Rock County Wisconsin

Hazard Mitigation Plan

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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
GPS	Global Positioning 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 Rock County Hazard Mitigation Plan is intended to provide strategies for reducing susceptibility to future damage to public and private infrastructure in the county. The Rock County Emergency Management Office applied for and received assistance from the Hazard Mitigation Grant Program (HMGP) in 2015. This grant program is sponsored by the U.S. Department of Homeland Security - Federal Emergency Management Agency (FEMA) and is administered by the Wisconsin Department of Military Affairs - Wisconsin Emergency Management (WEM). The procedures utilized in preparing this plan are based on guidance provided by FEMA and WEM and should therefore be considered consistent with the requirements and procedures in the Disaster Mitigation Act of 2000.

Section 409 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (P.L. 93-228, as amended) is the impetus for involvement of state and local governments in evaluating and mitigating natural hazards as a condition of receiving federal disaster assistance. 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 Rock 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 Rock 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 Rock County Hazard Mitigation Plan provides background information on Rock 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 Rock County Emergency Management Office has completed and regularly updates the Rock 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 the State of Wisconsin's HVA. The local HVA does not generally include detailed mitigation strategies for the identified hazards but the county used the HVA as the basis for their original pre-disaster hazard mitigation plan and continue to reference it as the plan is updated.

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

Rock County Code of Ordinances [1]

Chapter IV: Land Use Management and Zoning, Environmental Management and Board of Adjustment
Chapter XVI Zoning Ordinances
Chapter XXVII: Rock County Construction Site Erosion Control Ordinance
Chapter XXVIII: Rock County Storm Water Management Ordinance
Chapter XXXII: Rock County Floodplain Zoning
Chapter XXXVIII: Land Division and Development

City of Beloit [2]

Chapter 19 Zoning Code
Chapter 24 Storm Water Management
Chapter 25 Construction and Effect of Ordinances

City of Brodhead [3]

Chapter 393 Storm Water Management and Erosion Control
Chapter 455 Floodplain Zoning
Chapter 468 Shoreland-Wetland Zoning
Chapter 480 Zoning

City of Edgerton [4]

Chapter 22 Zoning Ordinance
Chapter 23 Land Divisions
Chapter 24 Floodplain and Wetland Zoning
Chapter 30 Storm Water and Erosion Control

City of Evansville [5]

Chapter 48 Erosion Control
Chapter 54 Floods Area Zoning
Chapter 100 Shoreland-Wetland Zoning
Chapter 104 Stormwater Management
Chapter 130 Zoning

City of Janesville [6]

Chapter 13 Water and Sewers
Chapter 15 Buildings and Construction
Chapter 18 Zoning

[1] http://www.co.rock.wi.us/images/web_documents/about_rock_county/county_ordinance.pdf
[2] https://www.municode.com/library/wi/beloit/codes/code_of_ordinances
[3] http://www.ecode360.com/BR3166
[4] http://www.codepublishing.com/WI/Edgerton/
[5] http://www.ci.evansville.wi.gov/code/MunicipalCode.htm
[6] http://cms.ci.janesville.wi.us/weblink/browse.aspx?dbid=0

City of Milton [7]
Chapter 10 Buildings and Building Regulations
Chapter 42 Land Division
Chapter 58 Planning and Development
Chapter 78 Zoning
Chapter 79 Floodplain District

Village of Clinton [8]
Chapter 8 Buildings and Building Regulations
Chapter 38 Storm Water Management
Chapter 50 Zoning

Village of Footville [9]
Amended Floodplain Ordinance

Town of Center [10]
Zoning Ordinance

Town of Clinton [11]
Chapter 4 Zoning

Town of Fulton [12]
Chapter 190 Building Construction
Chapter 302 Mining, Nonmetallic
Chapter 380 Subdivision of Land
Chapter 425 Zoning

Town of Harmony [13]
Chapter 1 Zoning Ordinance
Chapter 14 Building Code
Chapter 17 Land Division and Development

Town of Janesville [14]
Zoning Ordinance

[7] https://www.municode.com/library/wi/milton/codes/code_of_ordinances
[8] https://www.municode.com/library/wi/clinton/codes/code_of_ordinances
[9] http://footvillewis.net/ordinances
[10] http://www.townofcenterrockcounty.com/uploads/documents/Center Zoning Ord DATCP Approved 2015.pdf
[11] http://www.clintontownship.us/images/Chapter_4_-_Zoning-9162.pdf
[12] http://www.ecode360.com/FU2213?#FU2213
[13] http://townofharmony.com/municipal-code
[14] http://www.townofjanesville.org/uploads/images/Zoning_Ordinance_Re-vised_2015.pdf

Town of Johnstown [15]
Chapter 1 Zoning
Chapter 14 Landspreading

Town of Magnolia [16]
Zoning Ordinance

Town of Milton [17]
Chapter 54 Building Construction
Chapter 400 Zoning

Town of Plymouth [18]
Zoning Ordinance

Town of Porter [19]
Zoning Ordinance

Town of Rock [20]
Ord 762 Mineral and Mine
Ord 2012-01 Land Use and Land Division
Zoning Ordinance

Town of Spring Valley [21]
Zoning Ordinance

Town of Turtle [22]
Chapter 13 Building Construction
Chapter 18 Land Regulation
Chapter 19 Zoning

Town of Union [23]
Chapter 16 Land Division
Chapter 17 Zoning

[15] https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbnx0b3dub2Zqb2huc3Rvd24xfGd4OjEzNmE1NDI3NGQ5ODBlYzA
[16] http://townofmagnolia.com/uploads/documents/Magnolia Zoning Ord DATCPRev 2015.pdf
[17] http://www.ecode360.com/MI3049
[18] http://townofplymouthwi.com/zoning-ordinance
[19] http://www.porterwi.com/vertical/sites/%7B091515DB-84C7-4534-B75D55860C9D4420%7D/uploads/Zoning_Ordinance_-_ADOPTED.docx
[20] http://www.tn.rock.wi.gov/docs_by_cat_type.asp?doccatid=272&locid=181
[21] http://townofspringvalley.com/ordinances-resolutions/
[22] http://www.tn.turtle.wi.gov/Docs_by_cat_type.asp?doccatid=172&locid=172
[23] http://www.tn.union.wi.gov/Docs_by_cat_type.asp?doccatid=200&locid=123

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, storm water 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, storm water 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 Conservation, Zoning) with the elected leaders from the jurisdictions to triage projects and determine what can and should be done within the planning period. These options are usually discussed in open meetings prior to implementation, as required by Wisconsin state law. The determining factor for most projects is obviously budget availability. The units of government have several options for funding implementation including grants, special taxing authority (for the project and/or any matching funds), general purpose revenue from existing budgets, and regulatory authority, which can be used to require that an individual or business complete the project using their funds. The units of government use or improve, if necessary, the mechanisms described above to ensure the implementation of hazard mitigation ideas.

Plan Preparation, Adoption and Maintenance

The Rock 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:

- Shena Kohler, Rock County Emergency Management
- Beth Kline, Rock County Emergency Management
- Duane Jorgenson, Rock County DPW
- Norm Tadt, Rock County Land Conservation
- Michelle Genthe, Rock and Walworth Counties Head Start
- Bradley Liggett, City of Beloit
- Bruce Slagoski, City of Beloit
- Chris Walsh, City of Beloit
- Tom Harzell, City of Edgerton
- Dave Botts, City of Janesville
- Kamron Nielson, City of Janesville
- John Whitcomb, City of Janesville
- Inga Cushman, City of Milton
- Loren Lippincutt, City of Milton
- Lisa Tollefson, Town of Harmony
- Allan Arndt, Town of LaPrairie
- Paul France, Wisconsin Emergency Management
- Brad Smith, Blackhawk Technical College
- Ben Hem, American Red Cross
- Robert Wildermuth, Farm & Fire
- 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 every Rock County city, village and town clerk for distribution to the elected officials for discussion, review and completion. Key county departments (i.e., planning, zoning, highway, Sheriff's) also received the survey with a request for completion; the completed county and municipal surveys were compiled and the results, along with the cover letter, are in Appendix G.

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 adjacent 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 input can be viewed in Appendix G.

The Rock 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* (Mitigation Ideas, FEMA-R5, 9/02) booklet as an aid to generating ideas. All of the ideas generated during the workgroup meetings were incorporated into the plan and can be found in the Hazard Mitigation Strategies section of each chapter and are summarized in Appendix 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 by FEMA, a press release and legal public notice of the period of plan review was held to make the plan available for comment to 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 Rock County Board of Supervisors and all of the cities, villages and towns in the county except for the Cities of Beloit, Brodhead, and Evansville; the Village of Clinton; and the Towns of Lima, Newark, and Union. Please note that the City of Brodhead is a border community and will be covered in the Green County 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 June 15, 2017.

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 Rock 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 she receives information between the five-year update periods (e.g., comprehensive or capital improvement plans) that might be included, it will be added to Appendix H: Inter-Revision Updates. Rock 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 H at any time. Furthermore, the county Emergency Management Director will include in the Plan-of-Work activities program the distribution of an annual letter and media press release that reaches out to the plan’s stakeholders (county offices, municipalities, the public, etc.). The communications will be queried 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 the county’s Emergency Management committee meeting. Note that after a disaster, the Emergency Management committee may also meet to discuss mitigation strategies that might be applicable. These same stakeholders will be invited to fully participate in the five-year plan update, which will be detailed in the updated plan documents and will fully conform to FEMA’s requirements.

During the plan’s lifecycle, the county and incorporated municipalities will consider the strategies listed in Appendix 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. These projects will be reported 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 Rock County Land Conservation and Planning, Economic & Community Development Departments cross-referenced this plan in the update of the Rock County Comprehensive Plan 2035 (Section II: Chapter 2, page 10) and will continue to seek opportunities to so in updates and revisions of 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. They will also refer to it as they are involved in the planning and other preparedness activities of the 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 and its municipalities will have working copies. They have committed to using and referring to the mitigation plan as they complete their regularly scheduled reviews and updates of the aforementioned plans. Rock County Emergency Management will also refer to this plan in their emergency preparedness activities.

Physical Characteristics of Rock County

General Community Introduction

Rock County has a rich history. The Lake Koshkonong area, in the County's north-central portion, had been inhabited for thousands of years by various Native American groups, including the mound building societies and later the Winnebago, Potawotomi, Sauk, Fox, and Menominee tribes. The Winnebago, in particular, figure prominently in the history of the area. The name Koshkonong is Winnebago meaning, "the lake we live on" and the largest Native American settlement in the State of Wisconsin in the early 19th century was a Winnebago settlement on the western side of the Lake, just northwest of the County's north-central border. The Europeans first exposure to the area likely came in 1778 when French fur trader Charles Gautier de Verville passed through. In the next decade, French traders settled in the area now known as Charley Bluff, on the southern end of the Lake in the present-day Town of Milton.

Settlement of the area that was to become Rock County began in earnest in the 1830's, spurred on by two major events. Initially, the Federal Public Land Survey was completed in the area between 1833 and 1836. Additionally, U.S. soldiers returning from the Black Hawk War of 1832, which drove the great Winnebago chief Black Hawk westward through the lands that were to become the County, raved of the beauty and fertility of the Rock River Valley, peaking the curiosity of restless souls eastward. The County's early settlers were greeted by a gently undulating landscape teeming with prairie grasses and wildflowers. Rock Prairie, the largest in the State, occupied nearly half the County, extending from the Rock River eastward. Early settlers found extremely productive agricultural soils, particularly in the Rock River Valley, and soon large swaths of the County were under cultivation.

The County's urban areas, particularly the Cities of Janesville and Beloit, both settled in the early 1830's, developed quickly due to the productive hinterlands that surrounded them, their geography (both on the Rock River and in close proximity to the larger urban areas of Chicago, Milwaukee, and Madison), and emerging rail technology. The Rock River, in particular, given its capacity for energy generation, transportation, and agricultural production, figured prominently in the development of these Cities. So too did

rail, with lines coming to the County in the early 1850's, linking the County's farms to its urban areas, and its urban areas to larger regional urban centers. The Milwaukee and Mississippi Rail Road passed through the northern part of the County, containing a branch from Milton to Janesville that was eventually continued west to the Mississippi River as the Wisconsin Southern. The Rock River Valley Rail Road ran up the Rock River, from the Wisconsin-Illinois border, originating in Beloit and terminating in Madison. Lines also ran from Racine, on Lake Michigan, to Beloit, and from Janesville to Kenosha, also on the Lake. The Milwaukee, St. Paul, and Northwestern Railway would later emerge, consolidating many of the rail lines in the County.

Present day Rock County is economically diverse and modern. The primary industry within the county is tourism, evident by the number of motels, restaurants, museums, shops and recreational facilities now present in the county.

The County's population surpassed 30,000 by 1850. The County, with its balance of rural agricultural production and urban industry, continued to grow throughout the 19th century, spurred by innovation in both sectors. Prominent manufacturers in the County's early days included Beloit Reaper and Sickle Works, Merrill and Houston Iron Works, Rock River Paper Company, D. W. Dake's Creamery, and Beloit Plough and Wagon Works. Agricultural staples in the County's early days included wheat, corn, oats, and barley, and to a lesser extent wool, potatoes, pork, butter, and fruits.

The County emerged as a regional industrial center in the early 20th century. The Cities of Beloit and Janesville became centers of diversified industry, attracting immigrant workers. Parker Pen Company, a global pen manufacturer, was founded in the City of Janesville in 1891 and remained a staple of the County's economy into the century's second half. General Motors Corporation opened one of its first automobile assembly plants in the City of Janesville in 1919, providing the region with an industrial identity throughout the 20th century.

Stagnated population and economic growth was evident in the County in the late 20th century, coinciding with a national decline in domestic manufacturing and industry. Similarly, 2009 witnessed the closure of the General Motors plant, in turn affecting many other dependent industries in the County. Recent economic diversification, including an emerging health services sector, continued agricultural production, and the County's favorable geography have provided

stability to the region though, and the County continues to grow and develop at a steady rate.[24]

Plan Area

Rock County is located in the south-central portion of the State of Wisconsin, forming a portion of the State's southern boundary, approximately equidistant from Lake Michigan and the Mississippi River. The County's population was estimated at 160,331 in 2010 and the County is projected to have approximately 26,000 additional residents by 2035. The County covers 721 square miles, {rivers, streams and lakes (surface waters) accounting for about eight square miles of the total[25]}. It contains six cities, three villages, 20 towns, and multiple unincorporated hamlets. The City of Janesville is the County seat, is located in the County's central portion, and is the largest municipality in the County with a population estimated at over 63,575 in 2010.

The County is surrounded by vibrant rural communities and burgeoning urban areas. The County is bordered by Wisconsin counties, Dane and Jefferson to the north, Green to the west, and Walworth to the east, and Illinois' Counties Boone and Winnebago to the south. The rapidly growing Wisconsin State capital the City of Madison, is 30 miles to the County's northwest. Wisconsin's largest city, Milwaukee, lies 70 miles east of the County and Rockford, Illinois' third largest city is 30 miles south. Additionally, Chicago, Illinois, the country's third largest metropolitan area, is 80 miles to the County's south. The County is connected to these urban areas and other regional, State, and national locations by a vast road network, including U.S. Interstates 90/39 and 43, and U.S. Highways 51 and 14. [26]

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. This plan is designed to represent Rock County, the Cities of Beloit, Brodhead, Edgerton, Evansville, Janesville, and Milton; the Villages of Clinton, Footville, and Orfordville; and the Towns of Avon, Beloit, Bradford, Center, Clinton, Fulton, Harmony, Janesville, Johnstown, LaPrairie, Lima, Magnolia, Milton, Newark, Plymouth, Porter, Rock, Spring Valley, Turtle, Union (See Appendix A for a map of Rock County). The county and all of

[24] http://www.co.rock.wi.us/mission-facts-history
[25] https://en.wikipedia.org/wiki/Rock_County,_Wisconsin
[26] http://www.co.rock.wi.us/mission-facts-history

its municipalities except for the Cities of Beloit, Brodhead, and Evansville; the Village of Clinton; and the Towns of Lima, Newark, and Union have adopted the plan. Please note that the City of Brodhead is a border community and will be covered in the Green County Plan. Copies of the adoptions can be found in Appendix C.

Geology

The County's physical geography is varied. The County's main waterway, the Rock River, bisects the County from north to south, running from Lake Koshkonong in the north-central portion of the County, through the Cities of Janesville and Beloit. The County is located in twelve base watersheds, all components of the Lower Rock Basin, which in turn is part of the Mississippi River Basin. The County's defining geologic feature is the end moraine, a remnant of the last glacial advance (Wisconsin Glaciation) approximately 10,000 years ago. The County's glacially formed kettle-moraine landscape is characterized by varying topography and drainage patterns, and uneven hills and ridges.[27]

Most of Rock County lies within the Western Upland geographical province with a small northern and eastern slice in the Eastern Ridges and Lowlands.[28]

The Western Uplands are one of the most attractive parts of the state. Most of the region is a thoroughly-dissected upland, not a flat-topped or sloping surface as in northern Wisconsin or the region near Lake Michigan. The average elevation of the hilltops above sea level is about 1100 feet in St Croix and Pierce counties in northwestern Wisconsin, 1280 feet in Vernon County, and 900 to 1200 feet in Grant County. The uplands thus stand 100 to 200 feet above the Eastern Ridges and Lowlands to the southeast, and 200 to 350 feet above the Central Plain to the northeast.

Aside from the upland itself the strongest topographic features of the region are the great trenches or gorges of the Mississippi and Wisconsin rivers and their numerous branches. The gorge of the Mississippi is incised more than 500 feet below the level of the upland ridges.

[27] http://www.co.rock.wi.us/mission-facts-history
[28] http://www.wisconline.com/counties/Rock/index.html

The upland or plateau region of western Wisconsin consists of two cuestas and one monadnock, or an isolated rock hill, knob, ridge, or small mountain that rises abruptly from a gently sloping or virtually level surrounding plain. A cuesta is an upland belt with a short, steep descent, or escarpment, on one side and a long, gentle slope on the other. Most of the province is not a flat-topped upland or plateau, but a thoroughly dissected cuesta. With the exception of the area northwest of the Chippewa River, it has no smooth upland areas of notable extent. It is a region of high, narrow ridges and deep, steep-sided valleys.

The northern four-fifths of the Western Upland lies in the belt of Lower Magnesian limestone, and to a smaller extent in the area of the Cambrian sandstone. The southern fifth of the province lies, which includes Rock County, in the belt of Galena- Black River limestone. A small portion of the Western Upland is the Baraboo Range. This is not a cuesta, but an exhumed monadnock made up of pre-Cambrian metamorphic and igneous rocks.[29]

The Eastern Ridges and Lowland section of Wisconsin, of which Rock County's extreme northern and eastern edges are included, contains a large proportion of the people of the state. The reasons for this are not simple. The three factors of prime importance are level topography, fertile soil, and favorable climate. Topographic features are distinct, but they are low. The dominant thing in eastern Wisconsin is the plain.

Alternate weak and resistant rock layers having a moderate inclination will be carved by streams and weather into a belted plain. This plain will have parallel strips of upland and lowland corresponding to the more important resistant and weak strata. The uplands are called cuestas and the lowlands have sometimes been called vales. The topography of the eastern ridges and lowlands is controlled by cuestas. The westernmost ridge is the rather low, narrow cuesta formed by the resistant Lower Magnesian limestone. It is alluded to hereafter as the Magnesian cuesta. The eastern upland is the higher and broader cuesta of Niagara limestone. The intermediate Green Bay- Lake Winnebago- Rock River lowland lies upon the belt of Black River and Galena limestone, with the gentle back slope of the Magnesian cuesta for one wall and the steep escarpment of the Niagara cuesta for the other. Rock County is part of these two (i.e., Magnesian and Black River) cuestas.

[29] http://www.wisconline.com/wisconsin/geoprovinces/westernupland.html

The Lake Michigan lowland, half of which lies in the state of Wisconsin, owes its abnormal depth chiefly to glacial erosion rather than weathering and stream work, while the two cuestas and their intermediate lowland in eastern Wisconsin, though also modified by glaciation, are normal products of weathering and stream work.[30]

Topography

Wisconsin lies in the upper Midwest between Lake Superior, the upper peninsula of Michigan, Lake Michigan and the Mississippi and Saint Croix Rivers. Its greatest length is 320 miles, 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.[31] The most defining topographic feature of Rock County is a thoroughly-dissected upland.

[30] http://www.wisconline.com/wisconsin/geoprovinces/easternridges.html
[31] http://www.uwex.edu/sco/state.html

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

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

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

northern Wisconsin to about 40 per year in southern counties and occur mostly in the summer. Occasional hail, wind and lightning damage are also reported.

The average seasonal snowfall varies from about 30 inches at Beloit to well over 100 inches in northern Iron County along the steep western slope of the Gogebic Range. Greater average snowfall is recorded over the Western Uplands and Eastern Ridges than in the adjacent lowlands. The mean dates of first snowfall of consequence (an inch or more) vary from early November in northern localities to early December in southern Wisconsin counties. Average annual duration of snow cover ranges from 85 days in southernmost Wisconsin to more than 140 days along Lake Superior. The snow cover acts as protective insulation for grasses, autumn seeded grains, alfalfa and other vegetation. [32]

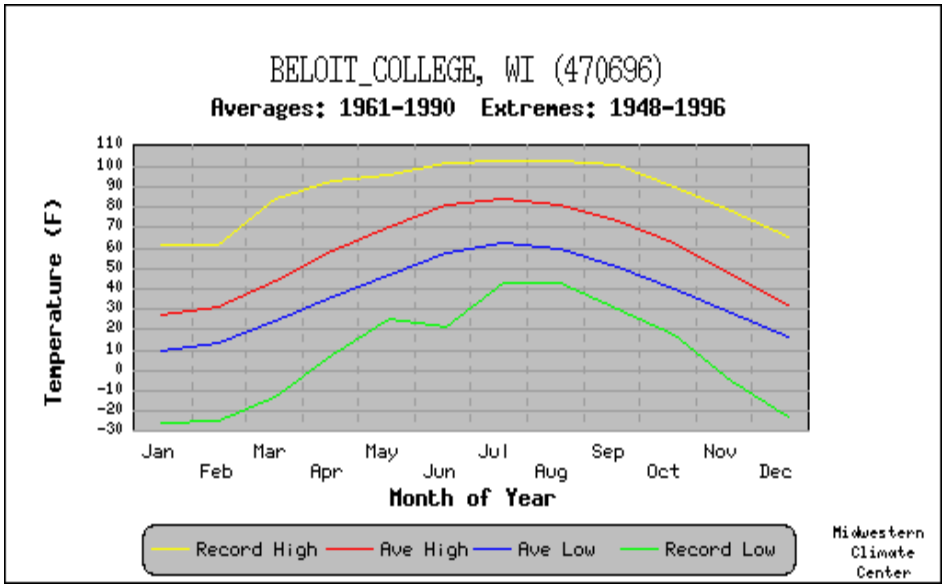
Climate Normals, Growing Season Summary and Climate Change [33]

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. Rock County's growing season averages 172 days with a range of 145 to 186 days. Rock County's median date of last spring frost is April 27th and the median fall date of the first frost is October 8th.

Climate Normals	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Ave Daily High (F°)	26.3	30.6	43.3	58.3	70.0	80.2	83.7	80.9	73.2	62.4	46.0	31.5
Ave Daily Low (F°)	8.8	12.7	24.2	36.0	46.3	57.1	61.6	58.9	50.7	39.9	28.2	15.6
Growing Degree Days	1	3	42	173	364	554	684	599	420	218	45	5
Heating Degree Days	1469	1212	967	534	254	29	0	19	119	438	837	1283
Cooling Degree Days	0	0	0	0	43	140	243	171	29	10	0	0
Ave Precipitation (")	1.17	1.06	2.27	3.13	3.05	3.77	3.89	4.02	3.97	2.38	2.51	1.83
Ave Snowfall (")	6.8	6.3	5.5	0.9	0.0	0.0	0.0	0.0	0.0	0.0	1.1	7.0

Data from the weather station at Beloit, latitude 42°30' N, longitude 89°02' W, elevation 780 ft.

[32] http://www.aos.wisc.edu/~sco/
[33] http://www.wisconline.com/counties/rock/climate.html



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

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

Possible impacts during the four seasons include:

- Spring - More frequent and intense rain events may lead to more flooding with health impacts such as stress and mental health disorders; foodborne and waterborne illnesses; injuries; drowning; and death.
- Summer - Southern Wisconsin may experience approximately 28 more days exceeding 90 degrees Fahrenheit. Health

impacts can include heat stress, respiratory disease, allergic reactions and death.

- Fall - Extended periods of warming could case more drought with health impacts including water and food insecurity; respiratory distress; allergic reactions; and death.
- Winter - Warmer winters might cause more ice, sleet and rain. Health impacts may include traffic accidents, power outages, injuries and death.[34]

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 including Rock County. Flooding is most frequent and most serious in April due to the melting of snow and spring rains. During this period, flood conditions are often aggravated by ice jams which back up the flood waters. Excessive rains of the thunderstorm type sometimes produce tributary flooding or flash flooding along the smaller streams and creeks. [35]

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

[34] *Wisconsin Climate and Health Profile Report*, 2014, WI Department of Health Services, Bureau of Environmental and Occupational Health http://www.dhs.wisconsin.gov/publications/P0/P00709.pdf
[35] http://www.uwex.edu/sco/state.html

discharge in the form of springs.[36] The winter period normally lacks infiltration because of frozen ground.

Groundwater resources constitute an extremely valuable element of the natural resource base of Rock County. The groundwater reservoir not only sustains lake levels and provides the base flow of streams in the county but also comprises a major source of water for domestic, municipal and industrial water users. Like surface water, groundwater is susceptible to depletion in quantity and to deterioration in quality.

Surface water mapping of Rock County includes delineation of all navigable and intermittent lakes, ponds, retention and detention basins, rivers and streams. Surface waters in Rock County total 3,549 acres, or 1% of the total area. There are three rivers in Rock County. Of the three, the Rock River is the largest major drainage basin in southern Wisconsin. Other rivers in Rock County are the Yahara and Sugar Rivers. There are more than 50 creeks and streams of which Turtle, Raccoon, Bass, and Allen Creeks are of some recreational value. For the remainder, agricultural runoff and large fluctuations in high and low flow periods preclude any recreational use. In 1970 the WDNR identified 72 lakes and ponds. Of these 72, 48 are five acres or less and only 10 exceed 20 acres.

WDNR's Outstanding and Exceptional Resource Waters Program provides a designation for Wisconsin's cleanest waters. An outstanding resource water is defined as a lake or stream that has excellent water quality, high recreational and aesthetic value, high quality fishing and is free from point source or non-point source pollution. An exceptional resource water is defined as a stream that exhibits the same high quality resource values as an outstanding resource water, but that may be impacted by point source pollution or that may have the potential for future discharge from a small sewer community. Exceptional resource waters in Rock County are Allen Creek (below the City of Evansville), Bass Creek, E. Fork Raccoon Creek, Little Turtle Creek, Raccoon Creek, Spring Brook (T2N, R14E S27), Turtle Creek and an unnamed creek (T2N R14E S31).[37]

Wisconsin is a state with a large quantity of groundwater and is a critical resource both statewide and within the county. It is the main source of drinking water for 70 percent of Wisconsin residents and 95 percent of Wisconsin communities. Rock County obtains all of its domestic drinking water from groundwater sources, including both

[36] DeVaul, 1967
[37] Rock County Comprehensive Plan 2035, Section II, Chapter 3

municipal and private wells. In addition, numerous high capacity wells exist in the County to serve agricultural and industrial uses. Recharge of the County's aquifers is derived almost entirely from locally occurring precipitation, giving our citizens control over, and responsibility for, their groundwater. The County's aquifers are close to the land surface and their limited natural protection make them vulnerable to pollution with over one-fourth of private wells exceeding the health enforcement level of 10 mg/liter for nitrate-nitrogen and 15% to 30% of private wells in Rock County annually testing positive for bacteria. Furthermore it is estimated Rock County consumes 20 million gallons of groundwater a day (the third largest in the State according to United States Geological Survey (USGS) estimates. The Rock County Comprehensive Plan 2035 has identified these issues and is seeking solutions to mitigate contamination and overuse issues with groundwater resources for the long term.[38]

Twelve watersheds are contained completely or partially within Rock County and include Allen Creek and Middle Sugar River, Badfish Creek, Bass Creek, Blackhawk Creek, Lower Koshkonong Creek, Lower Middle Sugar River, Lower Sugar River, Marsh Creek, Rock River – Milton, Turtle Creek, Whitewater Creek, and the Yahara River and Lake Kegonsa. All drain into the Mississippi River Basin.[39]

Soil Types

The soil of Rock County is similar to that found throughout Wisconsin. Soils in Rock County vary from droughty and loamy sands to very poorly drained wet organic soils with a wide range of well drained to moderately well drained, sandy and silty loams between these extremes. In general, most of the soils of Rock County are suitable for agricultural pursuits (i.e., farming crops such as corn, soybeans or vegetables and/or livestock production). A Rock County digital soil survey was prepared by the Natural Resources Conservation Service and is available for review at http://websoilsurvey.nrcs.usda.gov/app/.

According to the Soil Survey of Rock County, Wisconsin[40]:

> On the basis of surface features, the county can be divided into three physiographic areas. One area comprises the hills and kettles in the northern part of the county where the landforms are almost entirely caused by glacial deposition.

[38] Rock County Comprehensive Plan 2035, Section II, Chapter 3
[39] http://dnr.wi.gov/water/watershedsearch.aspx
[40] http://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/wisconsin/WI105/0/Rock_WI.pdf

Most of the soils of this area have a silt loam or loam surface layer and are underlain by glacial till or stratified sand and gravel outwash.

South of this area, a belt of flat outwash extended from east to west across the county and southward along the Rock River. The soils of this area have a silt loam or loam surface layer and are underlain by stratified sand and gravel outwash.

In the extreme southwestern part of the county, the glacial cover is thin or lacking and the topography is almost entirely caused by differential erosion of the bedrock. The terrain is characterized by deep valleys cut into sandstone and edges underlain by dolomite. The soils in much of this area have a loam or sandy loam surface layer and are relatively shallow to bedrock. The Sugar River flood plain in this area has a mantle of sand from the weathering and erosion of the surrounding sandstone. Loose sand blown from this flood plain since glacial times has moved north and east onto the adjacent uplands and adds a noticeable sand content to the soils of Newark and Beloit Townships.

The nine soil associations in Rock County include:

- Kidder-St. Charles Association – deep, well-drained and moderately well-drained, nearly level to steep soils that have a sandy clay loam to silty clay loam subsoil; over sandy loam glacial till
- Dresden-St. Charles-Warsaw Association – Moderately deep and deep, well drained and moderately well drained, nearly level to steep soils that have a sandy clay loam subsoil; over stratified sand and gravel
- Plano-Warsaw-Dresden Association – Deep and moderately deep, well drained and moderately well drained, nearly level to sloping soils that have a silty clay loam to sandy clay loam subsoil; over stratified sand and gravel
- Schewa-Kane Association – Moderately deep, poorly drained and somewhat poorly drained, nearly level and gently sloping soils that have a mainly clay loam subsoil; over stratified sand and gravel

- Pecatonica-Ogle-Durand Association – Deep well drained and moderately well drained, nearly level to sloping soils that have a silty clay loam to sandy clay loam subsoil; over sandy loam glacial till
- Edmund-Rockton-Whalan Association – Shallow and moderately deep, well drained, nearly level to very steep soils that have a mainly clay and clay loam subsoil; over dolomite bedrock
- Mahalasville-Elburn Association – Deep, poorly drained and somewhat poorly drained, nearly level and gently sloping soils that have a mainly silty clay loam and silt loam subsoil; over sandy loam and sand and gravel
- Colwood-Sebewa Association – Moderately deep and deep, poorly drained, nearly level soils that have a mainly clay loam subsoil; over stratified silt and fine sand lacustrine deposits and sand and gravel outwash deposits
- Marshan-Gotham-Dickman Association – Moderately deep and deep, somewhat excessively drained and poorly drained, nearly level and gently sloping soils that have a mainly clay loam and loamy sand subsoil; over sand or stratified sand and gravel.

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.[41]

[41] http://dnr.wi.gov/topic/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).

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

Wetlands serve a variety of functions, including playing an important role in stormwater management and flood control, filtering pollutants, recharging groundwater, providing a habitat for many wildlife species and plants and offering open space and passive recreational opportunities. Wetlands include all marshes, swamps, fens, bogs and those areas excluded from cultivation or other uses because they are intermittently wet.

There are two main levels of jurisdiction (often overlapping) concerning wetlands in Rock County are the Wisconsin Department of Natural Resources and municipal zoning agencies. The Zoning Department has jurisdiction over wetlands in county zoning plans

while wetlands within city or village boundaries are also subject to the appropriate municipality's regulations.

According to the Wisconsin Department of Natural Resources, Rock County has approximately 19,424 acres of wetlands (approximately 4.2% of its total area). This is 0.4% of the total statewide acreage of wetlands.[42]

Land Use

The land in Rock County consists of farmland, shoreland and forests as well as commercial, residential and industrial land. The total area is 726 square miles. Of that area, approximately 718 square miles are land and 8 square miles are surface water.

The Wisconsin Department of Revenue (WDOR) tax assessment data classifies the land use in Rock County as follows[43]:

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

[42] http://dnr.wi.gov/topic/wetlands/acreage.html
[43] Rock County Comprehensive Plan Chapter 5 – Land Use

hunting grounds, wetlands, ponds, gravel pits, and road rights of way.

Land Uses Based on 2005 WDOR
Rock County Tax Assessment Data

Land Use Category	Acres	Percent
Agricultural*	344,020	82.9%
Residential	35,913	8.7%
Commercial	8,063	1.9%
Industrial	1,999	0.5%
Undeveloped	25,036	6.0%
Total	**415,031**	**100.0%**

*****_The Agricultural category consists of four WDOR categories: Agriculture, forest, agricultural forest and other_

Rock County is unique in that it has only limited ability to make decisions that affect land use, the ability for which primarily lies with each municipal zoning authority. Each municipality (i.e., city, village town) makes population projections based upon the amount of growth they want to have and on other criteria that it has decided is appropriate for the community. It has then made housing and land need projections based on their own projections for population.[44]

The following text from the Rock County Comprehensive Plan 2035 describes one possible outlook for future development noting that since growth is managed by individual municipalities (as described above), it might change. The "Future Land Use" map in Appendix A shows more detail:[45]

> *Over approximately the past two decades, Rock County has experienced growth that had previously been unrealized in the County's history. Rock County has experienced a change from past years when most of the population was tied to the agricultural industry in some fashion, to being a community largely populated by people who work in non-agriculture. Fast and convenient transportation corridors that link nearby large urban centers has made Rock County a desirable place to live, even for those who are employed outside of the County. The presence of Interstate 90/39 which connects the Chicago*

[44] Rock County Comprehensive Plan Chapter 5 – Land Use, p. II-5-1
[45] Rock County Comprehensive Plan Chapter 5 – Land Use, pp. II-5-17, 18, 19

metropolitan area, the City of Rockford, and the Cities of Beloit and Janesville, through the middle portion of the County, to the Madison metropolitan area, as well as Interstate 43 connecting the County to the Milwaukee area have been heavily influential in the growth of Rock County. Comparatively low land prices and pleasing environmental amenities have helped to spur primarily single-family residential development within easy commuting distance of these corridors and others (such as U.S. II-5-18 Highway 14 and State Highway 26). These transportation amenities have been part of the reason that Rock County has gone from being a largely rural community with small Cities and Villages to having quickly developing and expanding urban centers and rural residential communities.

There is continued pressure for housing development and transportation improvements to serve this expanding Rock County population. Even though a current economic downturn has slowed growth, it is expected that the demand for housing will be a strong economic factor once again at some point in the future, thus warranting continued planning for growth throughout the planning period, to 2035. Additionally, preservation of agriculture and natural resources is an important aspect of future land use planning.

…Rock County is expected to need approximately 12,033 additional households between 2010 and 2035 to accommodate new population. The density (how close together) at which future additional households are built will determine the amount of land needed to accommodate the new population.

Demographics

Human Settlement Patterns

Rock County was initially settled thousands of years ago and has been inhabited by Native American tribes including the mound builders as later by the Winnebago, Potawotomi, Sauk, Fox, and Menominee tribes. Europeans first entered the area in the late 18th century, first as fur traders and then as settlers. European settlement began in earnest in the 1830's with both farming and the building of the county's urban centers in the Cities of Janesville and Beloit.

