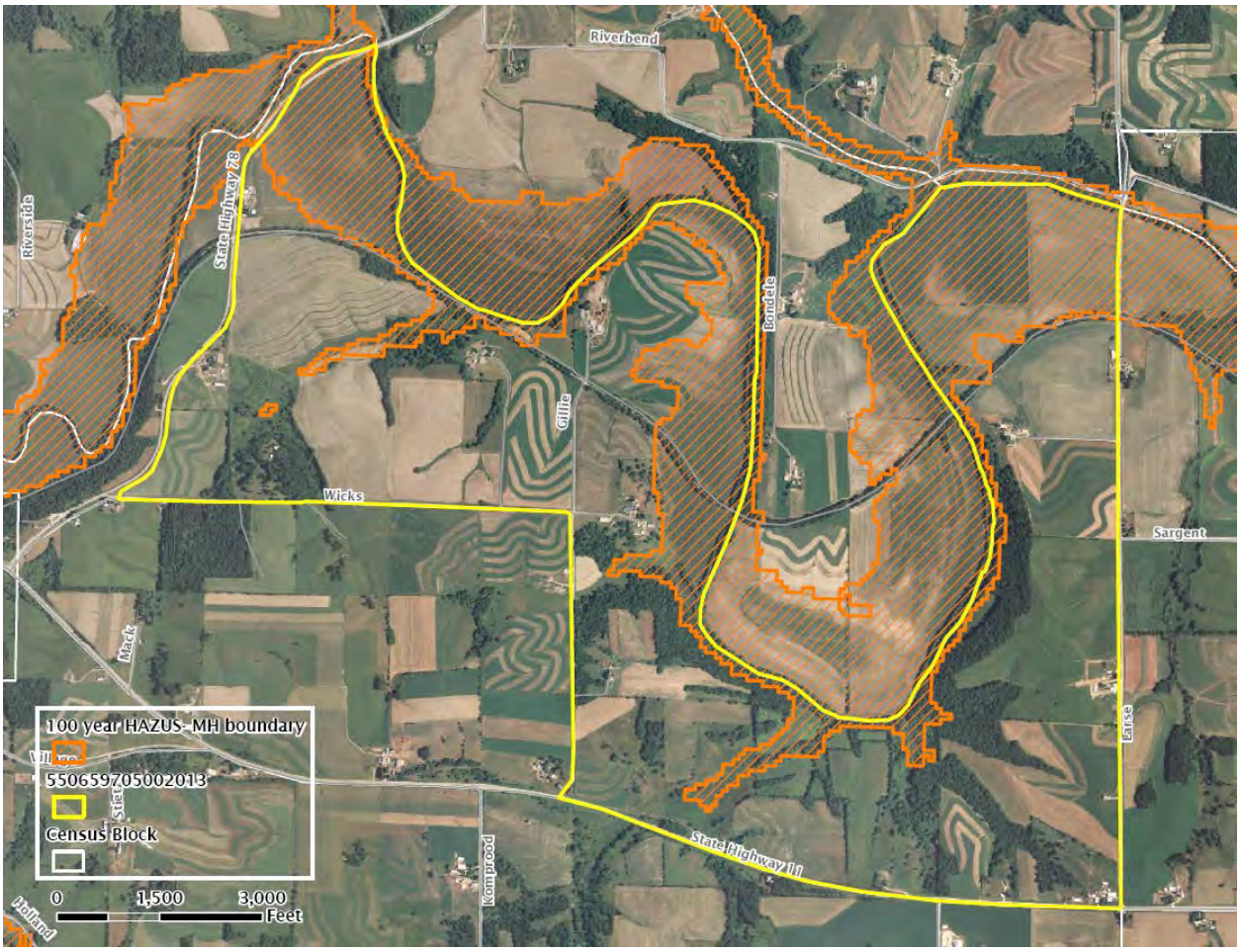


Figure 3b shows census blocks overlaid with the flood boundary and orthophoto of Apple River. HAZUS-MH estimates that census block 550659705002013 has an estimated building loss of $363 thousand with a combined replacement cost of $714 thousand. However, the orthophoto shows this area to be mainly forest and agriculture, with few buildings.

HAZUS-MH Essential Facility Loss Analysis

An essential facility would encounter many of the same impacts as any other building within the flood boundary. These impacts include: structural failure, extensive water damage to the facility and loss of facility functionality (e.g., a damaged police station will no longer be able to serve the community).

The HAZUS-MH analysis identified no facilities that may be subject to flooding.

Table 2: Lafayette County Essential Facility Loss - 100-Year Flood

Class	Building Count	At Least Moderate Damage	At Least Substantial Damage	Loss of Use
Care Facilities	2	0	0	0
EOC	0	0	0	0
Fire Stations	10	0	0	0
Police Stations	10	0	0	0
Schools	18	0	0	0

HAZUS-MH Shelter Requirement Analysis

HAZUS-MH estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. HAZUS-MH also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 155 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these 28 people (out of a total population of 16,137) will seek temporary shelter in public shelters.

HAZUS-MH State Property Loss Analysis

The flood boundaries were overlaid with the State of Wisconsin property boundaries as provided by the Department of Natural Resources. Table 4 provides a list of state properties impacted by the flood boundary. Figures 5a and 5b show examples of the inundated areas.

Table 4: Lafayette County State Property Flood Inundation

State Property	Percent Inundated	Acres
Yellowstone Wildlife Area	13%	568
Rem-Galena River	88%	460
Rem-Otter Creek	88%	146
Yellowstone Lake State Park	10%	73
Pecatonica State Trail	34%	73
Rem-Lovetts Creek	87%	22
Stream Bank Protection Fee Program	73%	13
Statewide Natural Area	5%	10
Rem-Cannon Branch	73%	3
Brennan Creek Fishery Area	91%	3

Figure 5a: Boundary of 100-Year Flood Overlaid with State of Wisconsin Properties

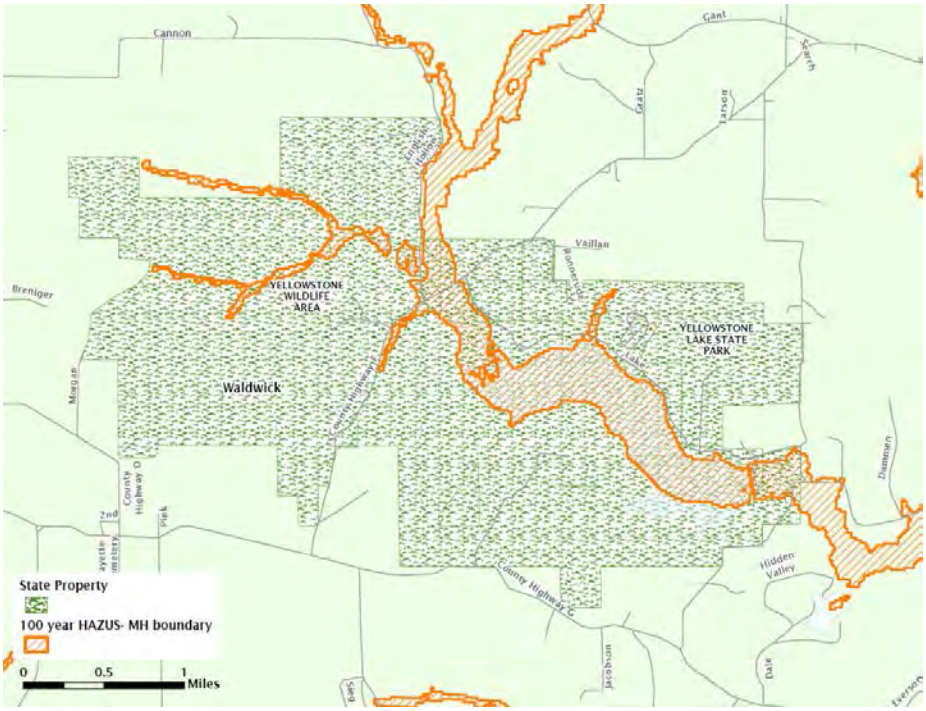


Figure 5b: Boundary of 100-Year Flood Overlaid with State of Wisconsin Properties