The population of the county surpassed 30,000 by 1850 and the county continued to grow throughout the 19th century due to innovations in farming and industry as well as easy access by rail to urban market hubs in Madison, Milwaukee, St. Paul (MN), and Chicago (IL). Stagnated population and economic growth were evident in the late 20th century, tracking the national decline in domestic manufacturing, and seen locally as several cornerstone businesses closed operations in Rock County. In the 21st century, the county has diversified into new sectors such as healthcare and continues to have a strong agricultural presence, leading to stability and a steady rate of growth and development.[46]

Population

Rock County's population is 160,148 according to the 2013 US Census Bureau estimate, which has increased .3% since 2010. The Rock County population of the participating communities as of the 2010 US Census is for the Cities of Beloit (36,966), Brodhead (90), Edgerton (5,364), Evansville (5,012), Janesville (63,575) and Milton (5,564); the Villages of Clinton (2,154), Footville (808) and Orfordville (1,442) and the unincorporated towns have a population of 39,356

In the 2000, the county was home to 152,307 people[47]; in 2010, there were 160,331 and according to the 2014 U.S. Census Bureau estimate, there are 161,188 people residing in Rock County. [48] This

[46] http://www.co.rock.wi.us/mission-facts-history
[47] http://www.census.gov/population/cencounts/wi190090.txt
[48] http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk

is an increase of 8,881 people between 2000 and 2014 – a population growth rate of 6%.

According to the 2014 U.S. census report,[49] there are 63,385 households in Rock County with an average of 2.48 people per household. The 2014 U.S. census numbers indicate that the median household income is $49,645 and that the per capita income is $24,715. Approximately 14.9% of the people live below the poverty line. The 2014 census estimates also indicate that there are approximately 68,301 housing units within the county.

According to the 2014 Census report, the majority (90.9%) of people reported their race as singularly White. Black or African American people were 5.1% of the population, Asians were 1.2% and American Indians are 0.5%. People reporting two or more races were 2/2% of the population and Hispanic/Latinos were 8.2% of the population.

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.

- <5 years old – 6.0%
- <18 years old – 23.9%
- >65 years old – 15.1%
- Female – 50.9%
- Foreign Born – 4.6%
- No English at Home – 8.5%
- High School Graduates – 88.4%
- College Degree – 20.0%

Transportation Network

Rock County's road network of highways and local roads connect the county's inhabitants and visitors to commercial, recreational and educational sites. Roadways in Rock County are categorized by a

[49] http://www.census.gov/quickfacts/table/PST045215/55105,55

functional classification system based on the level of service the roadway provides in carrying vehicular traffic. Functional road classifications for rural areas include principal arterials, minor arterials, major collectors, minor collectors and local roads. The map in Appendix A shows the various roads in the county. Several important roadways bisect and cross the county, including Interstates 90, 39, and 43; and US Highways 14, 51, 12, 11, 26, 59, 67, 81, 89, 104, 140 and 213. These roadways support the majority of the traffic movement within the county.

The county also operates the Southern Wisconsin Regional Airport, which has been serving the South Central Wisconsin/Northern Illinois region in Janesville since the late 1940's. The official aviation designator for the Airport is KJVL; its latitude/longitude is N42 37.2150' W89 2.4933'. The County provides onsite maintenance, rescue and safety resources that canvass the property's three runways, cargo and corporate hangars and tower sited on 1,400-acres. The airport supports over 50,000 operations (landings/take-offs) and one-half million pounds worth of freight through the airport annually.[50]

Rock County has an excellent transportation network and has maintained this infrastructure to provide a safe and efficient transportation system. With continued maintenance, these systems will continue to serve the population effectively.

Public Safety Support

Medical

The Rock County Office of Emergency Management, city and county emergency services responders, hospital emergency staff and various departments have developed medical and mass casualty plans. These plans will be used in the event of a disaster. Rock County is served by a wide range of health facilities and health professionals. These health care facilities will coordinate with responding agencies to ensure the best utilization of services and the least injury or loss of life from a disaster situation.

[50] http://jvlairport.com/

Hospitals located within the county include:[51]

Beloit Memorial Hospital
1969 W. Hart Road, Beloit

Edgerton Hospital and Health Services
11101 N. Sherman Road, Edgerton

Mercy Health System
1000 Mineral Point Avenue, Janesville

St. Mary's Janesville Hospital
3400 E. Racine Street, Janesville

Rock County relies on a mix of volunteer, paid-on-call and paid staff to provide pre-hospital emergency medical services to its service areas. Details for pre-hospital medical units and their licensing levels are listed below:[52]

Beloit (City of) Fire Department
1111 Church Street, Beloit
License Level: EMT-Paramedic

Beloit (Town of) Fire Department
2445 South Afton Road, Beloit
License Level: EMT-Paramedic

Clinton Fire Protection District EMS
145 Ogden Avenue, Clinton
License Level: EMT-Basic

Edgerton Fire Protection District First Responders
621 North Main Street, Edgerton
License Level: First Responder

Edgerton Fire Protection District - EMS Division
621 North Main Street, Edgerton
License Level: EMT-Intermediate Technician

Evansville Emergency Medical Service
31 South Madison Street, Evansville

[51] https://www.dhs.wisconsin.gov/guide/hospitaldir.pdf
[52] https://www.dhs.wisconsin.gov/ems/provider/rock.htm

License Level: EMT-Basic

Footville Fire Department EMS
252 North Gilbert Street, Footville
License Level: EMT-Basic

Janesville Fire Department Ambulance Service
303 Milton Avenue, Janesville
License Level: EMT-Paramedic

Milton and Milton Township Fire Department
614 West Madison Avenue, Milton
License Level: EMT-Intermediate Technician

Orfordville Fire Protection District EMS
195 North Wright Street, Orfordville
License Level: EMT-Basic

Turtle (Town of) Fire Department
5131 East Creek Road, Beloit
License Level: First Responder

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

Fire Service

Rock County includes ten fire departments which are staffed by mainly full-time paid and volunteer firefighters who attend regularly-scheduled training activities.

Some county fire departments also feature specialized skills such as water rescue/dive, hazardous materials and confined space entry. Additional details for fire departments and their staffing are listed below:[53]

City Of Beloit Fire Department
1111 Church Street, Beloit
Full-Time Paid Firefighters: 62
Non-Firefighting Paid Staff: 10

[53] http://www.firedepartment.net/directory/wisconsin/rock-county

Town of Beloit Fire Department
2445 S Afton Road, Beloit
Full-Time Paid Firefighters: 10
Part-Time Paid Firefighters: 31
Non-Firefighting Volunteers: 2

Clinton Fire Protection District
PO Box 153, Clinton
Part-Time Paid Firefighters: 29

Edgerton Fire Protection District
621 N Main Street, Edgerton
Volunteer Firefighters: 33

Evansville Community Fire District
PO Box 165, Evansville
Part-Time Paid Firefighters: 32
Non-Firefighting Paid Staff: 1

Footville Community Fire Department
252 N Gilbert Street, Footville
Volunteer Firefighters: 29

Janesville Fire Department
303 Milton Avenue, Janesville
Full-Time Paid Firefighters: 91
Non-Firefighting Paid Staff: 3

Milton and Milton Township Fire Department
614 W Madison Avenue, Milton
Part-Time Paid Firefighters: 33
Non-Firefighting Paid Staff: 1

Orfordville Fire Protection District
173 N Wright Street, Orfordville
Full-Time Paid Firefighters: 1
Volunteer Firefighters: 46
Non-Firefighting Volunteers: 1

Turtle Fire Department
5131 E Creek Road, Beloit
Volunteer Firefighters: 28

Law Enforcement

Several departments in Rock County are responsible for law enforcement duties within the county. The Rock County Sheriff's Department provides deputies for unincorporated areas of the county, and those without full-time coverage. Also, the Wisconsin State Patrol provides limited coverage from their Southwest Region office in De Forest.[54] Law enforcement agencies operating within Rock County are listed below:[55]

Beloit Police Department
100 State Street, Beloit

Beloit Town Police Department
1133 Inman Parkway, Beloit

Clinton Police Department
301 Cross Street, Clinton

Edgerton Police Department
215 W. Fulton Street, Edgerton

Evansville Police Department
10 West Church Street, Evansville

Fulton Town Police Department
2738 W. Fulton Center Drive, Edgerton

Janesville Police Department
100 N. Jackson Street, Janesville

Milton Police Department
690 South Janesville Street, Milton

Milton Town Police Department
23 First Street, Milton

Orfordville Police Department
106 N. Center Street, Orfordville

Rock County Sheriff's Office
200 E. US Highway 14, Janesville

[54] http://wisconsindot.gov/Documents/about-wisdot/who-we-are/dsp/dsp-regions-map.pdf
[55] https://wilenet.org/html/directory/Law%20Enforcement%20Directory%2020151124.pdf

Turtle Town Police Department
6916 S. County Road J, Beloit

Special Teams

Hazardous materials (HazMat) response is performed by the countywide Level III Team, which is part of the Southwest Task Force.[56] Wisconsin Emergency Management contracts and manages twenty-two Regional Hazardous Materials Response Teams. The teams are divided into Task Forces: Northeast Task Force, Northwest Task Force, Southeast Task Force and the Southwest Task Force. These Task Forces are then divided into Type I, Type II and Type III teams, all with complimentary capabilities and training requirements.

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

Local (County) Hazardous Materials Response Teams respond to chemical incidents which require a lower level of protective gear but still exceed the capabilities of standard fire departments. Forty counties currently have Level 4 Hazardous Materials Response Teams. Those teams may provide assistance to surrounding counties and are approved by the Local Emergency Planning Committees. [57]

Archaeological and Historical Resources

The National Register of Historic Places also includes a listing of locations in Rock County.[58] As mitigation projects are considered, the county is committed to ensuring that archaeological and historical sites are preserved.

[56] http://emergencymanagement.wi.gov/training/docs/Regional_Hazardous_Materials_Resp_Teams_Map.pdf
[57] http://emergencymanagement.wi.gov/epcra/hazmat.asp
[58] http://nationalregisterofhistoricplaces.com/wi/rock/state.html

Historic Sites		
Historic Site Name	**Address**	**Municipality or Township**
Vacant/Not in Use		
Beloit Water Tower	1005 Pleasant St.	Beloit
Beloit Waterworks and Pump Station	1005 Pleasant St.	Beloit
Clinton Water Tower	High Street	Clinton
Cooksville Mill and Mill Pond Site	SR1	Evansville
Court Street Methodist Church	36 S. Main St.	Janesville
Crosby Block	102 Allen St.	Clinton
Dougan Round Barn[59]	444 West Colley Rd.	Beloit
Edgerton Public Grade School	116 N. Swift St.	Edgerton
Emerson Hall	Beloit College Campus	Beloit
Footville Condensery	Beloit St.	Footville
Gilley-Tofsland Octagonal Barn	NW of Edgerton	Edgerton
How-Beckman Mill	Address Restricted	Beloit
Janesville High School	408 S. Main St.	Janesville
Orfordville Depot	Beloit St.	Orfordville
J. K. Porter Farmstead	SR 1	Evansville
Risum Round Barn	SW of Orfordville	Orfordville
Historic Districts		
Benton Avenue Historic District	Benton Ave., Wilton Ave., Sherman Ave.,	Janesville

[59] Please note that the Dougan Round Barn was demolished in 2012. It is noted on the website and is listed as a historic site in Beloit ordinances but will be removed from the National Register of Historic Places and the State of Wisconsin Register of Historic Places. It. At this time, there is nothing there but there is an option for a plaque or monument to be placed.

Historic Sites		
Historic Site Name	**Address**	**Municipality or Township**
	Richardson St., Blaine Ave., and Prairie Ave.	
Bluff Street Historic District	Bluff St. from Shirland Ave. to Merrill St.	Beloit
Bostwick Ave. Historic District	404-436 Bostwick Ave and 1118 and 1128 Grace St.	Janesville
Beloit Waterworks and Pump Station	1005 Pleasant St.	Beloit
Columbus Circle Historic District	Columbus Circle bounded by N. Adams and E. Milwaukee Sts. and N. Garfield Ave.	Janesville
Conrad Cottages Historic District	235-330 Milton Ave.	Janesville
Cooksville Historic District	Both sides of streets bordering the Public Sq. and Rock St.	Cooksville
Courthouse Hill Historic District	Bounded by E. Milwaukee St., Garfield and Oakland Aves. and E. Court St. and Milton Ave.	Janesville
East Milwaukee Street Historic District	N. Parker Dr. and E. Milwaukee St.	Janesville
Evansville Historic District	Bounded by Allens Creek, Liberty, 4th and Garfield Sts.	Evansville
Fulton Street Historic District	Fulton St. bounded by Main and Albion Sts., 11-21 Swift St.	Edgerton
Jefferson Avenue Historic District	Bounded by Oakland, Garfield and Ruger Aves. and Forest Park Blvd.	Janesville
Look West Historic District	Bounded by Laurel Ave. and N. Madison, W. Court and N. Palm Sts.	Janesville

Historic Sites		
Historic Site Name	**Address**	**Municipality or Township**
Merrill Avenue Historic District	103, 107, 111, 115 Merrill Ave.	Beloit
Milton College Historic District	College St.	Milton
Mouth of the Yahara Archeological District	Address Restricted	Fulton
Near East Side Historic District	Bounded by Pleasant, Clary Sts., Wisconsin and E. Grand Aves.	Beloit
North Main Street Historic District	11-23 and 18-22 N. Main St. and Wall St. between N. Main and N. Parker Dr.	Janesville
Old Fourth Ward Historic District	Bounded by Washington St., Center Ave., Court St., Franklin St., and Monterey Park	Janesville
Prospect Hill Historic District	Bounded by Eisenhower, Prospect and Atwood Aves., Milwaukee St., Parker Dr and Centerway	Janesville
South Main Street Historic District	S. Main St. from Milwaukee St. to Rock Co. Courthouse grounds and E. Court St. from Parker Dr. to Rock Rd.	Janesville
West Milwaukee Street Historic District	Bounded by Wall, River, Court and Academy Sts.	Janesville
State Listing		
John Alexander Wheat Warehouse	304 S. Janesville St.	Milton
Abram Allen House	205 E. Madison Ave.	Milton
The Armory	10 S. High St.	Janesville
Bartlett Memorial Historical Museum	2149 St. Lawrence Ave.	Beloit
Belle Cottage	1837 Center Ave.	Janesville

Historic Sites		
Historic Site Name	**Address**	**Municipality or Township**
Beloit Water Tower	1005 Pleasant St.	Beloit
Benton Avenue Historic District	Benton Ave., Wilton Ave., Sherman Ave., Richardson St., Blaine Ave., and Prairie Ave.	Janesville
Selvy Blodgett House	417 Bluff St.	Beloit
Bluff Street Historic District	Bluff St. from Shirland Ave. to Merrill St.	Beloit
Bostwick Ave. Historic District	404-436 Bostwick Ave and 1118 and 1128 Grace St.	Janesville
Brasstown Cottage	1701 Colley Rd.	Beloit
Carlton Hotel	14 N. Henry St.	Edgerton
Church of St. Thomas the Apostle	822 E. Grand Ave.	Beloit
Citizens Bank	Front & Allen Sts.	Clinton
Beloit Waterworks and Pump Station	1005 Pleasant St.	Beloit
Clark-Bowen House	3457 Riverside Dr.	Beloit
Clinton Village Hall	301 Cross St.	Clinton
Clinton Water Tower	High St.	Clinton
Columbus Circle Historic District	Columbus Circle bounded by N. Adams and E. Milwaukee Sts. and N. Garfield Ave.	Janesville
Conrad Cottages Historic District	235-330 Milton Ave.	Janesville
Cooksville Cheese Factory	SR 1	Evansville
Cooksville Historic District	Both sides of streets bordering the Public Sq. and Rock St.	Cooksville
Cooksville Mill and Mill Pond Site	SR 1	Evansville

Historic Sites		
Historic Site Name	**Address**	**Municipality or Township**
Cooper-Gillies House	SR 1	Evansville
Court Street Methodist Church	36 S. Main St.	Janesville
Courthouse Hill Historic District	Bounded by E. Milwaukee St., Garfield and Oakland Aves. and E. Court St. and Milton Ave.	Janesville
J. W. Crist House	2601 Allen Rd.	Beloit
Crosby Block	102 Allen St.	Clinton
James B. Crosby House	1005 Sutherland Ave.	Janesville
Charles L. Culton House	708 Washington St.	Edgerton
Dr. Jean House	27 Third St.	Milton
Homer B. DeLong House	800 Milwaukee Rd.	Clinton
Erastus Dean Farmstead	E. of Janesville on US 14	Janesville
Dean-Armstrong-England Octagonal Barn	NE of Milton	Milton
Dougan Round Barn	444 West Colley Rd.	Beloit
J. B. Dow House and Carpenter Douglas Barn	910 Hoard St.	Beloit
John T. Dow House	SR 1	Evansville
Eager Free Public Library	39 W. Main St.	Evansville
East Milwaukee Street Historic District	N. Parker Dr. and E. Milwaukee St.	Janesville
Edgerton Depot	20 S. Main St	Edgerton
Edgerton Post Office	104 N. Swift St.	Edgerton
Emerson Hall	Beloit College Campus	Beloit

Historic Sites		
Historic Site Name	**Address**	**Municipality or Township**
Evansville Historic District	Bounded by Allens Creek, Liberty, 4th and Garfield Sts.	Evansville
Evansville Standpipe	288 N. 4th St.	Evansville
Fairbanks Flats	205, 215 Birch Ave. and 206, 216 Carpenter Ave.	Beloit
First Congregational Church	801 Bushnell St.	Beloit
Footville Condensery	Beloit St.	Footville
Footville State Bank	138 Depot St.	Footville

The Wisconsin Historical Society maintains a list of archaeological sites and cemeteries known as the Archaeological Site Inventory Database (ASI); this list is available to governmental agencies upon request. These sites cover an extended period of time, and include campsites/villages/communities, cabins/homesteads, sugar mapling sites, cemetery/burial/ mounds, trading/fur posts, mill/sawmills and kilns. Rock County has several ancient burial sites and archeological features of high historical significance. For example, the Beloit College area has 23 prime examples of Native American conical, linear, and animal shaped effigy mounds built between 400 and 1100 A.D. Although not all effigy mounds contain skeletal remains, they are of great historical importance in the study of Native American cultural anthropology. Because early civilizations used water systems as transportation corridors, most archeological sites are located adjacent to or with close proximity to water. Many of Rock County's major archeological sites are located in areas close to the Rock River, Yahara River, Turtle Creek, and Lake Koshkonong [60]

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

[60] Rock County Comprehensive Plan 2035 – Chapter 4

Hazard Analysis and Previous Mitigation Projects

The following sections identify those hazards that have occurred or could occur in Rock 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 Rock 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 hazards where there were differences identified within the county were dam failure, flooding, and wildfire; for those hazards, specific locations are identified. The workgroup evaluated the local risk from landslides and coastal erosion, hazards identified in the Wisconsin state plan, and found that they were not relevant in Rock County due to its location (i.e., not coastal) or topography (i.e., mostly flat plains).

For this plan the Rock 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. A copy of the table follows:

Hazard Analysis and Previous Mitigation Projects

Hazard	Likelihood of Occurrence *	Severity of Effects if It Does Happen*	Overall Risk (0 to 25)	Misc. Notes
Drought	3	4	12	Agriculture is the largest industry in the county; drought can cause decreased pig and beef cattle growth rates and decrease dairy production. The county also has some high-capacity wells associated with agriculture, which can increase the impact to groundwater supplies during a drought.
Dust Storm	2	2	4	Severity of effects is generally short-term. There is some risk of blowing dust, particularly along the I-90 corridor and in prairie areas. In spring (pre-planting), there is a risk of topsoil loss from the large areas of flat agricultural land in the county.
Earthquake	2	1	2	The county is near the northernmost edge of the region likely to feel effects of a significant earthquake along New Madrid fault but the effects at this distance would be very minor (low-level shaking) and the only damage expected would be to buildings in very poor repair (these are much more likely to be damaged by high winds or storms than by seismic activity).
Flood	4	4	16	There are regular spring floods, both from the river and from creeks and streams. The DNR policy of not removing stream debris increases the risk of damage during flooding. Significant floods in 2008 resulted in loss of some houses and in roads submerged in flood water in T. Fulton, Milton, and Rock. In 1998, T. Harmony also lost homes and agricultural land in a flood. In addition to regular flooding, there is also a risk of flash flooding along the Rock River and Turtle Creek. Regular flooding occurs on Colley Road where the Turtle Creek and Springbrook Creek converge in the Town of Turtle. Spring ice melt, long-precipitation storms, and flash flooding in this area has led to road closures at various times throughout the year and hindering emergency response vehicles.

Hazard	Likelihood of Occurrence *	Severity of Effects if It Does Happen*	Overall Risk (0 to 25)	Misc. Notes
Dam Failure Overall	2	2	4	The county has completed mitigation work for a number of dams since flooding in 2000 and most dams in the county are considered low risk at this time.
Indianford dam and downstream system (Rock River dam system)	2	5	10	The Indianford dam in T. Fulton holds back Lake Koshkonong, a significant amount of water. While it is still considered to have a low likelihood of failure, there is considerable downstream risk of severe effects if this dam were to fail.
Fog Overall	3	2	6	With the large expanses of farmland in the county, the primary fog-related concerns relate to risk of car and school bus accidents in rural areas. These rural areas are generally prone to the heaviest fogs (particularly between Clinton and Beloit) and carry a risk of road icing during winter fogs.
Wildland Fire (covers grass and forest fires) Overall	4	4	16	The county does not have significant tree cover; canopy fires are therefore not common and are not considered a risk. The primary risk is for grassland and crop fires.
Seasonally	5	5	25	The fall season carries the highest risk of cropland fires (fields are stubble) while the spring season is riskiest for grassland fires (before new growth develops). Impacts in the event of a fire include effects on the water supply, crop damage, and smoke over roadways causing a driving hazard. The latter is of particular concern along the I-90 corridor, which is lined with crop and grass lands.
Extreme Heat Overall	3	2	6	There has been a trend toward higher temperatures that is expected to continue.
Agriculture/ Functional needs	3	4	12	As with drought, periods of high temperatures can cause decreased pig and beef cattle growth rates and decrease dairy production. Temperature extremes also pose significant problems for functional needs populations such as the elderly and the disabled.

Hazard Analysis and Previous Mitigation Projects

Hazard	Likelihood of Occurrence *	Severity of Effects if It Does Happen*	Overall Risk (0 to 25)	Misc. Notes
Extreme Cold Overall	3	2	6	More frequent and longer sub-zero stretches have been noted during the winter.
Agriculture/ Functional needs	3	4	12	These can disrupt agriculture, particularly with water supply disruption and with wind chill effects posing a risk to livestock and farmer health. Temperature extremes also pose significant problems for functional needs populations such as the elderly and the disabled. The primary general effects of extreme cold consist of water lines and mains freezing and breaking, disrupting water supply; shutting down of rural bus lines due to safety risks for children; and school closings, most often due to wind chill concerns.
Storms/Hail Overall	4	2	8	Crop damage is the primary effect seen from hail storms, although larger hail can also impact business like car dealerships and cause roof damage to businesses and residences.
Ag	4	4	16	
Lightning Overall	4	2	8	Critical infrastructure (primarily communications) and outdoor community/public events carry the highest likelihood of negative effects in the event of lightning.
Infrastructure/ Events	4	4	16	
Thunderstorm Overall	5	2	10	Critical infrastructure (primarily communications) and outdoor community/public events carry the highest likelihood of negative effects in the event of thunderstorms.
Infrastructure/ Events	5	4	20	
Tornado	3	5	15	
High Wind (straight-line)	3	5	15	
Winter (ice/snow)	3	4	12	Winter storms in the county seem to be increasingly associated with ice instead of or in addition to snow, particularly early in the season. Beloit has had two Federal disaster declarations for ice in the past 15 years (2000 to 2015). Recovery from ice events can be very expensive, with power line and other infrastructure repairs.

Hazard	Likelihood of Occurrence *	Severity of Effects if It Does Happen*	Overall Risk (0 to 25)	Misc. Notes
Utility Failure Electricity Overall	2	4	8	Everything, particularly communications networks, are sensitive to electrical outages. Also, extreme temperature effects on agriculture and functional needs populations can be exacerbated by loss of electricity (for heating or cooling). Rock Energy Corporative, which provides electric services predominately to customers that reside within the unincorporated areas, is the only not-for-profit utility in the county. Backup generators are available for all lift stations as part of mitigation work done on lift stations in flood areas. There are some software-related risks to water/sewer (discussed under Man-Made Hazards). Livestock operations run on diesel and electricity interchangeably. Generally, farmers can get by for a few days if only one is lost; longer term, more issues will arise (e.g., may need to truck in water).
Ag/Functional needs	2	5	10	
Water/Sewer (not-for-profit)	2	4	8	
Man-Made	NA	NA	NA	Information on man-made (including terrorism) hazards will be included to aid private businesses in their mitigation planning. These include cyber-attack and hazardous materials (fixed and transported). There is a statewide Threat and Hazard Identification and Risk Assessment (THIRA), which was designed to help Wisconsin make informed choices about how to manage the risk and reduce the impact posed by potential threats and all-hazard events. This approach was brought to the county within the past few years. A Department of Homeland Security audit found the Supervisory Control and Data Acquisition (SCADA) System, which operates the sanitary sewer and water systems, for the City of Beloit to be highly vulnerable to attack. A cyber-attack on this system could interrupt water and/or sewer services.
Biological	NA	NA	NA	There are agriculture and public health concerns related to biological hazards. An example relates to pheasant farms in the county and the risk of avian flu outbreak.

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. The Rock County Emergency Management Office 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 Rock County Zoning Department or have their own planning departments. Members of the County 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.

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

- **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.[61]

    - DR-1768 (2008) – City of Janesville: Acquisition of eight single-family dwelling residential structures for $1,244,750.

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

  - DR-1768 (2008) – Rock County: Acquisition of six single-family dwelling residential structures for $1,075,745.
  - DR-1768 (2008) – Rock County: PDM Plan update for $30,000.

- **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 risk to the population and structures from future hazard events, while also reducing reliance on Federal funding from future major disaster declarations.[62]

  - PDM Plans Funded
    - 2002 – Rock County: New PDM plan funded for $17,600.

- **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.[63]

- **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.[64]

- **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

[62] http://www.fema.gov/pre-disaster-mitigation-grant-program
[63] http://www.fema.gov/flood-mitigation-assistance-program
[64] http://www.fema.gov/severe-repetitive-loss-program

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. [65]

- **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 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.[66]

- **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

[65] http://www.fema.gov/repetitive-flood-claims-program
[66] http://www.fema.gov/public-assistance-local-state-tribal-and-non-profit/hazard-mitigation-funding-under-section-406-0

of Engineers (i.e., these funds can be used for the local matching requirement of other federal grants).[67]

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

- 87195.26 Rock County: Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, demolition and clearance of hazardous structures, and acquisition/landfill for $495,000.
- EAP #08-10 Rock County: Rehabilitation of housing units, acquisition/demolition/relocation, LiDAR for $1,490,942.
- EAP #08-19 City of Janesville: Rehabilitation of damaged housing units, acquisition/demolition/relocation, storm sewer relocation, public facilities library and senior center for $2,475,887.
- EAP #08-21 City of Beloit: Lift station repairs for $45,000.

- **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.[68]

  - 2006-07 (MFC-53206-06) City of Beloit: Parking deck removal for $800,000.

- **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.[69]

[67] http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/communitydevelopment/programs/drsi
[68] http://dnr.wi.gov/Aid/MunFloodControl.html
[69] 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 Rock County would like to accomplish are detailed in the following sections.

The planning committee also used the all hazards approach to identify mitigation goals for the county and all of its municipalities. The purpose of the hazard mitigation plan is to identify hazard areas, to assess the risks, to analyze the potential for mitigation and to recommend mitigation strategies where appropriate. Potential mitigation projects will be reviewed using criteria that stress the intrinsic value of the increased safety for people and property in relation to the monetary costs to achieve this (i.e., a cost-benefit analysis). With that in mind, the 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 Rock County by identifying potential property damage risks and recommending appropriate mitigation strategies to minimize potential property damage.
- **Objective 3:** To promote countywide planning that avoids transferring the risk from one community to an adjacent community, where appropriate.
- **Objective 4:** To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.

Vulnerability

Perhaps the largest risk that falls under the all-hazards banner is the continuing challenge of securing funding to keep up with the rapid technological changes and advances in the public safety communications infrastructure. When departments cannot communicate with each other, they cannot be effectively coordinated in a disaster which could cause potential delays in providing critical services to citizens in need.

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.

Also, 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.

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 capital outlays 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. Rock 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 in municipalities that want to use siren technology. If used, each community should regularly test and maintain its sirens.
    - 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.
- Rock County Sheriff's Office to receive and distribute warning information to the public and first response agencies.
    - Rock County is a user of the Wisconsin Interoperable System for Communications (WISCOM), which is a shared system that first responders in communities across the state will use to communicate during a major disaster or large-scale incident. WISCOM will support up to four simultaneous conversation paths during an incident, dramatically increasing the current capacity available with statewide mutual aid channels and allowing responders from any area of the state to assist another community without losing communication capabilities.[70] The county would like to explore expanding coverage into the southern part of the county. They would also like to explore the feasibility of public/private partnership options to add signal

[70] http://interop.wi.gov/section.asp?linkid=1621&locid=166

boosters to larger buildings because police and fire digital radios do not penetrate some structures and building codes require boosters for new buildings but upgrades are needed for existing structures.

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, Rock County will continue to promote increased use of these radios among the public especially for places that hold large public gatherings (e.g., holiday festivals, the County Fair, 4H events).

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 Rock County's Emergency Operations Plan which is reviewed and updated on a regular schedule.

Rock 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.

Rock County will prepare facilities, systems and procedures to activate warning and communication. During an emergency, Rock County will deliver prompt and accurate warnings to businesses and residents. The county would like to investigate newer technology options for a county-wide emergency alert program for residents and businesses (e.g., reverse/push notification systems, smartphone applications).

Website

Geographic information system (GIS) mapping data is available from the Rock County website[71]. In recognition of the importance of the internet as a communication tool, especially in pre-planning activities, county offices will review their web pages to ensure that important emergency information and links for general preparedness topics are available. The Emergency Management Department will continue to look for opportunities to add/update links on the existing county web site (e.g., American Red Cross, Homeland Security/FEMA, WEM, Ready.gov) especially focusing on preparedness bulletins tailored for specific types of incidents (e.g., tornadoes, extreme temperatures, floods).

Other Potential Projects

Rock County Emergency Management also has two other potential projects that would help mitigate deleterious effects to the community after a disaster that would cut-across many types of disasters including:

- Conduct annual school assessments and continue to coordinate to receive and maintain copies of emergency plans for county schools and some daycares.

- Coordinate with the American Red Cross as needed to support their shelter inventory work in the county.

[71] http://www.co.rock.wi.us/land-record-maps-apps-data

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 Rock 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 Rock County. This assertion is further bolstered by the fact that there is very little irrigation done within the county and that the soils in Rock 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 at http://www.drought.unl.edu/monitor/spi.htm.

SPI Values [72]	
2.0+	Extremely wet
1.5 to 1.99	Very wet
1.0 to 1.49	Moderately wet
-0.99 to 0.99	Near normal
-1.0 to 1.49	Moderately dry
-1.5 to -1.99	Severely dry
-2.0 and less	Extremely dry

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

[72] http://www.drought.unl.edu/whatis/indices.htm#spi

unpredictable and may also be localized, making it difficult to determine probability with any accuracy.

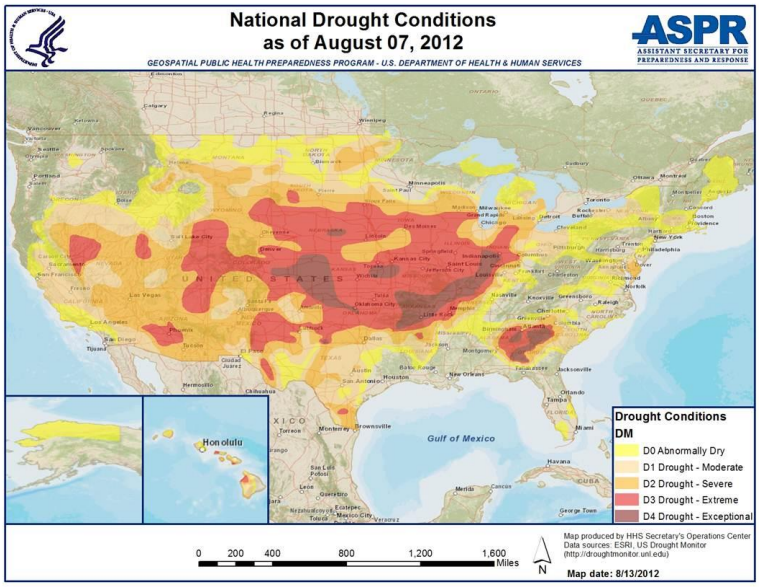
Drought conditions may vary from below-normal precipitation for a few weeks to a severe lack of normal precipitation for several months. Drought primarily affects agricultural areas because the amount and timing of rainfall has a significant impact on crop production. The severity of a drought cannot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

Frequency of Occurrence

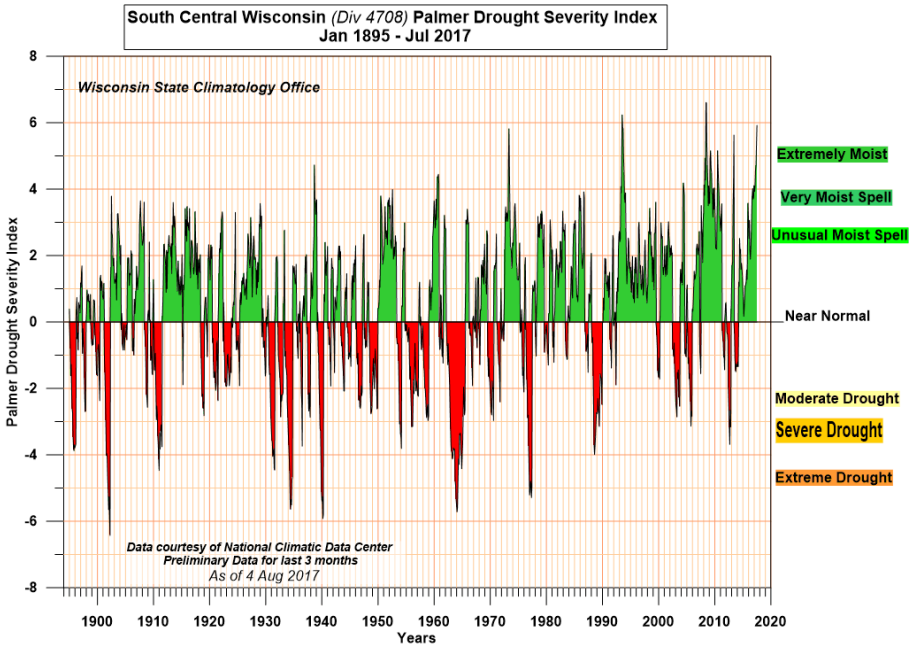
Drought is a relatively common phenomenon in Wisconsin and has occurred statewide in 1895, 1910, 1939, 1948, 1958, 1976, 1988, 1992, 2003 and 2005. The 1976 drought received a Presidential Emergency Declaration with damage to 64 Wisconsin counties. Estimated losses of $624 million primarily affected the agricultural sector. Reports show that Rock County was as affected as the rest of the state in this drought, receiving money for emergency feed programs for livestock and for increased fire protection of its wilderness areas. 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 US had record and near-record warmth for the seven-month period, except the Pacific Northwest, which was near average. The August 7, 2012 Drought Monitor map shows 52.27% of the United States and Puerto Rico in moderate drought or worse with Rock County in the D2 – Severe Drought category.[73]

[73] 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 Southcentral Wisconsin, which includes Rock County, follows[74]:



[74] http://www.aos.wisc.edu/~sco/clim-watch/graphics/pdsi-ts-08-l.gif

As can be seen from the frequency table above, Rock 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".[75]

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 17 drought events recorded by the National Weather Service for Rock County between 1 January 1996 and 31 May 2017[76] can be found in Appendix B.

Considering past occurrences, it can be surmised that Rock County has a high probability of drought occurrence in the future and the likelihood of damage due to drought is also considered high. The probability of dust storm and damages due to dust storms was considered low.

Vulnerability

Droughts and dust storms could impact Rock County disproportionately because a 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 an important part of the Rock County economy and that the losses could be staggering:

[75] State of Wisconsin Hazard Mitigation Plan
[76] http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=55%2CWISCONSIN

- Average size of farms: 225 acres
- Average value of agricultural products sold per farm: $77,242
- Average value of crops sold per acre for harvested cropland: $229.61
- The value of livestock, poultry, and their products as a percentage of the total market value of agricultural products sold: 46.16%
- Harvested cropland as a percentage of land in farms: 80.56%
- Average number of cattle and calves per 100 acres of all land in farms: 13.07
- Corn for grain: 129,285 harvested acres
- All wheat for grain: 5,293 harvested acres
- Soybeans for beans: 94,805 harvested acres
- Vegetables: 7,478 harvested acres
- Land in orchards: 158 acres[77]

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 Rock 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.