Appendix F: Community Input

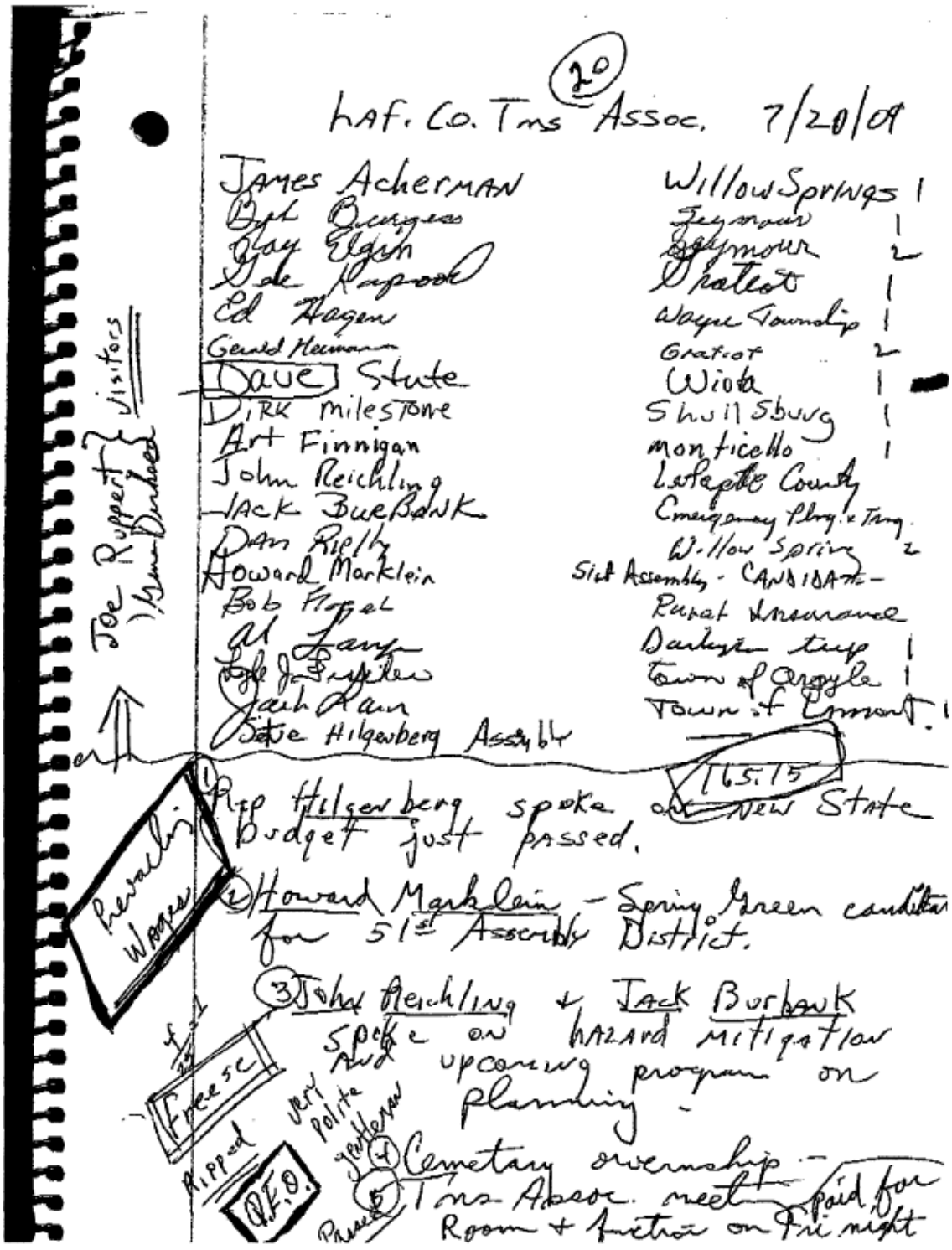
Lafayette County believes in the importance of gathering public input from interested parties in the community. To achieve this goal, Emergency Management took every opportunity available to utilize various methods to publicize the opportunity for people to participate in the planning process and to 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
Mar – Aug 09	First press release introducing the project was released and brochures were placed in the community. Surveys were sent to municipalities and returned.
7-20-09	Lafayette County Towns Association meeting. Municipal leaders were presented with the project and asked for input and the return of the previously sent surveys.
2-12-13	Press release introducing the project was sent to local media.
2-12-13	Invite to municipal and county leaders for the workgoup meetings.
3-4-13	Workgroup meeting
3-25-13	Workgroup meeting
10-22-13	Workgroup meeting

One of the main ways people were made aware of the plan was the publication of a brochure (following) that was widely distributed in the public buildings around the community including the City/County Courthouse and the library. The purpose of this brochure was to provide a general overview of the mitigation

planning process, the impetus for planning and the scope of the final result.

AUG. 4.2009 8:20AM LAFAYETTE CTY SHERIF NO.136 P.1



12 Feb 2013

For More Information, Contact John Reichling (608-776-4870)
For Immediate Release

Lafayette 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; these losses can be reduced through mitigation activities. It is estimated that for every dollar spent on mitigation, $2 to $3 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 Lafayette County to manage its vulnerability to disaster, John Reichling, Lafayette County Emergency Management Director, is creating a workgroup with the goal of completing 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 and the workgroup has begun identifying strategies that might help.

Reichling stated, “I am very excited about this part of the planning process. The input from the workgroup can have long-lasting impacts, making Lafayette County safer and more disaster resistant.”

FEMA has recognized the importance of having members of the community involved in the process and Reichling 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 John Reichling at 608-776-4870.

2/12/2013

Dear Municipal Official,

The Lafayette County Emergency Management Office is completing a Hazard Mitigation Plan. The plan reviews the risks for various natural disasters within Lafayette County and creates a plan for addressing these risks in a cost-effective way. As I am sure you are aware, Lafayette County and its municipalities have 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 is intended to help reduce potential future losses. Also, the federal government requires that communities have a current hazard mitigation plan as one criterion for eligibility for some types of grants so it is critical that this plan is completed and kept updated on schedule.

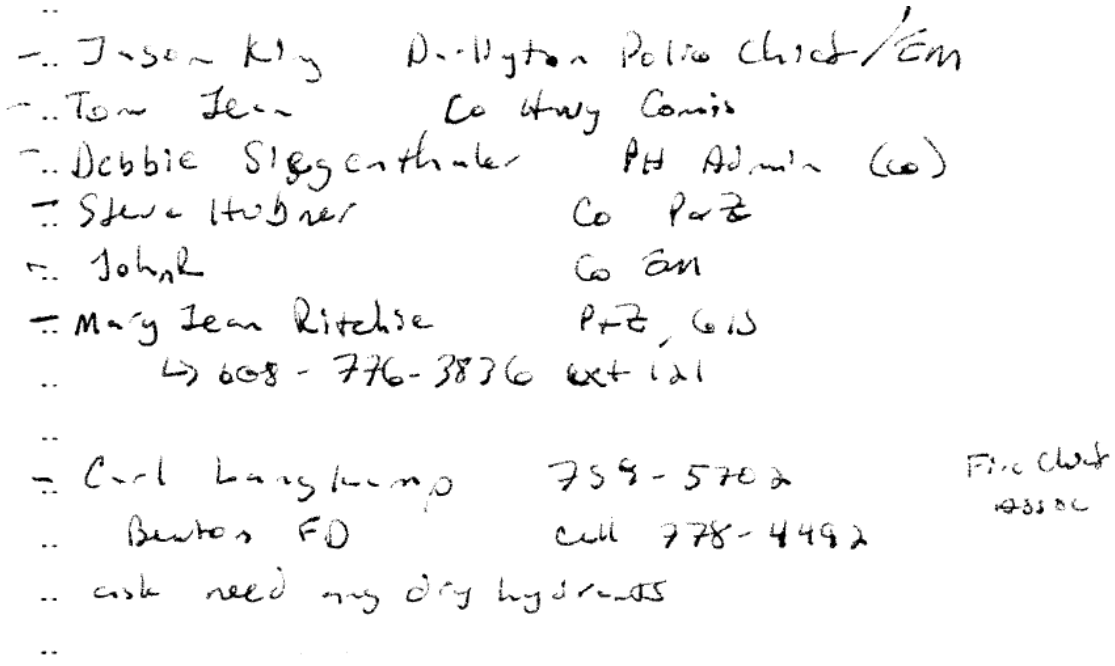
This requires significant input from stakeholder agencies and the public during the planning process. In order for you agency to be eligible for **future FEMA mitigation funding you agency must participate in these planning sessions**. I have contracted with Lenora Borchardt, EPTEC, INC., to assist me with completing this update. In order to be eligible for FEMA mitigation funding your **municipality must send at least one representative** to be a member of our planning team. Team members will be asked to be available to assist the contractor answering questions needed to complete the plan and to attend these occasional meetings.

We expect that we can complete this portion of the project in two meetings at the courthouse. Our first team meeting is scheduled for **March 4, 2013 at 6:30 p.m.** and the second meeting is **March 25, 2013 at 6:30 pm** in.

Please feel free to contact me with any questions or concerns at (608) 776-4804.

Sincerely,

John Reichling
Lafayette County Emergency Management



Meeting attendance.