Rock County will provide information to farmers concerning the potential severity of drought events. Information on potential drought was publicized during the heat event in 2012, specifically targeting

[77] http://www.city-data.com/county/Rock_County-WI.html

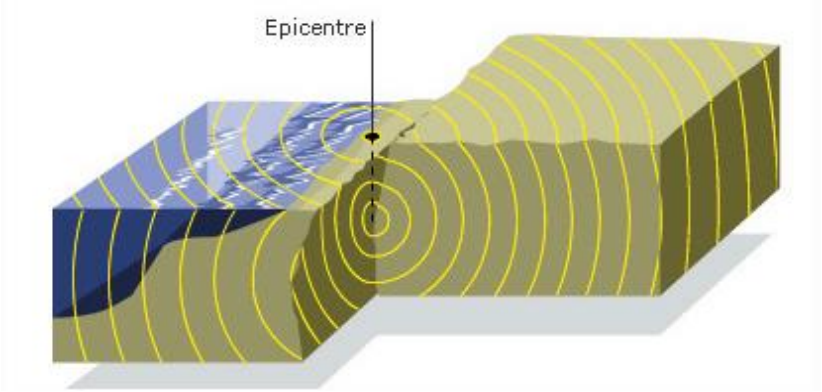
farmers and the extreme concerns they could face. The county will also prepare and publicize water usage information during drought conditions for the general public.

Rock County farmers can contact the Rock County U.W. Extension Office and the Department of Agriculture Stabilization and Conservation Service (ASCS) for information and guidance related to drought and the purchase of crop insurance. Various federal and state publications are available regarding ground water movement, the hydrologic cycle and irrigation methods. These agencies are also the lead agencies for obtaining emergency food and water supplies for agricultural use and for providing information regarding crop insurance. The Wisconsin Department of Natural Resources (DNR) also can provide assistance and permits for stream pumping for farms.

The hazard mitigation strategies listed above primarily involve providing information on water conservation measures to farmers and the public. Water conservation will ensure that the resource is available for critical residential, business and agricultural uses (e.g., drinking, food irrigation, manufacturing, firefighting) and good farming practices may help prevent erosion of the rich topsoil found in Rock 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). [78]



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

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

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

A third less often used way of measuring an earthquake's severity involves comparing its acceleration to the normal acceleration caused by the force of gravity. The acceleration due to gravity, often noted "g," is equal to 9.8 meters per second. Peak Ground Acceleration (PGA) measures the rate of change of motion relative to the rate of acceleration due to gravity and is expressed as a percentage. These three scales can be roughly correlated, as expressed in the table that follows[79]:

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.

[79] 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 1987 are listed in the table that follows. The most severe earthquake in Wisconsin was the record earthquake of 1811, centered along the New Madrid Fault. Most earthquakes that do occur in Wisconsin are very low in intensity and can hardly be felt. These very minor earthquakes are fairly common, occurring every few years. Events of moderate magnitude have occurred in locations in Illinois and Michigan. Those and other stronger earthquakes centered in other parts of the country have been felt primarily in southern Wisconsin.

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

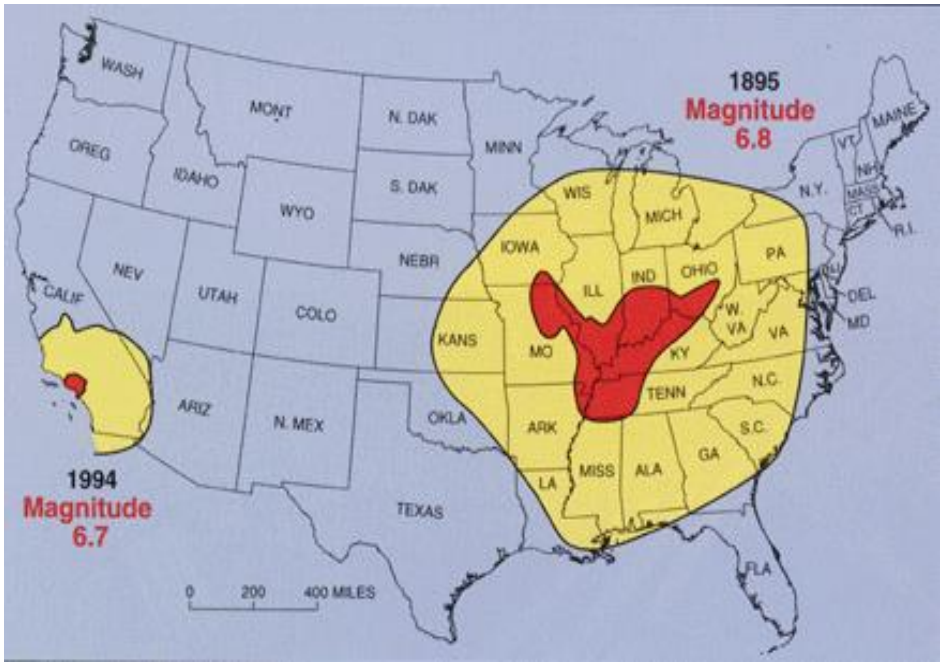
In an article (published in 2012) in the Milwaukee Journal-Sentinel:[80]

> *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.

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


1895
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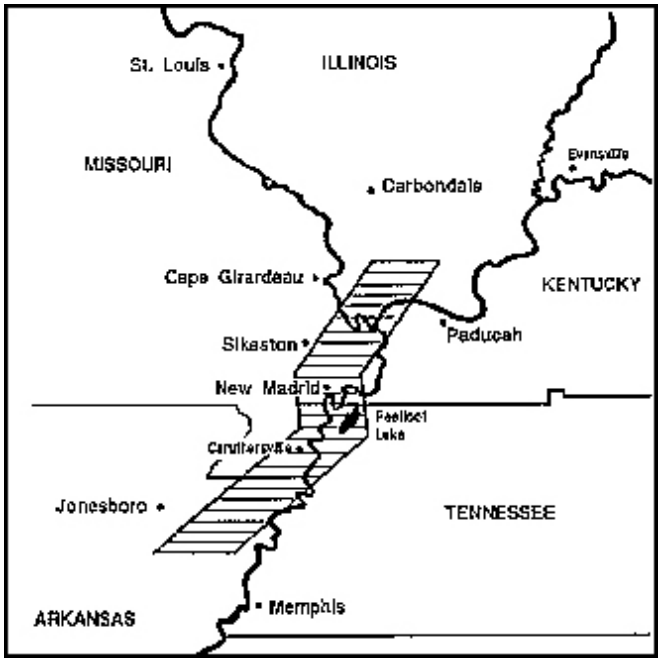
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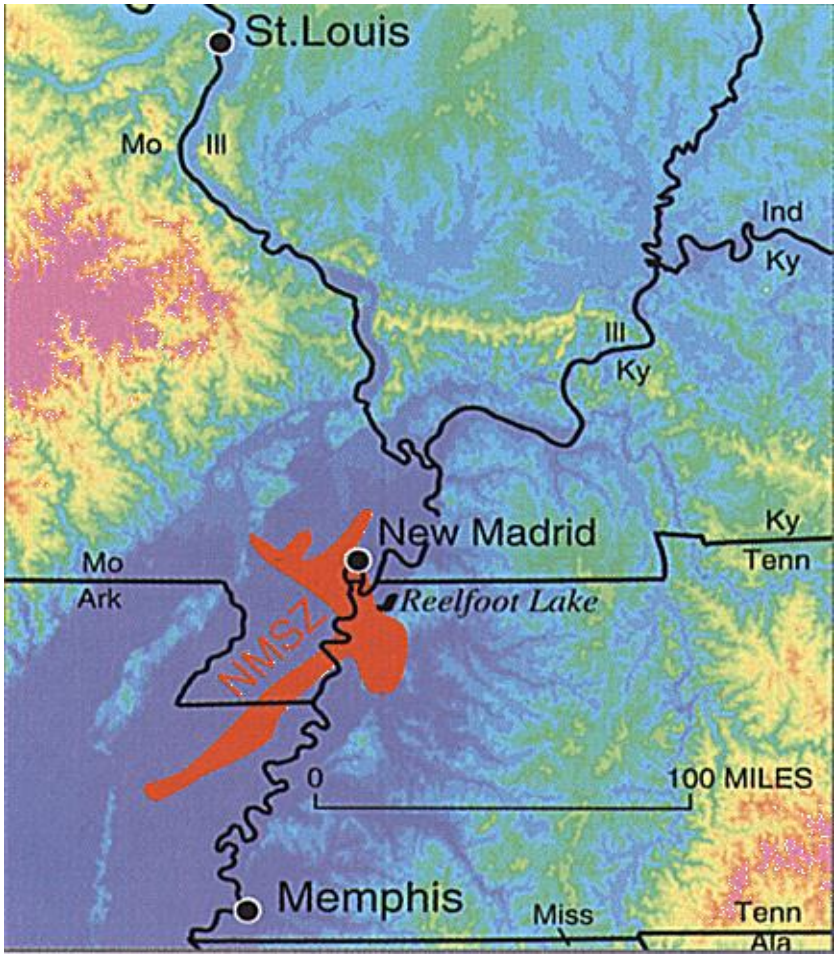


As seen on the map in Appendix A, the earthquake threat to Rock County is considered very low (the 50-year acceleration probability is 2%). Minor damage (e.g., cracked plaster, broken windows) from earthquakes has occurred in Wisconsin but most often the results have been only rattling windows and shaking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

Vulnerability

Any impact in the community from earthquake would likely be due to a few broken windows and personal effects that fell in the

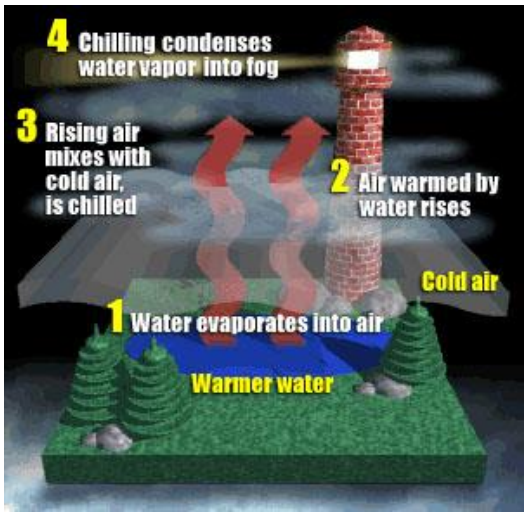
earthquake. The damage to critical infrastructure and buildings would be negligible.

Hazard Mitigation Strategies

Since Rock 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 low risks of earthquake damage and the very low severity of effects in Rock County.

Fog

Rock County has a long history dealing with fog, which at its most basic definition, is a cloud based on the ground rather than in the atmosphere.[81]



Physical Characteristics

Fog occurs when the air near the ground is saturated with moisture and condenses on tiny particles suspended in the air. These particles are called cloud condensation nuclei and actually attract water vapor molecules to their surfaces. Once condensation occurs on these tiny surfaces, the resulting liquid drops can remain suspended in the air because their weight causes them to descend slowly to the ground or be carried around by wind. The dew-point temperature, or saturation vapor pressure, can be reached by either adding more water vapor to the air or cooling the air down to the dew-point temperature. Fog is classified by the dominant formation process and exists as long as processes continue to maintain saturated conditions. There are several basic types of fog: [82]

[81] http://www.fi.edu/weather/events/fog.html

[82] http://www.jsonline.com/weather/wtmj/fogtypes.stm, http://www.usatoday.com/weather/tg/wadvfog/wadvfog.htm, http://www.usatoday.com/weather/tg/wfallfog/wfallfog.htm, http://www.usatoday.com/weather/tg/wrainfog/wrainfog.htm, http://www.usatoday.com/weather/wfog.htm, http://www.cimms.ou.edu/~cortinas/1014/l12_3.html

- Radiation Fog is caused by cooling close to the earth's surface. The earth gives off long-wave radiation which on a clear night travels out into space. If the temperature drops to the dew point close to the ground, radiation fog can form. Radiation fog is also known as ground fog. The fog normally disappears soon after sunrise as the sun's warmth evaporates it.
    - Valley Fog is one type of Radiation Fog that forms in mountain valleys during winter and can be more than 1,500 feet thick. Often, the winter sun is not strong enough to evaporate the fog during the day. When the air cools again the following night, the fog often becomes thicker, which makes it even harder for the sun to burn it off the following day. These fogs can last for several days until strong winds blow the moist air out of the valley. The tendency for cool, dense air to pool at the bottom of valleys also enhances valley fog.
- Advection Fog results from the movement (advection) of warm, moist air from the south over a colder land mass. During the winter this is common when snow covers much of the Midwest. The snow cools the bottom portion of the moist air mass often resulting in condensation. The thickest advection fog usually forms during nights with light winds because humid air near the ground is not mixed with the drier air above. With light winds, the fog near the ground can become thick and reduce visibilities to zero; usually the fog burns off during the day but it can last many days if it is thick enough to block out the sun’s light. This type of fog can occur almost anywhere in the United States, especially during winter warm-ups and early spring thaws. It can be widespread and very dangerous to commuters and aircraft travel.
- Evaporation Fog around Wisconsin is caused by cold air crossing over warmer bodies of water. The water evaporates its moisture into the colder air which immediately condenses it into clouds and fog. This is what looks like steam over Lake Michigan, inland lakes and rivers on a cold autumn or winter day. This rising fog can be found above thermal pools in Yellowstone National Park and is what you see when cool rain hits hot pavement. This may also be called “steam fog” or “sea smoke” when it forms over oceans. Sometimes this fog is lifted quickly and forms rotating whirls of fog known as *steam devils*.

- Upslope Fog is common near the Rockies, including the Denver area. If the winds are out of the east, the air flows up as it rises in elevation approaching the mountains. This can cool the air to its dew point and result in widespread fog.
- Rain Fog is created when late afternoon or evening showers and thunderstorms during the spring and summer leave the ground soaked just as the sun sets. Though the rain usually stops overnight, the high humidity level created by the rainfall won't allow the moisture to evaporate and as a result, fog forms. This occurs especially at times when there are light winds. As the air warms up the next morning, this rain-enhanced fog will usually burn off by midday.
- Precipitation Fog forms when rain or snow falls. As precipitation falls into drier air below the cloud, the liquid drops or ice crystals evaporate or sublimate directly into water vapor. The water vapor increases the moisture content of the air while cooling the air. This often saturates the air below the cloud and allows fog to form.

Frequency of Occurrence

Some locations on this planet have weather conditions that are conducive to making fog frequently such as:[83]

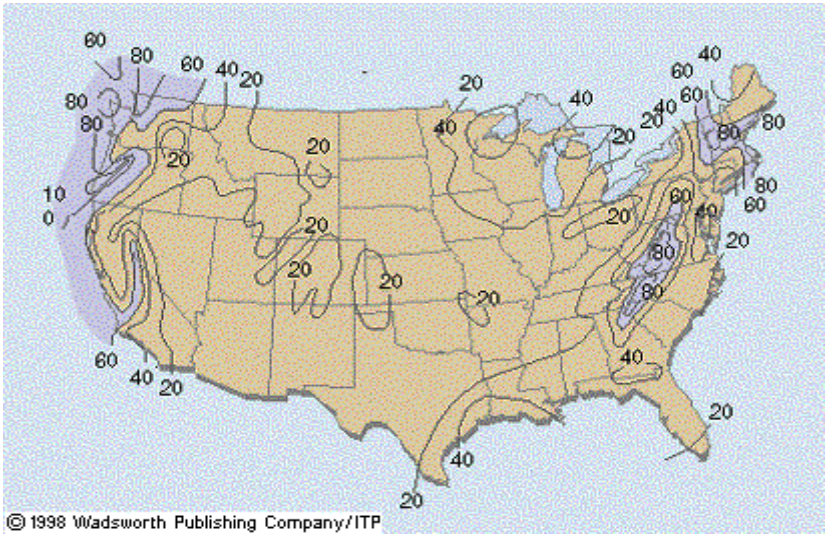
- San Francisco, California with an average of 18 days of heavy fog each year
- Cape Disappointment, Washington is the foggiest place on the western U.S. coast with an average of 106 days of heavy fog per year.
- The foggiest area on the east coast of the United States is found along the rockbound coast of Maine. Moose Peak Lighthouse on Mistake Island, at an elevation of 72 feet, averages 1580 hours of heavy fog each year. Many other locations have problems with fog, such as Eastport, Maine with 65 days annually and Portland, with 55 days of heavy fog each year.
- Inland areas with regular heavy fog include parts of the Appalachian Mountains such as a peak area in West Virginia that averages over 100 days each year. Elkins, at an

[83] http://www.jsonline.com/weather/wtmj/fogplaces.stm

elevation of 1948 feet has about 81 days annually with heavy fog.

- Milwaukee averages about 26 days with some heavy fog and this is comparable to the fog seen in Rock County.

Average Annual Number of Days with Heavy Fog in the United States



Rock County is geographically susceptible to issues with heavy fog. A table showing the 71 National Weather Service reported dense fog events in Rock County between 1 January 1996 and 31 May 2017 [84] can be found in Appendix B.

Overall, Rock County has a medium probability of fog occurrence in the future and the severity of effects due to fog is considered low.

Vulnerability

With the large expanses of farmland in the county, the primary fog-related concerns relate to risk of car and school bus accidents in rural areas. These rural areas are generally prone to the heaviest fogs, particularly between Clinton and Beloit, and carry a risk of road icing during winter fogs. The Gateway Business Park area is low and surrounded by wetlands; this area is also prone to heavy fogs and freezing fog on the roads during winter.

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

The largest vulnerability to fog is due to automobile traffic crashes. According to the Wisconsin Department of Transportation, dense fog contributes to hundreds of car accidents per year in the state. Following are the Wisconsin Department of Transportation's statistics for fog-related traffic crashes from 1999-2004:

Death and Injury Statistics for Fog-Related Traffic Crashes						
	1999	**2000**	**2001**	**2002**	**2003**	**2004**
Total Crashes	1259	1008	1066	595	772	1141
Fatal Crashes	14	12	19	12	11	16
People Killed	15	13	22	22	11	19
Injury Crashes	528	445	425	238	274	423
People Injured	777	643	593	372	391	615
Property Damage Crashes	717	551	622	345	487	702

Traffic Conditions at the Time of Fog-Related Traffic Crashes						
	1999	**2000**	**2001**	**2002**	**2003**	**2004**
Total Crashes	1259	1008	1066	595	772	1141
Daylight	467	340	295	158	257	398
Dark/Lighted	130	107	130	324	80	140
Dark/Unlit	547	439	491	46	343	456
Dusk	9	18	16	56	7	16
Dawn	99	101	126	9	77	122
Unknown Light Conditions	7	3	8	2	8	9

Some notable fog-related traffic crashes in Wisconsin follow:

- On the morning of Friday, October 11, 2002, 50 vehicles were involved in a massive vehicle accident on Interstate 43 in Sheboygan County near Cedar Grove, Wisconsin. This accident was the deadliest pile-up in Wisconsin history with ten individuals killed and over 40 people injured. Of the injured, seven were in critical condition and one was in serious condition at area hospitals immediately after the incident. 28 other people were treated and released for injuries ranging from burns to broken bones. The accident occurred as cars heading south collided into one another as some vehicles slowed down in a dense fog. This led to a chain reaction as numerous cars were unaware of the scene hidden behind a veil of fog. Chad Kruse, a driver interviewed after the accident, described it by saying, "I entered the wall of fog, like someone took a blanket and threw it over the windshield." At the same time but separate from this incident, four other accidents

occurred nearby on the interstate; all the individuals involved with these accidents survived. [85]

- Fourteen people were injured in January 1996 in a 26-car pileup on southbound I-43 near Ozaukee County Highway KK. The first driver struck said he had missed his exit because

[85] http://www.stoutonia.uwstout.edu/2002-2003/stories/021024/ne_04.html

of heavy fog and had slowed down to look for another when he was hit from behind. [86]

- In March 1990, three people were killed and 31 injured in a 52-vehicle pileup on the Tower Drive Bridge in Green Bay after dense fog and smoke from nearby paper mills created a "white wall" that reduced visibility to less than 10 feet. The accident was believed to be triggered when a tanker truck overturned and a ruptured gas tank ignited. Vehicles following too closely on the fog-shrouded bridge slammed into the tanker and were engulfed by a sheet of flames. [87]

As seen in the true examples above, fog-related incidents can cause death, injury and property loss to the vehicle owners and occupants and their insurance companies. Responding governmental agencies also may suffer losses due to the cost of response, for damage done to roadways and structures due to fires and for potential injuries to responders working in a reduced-visibility zone. Citizens may be impacted by the closure of roadways and delay of activities; businesses may suffer losses due to the absence of workers due to delay, injury and/or death and because of the delay of product on the roadways and direct loss of product in the crash (e.g., due to fire).

Hazard Mitigation Strategies

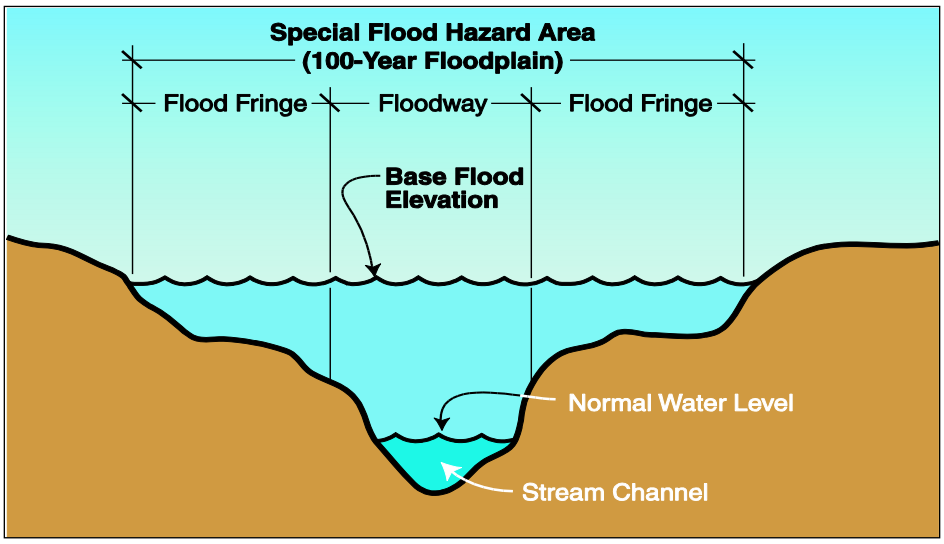
Strategies for assisting motorists in the fog primarily involve notification and warning of the risks and include:

- Fog area warnings, which are released by the National Weather Service and broadcast by local media
- School delays, which are determined by individual school districts and released to local media
- Road warnings/flashers in areas with higher than average risk. Public works and law enforcement at the state, county and local level will continue to monitor and place warnings as identified.

[86] The Fog, The Deadliest Traffic Crash in Wisconsin History; Trooper Tim Austin; Wisconsin Trooper, Callan Publishing Ins., Minneapolis, MN; Spring 2003.
[87] http://www.jsonline.com/news/state/oct02/87083.asp

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.[88]



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

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

[88] FEMA, August 2001

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.

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. There is also a concern regarding the loss of topsoil and erosion due to flooding.

The mechanism for the severe flooding that occurs in the City of Shell Lake is different though. The area lakes (i.e., Shell, Chain, Round, Little Ripley) have no natural inlet or outlet and maintain their lake levels through precipitation, runoff and groundwater flows; the only way for these lakes to lose water is through evaporation and groundwater seepage.

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

Flood Probability Terms Table[89]

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

[89] State of Wisconsin Hazard Mitigation Plan

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

The Wisconsin DNR database lists the following dams included in Rock County[90]:

Official Name	Popular Name	Owner Organization
Monterey		City of Janesville
Beckman	Swifts	Rock County
Indianford	Lake Koshkonong	Rock-Koshkonong Lake District
Beloit	Blackhawk	Eagle Creek Renewable Energy
Janesville Central	Janesville Upper	Eagle Creek Renewable Energy
Lake Leota		City of Evansville
Gibbs Lake		Rock County
Cramer,F Jean		
McCluskey,Steven S		
Camp Rotamer		
Cain, Calvert B.		
Schroeder, Jack D.		Schroeder, Jack D.
Douglas,Walter		Douglas,Walter
Storr's #1	WI DNR	WI DNR-Natural Resources Area Supv.
Storr's #2	WI DNR	WI DNR-Natural Resources Area Supv.
Storr's #3	WI DNR	WI DNR-Natural Resources Area Supv.
Lima Marsh #1	WI DNR	WI DNR-Natural Resources Area Supv.

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

Lima Pond	WI DNR	WI DNR - Fish Propagation Supv.
Kietzman, Robert		Kietzman, Robert
Houfe, Thomas		Houfe, Thomas
Lima Trout Pond	WI DNR	WI DNR - Fish Propagation Supv.
Caledonia Creek Dam	Caledonia Creek Dam	Town of Porter
Labree Dam	Leisure Lifestyles	Leisure Lifestyles

* Please note that this is the list of dams provided by the Wisconsin DNR; the list is not complete.

Most of these dams are small, mill-type dams under the jurisdiction of the DNR, municipalities and/or are also privately owned. Management and maintenance of dams is critical because severe flooding can result from inadequate attention to the dams.

Most dams in Rock County are considered low-hazard. Dams are classified by the Wisconsin DNR as Low, Significant or High Hazard. A dam is assigned a rating of High Hazard when its failure would put lives at risk. The "hazard" rating is not based on the physical attributes, quality or strength of the dam itself, but rather the potential for loss of life or property damage should the dam fail. 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.

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 Rock County, and the high use of recreational watercraft, there is concern about ensuring the stabilization of the shorelines.

Watersheds

Twelve watersheds are contained completely or partially within Rock County and all drain into the Mississippi River Basin.[91] The maps in

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

Appendix A show the watershed boundaries and 100-year floodplains for the entire county. Following is a brief description of each watershed:

Allen Creek and Middle Sugar River (SP13) - The Allen Creek and Middle Sugar River Watershed straddles the northeast corner of Green County, northwest Rock County, and south central Dane County. Agriculture dominates the land use in this watershed that also contains scattered woodlots and grasslands. Residential development is impacting the upper reaches of the watershed. The population of the watershed is expected to increase by over 14 percent, mainly as a result of the watershed's proximity to Madison. Municipal wastewater treatment plant discharges to surface water in the watershed come from Belleville, Brooklyn, and Evansville. The watershed is fortunate to have six exceptional resource waters within its borders. An atrazine prohibition area exists throughout most of Dane County, as well as portions of Rock County adjacent to Allen Creek and much of the Sugar River corridor in northeastern Green County.

Municipal wastewater treatment plant discharges to surface water in the watershed come from Belleville, Brooklyn, and Evansville. The watershed is fortunate to have six exceptional resource waters within its borders.[92]

Badfish Creek (LR07) – The Badfish Creek Watershed, located in Rock and Dane Counties, is approximately 53,894 acres in size and consists of 79 miles of streams and rivers, 218 acres of lakes and 3800 acres of wetlands. The watershed is dominated by agriculture (67%) and is ranked medium for nonpoint source issues affecting streams and is ranked high for nonpoint source issues affecting groundwater, based on WDNR groundwater susceptibility mapping. Badfish Creek has the dubious distinction of being one of the top watersheds in Rock County for soil loss, which is estimated at 9 tons/acre/year. Soil loss in the Dane County portion is more difficult to determine, but is estimated to be 8.3 tons/acre/year. The Madison Metropolitan Sewerage District has an ongoing monitoring program to track water quality in Badfish Creek. MMSD conducts biotic index monitoring of Badfish Creek tributaries semi-annually since 1983 and periodically conducts biotic index monitoring in selected tributaries to Badfish Creek (MMSD).

The Badfish Creek Watershed lies in south central Dane County and in the northwest corner of Rock County and encompasses 85.5

[92] http://dnr.wi.gov/water/watershedDetail.aspx?key=924723

square miles. The village of Oregon is the largest community (7,514 in 2000) in this rural watershed. The village's growth of 30.5% from 1995-2000, is rapidly changing the area's rural character to a suburban community. As the village and towns of this watershed continue to grow, stormwater management and construction site erosion control have become more important. For example, increased stormwater flows have caused flooding problems in part of the village. A few municipalities are located within this basin, with a portion of the city of Fitchburg, the towns of Oregon and Rutland, and the village of Oregon. Wastewater from the city of Madison, treated by the Madison Metropolitan Sewerage District (MMSD), affects the watershed's water quantity and quality via discharges through an effluent ditch that joins the Oregon Branch of Badfish Creek. Wetlands in this watershed include Grass Lake, Island Lake, and Hook Lake.

Madison Metropolitan Sewerage District (MMSD) serves the entire Madison metropolitan region with its direct discharge and pretreatment programs. The district's operations have undergone nine substantial upgrades, the ninth addition, which includes a new ultraviolet disinfection system and biological phosphorus removal, was completed in 1997. A 1996 inspection found MMSD in substantial compliance with its permit. The plant has a design load of 50 million gallons per day (mgd). In 1993 Verona was annexed into MMSD; the Verona wastewater treatment plant was operated by MMSD from January 1995 through July 1996, when connection of Verona's flow to the Nine Springs Wastewater Treatment Plant was completed. Beginning in the summer of 1998, MMSD will return a volume of effluent to Badger Mill Creek that is equal to the volume of wastewater pumped out of the Sugar River Basin and treated at the Nine Springs Wastewater Treatment Plant. MMSD has worked with WDNR and other stakeholders to develop a mutually agreeable plan for managing this effluent return program (MMSD). The plant currently discharges to an effluent ditch via an underground pipe from the Nine Springs plant about five miles away, at an average rate of 36-37 mgd.[93]

Bass Creek (LR03) - This 109-square miles watershed lies within Rock County west of and adjacent to the Rock River, and stretching from the state line at Beloit to just above Janesville. While predominately agricultural, there are significant urban areas at Janesville and Beloit. We know little about the water quality and use potential of the tributaries to Bass Creek and to the Rock River in this watershed. Stevens Creek may have potential for trout. Habitat

[93] http://dnr.wi.gov/water/watershedDetail.aspx?key=924815

surveys of portions of the watershed were conducted in May 1996. Two reaches of Bass Creek were surveyed and two portions of Stevens Creek were evaluated. The surveys indicated fair to poor streambank habitat with moderate to severe erosion in some areas, possibly due to streambank pasturing and degradation of water quantity and quality in upstream reaches. This watershed ranked high for funding under the state's priority watershed program. This watershed is ranked as a second priority for soil loss in Rock County. Rock County Land Conservation Department staff estimate about 3.4 miles of streambank are eroding. In the watershed, more than 59% of the cropland exceeds an average soil loss of about 7.5-8 tons/acre/year. There are 37 barnyards ranked high and 74 barnyards ranked medium by the barnyard ranking criteria used in the Turtle Creek priority watershed. Most of the problematic barnyards are located along Bass Creek and tributary headwaters in the north and west portions of the watershed. Bass Creek Land Conservation staff believe that this source of sediment and nutrients (barnyard and streambank pasturing) could be reduced through implementation of a priority watershed project. About 68% of the watershed's 63,198 acres are in cropland. This watershed has a high participation level in the Farmland Preservation Program; about 72% of eligible land is enrolled in the program. This watershed has a high susceptibility for groundwater contamination based on WDNR groundwater susceptibility mapping. Bass Creek watershed was selected as an Environmental Quality Improvement Program (EQIP) project. This program, funded by the U.S. Natural Resources Conservation Service (NRCS), targets critical watersheds for implementation of agricultural best management practices that will also protect water resources.

Agriculture is the dominant land use in the watershed, encompassing 76% of the landscape (Figure 1). Other land uses and coverage in the watershed include urban/ suburban (8%), forests (7%), open water/ open space (5%), and wetlands (3%). The remaining 1% (approximately) is barren and grasslands. While predominately agricultural, there are significant urban areas at Janesville and Beloit. The western side of the city of Beloit is at the mouth of this watershed. In the past the city of Beloit has experienced flooding problems on its west side and has recently designed and installed a stormwater detention wetland system to abate this problem. Cropland soil loss and barnyard runoff contribute to water quality issues. The Bass Creek watershed was designated a priority area for USDA-Environmental Quality Incentive Program (EQIP) and the state’s Priority Watershed Program. Both programs have since closed. USDA provided funding to landowners interested in the

implementation of water quality projects, such as barnyard and streambank improvements. Recently, the city and town of Beloit, and other surrounding towns, updated the Beloit Sewer Service Area Plan. This plan provides a guideline for locating sewer development for the next 20 years. Population projections used in the update indicated that while residential growth would be steady and perhaps declining during that time period, land was allocated to commercial and industrial development along I-90 to attract new business and spur residential growth, particularly in the Turtle Creek Watershed.

There are no point source discharges to either Stevens Creek or Markham Creek. Sedimentation from stream bank erosion and runoff from agricultural practices within the watersheds are the suspected cause of habitat degradation in Stevens Creek and Markham Creek. Fine sediments covering the stream substrate reduce suitable habitat for fish and other biological communities by filling in pools and reducing available cover for juvenile and adult fish. Sedimentation of riffle areas compromises reproductive success of fish communities by covering gravel substrate necessary for spawning conditions. The filling in of riffle areas also affects the fish communities' food source, macroinvertebrates, which have difficulty thriving in areas with predominantly sand substrate as opposed to a substrate composed of gravel, cobble/rubble, and sand mixture. In addition, sedimentation can increase turbidity in the water column, causing reduced light penetration necessary for photosynthesis in aquatic plants, and reduced feeding capacity of aquatic macroinvertebrates due to clogged gill surfaces. Sedimentation of the substrate can also cause an increase in other contaminant levels, which are attached to sediment particles and transported into the stream during runoff events.[94]

Blackhawk Creek (LR02) - This watershed drains 106 square miles of Rock County east of the Rock River. It is primarily agricultural but does have some highly urbanized areas including parts of Janesville and Beloit. This watershed has a medium susceptibility for groundwater contamination based on WDNR groundwater susceptibility mapping.

A number of planning and research activities have taken place in Rock County since 1990. A land use study conducted by Rock County in 1990 found that the town of Janesville was comprised of 74.9 % agricultural land; 12.8 % developed land (including residential, transportation and industrial uses) and 12.4 % woodlots and water resources (RCPDA, 1991). Both the town of Janesville and

[94] http://dnr.wi.gov/water/watershedDetail.aspx?key=924661

the City of Janesville are growing fairly rapidly. The Town of Janesville population has grown 10.3% in the past five years, compared to an 8.9% increase from 1990-1995. The town's agricultural base is slowly changing to a mix of agriculture and residential with homes for commuters who work in the city of Janesville. In 1995, Rock County's Planning and Development Agency produced a development plan for the town of Janesville. The plan identified environmental corridors adjacent to Stevens, Markham and Marsh Creek that roughly correspond to open water and highly erodible soils (RCPDA 1995). The City of Janesville population has grown 6% from 1995 - 2000, triple the percentage from 1985 - 1995 when the population grew only 2% (RCPDA 1989). In 1993, the city developed its own land use, population and housing analyses. An environmental analysis was conducted in 1983. The city's land use analysis described the city's growth, both in acreage from annexations and in population. While growth continues, the city's residential density has decreased, mainly from new subdivisions on the periphery of the central urban area. The area surrounding Spring Brook creek is demarcated as an environmental corridor, as are areas on the west side of the Rock River above the City of Janesville's central area. The city must deal with the urgent problem of stormwater management, especially during its update to the Janesville Sewer Service Area Plan.[95]

Lower Koshkonong Creek (LR11) - The Lower Koshkonong Creek Watershed covers an area of 220 square miles, or 140,480 acres. Two-thirds of the land area is evenly divided between Rock and Dane counties, with 26% of the remaining area in Jefferson County and 5% in Walworth County. Eight lakes are larger than 25 acres, six of these larger than 100 acres. The watershed includes Lake Koshkonong and the Rock River from Ft. Atkinson to the Indianford Dam. Streams in the watershed include Saunders, Allen and Otter creeks, and a portion of the main stem of the Rock River. No Class I or II trout streams or smallmouth bass streams exist in the watershed. Stream water quality is fair. While the majority of wetlands in the watershed have been drained for agricultural purposes, many significant wetlands remain. The Rockdale dam was removed in 2001 and Koshkonong Creek now runs free of impoundments. Fish and wildlife habitat is expected to improve following dam removal. This watershed has a high susceptibility for groundwater contamination based on WDNR groundwater susceptibility mapping.