SIGN-IN

Event: LaFayette Co PDM **Date:** 22 OCT 13 **Location:** DARLINGTON

Name (Please Print)	Agency/Department	Email/Phone Number
LENORA BORCHARDT	EPTEC	608-834-0802 LENORAB@EPTECINC.COM
John Reichling	E.M.	fjreichling@yahoo.com
Gary McCrea	Village Pres Benton	MGMcCrea@centurytel.net
BRAD BOCKHOP	VILLAGE BELMONT PRES.	bbockhop@lagrant.net
KATHRYN KAMMERUDE	VILLAGE CLERK-TREAS	blanchvilclerk@tds.net
Mary Jean Ritchie	Land Records	lafayettelandrecords@yahoo.com
Jason King	DARLINGTON Police	jason.king@cityofdarlingtonwi.org

LAFAYETTE COUNTY NATURAL HAZARDS PREPAREDNESS AND MITIGATION QUESTIONNAIRE

1. In the past five years, has your community experienced a natural disaster such as a severe windstorm, flood, wildfire, earthquake, etc.?
   - o No (If NO, skip to Question 2)
     - o Village of Belmont
     - o Town of White Oak Springs
     - o Town of Argyle
     - o Town of Benton
     - o Town of Lamont
     - o Town of Seymour

   If YES, which of these natural disasters occurred? (Please check all that apply.)

Event	When event last occurred:				
	Within past year	**1-5 years ago**	**5-15 years ago**	**More than 15 years ago**	**Never**
Drought	T. of Belmont	V. of South Wayne	V. of Gratiot T. of Monticello	V. of Argyle T. of Belmont T. of Shullsburg T. of Wiota	V. of Benton T. of Gratiot
Dust Storm					V. of Benton V. of Gratiot T. of Gratiot T. of Monticello T. of Shullsburg T. of Willow Springs T. of Wiota
Earthquake					V. of Benton V. of Gratiot V. of South Wayne T. of Gratiot T. of Monticello T. of Shullsburg T. of Willow Springs T. of Wiota
Flood	C. of Darlington V. of Gratiot V. of South Wayne T. of Belmont T. of Elk Grove T. of Gratiot T. of Shullsburg T. of Willow Springs	V. of Hazel Green V. of South Wayne T. of Gratiot T. of Monticello T. of Shullsburg	V. of Benton V. of Hazel Green V. of South Wayne T. of Elk Grove T. of Gratiot T. of Shullsburg	V. of Argyle V. of South Wayne T. of Elk Grove T. of Gratiot T. of Wiota	
Lakeshore Erosion					V. of Benton V. of Gratiot V. of South Wayne T. of Gratiot T. of Monticello

					T. of Shullsburg T. of Willow Springs T. of Wiota
Landslide/ Debris Flow	T. of Gratiot T. of Shullsburg	V. of Hazel Green T. of Gratiot T. of Monticello T. of Shullsburg	V. of Hazel Green T. of Gratiot T. of Shullsburg	T. of Gratiot	V. of Benton V. of Gratiot V. of South Wayne T. of Willow Springs T. of Wiota
Wildfire				T. of Monticello	V. of Benton V. of Gratiot T. of Gratiot T. of Shullsburg T. of Willow Springs T. of Wiota
Windstorm/ Tornado	V. of Gratiot V. of South Wayne T. of Gratiot	V. of South Wayne T. of Belmont T. of Gratiot T. of Monticello T. of Wiota	C. of Darlington V. of Argyle V. of South Wayne T. of Gratiot	V. of Hazel Green V. of South Wayne T. of Gratiot T. of Shullsburg	V. of Benton T. of Willow Springs
Severe Winter Storm	V. of Argyle V. of Benton T. of Elk Grove V. of Gratiot V. of South Wayne T. of Belmont T. of Gratiot T. of Monticello T. of Shullsburg T. of Willow Springs T. of Wiota	V. of South Wayne T. of Elk Grove T. of Gratiot T. of Shullsburg	V. of Hazel Green V. of South Wayne T. of Elk Grove T. of Gratiot	V. of Hazel Green V. of South Wayne T. of Gratiot	
Other: Ice Storm				V. of Hazel Green	
Other: Drainage Problems				V. of Hazel Green	
Other: Heavy Rains	V. of South Wayne				
Other:					

2. For which of the following natural disasters do you think your community is at risk? (Check the appropriate box for each hazard.)

Event	Extremely Concerned	Very Concerned	Concerned	Somewhat Concerned	Not Concerned
Drought	T. of Wiota	V. of South Wayne	V. of Argyle V. of Gratiot T. of Argyle T. of Lamont T. of Monticello T. of Seymour T. of Willow Springs	C. of Darlington V. of Belmont T. of Shullsburg T. of White Oak Springs	T. of Belmont T. of Gratiot
Dust Storm			V. of South Wayne	T. of Shullsburg	C. of Darlington V. of Argyle

					V. of Belmont V. of Gratiot T. of Argyle T. of Belmont T. of Gratiot T. of Lamont T. of Monticello T. of Seymour T. of White Oak Springs T. of Willow Springs T. of Wiota
Earthquake				V. of South Wayne T. of Shullsburg T. of Wiota	C. of Darlington V. of Argyle V. of Gratiot V. of Belmont T. of Argyle T. of Belmont T. of Gratiot T. of Lamont T. of Monticello T. of Seymour T. of White Oak Springs T. of Willow Springs
Flood	C. of Darlington V. of Gratiot V. of South Wayne T. of Gratiot T. of Wiota	V. of Argyle V. of Belmont V. of Hazel Green T. of Belmont T. of Monticello T. of Shullsburg T. of Willow Springs	V. of Benton T. of Argyle T. of Benton T. of Elk Grove T. of Lamont T. of Seymour		T. of White Oak Springs
Lakeshore Erosion				T. of Monticello	C. of Darlington V. of Argyle V. of Gratiot V. of Belmont V. of South Wayne T. of Argyle T. of Belmont T. of Gratiot T. of Lamont T. of Seymour T. of Shullsburg T. of White Oak Springs T. of Willow Springs T. of Wiota
Landslide/ Debris Flow	T. of Gratiot		T. of Monticello T. of Shullsburg	V. of Argyle T. of Lamont T. of Wiota	C. of Darlington V. of Gratiot V. of Belmont V. of South Wayne T. of Argyle T. of Belmont T. of Seymour

					T. of White Oak Springs T. of Willow Springs
Wildfire		T. of Gratiot	V. of South Wayne T. of Belmont T. of Wiota	T. of Lamont T. of Monticello	C. of Darlington V. of Argyle V. of Gratiot V. of Belmont T. of Argyle T. of Belmont T. of Seymour T. of Shullsburg T. of White Oak Springs T. of Willow Springs
Windstorm/ Tornado	C. of Darlington V. of Argyle V. of South Wayne T. of Gratiot	V. of Belmont V. of Benton V. of Hazel Green T. of Monticello T. of Shullsburg T. of Wiota	V. of Gratiot T. of Argyle T. of Benton T. of Lamont	V. of Argyle T. of Willow Springs	T. of Seymour T. of White Oak Springs
Severe Winter Storm/ Ice Storm	C. of Darlington V. of Gratiot V. of South Wayne T. of Belmont T. of Gratiot T. of Monticello T. of Shullsburg T. of Wiota	V. of Belmont V. of Benton V. of Hazel Green T. of Lamont T. of Willow Springs	T. of Argyle T. of Benton T. of Elk Grove T. of Seymour		T. of White Oak Springs
Other: Tornado	V. of South Wayne T. of Lamont T. of Shullsburg	V. of Argyle			
Other: Heavy Rain	V. of Hazel Green				
Other:					

3. Has your community had damage to facilities or infrastructure (e.g., roads, public buildings, utilities?)

Cities

- Yes- Streets- City of Darlington

Villages

- Fire at Electric Utility- Village of Argyle
- 1993 Flood damage to the Fire Station- Village of Belmont
- Yes, Park Buildings-Village of Benton
- Yes- Our roads, community buildings, sewer systems, and homes- Village of Gratiot

- Crawford Lane in the Village of Hazel Green has flooded two times in the last year; runoff area to our three- Village of Hazel Green
- Water erodes the shoulders of roads and floods basements and park lands; Trees have blown down across streets and damage pavement and sidewalks; Roadways and storm sewer system- Village of South Wayne

Towns

- No- Town of Argyle
- Yes- Town of Belmont
- Roads- Town of Benton
- Infrastructure- roads, bridges, and culverts- Town of Elk Grove
- Side of Road Washouts; Culvert Ends Washed Out- Town of Gratiot
- Roads due to flooding and winter storm- Town of Lamont
- No Information available- Town of Monticello
- No- Town of White Oak Springs
- 1990 Roads washed out- Town of Seymour
- Hail damage on public buildings; roads due to flooding- Town of Shullsburg
- Yes- Roads, bridges, and tubes- Town of Willow Springs
- Road damage, bridges and culverts- Town of Wiota

4. What facilities or infrastructure in your community do you think are especially vulnerable to damage during a natural disaster?