[95] http://dnr.wi.gov/water/watershedDetail.aspx?key=924660

Land use in the watershed is predominately agricultural. In 1983, 55% of the watershed was in agricultural use, 25% of which had high erosion potential (WDNR 1996). Urban pollution potential is high from the growing areas of Fort Atkinson, Cambridge, Oakland and Edgerton. Each of these urban areas discharges municipal wastewater and stormwater. Growth in the city of Fort Atkinson has been moderate compared to other municipalities in the basin. The city's population, now more than 11,600, indicates that sewer service area planning and wellhead protection planning should take place, as well as stormwater management and erosion control planning. As small communities in this watershed grow, a comprehensive stormwater management plan should be in place--a plan that coordinates recommendations with local master and land use plans and state and regional planning goals (Kroner 1996). The village of Cambridge has a population of over 1,100. Its population grows to roughly six times that number of people during the summer season. The village's facilities plan should be reviewed to ensure that the city's wastewater treatment plant could accommodate these seasonal fluctuations. Sewerage capacity and land use issues have been a top concern in this area, as the Oakland Sanitary District, which sends its effluent to the Cambridge wastewater treatment plant, has developed a moratorium on multi-scale development, allowing only single family development. The town of Oakland developed a draft land use plan that will limit unsewered development and build in a developer payback to cover infrastructure costs. This plan does not address the existing approved plans that continue to be developed and may yet add another 100 homes. The single family development moratorium may encourage urban/suburban sprawl, precipitating the loss of prime agricultural land and leading to low density growth that drives up the cost of wastewater treatment. While sewer service area planning is conducted in the Dane County portion of Cambridge, the Jefferson County portion, which is growing more rapidly than the west side, has no sewer service area planning in place. Cambridge should work with Dane County, Jefferson County and surrounding urbanizing areas to develop a comprehensive long term sewer service area plan that addresses the entire urban area and which reflects the facilities plan for the Cambridge wastewater treatment plant. The city of Edgerton has grown by 12.5% over the past five years. The Edgerton area's most notable impact on local water, however, stems from the effects of the Edgerton landfill, which contributes volatile organic compounds to the area's shallow aquifer. In 1992, residents of Rock County living between the landfill and the Rock River have been under a drinking water advisory due to groundwater contaminated with trichloroethylene. Edgerton and other involved parties settled a

lawsuit over the source of clean-up costs; a new public water supply system was installed. [96]

Lower Middle Sugar River (SP12) - The Lower Middle Sugar River Watershed includes a portion of the Sugar River and tributaries from the dam at Albany downstream to the Decatur Lake dam. Agriculture is the predominant land use and the subsequent agricultural non-point source pollution is the major source of impairment to streams in the watershed. The population of the watershed will likely remain steady over the next two decades owing to the relatively small size of the watershed and lack of major municipalities. The watershed has not been ranked for nonpoint source priority. The Village of Albany waste water treatment facility discharges to surface water. A large wetland complex still exists adjacent to the Sugar River although other large areas of wetlands have been drained and put into cultivation. [97]

Lower Sugar River (SP11) - The Lower Sugar River watershed lies in southeast Green and southwest Rock Counties. It contains an 18.4 mile stretch of the Sugar River from the dam at Decatur Lake downstream to the Wisconsin-Illinois state line. The watershed is intensively agricultural with scattered grasslands and woodlots. Two municipalities, Brodhead and Orfordville, discharge to the Sugar River and Swan Creek, respectively. The Juda wastewater treatment facility discharges to groundwater. One industrial facility, Sylvester Whey, discharges to the North Fork Juda Branch. Polluted runoff is the primary cause of water quality and in-stream habitat problems. Point source pollution is also a problem on the North Fork Juda Branch. The North Fork Juda Branch and Spring Creek are on the state's list of impaired (303d) waters, mainly due to habitat impairments caused by non-point source pollution. Many of the streams in this watershed have not been monitored in the last 10 years.[98]

Marsh Creek (LR05) - The Marsh Creek Watershed drains 44 square miles and is surrounded by agricultural fields. It has a medium susceptibility for groundwater contamination based on WDNR groundwater susceptibility mapping. Marsh Creek watershed was selected as an Environmental Quality Improvement Program (EQIP) project. This program, funded by the U.S. Natural Resources Conservation Service (NRCS), targets critical watersheds for implementation of agricultural best management practices that will

[96] http://dnr.wi.gov/water/watershedDetail.aspx?key=924665
[97] http://dnr.wi.gov/water/watershedDetail.aspx?key=924722
[98] http://dnr.wi.gov/water/watershedDetail.aspx?key=924721

also protect water resources. This watershed does not contain any municipalities within its boundaries, nor any named lakes.[99]

Rock River – Milton (LR04) - The Rock River/Milton watershed is approximately 31,205 acres is size and consists of 32 miles of streams and rivers, 124 acres of lakes and 250 acres of wetlands. The watershed is dominated by agriculture (57%), forest (16%) and grassland (12%). The Rock River/Milton watershed has high susceptibility for groundwater contamination based on WDNR groundwater susceptibility mapping.

The city of Janesville is a medium-to-large-sized urban center located along the main stem of the Rock River. Portions of the city fall in the Rock River/Milton Creek watershed (LR04), Blackhawk Creek watershed (LR02) and the Bass Creek watershed (LR03). In year 2000, the City of Janesville grew to a population of 59,500, a 6% growth rate from 1995 to 2000. A 1993 population analysis by the city of Janesville predicted the year 2000 population at 57,600 (an underestimate of nearly 2,000 people) at a growth rate of about 1 percent per year. Like many other metropolitan area, Janesville is experiencing migration from the city to the suburbs and outlying rural areas. Densities in the city have gradually decreased as more land has been annexed and the population has grown. The city is now in the process of updating its sewer service area plan to reflect shifts in urban/suburban growth.[100]

Turtle Creek (LR01) - This watershed's 288 square miles are in eastern Walworth County (62%) and Rock County (38%). Land use is primarily cash crop and dairy agriculture throughout the headwater tributaries and creek main stem. Turtle Creek flows into the east side of the city of Beloit to join the Rock River just above the Illinois border. Cropland in the headwater areas and urban land use near Beloit contribute the two highest erosion rates in the watershed. Also, streambank erosion is a problem. A 1982 inventory showed that 10 percent of streambanks in the watershed were eroding (Rock Co. Erosion Control Plan). In 1986, this watershed experienced an estimated average soil loss of 8 tons/acre/year. A priority watershed project under the Wisconsin Nonpoint Source Water Pollution Abatement Program began in 1984 and was completed in 1994. The project, jointly administered by the Rock and Walworth County Land Conservation Departments and WDNR, had four water quality and water use objectives: 1. Improve the smallmouth bass fishery in main stem Turtle Creek and Little Turtle Creek; 2. Protect and improve fish

[99] http://dnr.wi.gov/water/watershedDetail.aspx?key=924662
[100] http://dnr.wi.gov/water/watershedDetail.aspx?key=924814

habitat and water quality of tributaries to Turtle Creek; 3. Protect and improve fish habitat in creeks that currently support remnant populations of Wisconsin's endangered and threatened fish species; and 4. Retard the eutrophication process in Lakes Delavan and Comus. According to the 1994 post-project evaluation report, the effectiveness of best management practice implementation was evident on a site-by-site basis, but there was no discernible watershed-wide reduction in nonpoint source (runoff) pollutant loads. Low participation rates and implementation of best management practices that brought landowners short-term benefits are sited as reasons for this result. Poor livestock management practices, such as cropping too close to stream channels, overgrazing of pastures, and livestock grazing in streambanks in headwater streams, limited the overall effectiveness of the project.

Although the Southeast Glacial Plains Region is quite urban compared to other state areas, agriculture is very important with 77% of land area in the Turtle Creek Watershed devoted to farmland. Among the regions it ranks third in percent of acreage in farmland, market value of agricultural products per acre, and milk production per acre; and it ranks second in corn production. (Farmland includes all land under farm ownership such as cropland, pastureland, and woodland.) The percentage of agricultural land sold and diverted to other uses is below average. Per capita water use is near average. The per capita income, average wage, and number of high school and college graduates are all third highest, while the rates of poverty and unemployment are both third lowest among the regions. The manufacturing sector is relatively strong, whereas farming, though very productive, does not provide a large percentage of jobs. After agriculture, forest cover accounts for the second largest share of land use in the Turtle Creek Watershed with eight percent of the total area. Open water and open space is the third most common land use in the watershed with six percent of the total area. Suburban and urban environments amount to another six percent of the watershed’s area. Grasslands and wetlands are the last significant land uses in the watershed with three percent and one half of one percent of the watershed’s area, respectively. Turtle Creek Watershed’s largest water resource, Delavan Lake, has a watershed (drainage area) of about 26,000 acres or 40.8 square miles. As of 1995, approximately 85% of the lake’s watershed consisted of rural land uses, and 15% of urban land uses. Major land uses included: 70% agriculture, eight percent woodlands, wetlands or open lands, seven percent residential, and eight percent commercial, industrial, transportation, and recreational. Under planned 2020 conditions, the Walworth County development plan and regional land use plan

forecast 6,200 acres (24 percent of total area) of development within the watershed (SEWRPC 2002).

The Turtle Creek Watershed is listed as a high priority overall for nonpoint source (NPS) pollution due to its listing as a high priority for groundwater and stream NPS pollution. Individual streams and lakes in the watershed have not yet been ranked for NPS pollution. CAFOs A Concentrated Animal Feeding Operation (CAFO) owned by S & R Egg Farms, Inc. is located in the township of La Grange, just east of Whitewater. This CAFO has a permit for animal waste/industrial water discharge to groundwater.[101]

Whitewater Creek (LR14) - This watershed lies in the northwest corner of Walworth County and stretches into southern Jefferson County. A portion of the Kettle Moraine State Forest runs along the southeast edge of the watershed. Land use is predominately agricultural. Historical development of land for agriculture and current development of land for residential areas is responsible for the draining of many wetlands and the ditching and straightening of some streams in the watershed. Based on soil loss evaluations in county soil erosion control plans, the town of Cold Spring in Jefferson County ranked last in soil eroded above tolerable limits. The town of Whitewater in Walworth County is the 12th ranked in the county for total soil loss. The Whitewater Creek part of Rock County ranks third for soil loss in that county with an average of 7.6 tons/acre/year. This watershed has a high susceptibility for groundwater contamination based on WDNR groundwater susceptibility mapping.

The city of Whitewater is the only major urban area and its wastewater treatment plant discharges to Whitewater Creek. The City of Whitewater's population grew almost 2% from 1995 - 2000 to 13,437. The Town of Whitewater has a population of roughly 1,400.[102]

Yahara River and Lake Kegonsa (LR06) - The 126 square mile Yahara River/Lake Kegonsa Watershed lies within the Lower Rock River Basin. The boundaries of this watershed stretches from just east of Madison southward to the Yahara River's confluence with the Rock River below Indianford in Rock County. The central feature of the watershed is the Yahara River, including Lower Mud Lake and Lake Kegonsa. Other waterbodies of importance are Door Creek and the wetlands of Door Creek, and Gibbs Lake.

[101] http://dnr.wi.gov/water/watershedDetail.aspx?key=924813
[102] http://dnr.wi.gov/water/watershedDetail.aspx?key=924667

The majority of the watershed is in Dane County and major municipalities within the boundaries of the watershed are the cities of Stoughton, the Village and Town of Cottage Grove, and the towns of Pleasant Springs, Dunn, Dunkirk, Fulton and Porter. At the time of the 2010 Census, the Wisconsin Population Lab has determined the Four Mile and Five Mile Creek Watershed to contain 37,211 inhabitants.

Today, the watershed is primarily agricultural, but is also urbanizing rapidly, especially in and around the Township of Cottage Grove. Huge tracts of wetlands have been ditched and drained for agricultural and development purposes, destroying habitat and decreasing water quality. Hydric soils, also known as wetland soils, demonstrate characteristics of long term hydrology and waterlogged conditions. Hydric soils show the previous extent of wetlands in the watershed. Although large tracts of wetlands remain, they comprise only 5.4 percent of the land use in the watershed, while agriculture accounts for 81 percent and urban land uses account for 6.9 percent. The loss of these important wetlands is one of the major issues facing the Yahara River/Lake Kegonsa watershed today. Wetlands are invaluable as wildlife and fishery habitat, and help to protect the water quality of lakes and streams.[103]

Floodplain Regulations

Floodplain regulations have been in place in the cities, villages and towns of Rock County for many years. The Wisconsin Department of Natural Resources (DNR) 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, Rock 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.

[103] http://dnr.wi.gov/water/watershedDetail.aspx?key=924663

- 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 floodplains or urban areas in Wisconsin can be considered safe from damages.

Rock County does have a history of flooding problems and has been included in several Presidential Disaster Declarations requests for flooding, the most recent of which are detailed below[104] (note that dollar losses and victim numbers are for the entire disaster, not just Rock Co.):

- FEMA-DR-376-WI: 1973. $24M losses. 0 deaths
- FEMA-DR-874-WI: June, 1990. $21M losses. 0 deaths
- FEMA-DR-964-WI: September, 1992. $17M. 0 deaths
- FEMA-DR-994-WI: June-August, 1993. $740M. 2 deaths
- FEMA-DR-1238-WI: August, 1998. $55M. 2 deaths
- FEMA-DR-1719-WI: August, 2007. $116.4M. 1 death
- FEMA-DR-1768-WI: June, 2008. $763.619M. 1 death

2007 Flooding[105]

In August, 2007, a series of thunderstorm clusters moved east-southeast through the southern third of Wisconsin, dumping record-setting rains. Many locations set new all-time daily and monthly August rainfall records. Much of the rain fell during August 19-20, 2007, when six to 12 inches were measured (150% to 300% of the August monthly average). Only one person perished in a flash flood event in southern Richland County. Alongside unofficial reports of 22 to 25 inches of water, Viroqua (Vernon County) picked up 21.74 inches of rain for the month, a new all-time monthly record for Wisconsin. Total flood damages were about $116.4 million. A record

[104] Wisconsin State Hazard Mitigation Plan.
[105] Wisconsin State Hazard Mitigation Plan.

flood crest was reported at the Root River Canal near Raymond (Racine County), and major flood levels were observed at New Munster on the Fox River (Kenosha County) and at Newville on the Rock River (Rock County). Some locations along the Kickapoo River came within one to two inches of establishing a new all-time record crest.

2008 Flooding[106]

In June 2008, yet another widespread, severe flooding/flash flooding event, consisting of two rounds of heavy rains, ravaged an already saturated part of the state south of a line from La Crosse (La Crosse County) to Manitowoc (Manitowoc County). The first round of heavy rains occurred June 5 through 8, 2008 and the second round during the overnight hours of June 12 through 13, 2008. Collectively, amounts ranged from six to over 15 inches. In many locations, 24-hour and monthly rainfall records were established. Milwaukee would eventually measure 12.27 inches, which was a new record monthly rainfall. At least 38 river gauge sites set new all-time record-high crests; in some cases exceeding flood stage by six to over 11 feet. The Baraboo River in Baraboo (Sauk County) crested at 27.48 feet, where normal flood stage is 16.0 feet. Thousands of homes, businesses, and farms were damaged or destroyed by the flood waters. In some cases, rivers remained in flood stage into late July 2008, and some low spots in farm fields still had standing water into September 2008 due to a high water table. Most of the flooding was of the “100-year” magnitude, and some was probably of the “200- or 300-year” type. Numerous roads were closed, damaged, or washed-out in river valleys and other low spots, and some bridges were significantly damaged. The worst river flooding occurred on the Baraboo, Kickapoo, Rock, Northern and Southeastern Fox, and Crawfish Rivers. A number of farm fields were never replanted by the time they dried out in late July or early August 2008. In some areas, the June 2008 flooding in Wisconsin was worse than the 1993 flooding. On June 14th, President Bush declared Disaster Declaration 1768 in the state. Eventually the declaration included 31 counties with estimated damages totaling roughly $763 million.

Changes in precipitation patterns indicate that rainfall totals have increased in the past few years during individual rain events. For instance, heavy rain events in both 2007 and 2008 precipitated 20 to 25 inches (50-75% of the yearly average) or more in some river basins. This is important to note, since in many cases these heavy

[106] Wisconsin State Hazard Mitigation Plan.

rain events occur after soils have already become saturated, leading to record-setting floods, resulting in hundreds of millions in damages.

The rains combined with the already saturated soils worsened the flooding conditions necessitating rescues, evacuations, road closures, and sandbagging. Thousands of homes sustained damages and many people were left homeless. Hundreds of small businesses were damaged and temporarily closed. Damage to public facilities is estimated to be in the tens of millions of dollars. Both the agriculture and tourism industries, representing the heart of state and local economies, suffered significantly. Many of the communities were still recovering from flooding that occurred ten months earlier which also resulted in a federal disaster declaration.

Tables showing the flood and flash flood events recorded by the National Weather Service between 1 January 1996 and 31 May 2017[107] can be found in Appendix B.

The following list summarizes damages attributed to flooding in Rock County by the National Flood Insurance Program from 1 January 1978 through 30 November 2015: [108]

Rock County NFIP Loss Claims				
Jurisdiction	**Total Loss**	**Closed Loss**	**Closed Without Payment**	**Total Payments**
City of Beloit	28	18	10	$129,760.88
City of Evansville	2	1	1	$3,539.99
Village of Footville	1	0	1	$0.00
City of Janesville	62	47	15	$898,865.44
Rock County	169	144	25	$2,928,311.12

The repetitive loss properties as listed through 30 April 2015.

- Single family home, Hamilton Avenue, Janesville
- Milwaukee Street, Janesville
- Single family home, Carnforth Place, Beloit
- Single family home, W. Bass Creek Road, Beloit
- N Main Street, Janesville
- Single family home, N. & S. River Road, Janesville – 3 properties

[107] http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=55%2CWISCONSIN
[108] http://bsa.nfipstat.fema.gov/reports/1040.htm

- Single family home, E. Road 6, Edgerton
- Single family home, N. Shore Drive, Milton

Mitigation projects have occurred throughout the county to reduce future damages but there are still projects to accomplish. There are regular spring floods, both from the river and from creeks and streams. The DNR policy of not removing stream debris increases the risk of damage during flooding. Significant floods in 2008 resulted in loss of some houses and in roads submerged in flood water in the Towns of Fulton, Milton, and Rock. In 1998, the Town of Harmony also lost homes and agricultural land in a flood. In addition to regular flooding, there is also a risk of flash flooding along the Rock River and Turtle Creek. The Gateway Business Park in Beloit (fronts I-39/90 to the west and I-43 to the north) lacks a drainage system and as a result is subject to flash flooding. Flash flooding in this area has led to mudslides that have covered roads, flipped cars, caused business losses, and led to notable cleanup costs. Due to these concerns, as well as a review of the geography and history of flooding in Rock County, the workgroup believes that there is both a high probability of flooding and a high severity of effects if flooding occurs due to flooding and flash flooding.

The county has completed mitigation work for a number of dams since flooding in 2000 and most dams in the county are considered low risk at this time. The Indianford dam in the Town Fulton holds back Lake Koshkonong, which is a significant amount of water. While it is still considered to have a low likelihood of failure, there is considerable downstream risk of very high effects if this dam were to fail. With those considerations in mind, the workgroup decided that there is a low probability of dam failure in the county and the severity of effects is also considered low for the county except for the Indianford Dam, which is on the Rock River dam system.

Vulnerability

After flooding, whether caused 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 effective 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, mold and mildew may impact the home's air quality and cause illness among the occupants. Contaminated water may infiltrate the drinking water wells, especially damaging for the private residential wells that supply much of the rural population. Standing water may also breed insects, increasing the possible spreading of insect-borne disease.

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.

Success Story - Waterman Estates Flooding Town of Harmony

The Waterman Estates Subdivision in the Town of Harmony in Rock County has dealt with flooding issues in its low lying areas for many years. Much of the original retention pond was the same depth as the low lying areas of the subdivision.

Waterman Estates facing away from retention pond – June, 2013

In 2014, with the help of Rock County Land Conservation, Rock County Planning, and Rock County Public Works, the Town of Harmony was able to redesign the original retention pond. The plan included deepening the retention pond, cleaning up construction debris, clearing trees from the retention pond berm, adding an additional culvert, and regrading a roadside swale. A local contractor completed the work. The new design works exceedingly well draining the low lying areas of the subdivision more quickly. The deeper retention pond holds the storm water until it evaporates or is absorbed into the ground.

Hazard Mitigation Strategies

The purpose of the flood mitigation portion of the plan is to identify areas that are particularly susceptible to flooding, assess the risks, analyze the potential for mitigation and recommend mitigation strategies where appropriate. With that in mind, the plan goals are:

- Goal 1: To reduce, in a cost effective manner using a cost-benefit analysis, 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.
- Goal 2: To preserve and enhance the quality of life throughout Rock 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 encourage all communities in Rock County to 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.

Rock County is committed to remaining compliant with the requirements of the National Flood Insurance Program (NFIP) and all other state and federal laws. According to the NFIP, the county and all of its municipalities participate in the program except for the Villages of Clinton and Orfordville. The Village of Orfordville is not mapped. The Village of Clinton is mapped and has been sanctioned for not adopting the maps within a year. The village has recently experienced a large amount of staffing change; current staff are reviewing the issue to determine why the community is not participating and to evaluate participating.[109] There are no areas in Rock County which have had special flood areas identified by FEMA but are not in the NFIP program.

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.

Other potential projects include:

- Continue to support homeowners with small flood mitigation projects such as elevation of functionals (e.g., HVAC, washer/dryers), etc.
- Explore potential solutions for high-risk properties (including county resources) at risk of flooding and, as appropriate, investigate acquisition or other mitigation strategies (e.g.,

[109] http://www.fema.gov/cis/WI.html

elevation) for repetitive-loss properties. This is an ongoing project for all communities within the county. Some specific areas of concern include:

  - Explore potential solutions for at-risk properties on Clear Lake.

  - Explore potential solutions for high-risk properties along Lake Koshkonong between Janesville and Beloit along Highway 51 and in the area of River Rd., Walworth, and Community Ave. The Highway 51 area of concern is mostly low income (including a trailer park and 6-8 houses). Review structures that had flooding, make contact with owners to assess interest and evaluate ongoing issues, plan strategies (buyouts, berming, etc.)

  - Explore potential solutions for at-risk properties in Starview subdivision.

  - Investigate potential solutions for Beloit Box Board Company flooding issues. 100-year-old building built right along river: water floods the parking lots and comes in windows. The company has pumps that run constantly during wet weather. The City of Beloit modified the landscaping and added raised beds but more is needed and they also need to upgrade from dirt to concrete around the building. The plan is to review the structure and then make contact with owners to assess interest, evaluate ongoing issues, plan feasible mitigation strategies.

- Investigate potential solutions for flooding in the Turtle Creek floodplain area due to ongoing flooding in the Town of Turtle and the Cities of Beloit and South Beloit (IL).

- Ensure developers use detention and retention ponds to mitigate potential flooding in new and existing development.

- Investigate options and possible funding sources for tying navigable rivers and shorelines into a mile-marker system. This would allow those who call in with emergencies, including flood conditions, to accurately pinpoint their location. One potential partner for this is the Rock River Coalition, which is active on the Illinois side of the river but they are trying to build

partnerships into Wisconsin. They currently primarily focus on tourism but may be a source of labor and/or funding for this.

- Dams - The county will continue to participate in the preparedness program and work with partners to monitor the dams and plans to ensure currency. Other dam mitigation efforts include:
    - Investigate options for conducting a study to determine the effects of removal of the Monterey Dam in the City of Janesville. This project would be part of downtown of number of planned shoreline projects.
    - Explore options for protecting properties downstream of the Indianford Dam. The Indianford Dam near the Town of Fulton holds back Lake Koshkonong, a significant amount of water. While it is still considered to have a low likelihood of failure, there is considerable downstream risk of severe effects if this dam were to fail. Downstream of the Indianford Dam are the Janesville Central and Monterey Dams (in the City of Janesville) and the Beloit Dam (in the City of Beloit). Failure of Indianford Dam would therefore put the Cities of Beloit and Janesville at risk.

The current emphasis in flood mitigation is on long-range actions. Such actions include the adoption and ongoing maintenance of proper flood plain zoning ordinances and land use planning, primarily through the comprehensive plan. The county and the municipalities will work together to ensure that the various plans take into account the long-range mitigation planning as a consistent theme and to ensure data sharing and consistency between the communities. Also, it has been shown that floodplain management reduces the cost of damages attributed to flooding. The Rock County Planning, Economic & Community Development Department, in conjunction with the municipalities, will lead the county's effort in these efforts.

In addition, the county will provide flood information to the public including:

Post-flood recovery plans and programs to help county residents rebuild and implement mitigation measures to protect against future floods

Distribute National Flood Insurance Program information

Provide information and offer education to make people aware of natural floodplain resources and functions; and how they can protect them.

Promote public awareness regarding dam safety, which is done annually during Dam Safety Week.

Some of the above information is provided annually during Flood Awareness Week and in anticipation of flooding events; and is readily available on the county website.

Wildfires

Wildfire (fires in forested, open, and/or agricultural land) season in Rock County begins in March and continues through November, although fires can occur at any time during any month of the year. The fall season carries the highest risk of cropland fires (fields are stubble) while the spring season is riskiest for grassland fires (before new growth develops). 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.

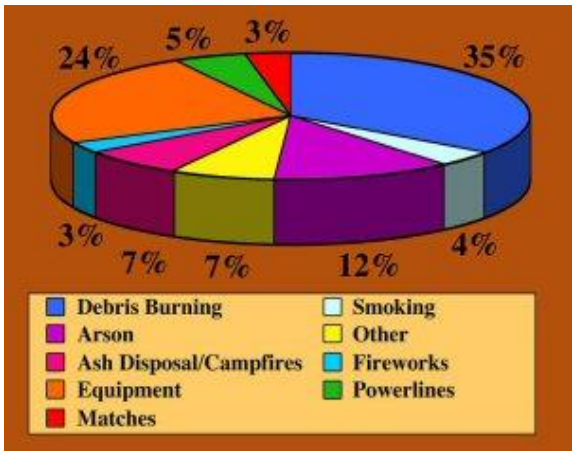
The Wisconsin Department of Natural Resources (DNR) is responsible for forest fire protection on approximately 18 million acres of forest and wildland in Wisconsin. The U.S. Forest Service maintains forest fire protection on two million acres of this land while local fire departments retain responsibility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

Physical Characteristics

Rock County does not have significant tree cover; canopy fires are therefore not common and are not considered a risk. Wooded areas that do exist are managed by county and municipal parks departments or private citizens. The primary risk is for grassland and crop fires.

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.[110]

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



Local fire departments provide the primary fire management services within the county and pairs with The Wisconsin Department of Natural Resources (DNR) to provide firefighting protection as needed.

Frequency of Occurrence

While the total number of open fires in Wisconsin has decreased over the years, the potential danger to lives and property remains due to the increased encroachment of development into previously open lands. Overall, the probability of a wildfire in Rock County is high due to the extensive agricultural lands in Rock County. According to the Wisconsin DNR, there have been two recorded forest fires over 500 acres in Rock County between 1976 and 2001.

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

Vulnerability

Wildfires can impact the ecology of the open lands and while fire within park areas would not cause great impacts, a fire could erase the usability of this habitat for wildlife and/or recreational purposes for many years. Other impacts in the event of a fire include effects on the water supply, crop damage, and smoke over roadways

causing a driving hazard. The latter is of particular concern along the I-90 corridor, which is lined with crop and grass lands.

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 smaller, more rural towns in northern Wisconsin and larger, 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, the 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.[111]

As can be seen on the map in Appendix A there are no Communities at Risk or Communities of Concern in Rock County.

Hazard Mitigation Strategies

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

Local fire departments responsible for wildfire fighting would like to continue to enhance local intergovernmental cooperation in emergency response by, for example, continuing to provide training for fire fighters, which is usually done with Wisconsin DNR fire rangers in spring.

[111] Wisconsin State Hazard Mitigation Plan

All departments are committed to providing good public information on fire-safety and wildfire concerns on an ongoing basis with a special emphasis during Fire Safety Week in October and Wildfire Prevention Week in April of each year. Projects include:

- Encouraging residents to have fire plans and practice evacuation routes.

- The DNR leads wildfire safety and the municipalities would like to work with them, as they have in the past, to continue with a strong focus on wildfires (FIREWISE).

The hazard mitigation strategies listed above are designed to reduce damages to existing or future buildings and infrastructure by 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.

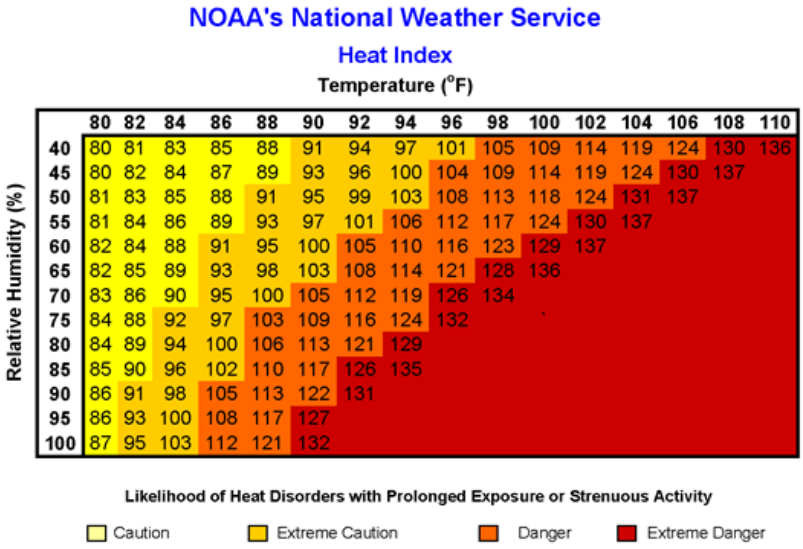
Extreme Temperatures

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.



Relative Humidity (%)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	128	136					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

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[112]:

[112] FEMA, 1997; NWS, 1997

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

The major risks to people due to extreme heat are:

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

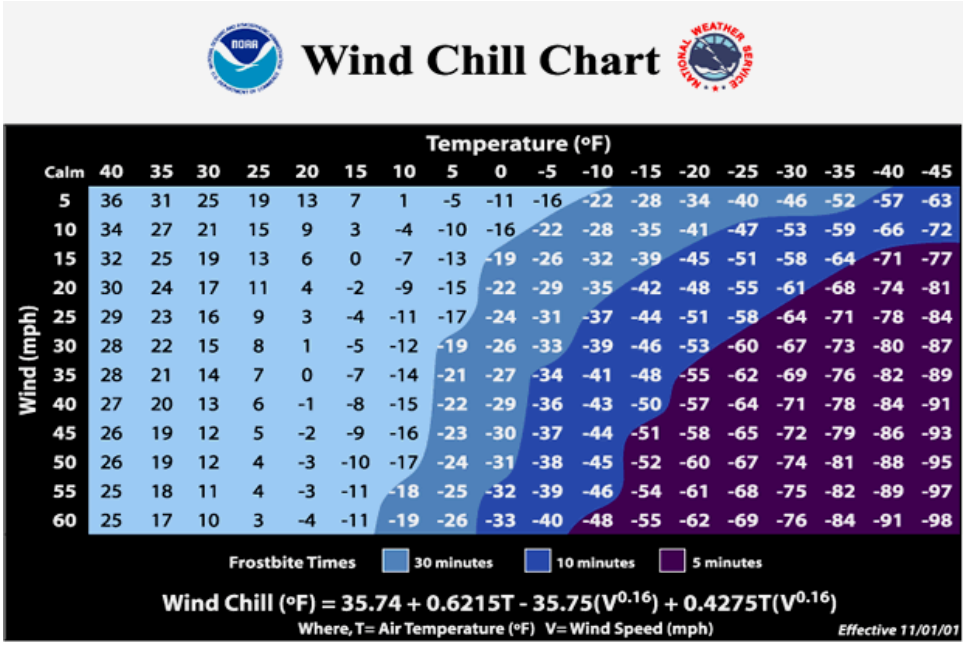
- Heat Cramps – muscular cramping brought on by exercising in warmer weather than one is accustomed to, no lasting effect.

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.[113]



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.

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

  - 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. Other heat events occurred in 1979, 1995, 2001, 2011 and 2012.

Tables showing the excessive heat and heat events recorded by the National Weather Service in Rock County between 1 January 1996 and 31 May 2017[114] can be found in Appendix B.

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. 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 low likelihood of occurrence for the general population but the committee recognized that the severity increases to high for agricultural losses and certain populations such as the elderly, chronically ill, children, those who work outdoors and those with limited financial resources (e.g., to pay for air conditioning).

Frequency of Occurrence: Cold

Wisconsin regularly has extreme cold temperatures as part of its winter climate. Tables that outline extreme cold/wind chill and cold/wind chill events which have been recorded by the National Weather Service in Rock County between 1 January 1996 and 31 December 2015[115] can be found in Appendix B.

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

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 high and individuals may suffer damage due to water main breaks and other such problems but the overall risk is low. 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.

Vulnerability

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

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

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

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

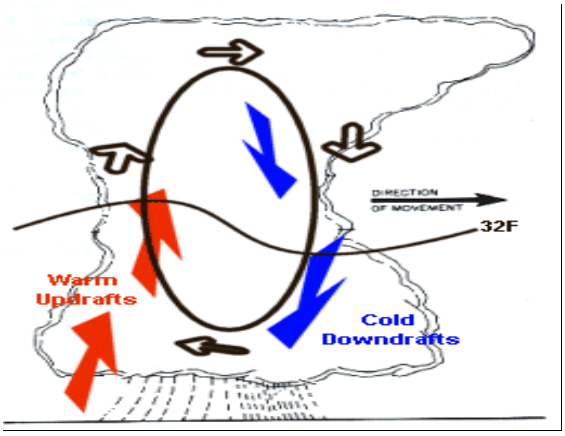
Hazard Mitigation Strategies

The goal of severe temperature mitigation activities is to reduce, in a cost effective manner, the loss of lives and property due to these events. Temperature extremes are difficult for a community to mitigate and the risks are to the health and safety of citizens, animals and crops. There are no strategies that need to be employed to reduce damages to buildings and infrastructure. The county and its municipalities will continued to coordinate with the American Red Cross as needed to support their shelter inventory work (i.e., inventory of local facilities open to the elderly or those with disabilities needing a place to escape the extreme temperatures) in the county.

Rock County Emergency Management and its municipal and other partners (e.g., Rock County Public Health, Rock County Human Services) will continue to participate in public outreach and collaborative systems to ensure that those with functional needs and the elderly are checked for welfare as appropriate during times of extreme temperatures participates. The county participates in the statewide public information campaigns for Winter and Heat Awareness Weeks each year and provides 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 liquid water accumulated 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: [116]



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

Physical Characteristics

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

[116] NWS, January 10, 2003

Hail Size Estimates [117]	
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. Rock County, as can be seen in the map in Appendix A, has a medium probability of hail occurrence in Wisconsin. The likelihood of damage due to hail is therefore considered medium.

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 that shows the hail events recorded by the National Weather Service between 1 January 1996 and 31 May 2017[118] can be found in Appendix B.

It should be noted that this table represents only the hail incidents reported to the National Weather Service. One limitation of the

[117] NWS, January 10, 2003
[118] http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=55%2CWISCONSIN

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 Rock County having a hailstorm usually at least once per year. With that understanding, it was decided that the overall probability of hail is high and the severity of effect should it happen is also low except for the agricultural sector, which has both a high probability and severity of effects.

Vulnerability

NWS loss tables show that property damage has reached up to $436,000 in Rock County. Hail, typically occurring in conjunction with thunderstorms and lightning, can damage many types of infrastructure. Public and private vehicles (e.g., campers, boats, cars, trucks) are liable to have their windshields cracked, bodies dented and paint damaged as a result of hail. This damage can occur, depending on the size of the hail, whether the vehicle is moving through the storm or is stationary. Hail on the roadway can also cause vehicles to slide off the road. Vehicle damage and iced roadways are of particular concern when you consider the need for emergency vehicles such as police cars, fire trucks and ambulances to quickly move to assist victims in a disaster.

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

Residential and business properties are liable to receive damage to roofing, 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 incidents. 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.

Rock County Emergency Management 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.