Cities

- Power Supply- City of Darlington

Villages

- Utility/Flood- Village of Argyle
- Roads; All Public Buildings; Utilities, including sewer plant, water tower, and electric service- Village of Belmont
- Park and residential structures in low-lying areas- Village of Benton
- Roads; Municipal Buildings; Sewer System; and Homes- Village of Gratiot
- The Village has its own water and waste water system, that a natural disaster could cause major problems to; We also supply our own comminute with electric power, which would cause a major problem in a natural disaster. Additionally, there are drainage problem areas in the Village, on West 22nd Street (Drainage Chute) and East 23rd Street (Street Drainage Area)- Village of Hazel Green
- Any area with trees or low lying areas; Road Surface, curbs, and gutters; Waste water treatment plant, and storm water system- Village of South Wayne

Towns

- Roads and Bridges; Buildings if Tornado- Town of Argyle
- Roads- Town of Belmont

- Bridges and Roads- Town of Benton
- Infrastructure- roads, bridges, and culverts- Town of Elk Grove
- Road and Bridges; Town Shop- Town of Gratiot
- Town garage and equipment- Town of Lamont
- Roads, Bridges, Town Hall, Utilities- Town of Monticello
- Roads and Bridges, and Building- Town of Seymour
- Several locations due to tornado damage- Town of Shullsburg
- None- Town of White Oak Springs
- Roads- Town of Willow Springs
- Electrical utilities, roads, gas line problems- Town of Wiota

5. How important do you think each of the following projects are in mitigating (i.e., lessening the impacts of) a natural disaster in your community?

Project	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important
Protecting private property	V. of Belmont V. of Gratiot V. of South Wayne T. of Lamont T. of Monticello T. of Seymour T. of Shullsburg	C. of Darlington V. of Argyle V. of Hazel Green T. of Benton	T. of Belmont V. of Benton T. of Argyle T. of Gratiot T. of White Oak Springs T. of Willow Springs T. of Wiota		
Protecting critical facilities (hospitals, fire stations, etc.)	C. of Darlington V. of Argyle V. of Belmont V. of Benton V. of Gratiot V. of Hazel Green V. of South Wayne T. of Benton T. of Gratiot T. of Lamont T. of Monticello T. of Seymour T. of Wiota	T. of Shullsburg T. of White Oak Springs	T. of Belmont	T. of Argyle	T. of Willow Springs
Preventing development in hazard areas	C. of Darlington V. of Belmont V. of Gratiot V. of Hazel Green T. of Argyle T. of Wiota	V. of South Wayne T. of Monticello	V. of Argyle T. of Belmont T. of Benton T. of Gratiot T. of Lamont T. of Seymour T. of White Oak Springs	T. of Shullsburg	T. of Willow Springs
Enhancing the function of natural features (streams, wetlands)	V. of Argyle V. of Gratiot V. of Hazel Green	C. of Darlington V. of Belmont T. of Argyle T. of Belmont T. of Monticello T. of Wiota	V. of South Wayne T. of Benton T. of Gratiot T. of Lamont T. of	T. of Shullsburg	T. of Willow Springs

			Seymour T. of White Oak Springs		
Protecting historical and cultural landmarks	T. of Belmont V. of Hazel Green	C. of Darlington V. of Gratiot V. of South Wayne T. of Lamont T. of Monticello T. of Shullsburg T. of White Oak Springs	V. of Argyle V. of Belmont T. of Argyle T. of Benton T. of Gratiot T. of Seymour T. of Wiota		T. of Willow Springs
Promoting cooperation among public agencies, citizens, non-profit organizations and businesses	V. of Belmont V. of Benton T. of Lamont V. of Hazel Green V. of South Wayne T. of Monticello T. of Shullsburg	C. of Darlington V. of Argyle V. of Gratiot T. of Argyle T. of Belmont T. of Benton T. of Gratiot T. of Seymour T. of White Oak Springs T. of Wiota		T. of Willow Springs	
Protecting and reducing damage to utilities	V. of Argyle V. of Belmont V. of Benton V. of Gratiot V. of Hazel Green V. of South Wayne T. of Benton T. of Lamont T. of Monticello T. of Wiota	C. of Darlington T. of Belmont T. of Gratiot T. of Seymour T. of White Oak Springs	T. of Argyle	T. of Shullsburg T. of Willow Springs	
Strengthening emergency services	C. of Darlington V. of Argyle V. of Benton V. of Gratiot V. of Hazel Green V. of South Wayne T. of Belmont T. of Benton T. of Gratiot T. of Lamont T. of Monticello T. of Wiota	T. of Argyle T. of Shullsburg T. of Seymour T. of White Oak Springs		T. of Willow Springs	