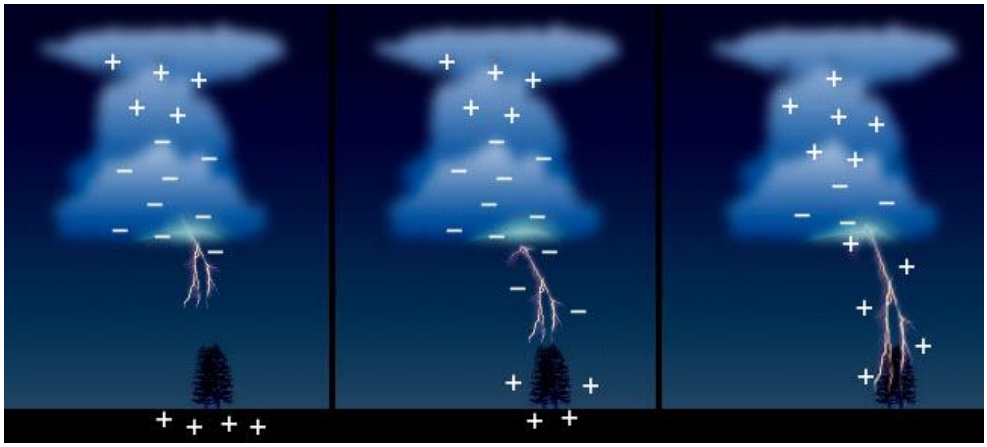
The county would like to conduct additional outreach to mobile home park owners, campground owners, recreational vehicle park owners, and other owners associations regarding severe weather considerations perhaps as an annual form letter requesting updates to contact info, giving information regarding emergency planning, etc.

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.[119]

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.

[119] 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. Rock County has a high probability of lightning occurrence at any one location within it. This was determined by recognizing that lightning usually happens in conjunction with thunderstorms, and that Wisconsin and Rock County generally have several severe thunderstorms per summer. The likelihood of damage due to lightning is considered low for most areas of the county although the workgroup felt that the severity of effects was high if lightning struck infrastructure or special events (e.g., fairs).

A table showing the lightning events recorded by the National Weather Service (NWS) between 1 January 1996 and 31 May 2017[120] can be found in Appendix B. This table from the NWS is obviously not reporting all of the incidents of lightning strikes but those with notable/reportable losses from the past and can reasonably be inferred to show that there is exposure to potential future losses.

Vulnerability

Lightning, which often occurs in conjunction with thunderstorms and hail, can damage many types of infrastructure, including 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.

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

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. The 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. There is also a concern about lightning strikes on components of the public safety communications infrastructure, which is the backbone of emergency response.

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. It is also a concern at special events such as fairs, sporting events and outdoor concerts.

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 including the use of fire resistant materials when constructing buildings. The use of fire resistant materials, lightning rods, surge protectors and other grounding equipment will make existing buildings and their contents and future construction less prone to damage or will minimize fire damage and spread due to lightning strike.

Rock County Emergency Management 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, which is held each spring, and storm spotter training is offered in conjunction with the National Weather Service as needed.

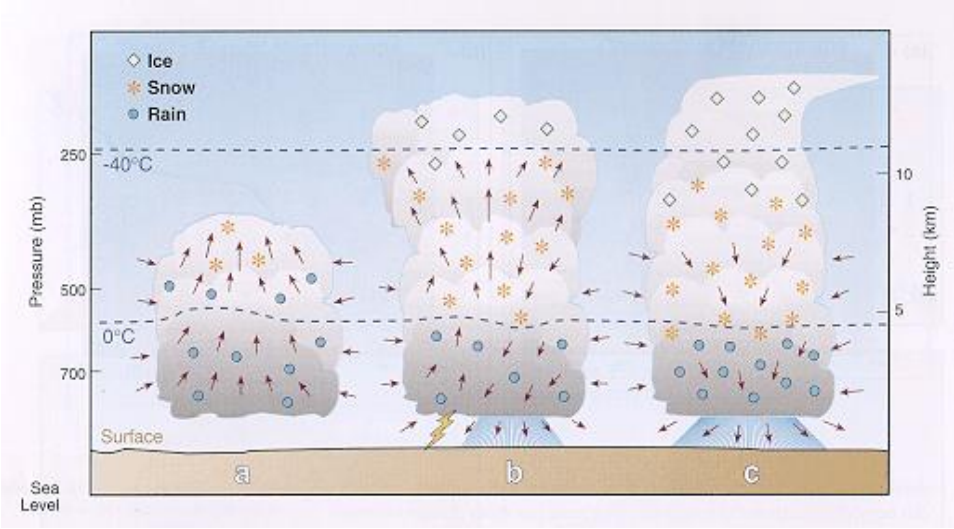
Storms: Thunderstorms

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.[121]



Physical Characteristics

A thunderstorm often is born, grows, reaches maturity and dies in a thirty-minute period. The individual thunderstorm cell often travels between thirty and fifty miles per hour. Strong frontal systems may create one squall line after another, each composed of many

[121] National Weather Service – Flagstaff, Arizona

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 average between 30 and 40 thunderstorm days per year although a portion of southwestern and south-central Wisconsin average 40 to 50 thunderstorm days per year. In Rock County there is typically one or more severe thunderstorm 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 Rock County is very high as these storms usually occur one or more times each year during the summer in Rock County. The severity of effects in thunderstorms is considered low generally but high for infrastructure and during special events (e.g., fairs, sporting events, outdoor concerts). Damage from thunderstorms usually is a result of the hail, lightning, winds and/or flash flooding that can occur as part of the storm. The likelihood of damage from these causes is also discussed in the appropriate chapters.

Tables showing the wind events that have been recorded in Rock County by the National Weather Service between 1 January 1996 and 31 May 2017[122] can be found in Appendix B.

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 and are of concern at special events such as fairs, sporting events and outdoor concerts. Rock County's thunderstorm vulnerabilities due to associated hail,

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

lightning, winds and flood waters are also discussed in the other hazard chapters of this plan.

Hazard Mitigation Strategies

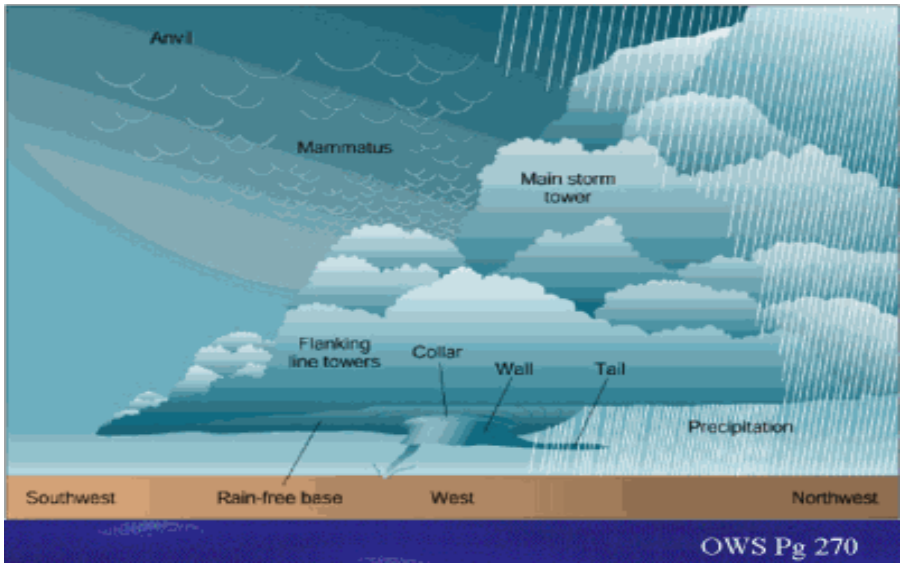
The goal of thunderstorm mitigation activities is to reduce, in a cost effective manner, the loss of lives and property due to these events.

The Rock 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 each spring there is extensive media coverage of safety tips with the goal of increasing public understanding of weather advisories.

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.



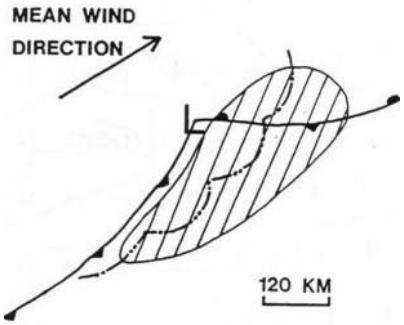
A derecho is a widespread, long-lived, violent, convectively-induced straight-line windstorm that is associated with a fast-moving band of severe thunderstorms usually taking the form of a bow echo. Derechos blow in the direction of movement of their associated storms; this is similar to a gust front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

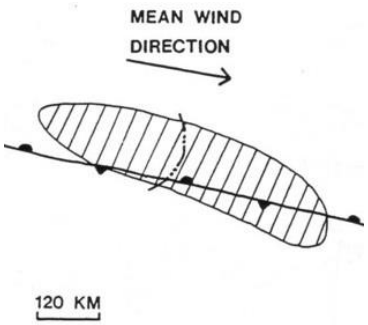
- Serial: Multiple bow echoes embedded in a massive squall line typically around 250 miles long. This type of derecho is usually associated with a very deep low. Also because of embedded supercells, tornadoes can easily spin out of these types of derechos.

- 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.[123]



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.

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.

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

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[124]		
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 investigator cannot identify the nature of a storm without mapping the

[124] FEMA, 1997

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 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 of the year. 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.

According to the National Weather Service, Rock County had 11 funnel clouds and 24 tornadoes between 1 January 1996 and 31 May 2017 (see tables in Appendix B).[125] Between these dates, the county had no deaths, two injuries and approximately $7.842M in property damage and $6,000 in crop loss due to these storms. The probability of Rock County being struck by a tornado or straight-line winds (i.e., derecho) in the future is medium and the likelihood of damage from future high-wind incidents is very high. All parts of Rock County are equally susceptible to tornadoes and high winds.

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

Case Study – 18 July 2015[126]

As can be seen in the tables above, the most common tornadoes in Rock County are EF0-EF2 strength. Once such tornado occurred on 18 July 2015 in the east central part of the county.

At approximately 2:45 pm that day, the National Weather Service (NWS) issued a Tornado Warning for Rock County following radar indication of rotation in the east central portion of the county. Reports of debris and tree damage were received in various locations throughout the area.

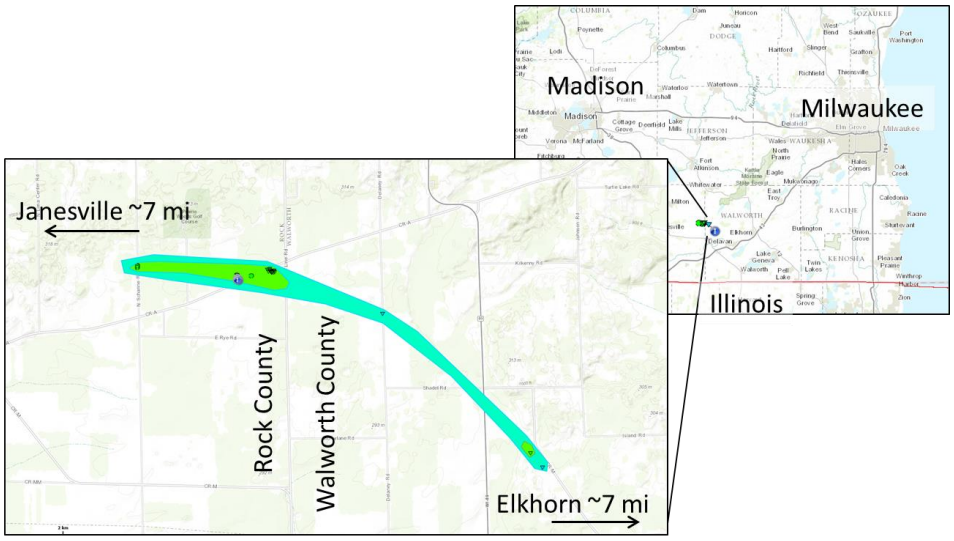
At 3:02 pm, Rock County 911 Communications received a call regarding substantial storm damages on East County Highway A, near the Rock County – Walworth County line. Reports indicated structural damages at 13430 East County Highway A and 13129 East County Highway A, including the destruction of a large barn, tree damage, and downed wires. The Sheriff's Deputy on-scene determined the extent of the property damage and confirmed that no persons or animals were injured during the incident.

Barn damaged in the Avalon/Johnstown area of Rock County

The NWS received damage reports from the Rock County 911 Communications Center Shift Supervisor, which included reports of damage to the above-mentioned area. Using radar and the timing of the dispatched calls for service, the NWS indicated the possibility of a tornado occurring in this area. The Rock County Sheriff's Office – Emergency Management Bureau and the NWS searched the area and completed damage assessments, which were reviewed by the NWS and later verified as a tornado. Damages were observed from North Scharine Road, traveling southeast across East County

[126] http://www.weather.gov/mkx/SaturdayJuly18StormSummary

Highway A, and continuing to North County Line Road. The storm was approximately 50 yards wide and traveled about 5 miles. Wind speeds were estimated around 100 miles per hour.



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; Rock 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 generally do not provide storm shelters. Other places of concern during these types of events include critical emergency facilities such as hospitals and public works/highway garages, police stations and fire departments, which contain equipment and services needed by the public after a tornado.

Mobile Home Parks[127]	
Park Name	**Location**
Beloit Mobile Home Park	Town of Beloit
Blackhawk Campground	Milton

[127] http://www.mhbay.com/mobile-home-park-directory/wisconsin/county/rock-county

Evansville MV Mobile Home Park	Evansville
Meadowview Place	Janesville
Spring Brook Village	City of Beloit
SJS Realty	Janesville
Rock River Shores	Town of Beloit
Rockvale Mobile Home Park	Janesville
Town & Country Mobile Home Court	Janesville
Wisconsin Homesites Rockvale	Janesville

Campgrounds [128]	
Campground Name	**Location**
Turtle Creek Campsite	Town of Turtle Creek
Oaks Campground	Clinton
Hickory Hills Campground	Edgerton
Rock River Leisure Estates	Edgerton
Kamp Dakota	Janesville
Blackhawk Campgrounds	Milton
Hidden Valley RV Resort and Campground	Milton
Lakeview Lodge	Milton
Lakeland Camping Resort	Milton
Pettit's Lakeview Campground	Milton
Unique Outlook	Milton

[128] http://www.hikercentral.com/campcounty/Wisconsin_Rock.html

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.

Rock 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/derecho hazard, which is critical to

the main goal of saving lives and reducing property losses. Forecasting of these incidents is difficult, however, because of the suddenness of their onset, their relatively short duration, the extreme variability of the strike area, limited knowledge of storm dynamics and the limitations of the weather observation system. As discussed in the All Hazards Chapter, Rock County Emergency Management 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 spring. Media information packets are distributed to reemphasize and alert the public to tornado warning procedures and to help citizens understand weather alert terms. Rock 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. Rock County also assists the National Weather Service with sponsoring tornado spotter training and in organizing local tornado spotter networks, upon request.

The county recognizes mobile home parks and campgrounds are particularly vulnerable locations for people and property during a tornado. To help mitigate the danger, the county plans 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 with the highest population concentrations as grant funding is available. The U.S. Department of Commerce Community Development Block Grants may be an avenue to achieve the necessary funding. Pre-identified facilities include:
    - Rockvale Mobile Home Park (high priority)
    - Newville Area (high priority)
    - Evansville (medium priority)
    - Clinton (medium priority)

Storms: Winter

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

Picture of snow drifts after the "Groundhog Day Blizzard" in 2011.[129]

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 of rain falling from warmer upper layers of the atmosphere to the colder ground, freezing upon contact with the ground and exposed objects near the ground.

[129] 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 incorporates 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 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. Beloit, in Rock County, averages approximately 31.9 inches over 18.7 annual snowfall days. 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. It should be noted that there were two additional large snow storms that occurred in late February and late March of 2011.[130]

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.

Winter storms in the county seem to be increasingly associated with ice instead of or in addition to snow, particularly early in the season. Beloit has had two Federal disaster declarations for ice in the past 15 years (2000 to 2015). Recovery from ice events can be very expensive, with power line and other infrastructure repairs. The probability that there will be severe winter storms in Rock County is medium and the likelihood that those storms will cause significant damage is high.

Tables in Appendix B detail Rock County's winter storm statistics as reported by the National Weather Service, including human loss and injury and property damage estimates, from 1 January 1996 through 31 May 2017.[131]

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 may be felt by both the business owner and employees unable to work during this period as

[130] http://readywisconsin.wi.gov/news/Top%20Weather%20Events%20in%20Wisconsin%20for%202011.pdf
[131] http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=55%2CWISCONSIN

well as the utilities and/or municipalities that own/repair the infrastructure.

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. In a snow emergency, it is critical to open roadways as quickly and efficiently as possible for emergency purposes. Funding is budgeted for the overtime hours of extra personnel but in a large emergency this may not be adequate. To address this, the county would like to continue to update existing, or as necessary create new, mutual aid agreements among county and municipal public works departments to address the need to share equipment and manpower in response to inclement weather. Without written mutual aid agreements, aiding municipalities' departments cannot get reimbursed from disaster assistance to a municipality with a declared disaster.

Redundant communication modes (e.g., radio, telephone) exist between government, police, fire, EMS, hospitals and highway departments. The Rock 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 Rock County Emergency Management Office during Winter Awareness Week in November and from the website. During a storm, the public is advised to monitor local radio, television and NOAA weather alert radios for up-to-date forecasts and is provided winter safety tips (e.g., driving).

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 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.

Photo credit[132]

Fuel shortages can be caused by localized imbalances in supply. Labor strikes, severe cold weather or snowstorms also can cause a local shortage.

[132] http://static.panoramio.com/photos/large/93725153.jpg

Two electric utilities (Wisconsin Power and Light, Wisconsin Electric Power Company), one electric cooperative (Rock Energy Cooperative), and one municipal provider (Evansville Water & Light) serve Rock County. Rock Energy Corporative, which provides electric services predominately to customers that reside within the unincorporated areas, is the only not-for-profit utility in the county. See the map in Appendix A for a view of the service areas.[133]

In Rock County, natural gas services are provided by Wisconsin Electric Power Company, Wisconsin Power and Light, and Wisconsin Gas. See the map in Appendix A for a view of the service areas.[134]

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

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

Rock 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. Rock County may also be subject to brown-outs (i.e., times when, because of high power demand, areas are purposefully turned off of the power grid) by the power companies that provide service.

[133] http://www.psc.wi.gov/utilityinfo/maps/documents/largeElectricMap.pdf
[134] https://psc.wi.gov/utilityInfo/maps/documents/medGasMap.pdf

In general, Rock County has a low likelihood of utility failures with the potential for a high severity of effects if it does occur, especially for the non-profit water/sewer utilities. Obviously, power outages can be life-threatening, especially if a person with special needs (e.g., the elderly, the young, those on special medical equipment) is involved. The workgroup therefore ranked the severity of effects on this group as very high. The severity was also ranked as very high for the agricultural sector primarily because of the needs for managing large numbers of livestock.

Vulnerability

Everything, particularly communications networks, are sensitive to electrical outages. 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. Backup generators are available for all lift stations as part of mitigation work done on lift stations in flood areas. There are some software-related risks to water/sewer (discussed in Other Hazards). 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.

Livestock operations run on diesel and electricity interchangeably. Generally, farmers can get by for a few days if only one is lost; longer term, more issues will arise (e.g., may need to truck in water). Therefore a long-term power outage may impact agricultural concerns because extreme temperatures reduce the volume of livestock products and products such as milk may not be able to be properly stored. Finally, transportation on roadways may become unsafe due to the loss of directional and street lights.

Beginning in 2009, Rock County began participating with other counties in Wisconsin in a Long-Term Power Outage workshop and exercise series to identify risks and vulnerabilities for power outage situations. It is expected that the workshops will provide information that can be used to prepare for, respond to recover from and mitigate these incidents.

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.

Evacuation and shelter arrangements have been prepared in case of a severe power outage by Rock County Emergency Management and its partners (e.g., American Red Cross, Rock County Public Health). These partners would also like to promote public awareness of and personal preparedness for possible utility failure, which could include: how to determine the appropriate generator based on needs; what supplies to have on hand; fuel availability (most gas stations do not have generators that will power the gas pumps); etc.

The county and its municipalities will encourage electric utilities to bury above-ground power lines as able. This is most likely economically feasible in areas such as new subdivisions and those undergoing major infrastructure updates. The City of Beloit would like to investigate potential funding sources for burying power lines along specific corridors (e.g., Highway 81, McKinley Rd., Milwaukee Rd.).

The City of Beloit Water Resources Division is investigating potential solutions for flooding at its Turtle Creek Pump Station and city-owned electrical substation on Colley Road. The area near the infrastructure was inundated due to an ice jam in 2013. If the lift station and/or electrical substation were to be compromised, the lift station would lose power raising the risk of a sanitary sewer overflow that could impact Turtle Creek

 [135]

[135] The four preceding photographs were provided by the City of Beloit.

Other Hazards

This chapter of the Rock County Pre-Disaster Hazard Mitigation Plan goes beyond the minimum required by the Federal Emergency Management Agency (FEMA) and addresses hazards beyond those associated with natural weather incidents. One useful tool for evaluating threats is a Threat and Hazard Identification and Risk Assessment (THIRA). The Wisconsin THIRA is a statewide assessment that was designed to help Wisconsin communities make informed choices about how to manage the risk and reduce the impact posed by potential threats and all-hazard events. This approach was brought to the county within the past few years.

After evaluating the THIRA, the hazard mitigation workgroup, who envision this document as the living plan for all community hazard mitigation strategies, saw opportunities to include select other strategies that can make Rock County more disaster resilient; this information is included here to aid governmental agencies, citizens and private businesses in their mitigation planning.

Physical Characteristics

The form and locations of many natural hazards are identifiable and, even in some cases, predictable. However, there is no defined geographic boundary for some hazard types. One kind of these is the technological, or man-made, hazards which can be accidental or purposeful. One subset of technological hazards is terrorism, which is defined as the use of force or violence against persons or property in violation of the criminal laws of the United States for purposes of intimidation, coercion or ransom. The Federal Bureau of Investigation (FBI) classifies terrorism in the United States as one of two types:

- Domestic Terrorism – Terrorist activities that focus on facilities or populations without foreign direction.

- International Terrorism – Terrorist activities that are foreign-based and/or sponsored by organizations or groups outside of the United States.

One local example of concerns is that a Department of Homeland Security audit found the Supervisory Control and Data Acquisition (SCADA) System, which operates the sanitary sewer and water

systems, for the City of Beloit to be highly vulnerable to attack. A cyber-attack on this system could interrupt water and/or sewer services.[136] Recognizing this, the Rock County PDM workgroup is identifying that county and municipal partners should evaluate their systems so that they might plan and budget to protect their critical systems from cyberattack. A cyberattack (also known as a computer network attack-CNA) is deliberate exploitation of computer systems, technology-dependent enterprises and networks. Cyberattacks use malicious code to alter computer code, logic or data, resulting in disruptive consequences that can compromise data and lead to cybercrimes, such as information and identity theft.[137]

Cybersecurity involves protecting that infrastructure by preventing, detecting, and responding to cyber incidents. Unlike physical threats that prompt immediate action–like stop, drop, and roll in the event of a fire–cyber threats are often difficult to identify and comprehend. Among these dangers are viruses erasing entire systems, intruders breaking into systems and altering files, intruders using your computer or device to attack others, or intruders stealing confidential information. The spectrum of cyber risks is limitless; threats, some more serious and sophisticated than others, can have wide-ranging effects on the individual, community, organizational, and national level. These risks include:

- Organized cybercrime, state-sponsored hackers, and cyber espionage can pose national security risks to our country.
- Transportation, power, and other services may be disrupted by large scale cyber incidents. The extent of the disruption is highly uncertain as it will be determined by many unknown factors such as the target and size of the incident.
- Vulnerability to data breach and loss increases if an organization's network is compromised. Information about a company, its employees, and its customers can be at risk.
- Individually-owned devices such as computers, tablets, mobile phones, and gaming systems that connect to the Internet are vulnerable to intrusion. Personal information may be at risk without proper security.[138]

[136] Berkey-Ames, Laura M. "APWA members' cyber systems are evaluated by DHS." APWA Reporter, January, 2011. American Public Works Association. pp 6-7.
[137] https://www.techopedia.com/definition/24748/cyberattack
[138] https://www.ready.gov/cyber-attack

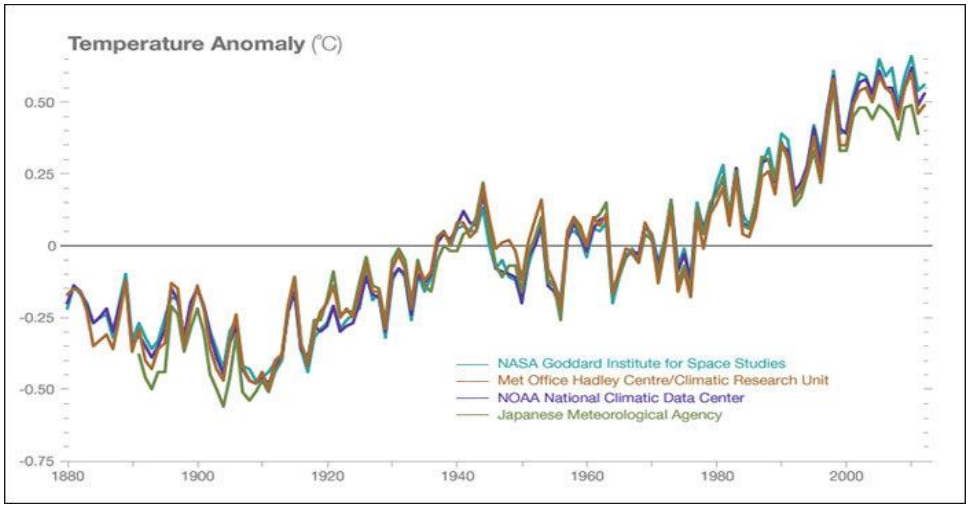
Based on previous events it is presumed that critical facilities, critical services and large gatherings of people are at higher risk for terrorism. Terrorism cannot be forecast with any accuracy. This allows the potential for most, if not all, types of terrorist acts to occur anywhere and at any time. The National Terrorism Advisory System, or NTAS, is used to communicate information about terrorist threats by providing timely, detailed information to the public, government agencies, first responders, airports and other transportation hubs and the private sector because the electrical system powers the pumps and lift stations that move and treat the water and sewage.

Another way to look at these other hazards is by their etiology. For example, there is extensive preparedness work being conducted for chemical, biological, radiological, nuclear and explosive (CBRNE) hazards. These hazards can exhibit multiple origins, for example, a new disease may be the result of a natural process (e.g., a mutation occurring without human interference), created by genetic engineering or a mix of the two processes over time. Regardless of their origin or intent, a thorough risk and vulnerability assessment determines that they may be elements of concern. There are many ongoing federal, state and local preparedness groups evaluating and creating mitigation plans for these concerns in emergency management, public health and the agriculture agencies. For example, there are local agriculture and public health concerns related to biological hazards such as the risk of avian flu outbreak stemming from pheasant farms in the county. These groups will continue to prepare (i.e., plan, train, exercise) and mitigate these hazards as they become known.

Finally, it is worth noting that global climate change is an area of interest in Rock County. According to the U.S. National Aeronautics and Space Administration (NASA), there is near universal consensus among scientists that the earth's climate is warming[139]:

> Multiple studies published in peer-reviewed scientific journals show that 97 percent or more of actively publishing climate scientists agree: Climate-warming trends over the past century are very likely due to human activities. In addition, most of the leading scientific organizations worldwide have issued public statements endorsing this position.

[139] http://climate.nasa.gov/scientific-consensus/



Temperature data from four international science institutions[140] all showing rapid warming in the past few decades and that the last decade has been the warmest on record.

Also there was a statement on climate change from 18 scientific associations including the American Association for the Advancement of Science, American Chemical Society, American Geophysical Union, American Medical Association, American Meteorological Society, American Physical Society, and The Geological Society of America[141]:

> Observations throughout the world make it clear that climate change is occurring, and rigorous scientific research demonstrates that the greenhouse gases emitted by human activities are the primary driver.

Furthermore, there have been joint statements reinforcing this fact from American and international science academies (including the U.S. National Academy of Sciences), governmental agencies and intergovernmental bodies. There are currently nearly 200 scientific organizations worldwide that posit that climate change is occurring and that it has been caused by human activities.[142]

[140] Data sources: NASA's Goddard Institute for Space Studies, NOAA National Climatic Data Center, Met Office Hadley Centre/Climatic Research Unit, and the Japanese Meteorological Agency.
[141] http://www.aaas.org/sites/default/files/migrate/uploads/1021climate_letter1.pdf
[142] https://www.opr.ca.gov/s_listoforganizations.php

On November 01, 2013, President Obama released an Executive Order entitled, "Preparing the United States for the Impacts of Climate Change." [143] Since then, many U.S. agencies, including the Departments of Defense and Homeland Security, are creating plans based on the predicted effects of global climate change. As part of the Department of Homeland Security, FEMA's projects include[144]:

- **FEMA Strategic Plan (FY 2011 – 2014**). The strategic plan provides the foundation for FEMA to promote community participation, build the nation's ability to stabilize and recover from a disaster event, establish a unified and common understanding among the emergency management team, and learn from the past and innovate as an organization. The strategic plan recognizes that climate change, coupled with deteriorating infrastructure, has the potential to alter the types and magnitudes of hazards faced by communities.

- **Strategic Foresight Initiative (SFI).** FEMA facilitates the SFI as a collaborative effort to help emergency managers understand how the world is changing. The SFI released a summary of their findings in May 2011, which identified climate change as one of the nine drivers likely to affect the field of emergency management over the next 15 years. The SFI recommended that emergency management community consider these drivers as it updates long-term plans.

- **NFIP Reform Working Group.** FEMA established the National Flood Insurance Program (NFIP) Reform Working Group to identify and analyze options for the future of the program. This internal work group, comprised of a cross-section of the Federal Insurance and Mitigation Administration, identified guiding principles for the reform effort and crafted evaluation criteria to steer policy analysis.

[143] https://www.whitehouse.gov/the-press-office/2013/11/01/executive-order-preparing-united-states-impacts-climate-change
[144] http://www.c2es.org/docUploads/federal-agencies-adaptation.pdf

- **Risk MAP (Mapping, Assessment, and Planning) Multi Year Plan (March 2009).** The vision for Risk MAP is to deliver quality data that increases public awareness and leads to action that reduces risk to life and property. Risk MAP builds on flood hazard data and maps produced during the Flood Map Modernization program, recognizing that the dynamic nature of floodplains will require updated analysis of flood hazards based on climatic conditions such as changing rainfall data as well as hurricane patterns and intensities.

- **Coastal Construction Manual.** In 2008, FEMA published a Coastal Construction Manual (FEMA 55) that documents state-of-the-art and best practices in coastal construction in accordance with information and recommendations contained in several pertinent publications. Currently FEMA's Mitigation Directorate is substantially revising the manual, which will now include a new section that addresses climate change.

- **Community Rating System (CRS)**. The CRS, a program component of the NFIP, provides financial incentives for implementing practices aimed at mitigating future losses beyond the minimum NFIP floodplain management standards. The next revision of the CRS manual will likely contain new climate change-specific language describing certain CRS activity credits.

As can be seen, this topic is of national and international concern and has many implications for hazard mitigation. Rock County leaders will continue to monitor this topic, evaluating local concerns as information and guidance become available.

Frequency of Occurrence

There are regular occurrences of accidental incidents (e.g., hazardous materials spills, seasonal/annual influenza outbreaks) in Rock County which are managed and mitigated, as possible, by the existing systems. No data exists to show that a community in Rock County has experienced a terrorist act but the county recognizes that terrorism can strike any community of any size. The history of

terrorism on United States soil includes the large−scale attacks of September 11, 2001 and the ensuing anthrax attacks; the 1995 bombing of the Alfred P. Murrah Federal Building in Oklahoma City; and earlier bombing of the World Trade Center in 1993.

Given the wide scope of hazards that could be included in this “other” category, no one estimate could quantify the probability of a future occurrence of any single incident but it is safe to say that incidents of various magnitude will occur in Rock County.

Vulnerability

Because there is no defined geographic hazard boundary, all people and property in Rock County are potentially exposed to risk from damage from one of these types of “other” incidents. While an incident may not be preventable, there are opportunities to lessen the likelihood and/or the potential effects of an incident. Response agencies in the county continue to improve their readiness to respond to an incident through participation in state and federal programs that provide training and equipment for agencies that would respond to a local accident or criminal/terrorist incident; and in exercises that help to improve agency coordination and test local response plans.

As part of the community risk analysis, emergency management coordinates with other public and private agencies to evaluate areas of concern (for accidents) and potential targets (for criminal/terrorist acts) so that mitigation and preparedness resources can be geared to the highest concerns such as hazardous materials fixed facilities and transportation resources, critical infrastructure protection (e.g., cyberattack on SCADA systems) as well as environmental complications from man-made changes such as from climate change, fracking, etc. In general, the likelihood of an incident occurring is high and the probability of damages, injury and/or death varies by the type of incident.

Hazard Mitigation Strategies

The goal of these mitigation activities is to reduce, in a cost effective manner, the loss of lives and property due to these incidents. To that end, Rock County and its partners will continually work with public and private organizations and citizens within the county to:

- Monitor and evaluate high-quality, reputable data on evolving issues (e.g., climate change)

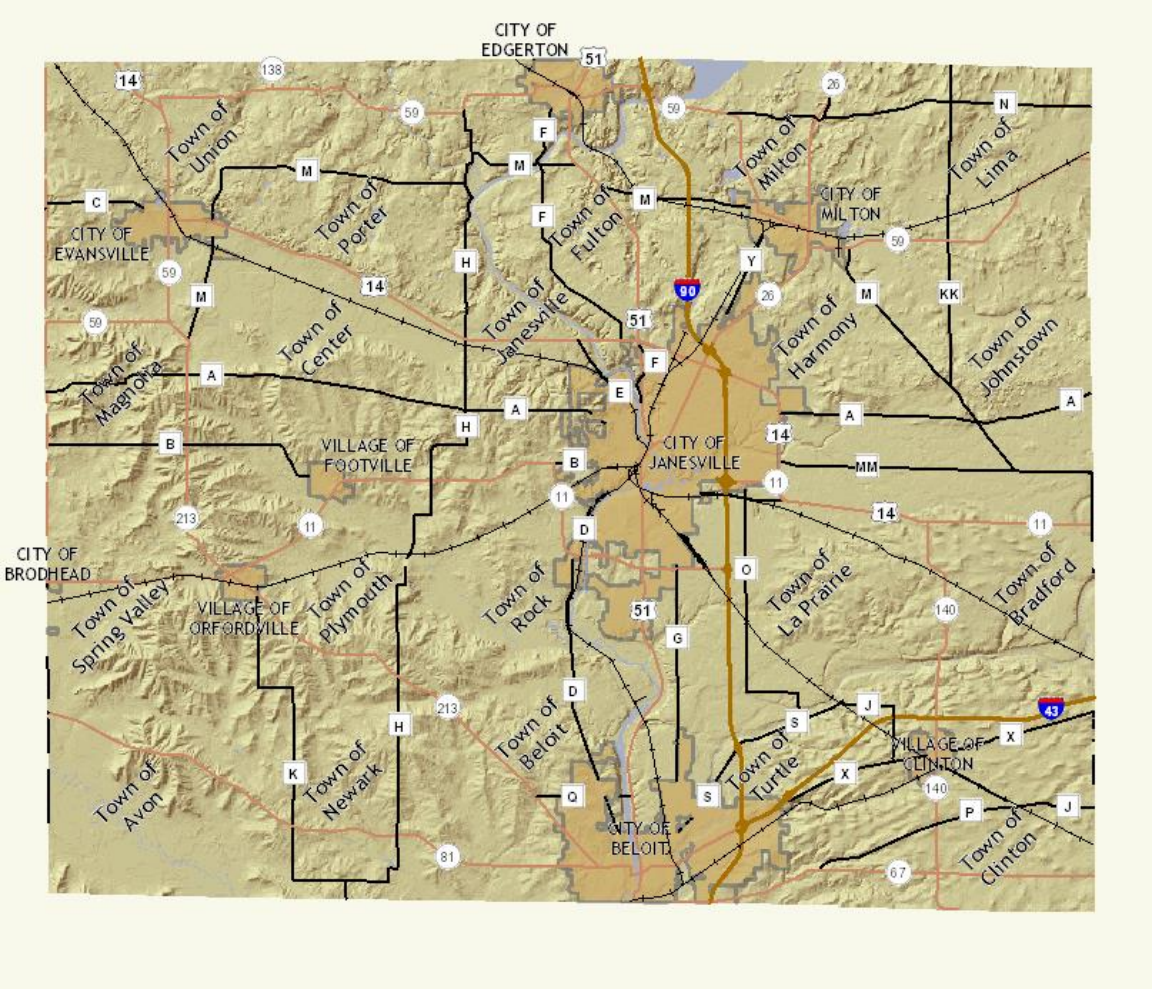
- Provide easily accessible hazard-related information

- Promote hazard mitigation education and awareness as well as discuss ways to better integrate mitigation into the county's culture.

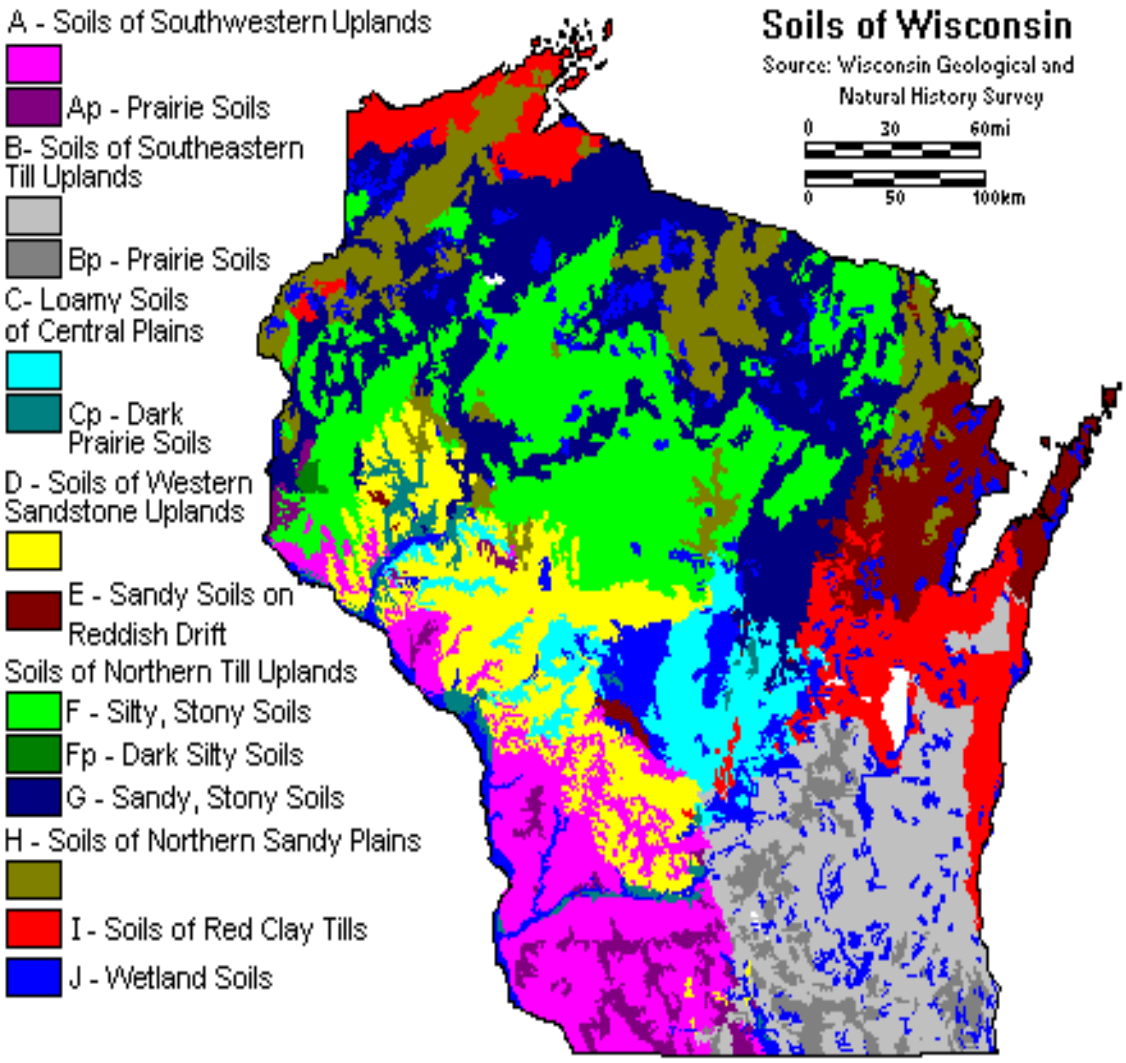
One specific, focused mitigation strategy will be to evaluate risks to information technology infrastructure from cyberattack and investigate options for reinforcing those systems to ensure security and prevent unauthorized access or system failure.

Appendix A: Maps

Rock County Base Map

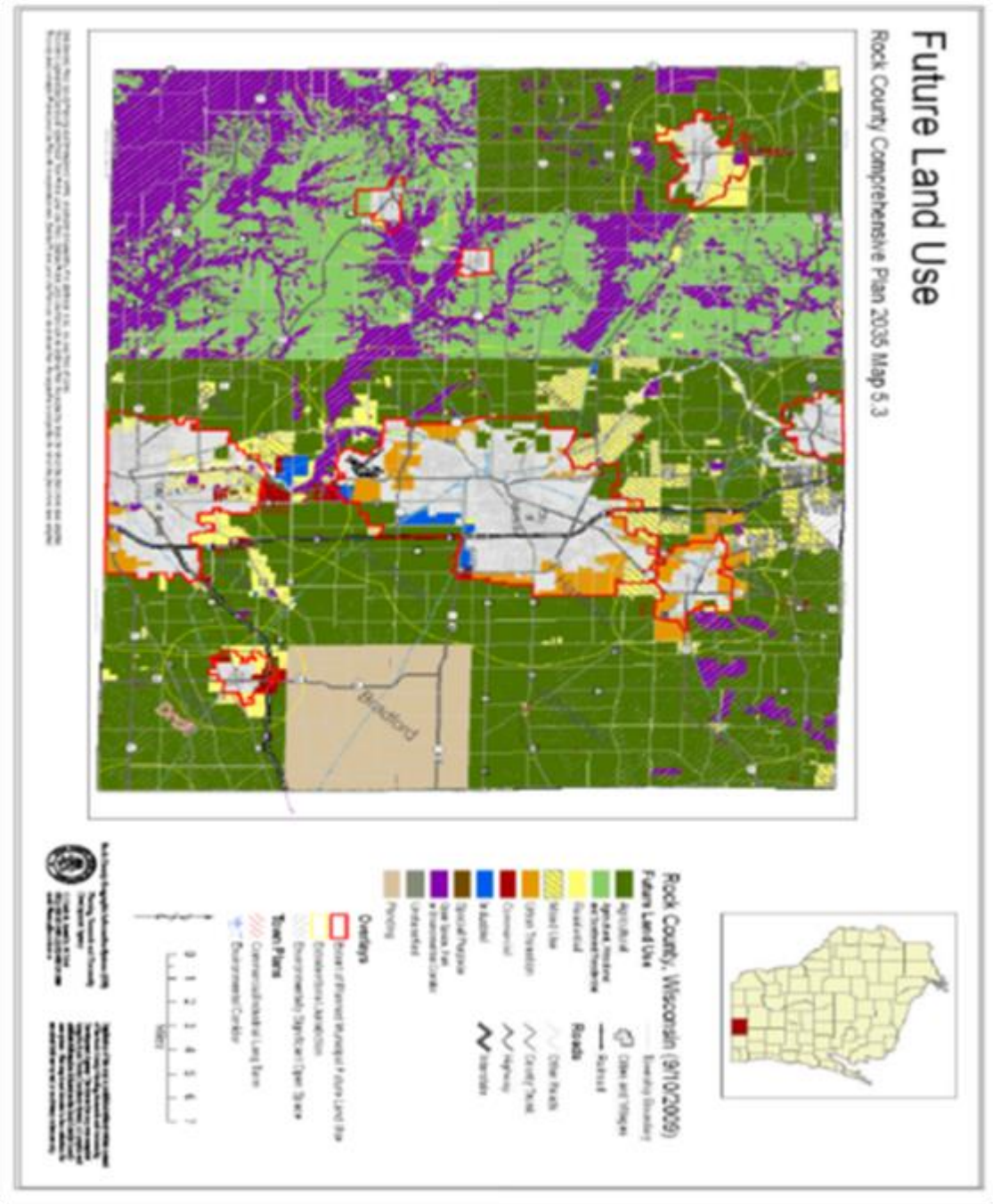


Soils Types [145]



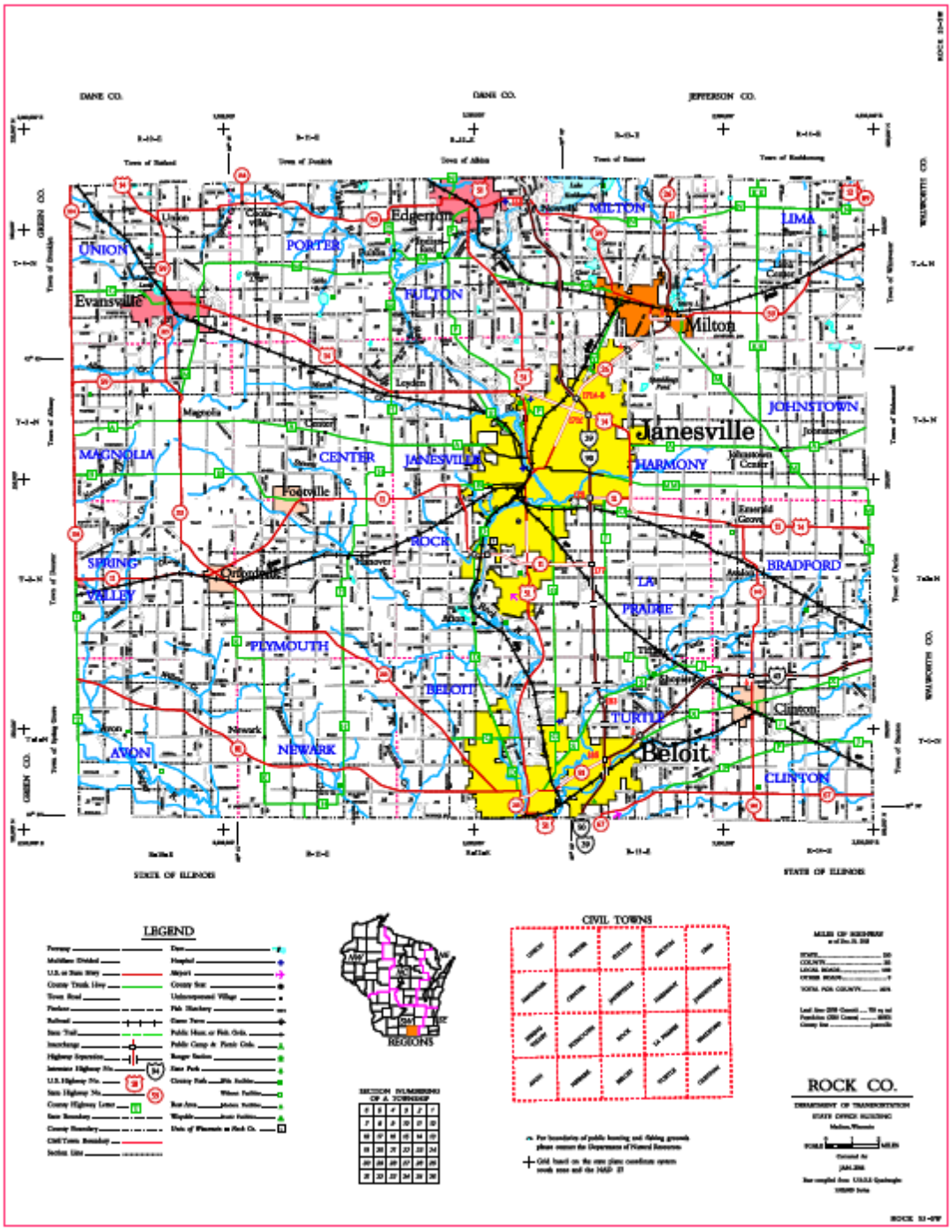
[145] Source: Soils of Wisconsin compiled by F. D. Hole, 1973; Wisconsin Geological and Natural History Survey Map, scale (approx.) 1: 3,150,000.

Future Land Use [146]



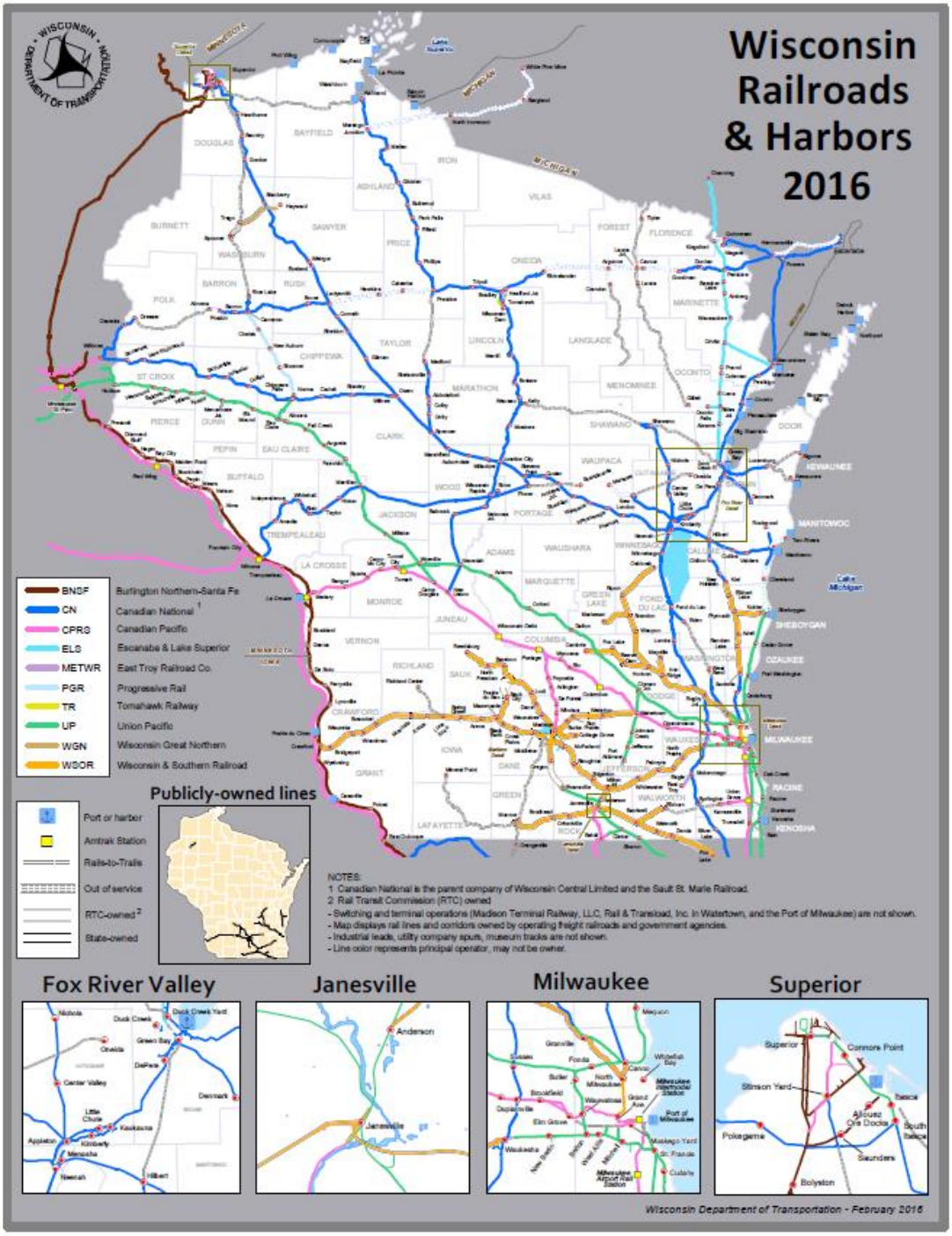
[146] Rock County Comprehensive Plan 2035, p. II-5-23

Rock County Road Map [147]



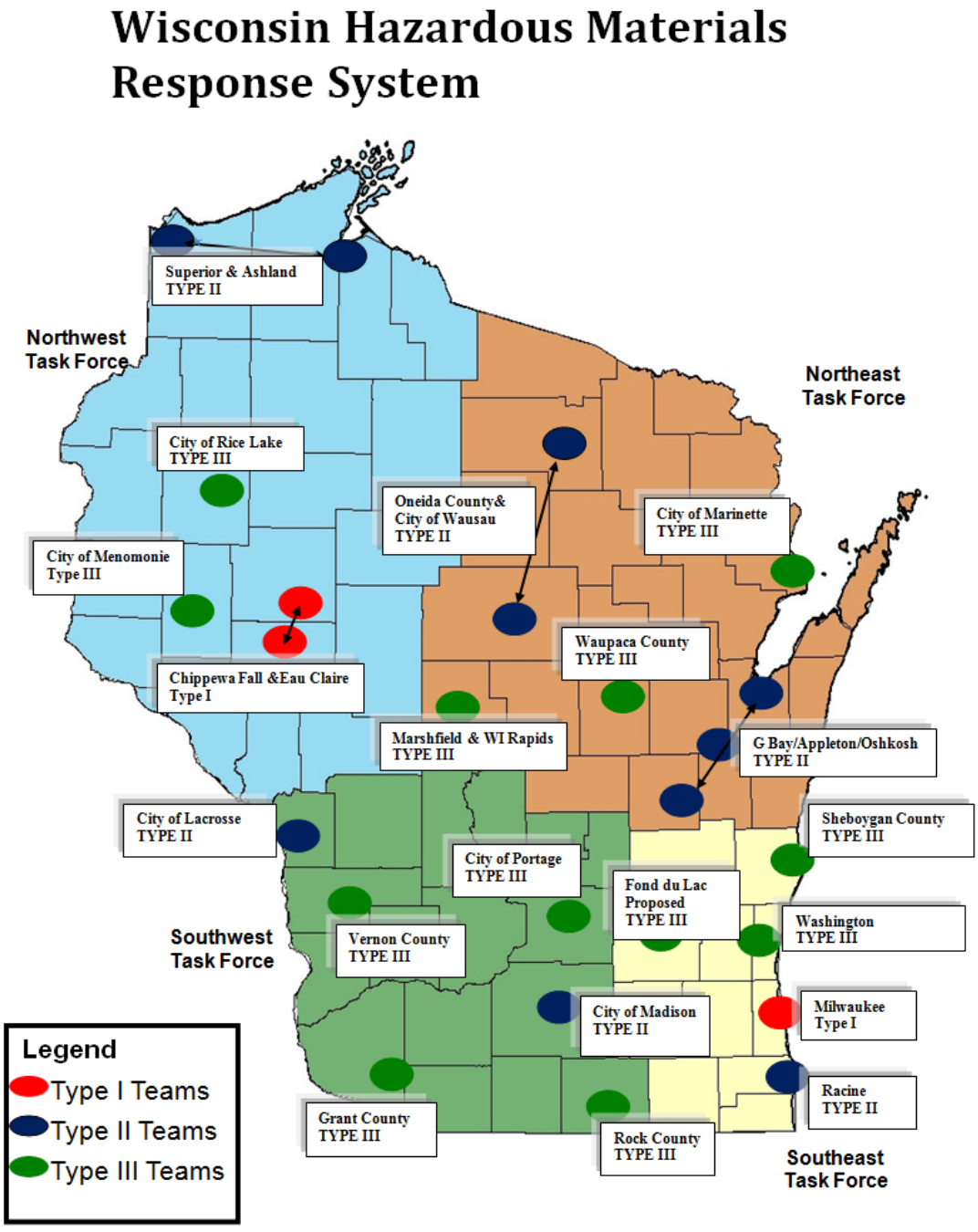
[147] http://wisconsindot.gov/Documents/travel/road/hwy-maps/county-maps/rock.pdf

Wisconsin Railroads & Harbors[148]



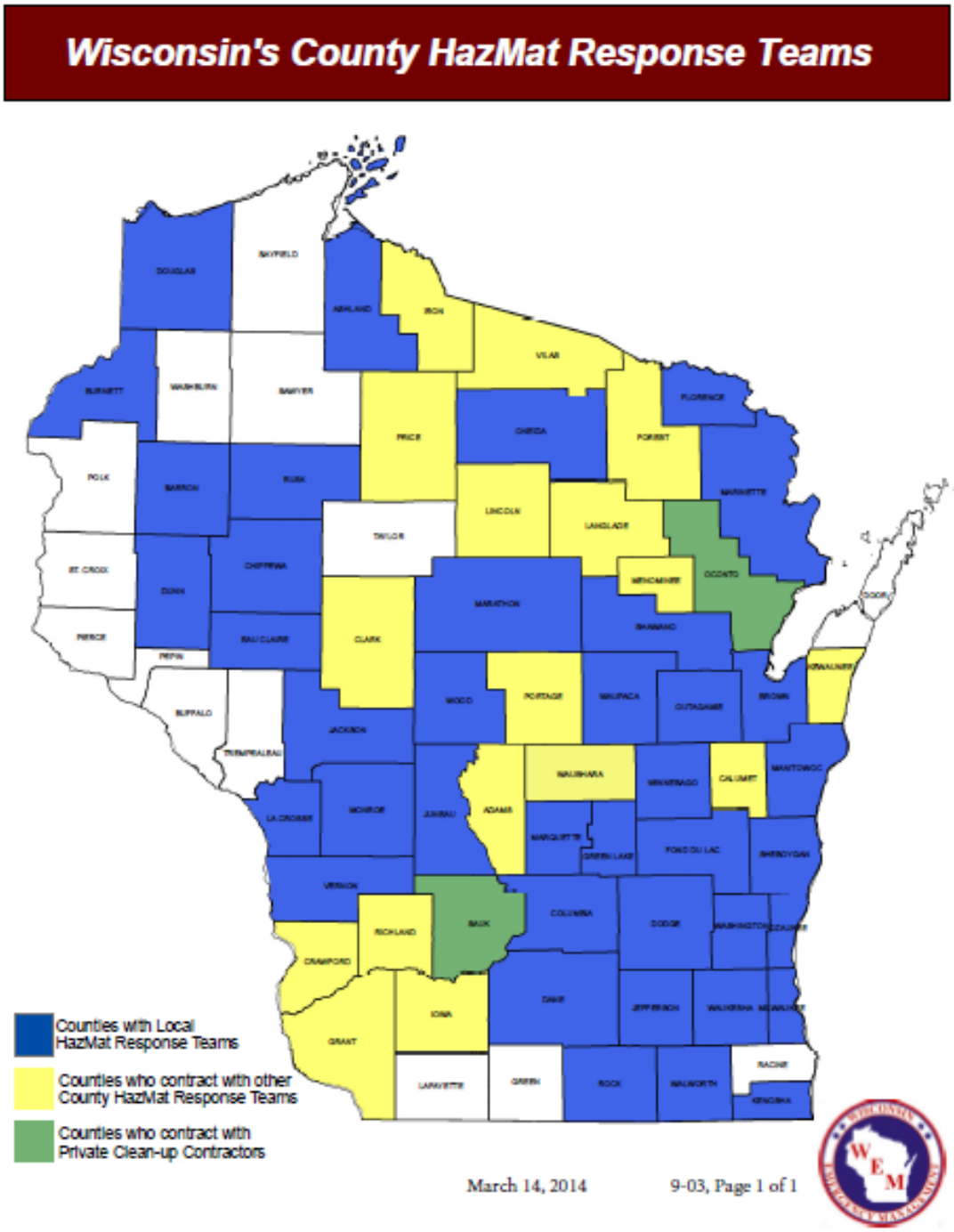
[148] http://wisconsindot.gov/Documents/travel/rail/railmap.pdf

Wisconsin Hazardous Materials Response System[149]



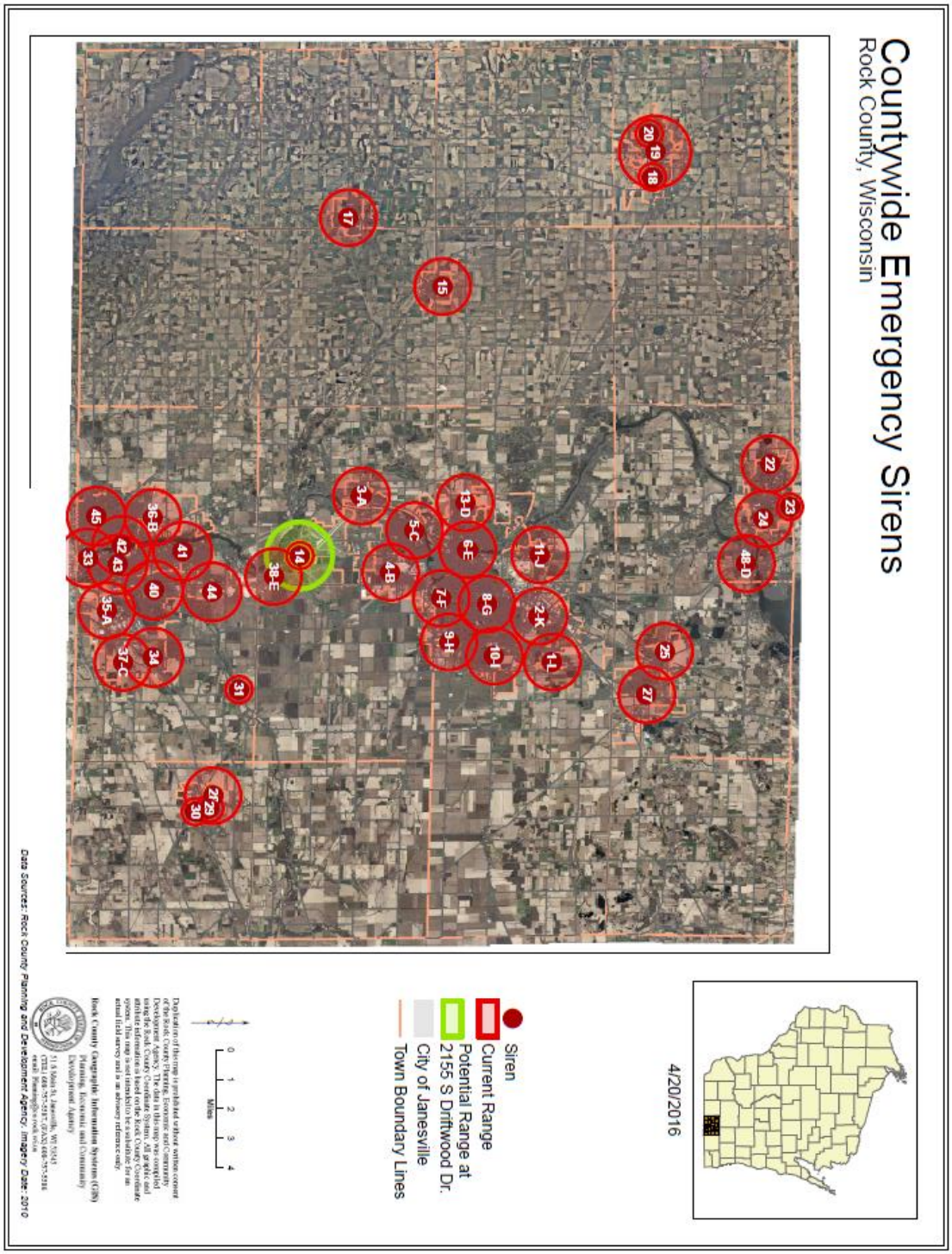
[149] http://www.emergencymanagement.wi.gov/training/docs/Regional_Hazardous_Materials_Resp_Teams_Map.pdf

Wisconsin Hazardous Materials Response Teams[150]

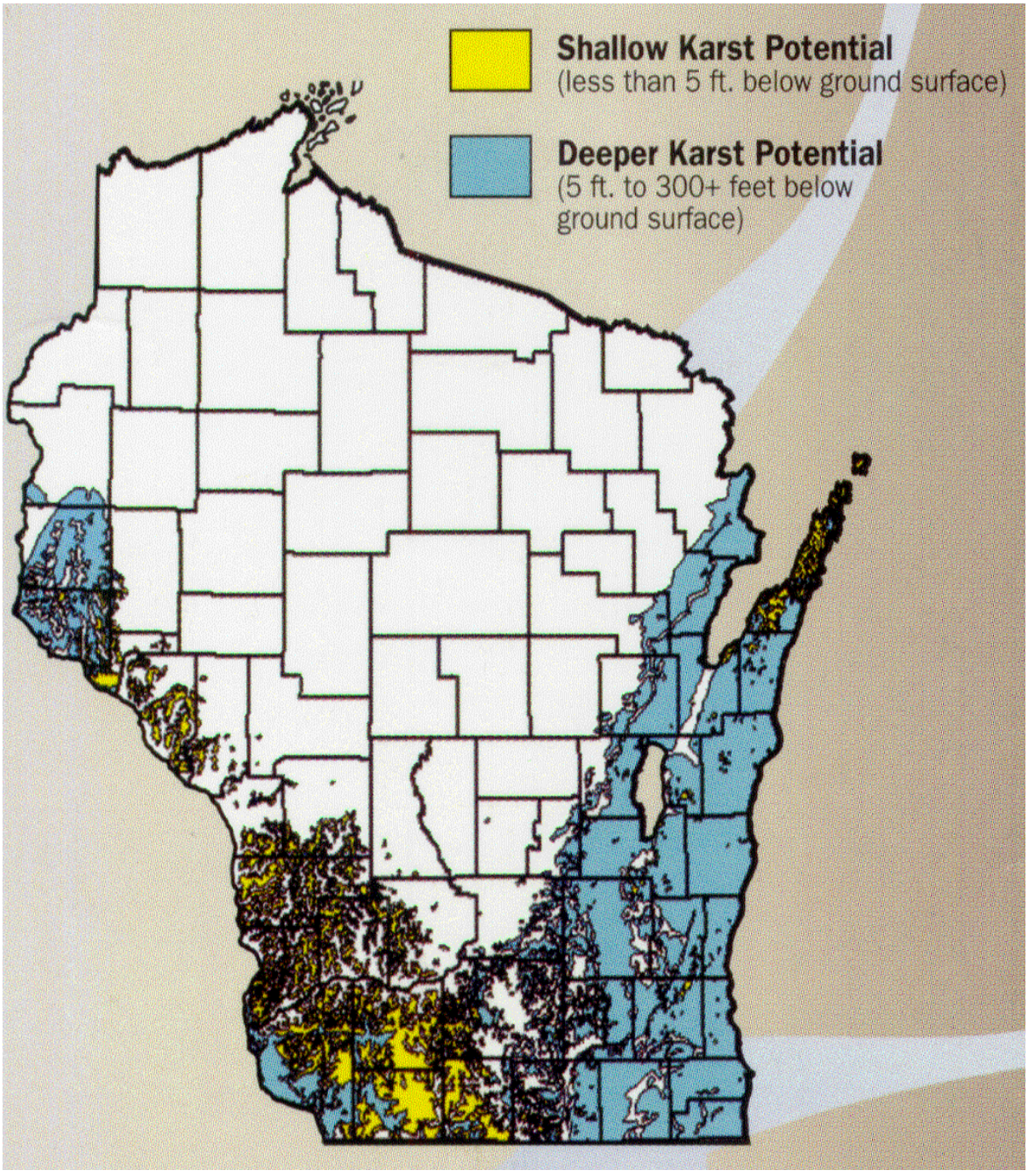


[150] http://www.emergencymanagement.wi.gov/training/docs/County_Hazardous_Materials_Resp_Teams_Map.pdf

Countywide Sirens

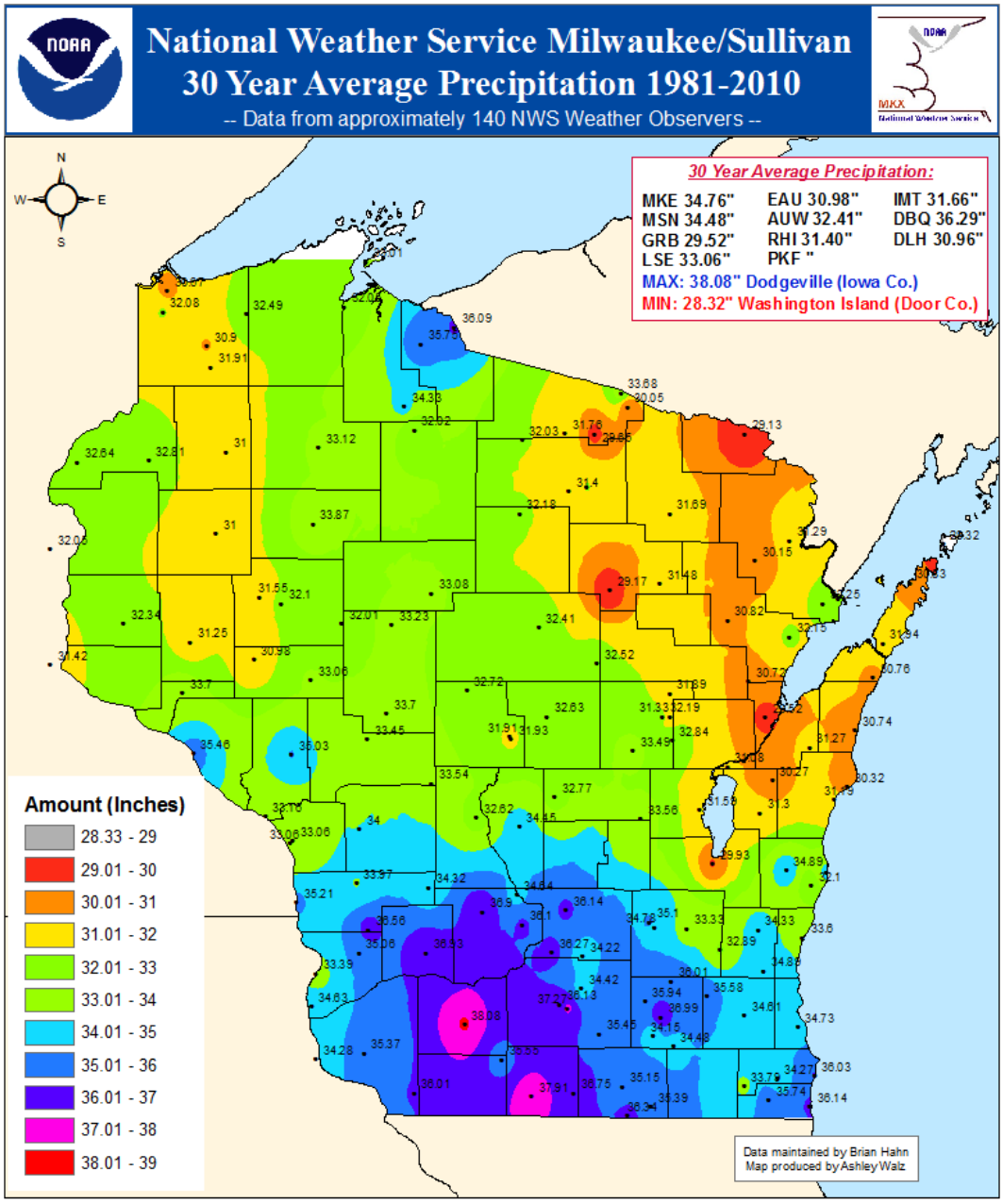


Karst Potential [151]



[151] Wisconsin State Hazard Mitigation Plan

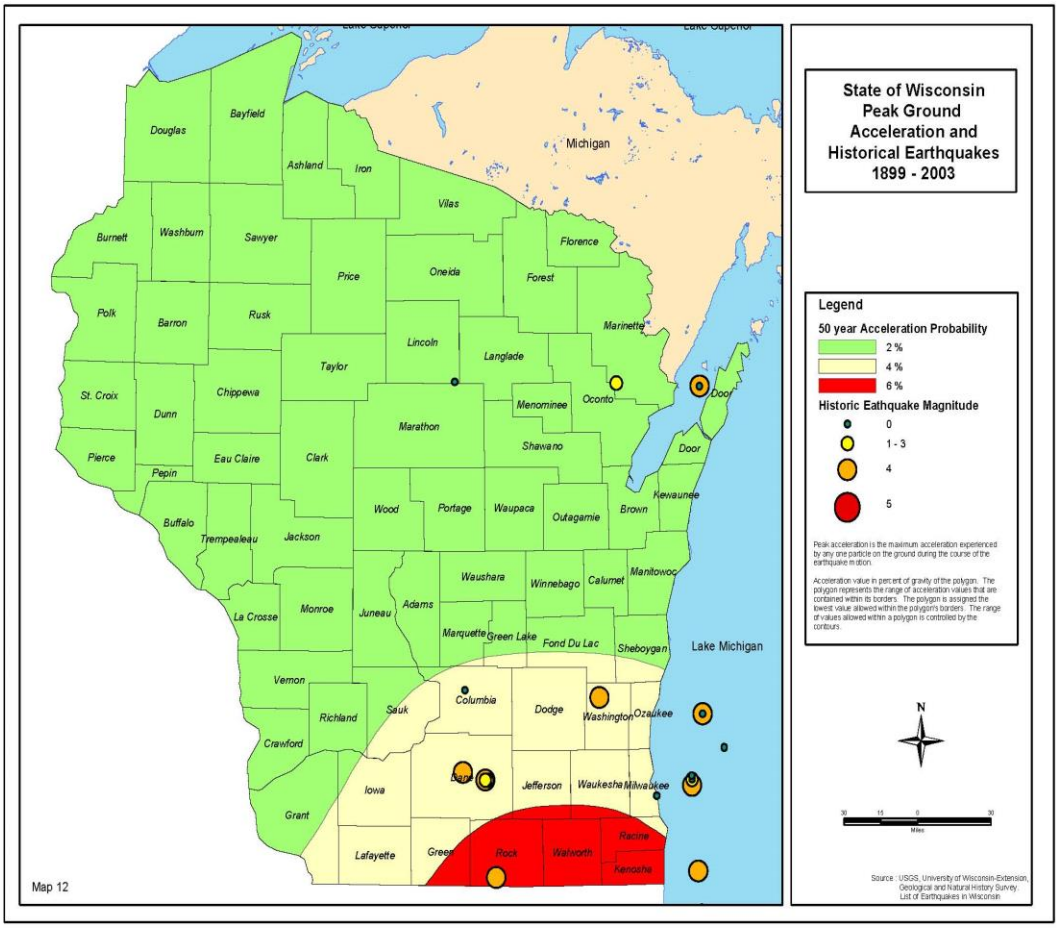
Wisconsin 30-Year Average Precipitation [152]