6. What ideas do you have for your community to mitigate natural disasters?

Cities

- The most important thing is for private residences and the government agencies to have plans and resources in place for continuity of service and basic support needs so that emergencies can be coped with on a local level until help can arrive- City of Darlington

Villages

- Follow established emergency plan- Village of Argyle

- None- Village of Belmont
- We have many ideas; but, there is no available money to proceed- Village of Gratiot
- We would start with figuring out how to stop Crawford Lane and the Lane from 14th street to our waste water plant from flooding- Village of Hazel Green
- Maintenance of Equipment- Village of South Wayne

Towns

- None- Town of Belmont
- We have probably no private structures in flood plan areas; we have no hospitals or fire stations; comprehensive plan discourages this through Lafayette Conservation (Soil and Water)- Town of Elk Grove
- None- Town of Gratiot
- To maintain our roads to the best of our ability; to promote and support county emergency services- Town of Lamont
- Need to increase transportation aids to allow better infrastructure- Town of Shullsburg
- None- Town of White Oak Springs
- None- Town of Willow Springs

GOVERNMENTAL & PUBLIC INPUT

Successful community mitigation begins with a commitment from government officials throughout the county. Community groups then provide vital information to insure that the plan is workable within the framework of the community's priorities.

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

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.

MITIGATION PLANNING PAYS OFF

FEMA has long recognized the critical importance of hazard mitigation and considers reducing vulnerability to natural disasters through mitigation planning a cornerstone of a national emergency management plan.

In the same way, **mitigation should be the cornerstone of local community planning** – a necessary means of making our community a safer place in which to live, work and play and to leave a more viable and sustainable environment for generations to come.

Keep in mind – experience shows that for every dollar spent on mitigation; two to three dollars is saved in potential future damages.

NOTES:_____

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For further information please contact:

Lafayette County
Emergency Management

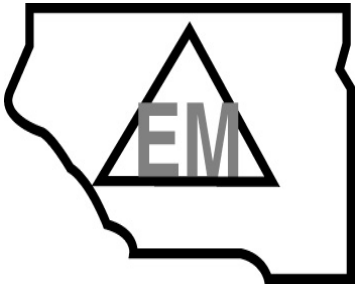
Phone
Fax

MITIGATION PLANNING

Creating Safe,

Sustainable

Communities



Prepared by:
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HISTORY

1. Since 1993 more than 400 disasters have occurred in the United States, affecting communities in all 50 states, costing the country over **$500 million dollars per WEEK and killing over 24,000 people**.
2. 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.

WHAT IS HAZARD MITIGATION PLANNING?

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.

WHY DO IT?

- To preserve the life, health and safety of residents in your community
- To protect your community's economic health
- To preserve the unique character of your community
- To reduce your community's vulnerability to disaster
- To speed your community's recovery after a disaster
- To save valuable tax dollars in your community and beyond

THE DISASTER MITIGATION ACT OF 2000 (DMA2K)

The impetus for states and local governments to undertake natural hazard mitigation planning occurred on October 30, 2000 when the President signed the Disaster Mitigation Act of 2000 (Public Law 106-390, DMA2K). The law encourages and rewards local and state pre-disaster planning, promotes sustainability as a strategy for disaster resistance and is intended to integrate state and local planning with the aim of strengthening statewide mitigation planning. This new approach facilitates cooperation between state and local authorities, prompting them to work together. The resulting enhanced planning network enables local and state governments to articulate accurate and specific needs for mitigation, resulting in faster allocation of funding and more effective risk-reduction projects.

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- Next, communities 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 G: Inter-Revision Updates

This plan will undergo major revisions every five years per the FEMA requirements. Lafayette 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.