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

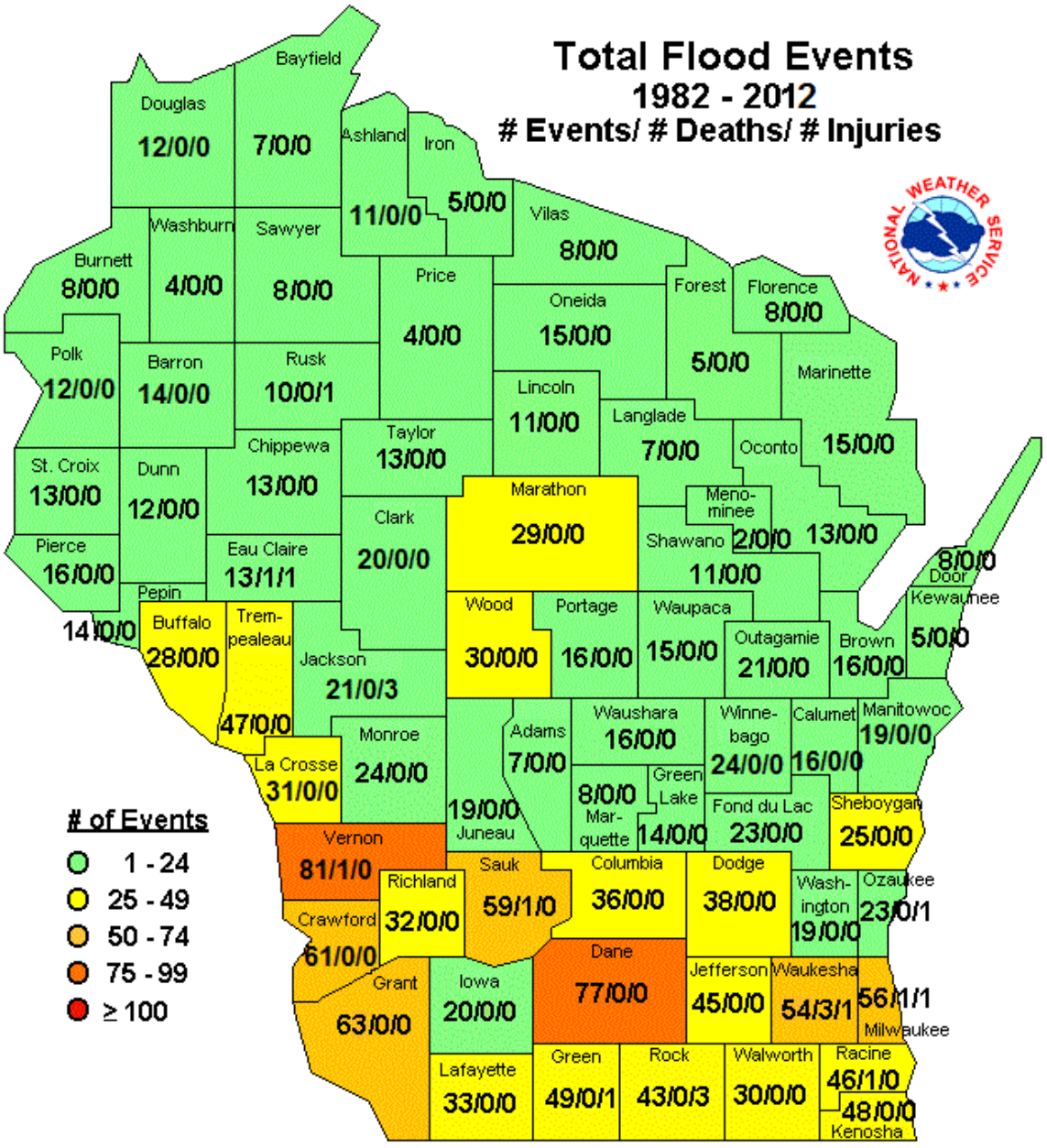
Earthquakes in Wisconsin [153]

Peak Ground Acceleration Contours and Historical Earthquakes in Wisconsin



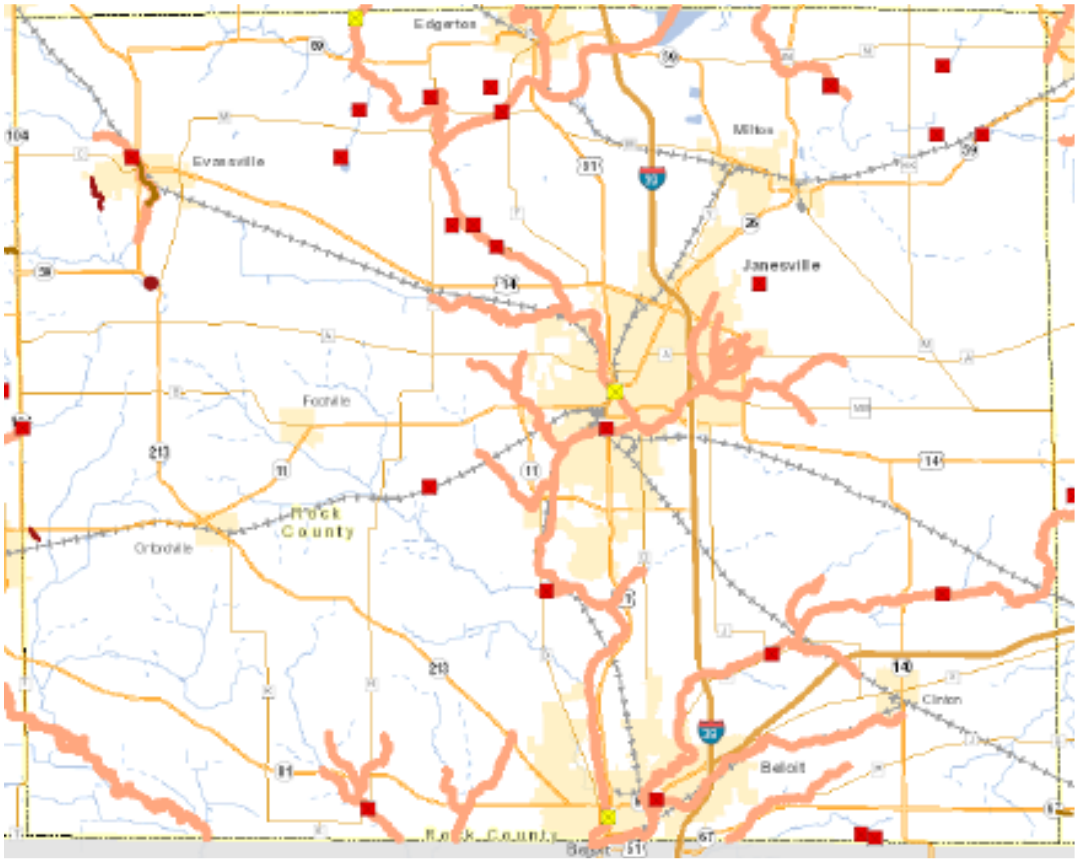
[153] Wisconsin State Hazard Mitigation Plan

Wisconsin Total Flood Events [154]



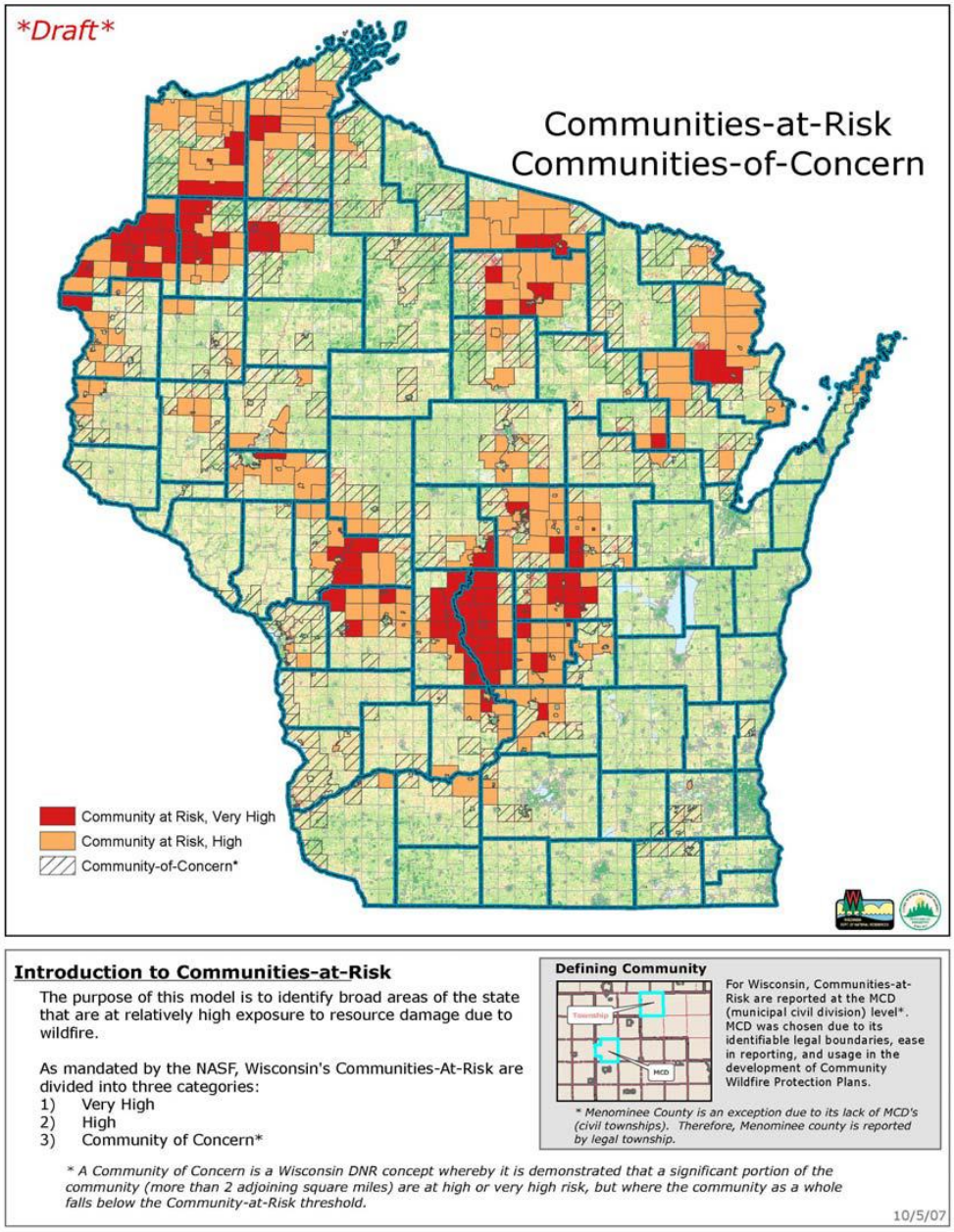
[154] http://www.crh.noaa.gov/images/mkx/severe/flood.gif

Rock County Dams[155]



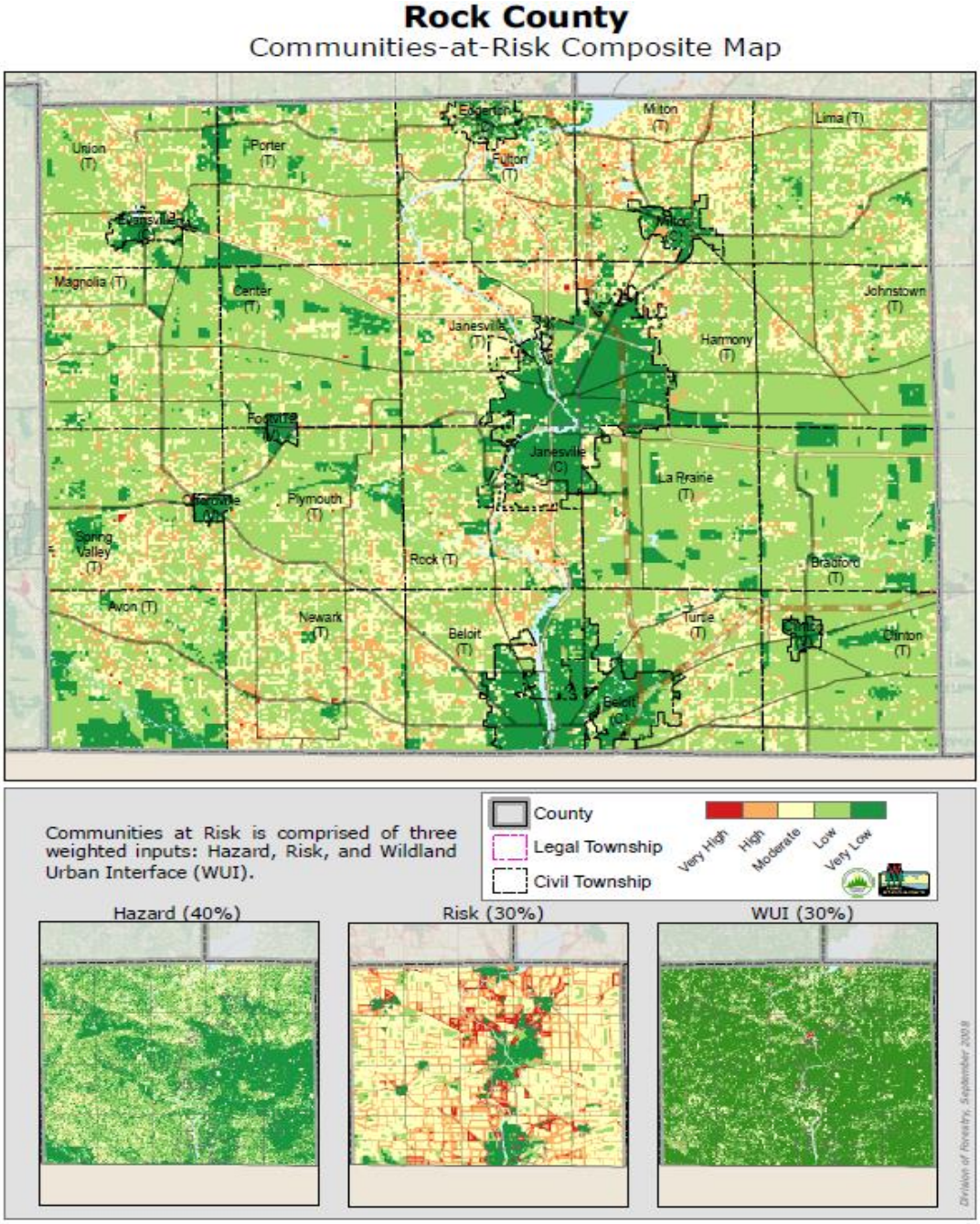
[155] https://dnrmaps.wi.gov/H5/?Viewer=SWDV

Wildfire Communities at Risk [156]



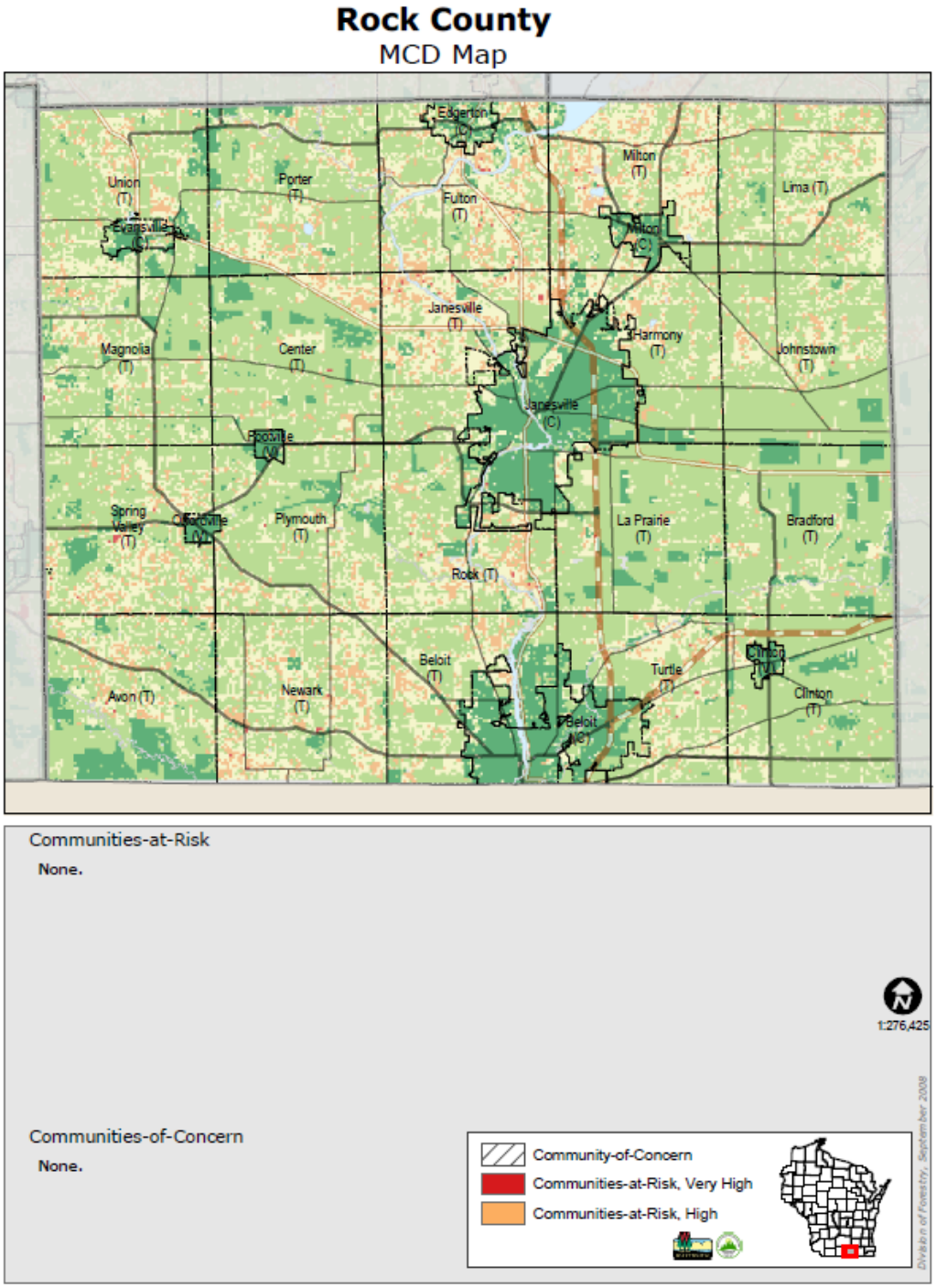
[156] Wisconsin Department of Natural Resources

Rock County Communities-at-Risk Composite Map [157]



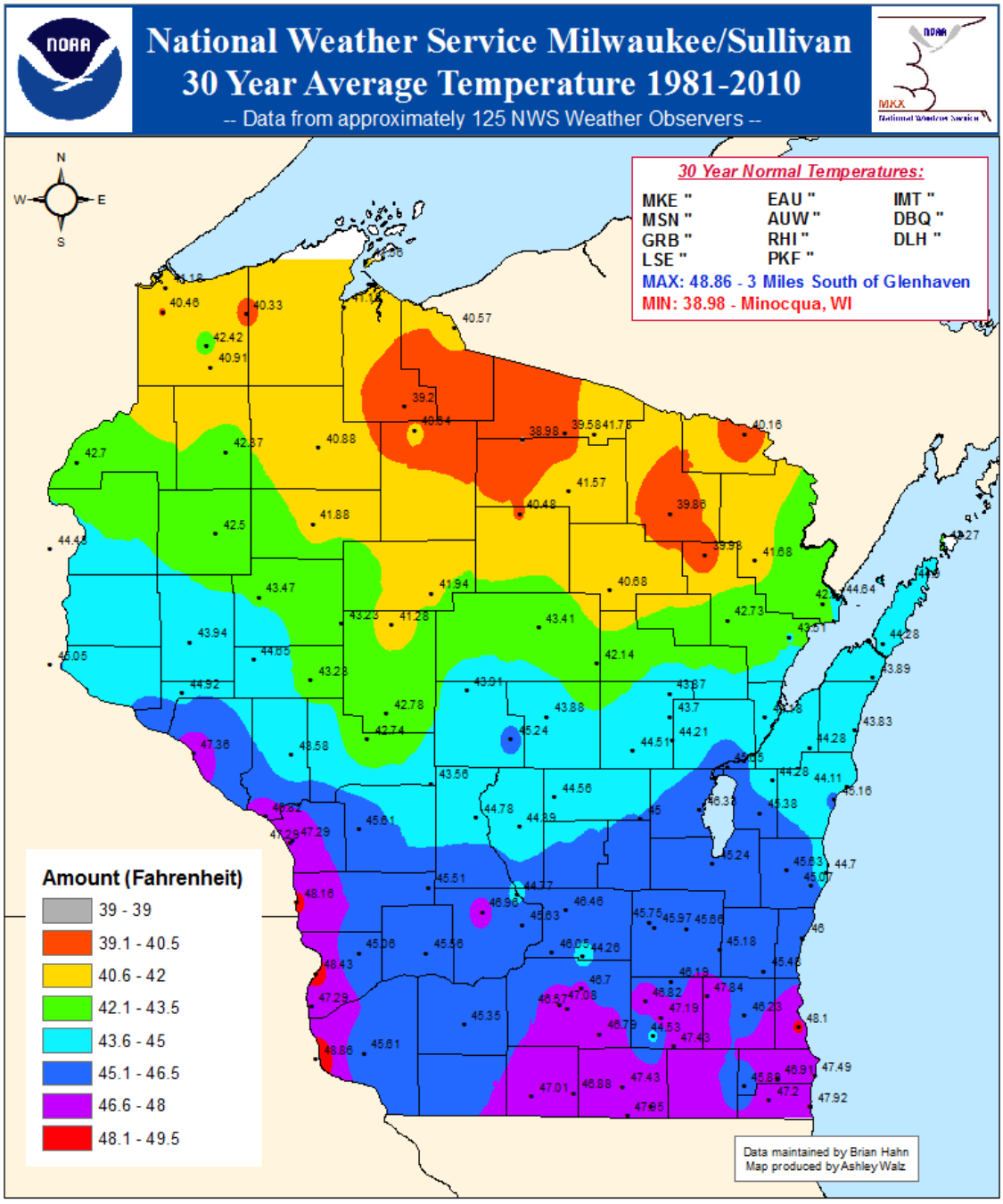
[157] Wisconsin Department of Natural Resources

Rock County Communities-at-Risk MCD Map [158]



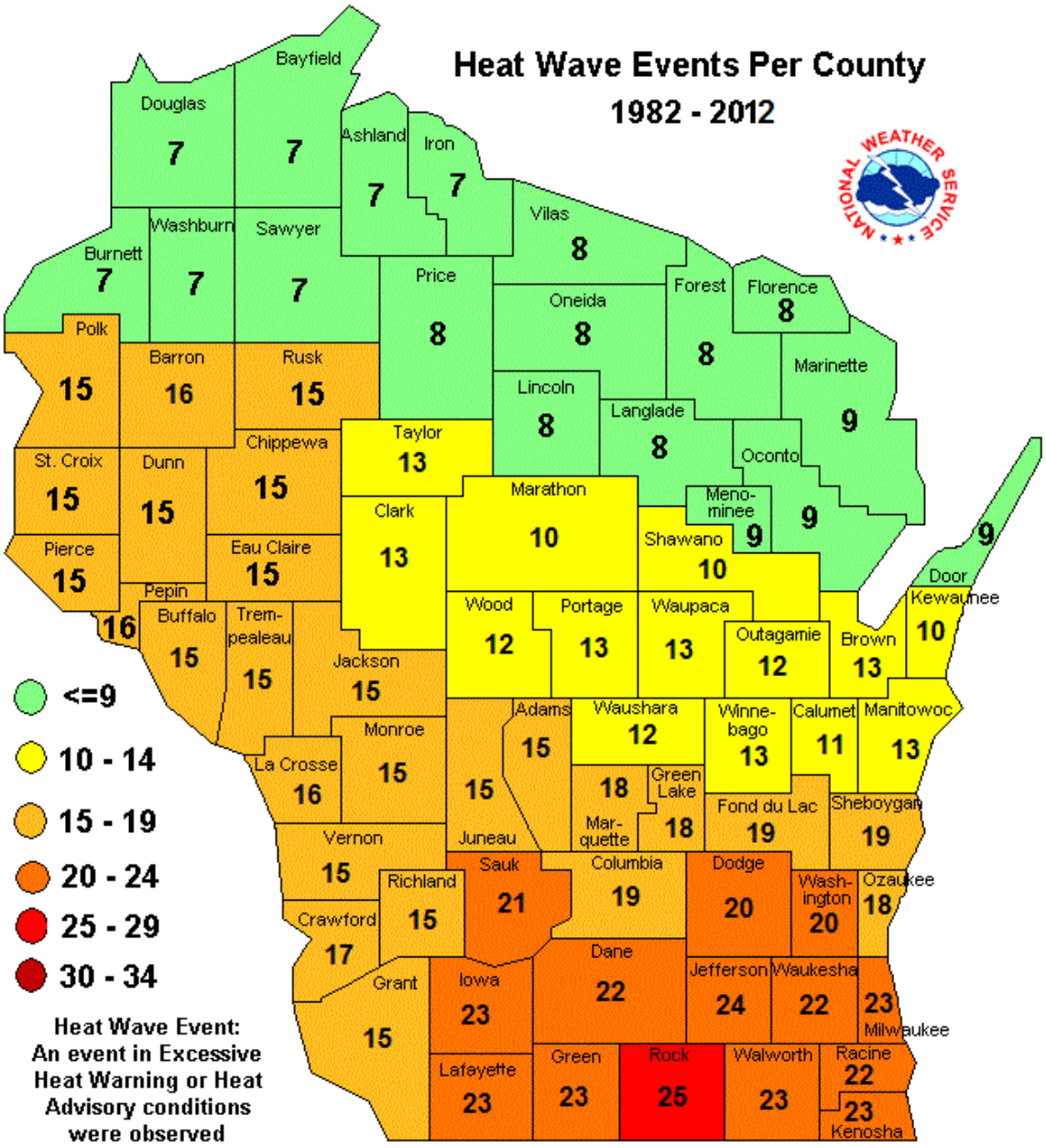
[158] Wisconsin Department of Natural Resources

Wisconsin 30-Year Average Temperature [159]



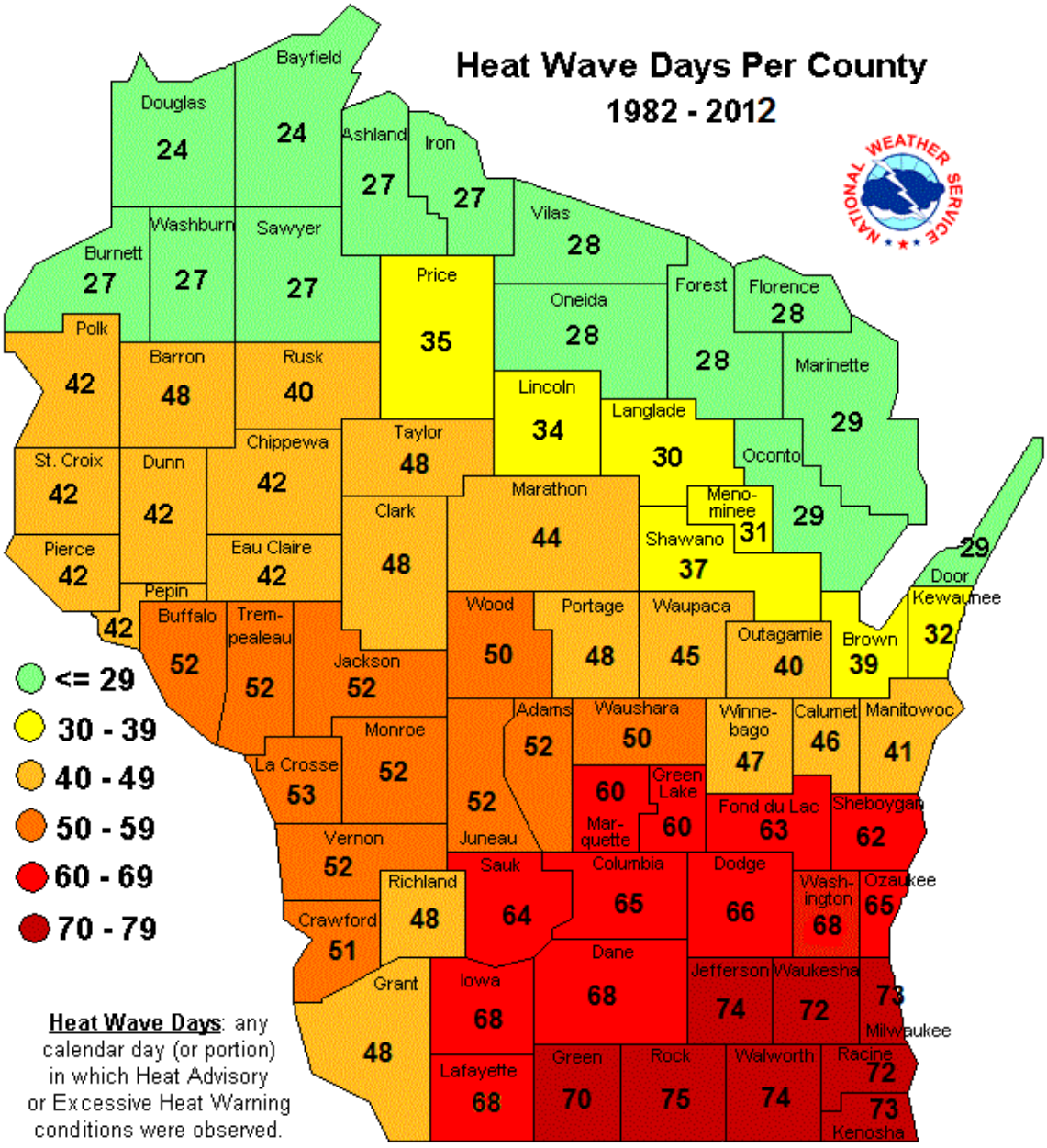
[159] http://www.crh.noaa.gov/images/mkx/climate/avg_30_year_temp.png

Wisconsin Heat Wave Events[160]



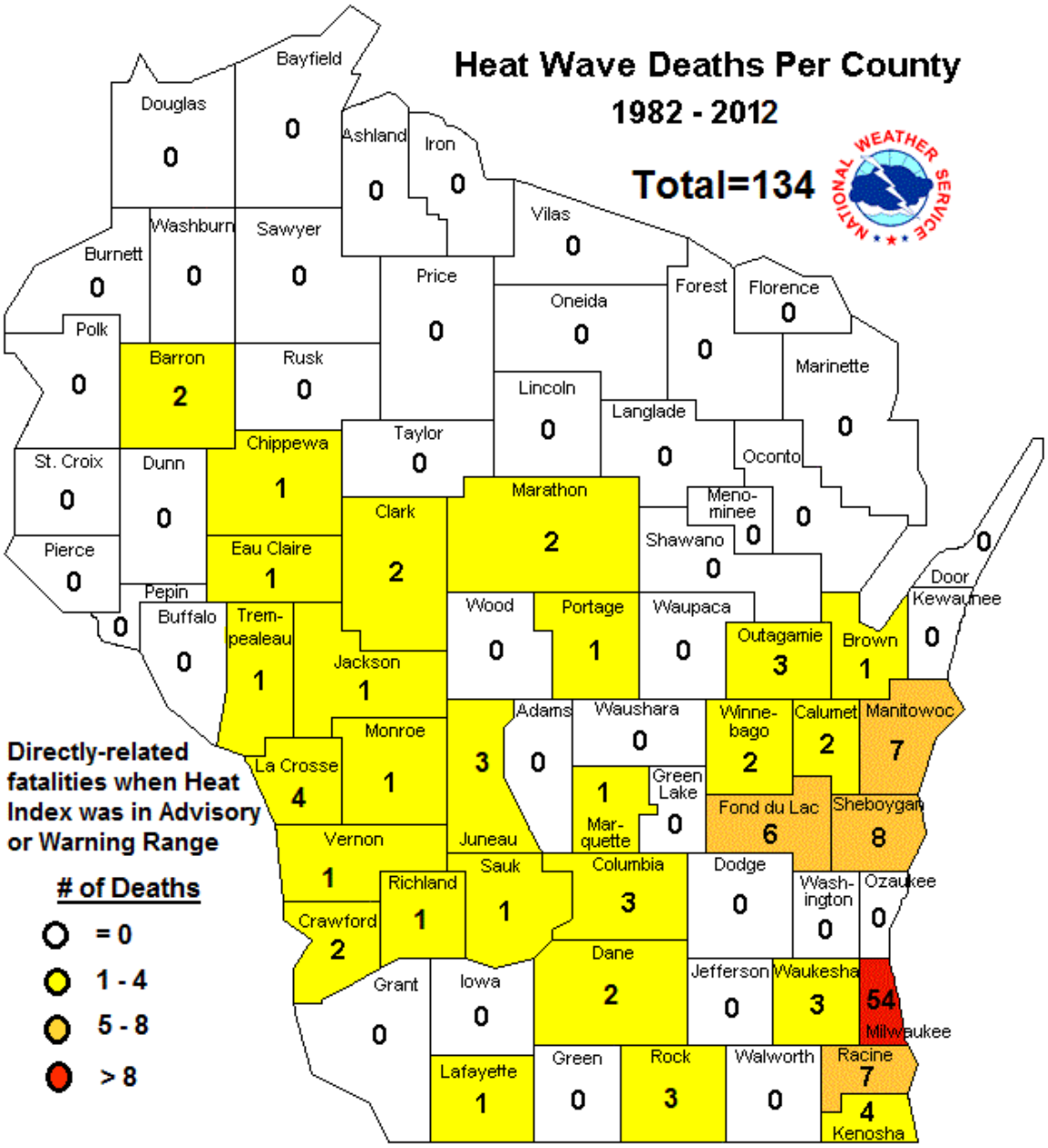
[160] http://www.crh.noaa.gov/images/mkx/severe/htwaveevents.gif

Wisconsin Heat Wave Days[161]



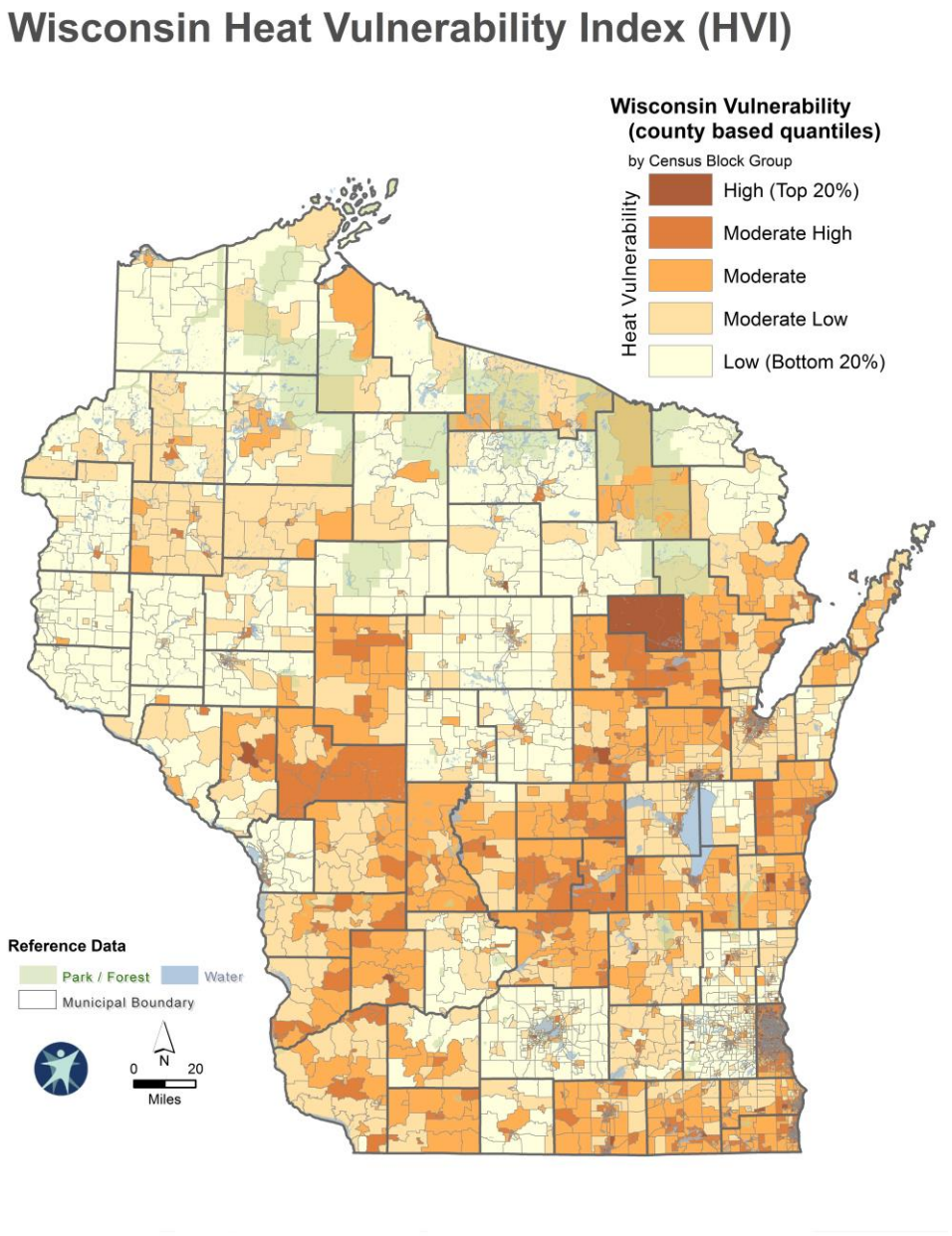
[161] http://www.crh.noaa.gov/images/mkx/severe/htwavedays.gif

Wisconsin Heat Wave Deaths[162]



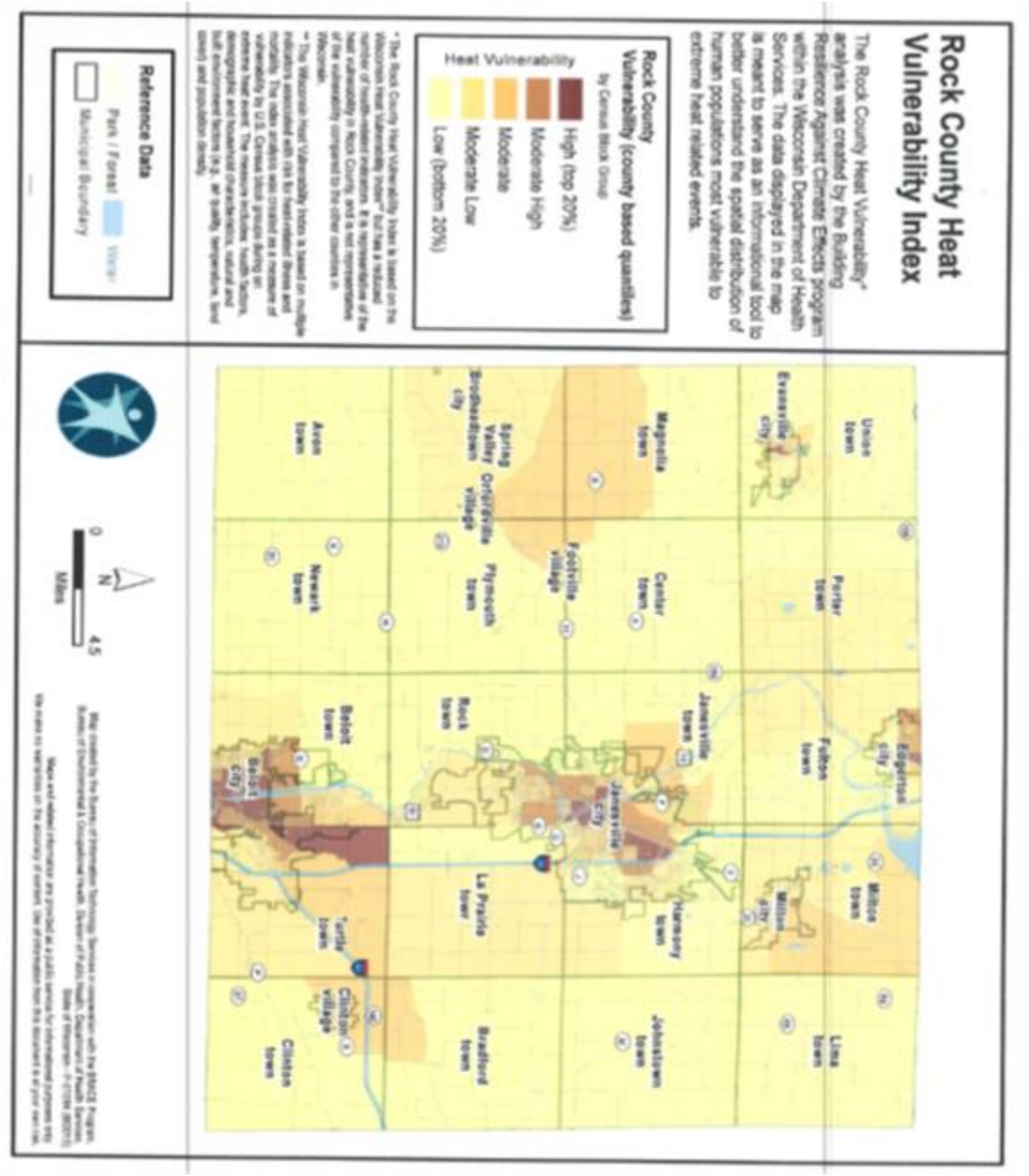
[162] http://www.crh.noaa.gov/images/mkx/severe/htwavedeaths.gif

Wisconsin Heat Vulnerability Index[163]



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

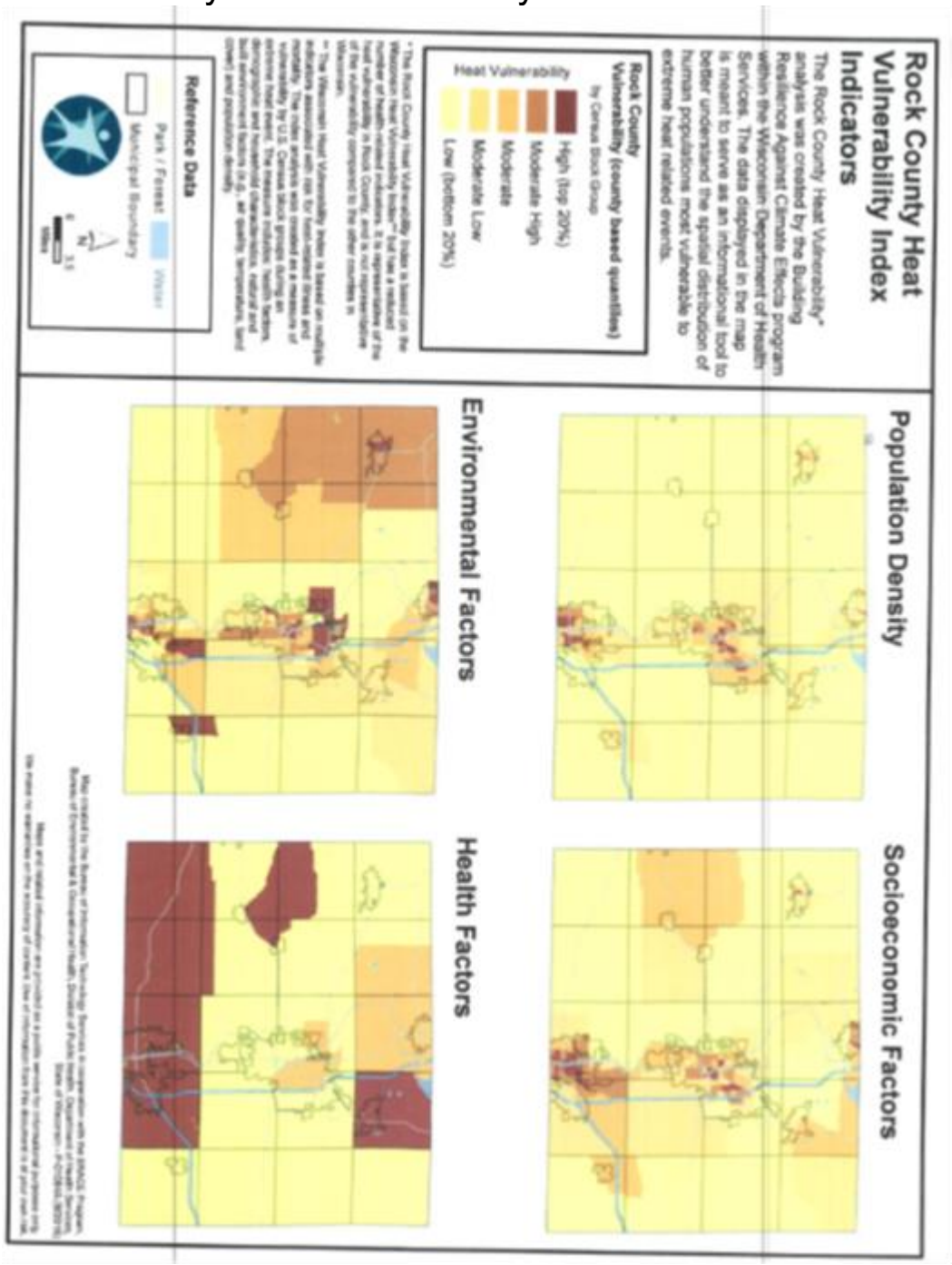
Rock County Heat Vulnerability Index[164]



[164] https://www.dhs.wisconsin.gov/publications/p01084-rock.pdf

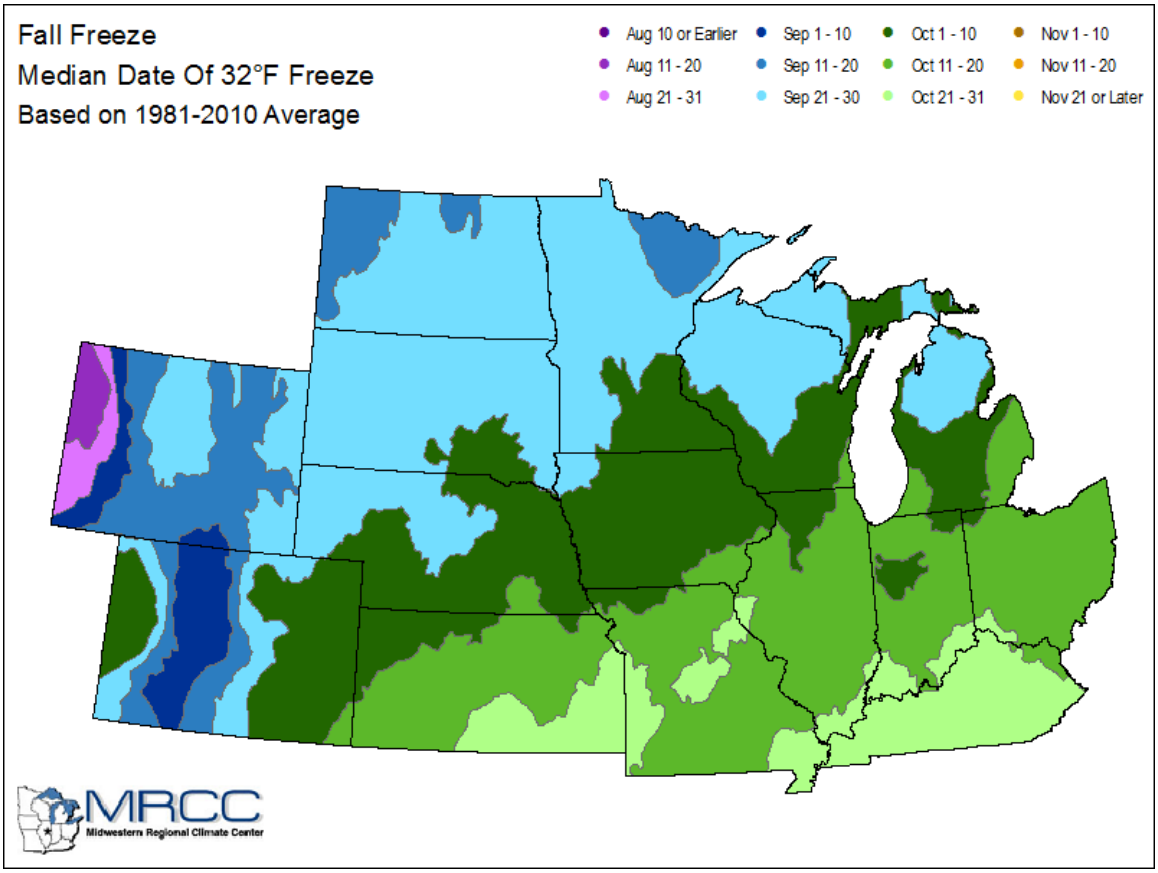
Appendix A: Maps

Rock County Heat Vulnerability Index Indicators[165]



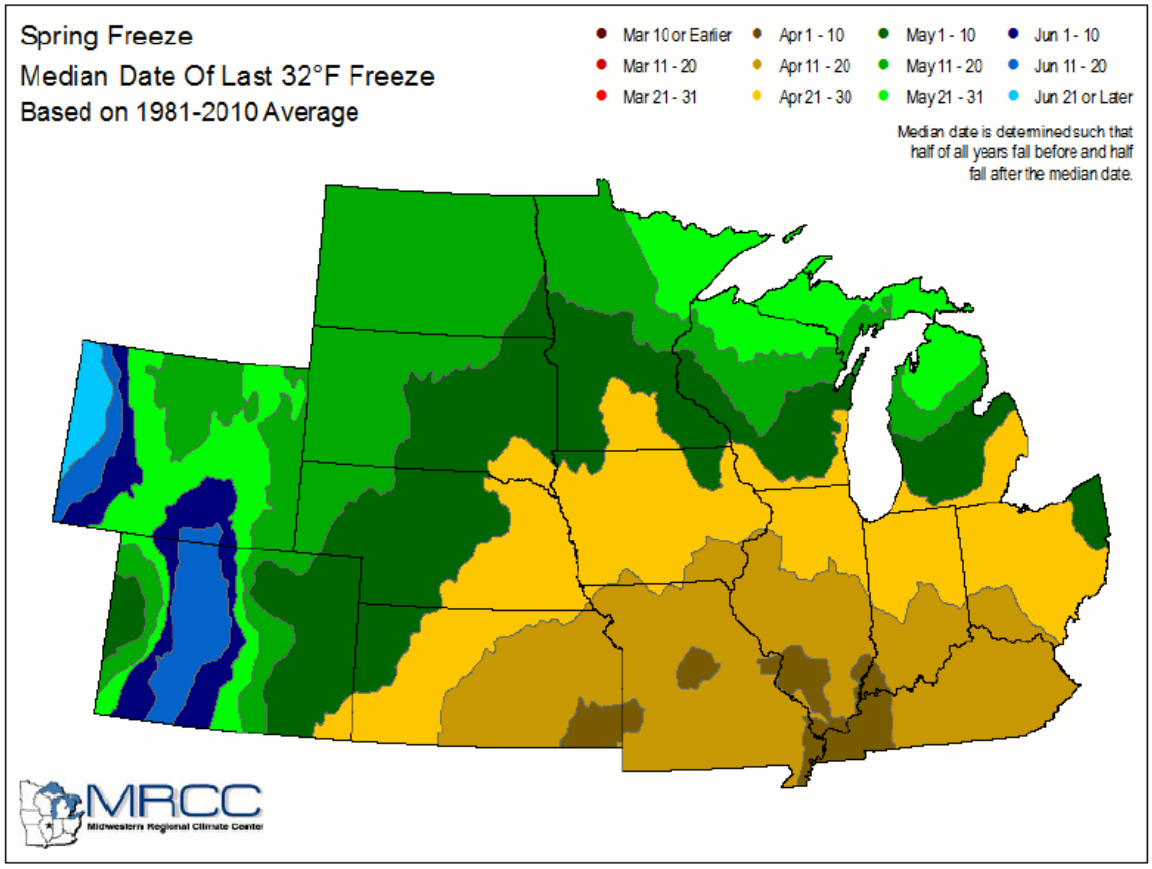
[165] https://www.dhs.wisconsin.gov/publications/p01084a-rock.pdf

Median Date of First Freeze[166]



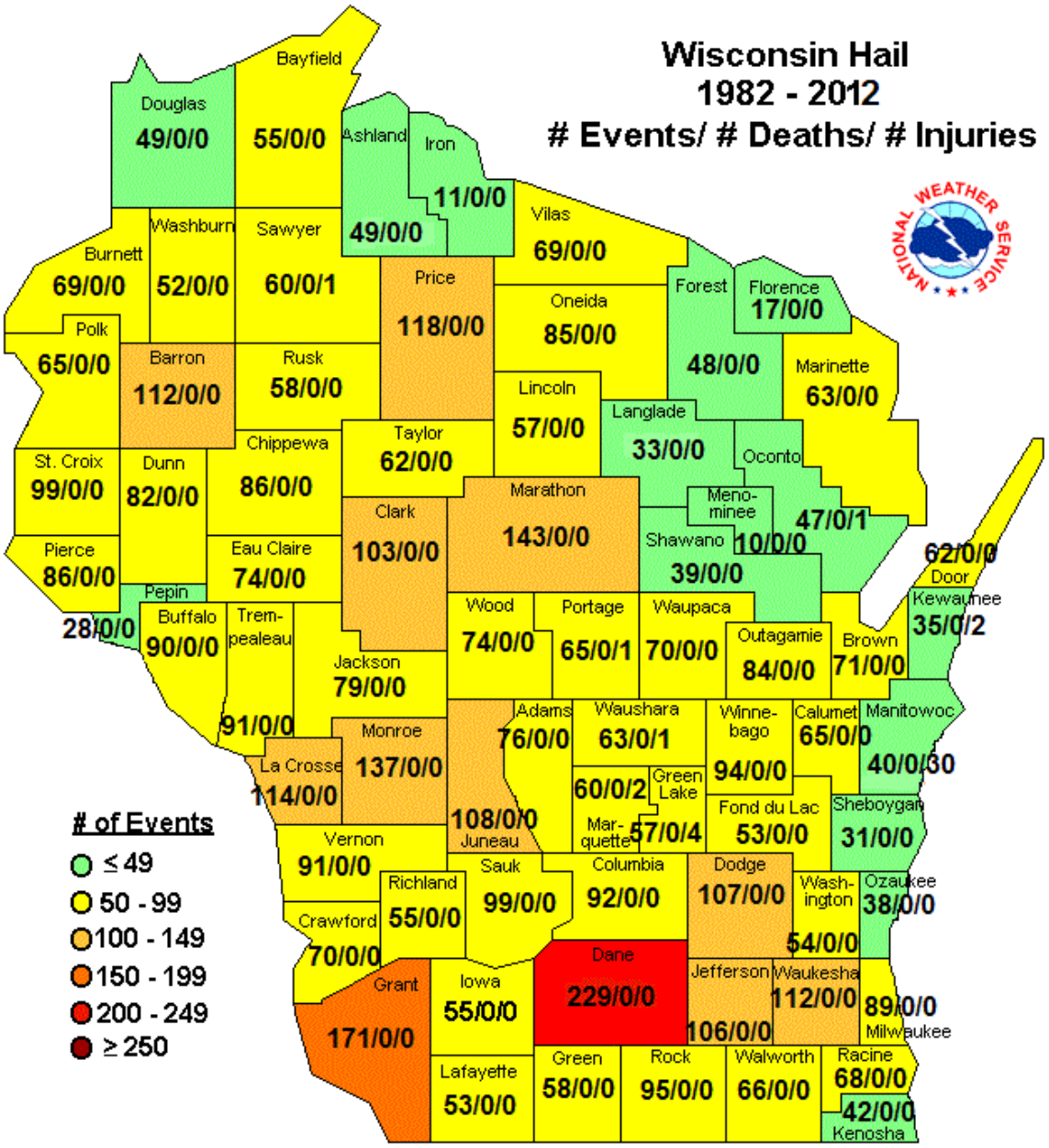
[166] http://www.crh.noaa.gov/images/mkx/climate/FallFirstFreeze.png

Median Date of Last Freeze[167]



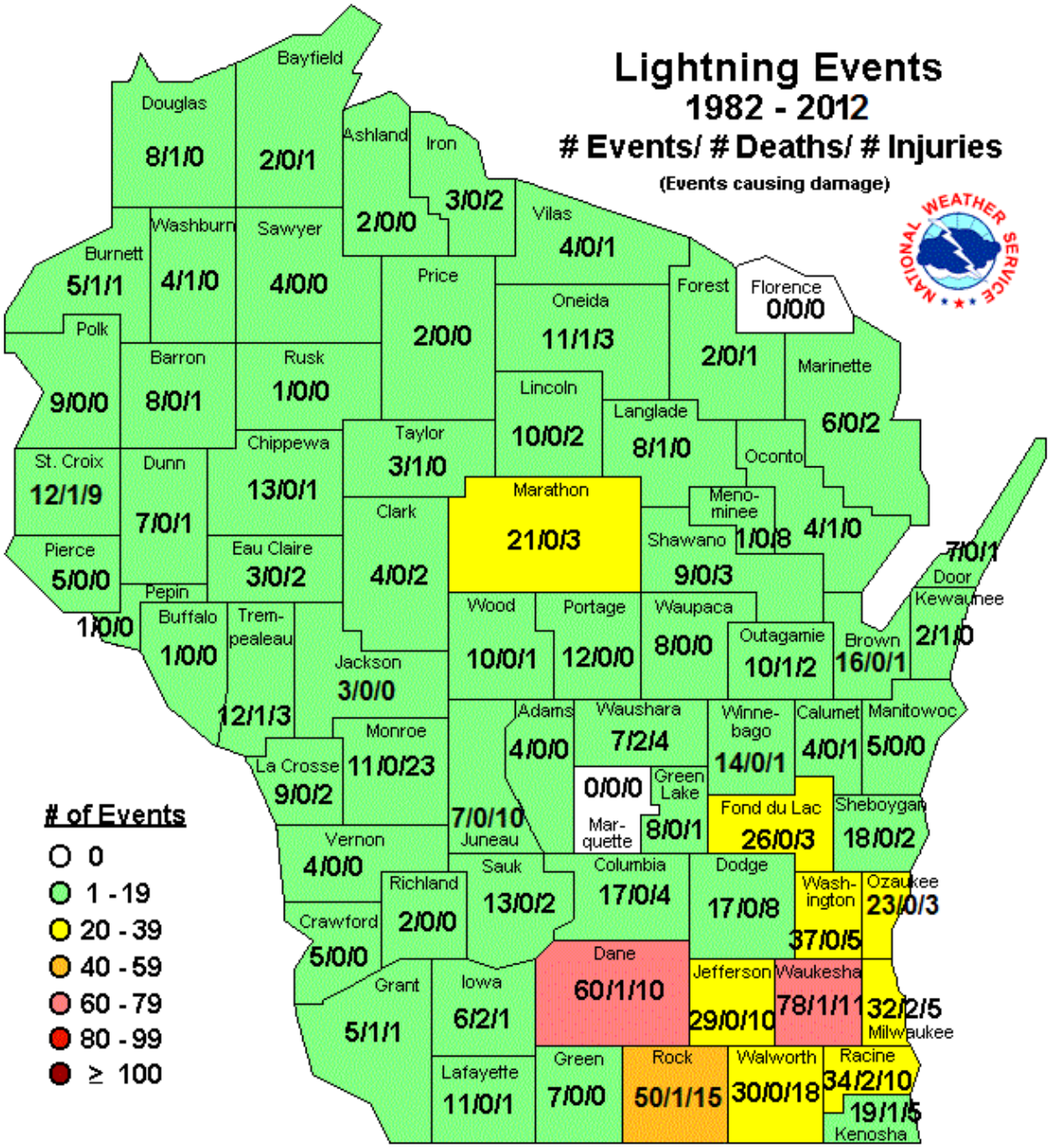
[167] http://www.crh.noaa.gov/images/mkx/climate/springlastfreeze.png

Wisconsin Hail [168]



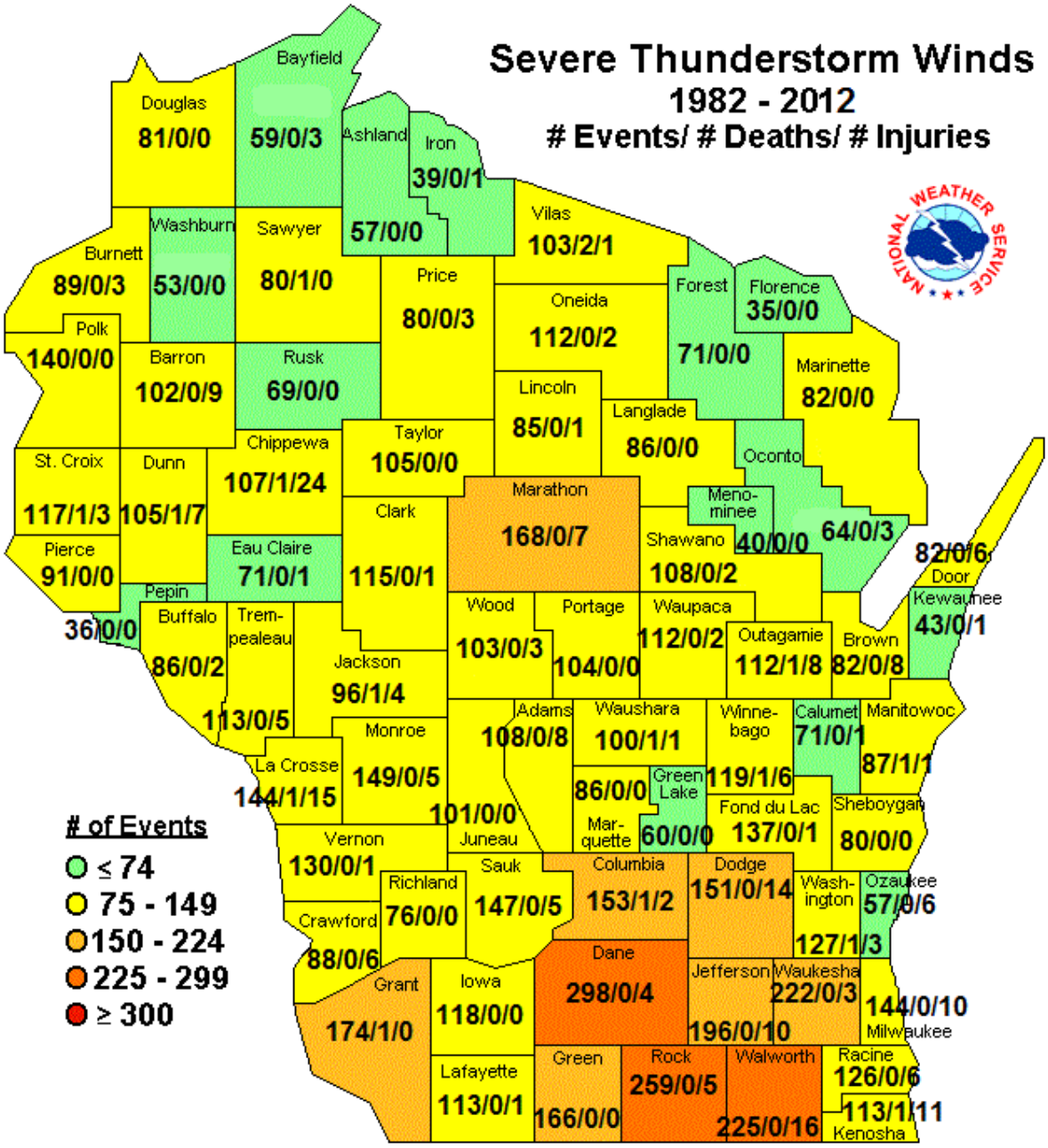
[168] http://www.crh.noaa.gov/images/mkx/severe/hail.gif

Wisconsin Lightning [169]



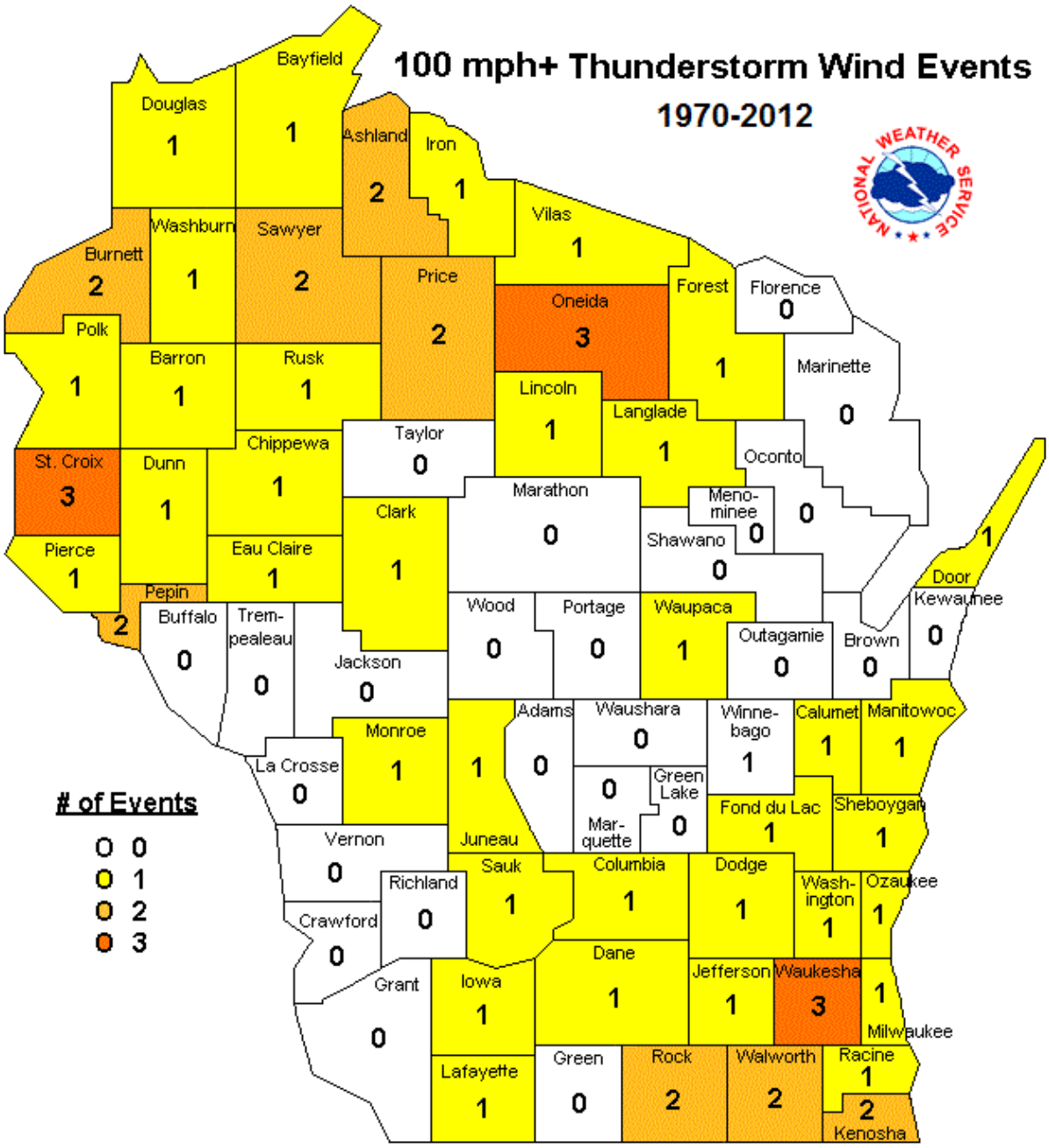
[169] http://www.crh.noaa.gov/images/mkx/severe/lightning.gif

Wisconsin Severe Thunderstorm Winds [170]



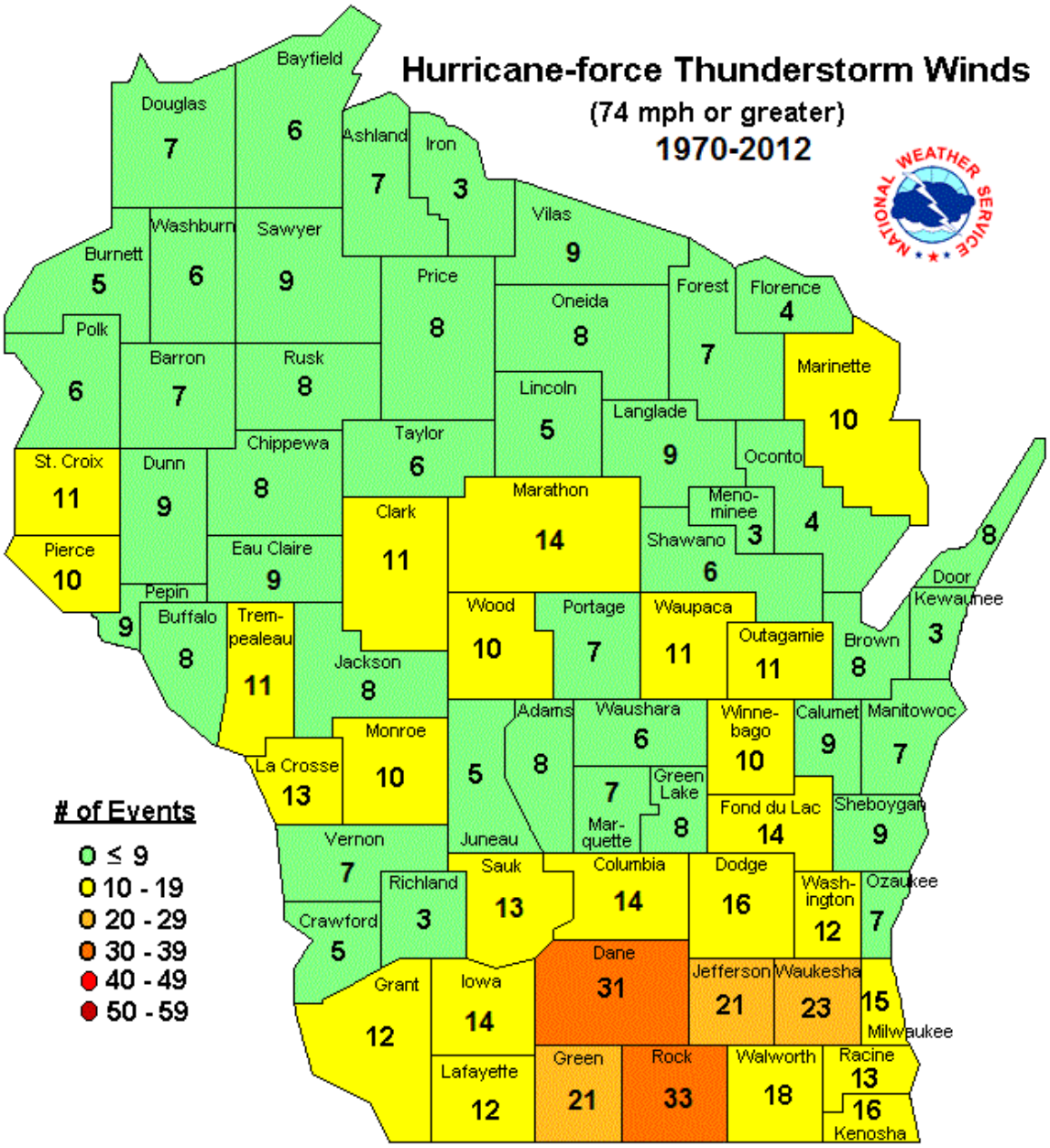
[170] http://www.crh.noaa.gov/images/mkx/severe/tstormwind.gif

Wisconsin 100+ mph Thunderstorm Wind Events[171]



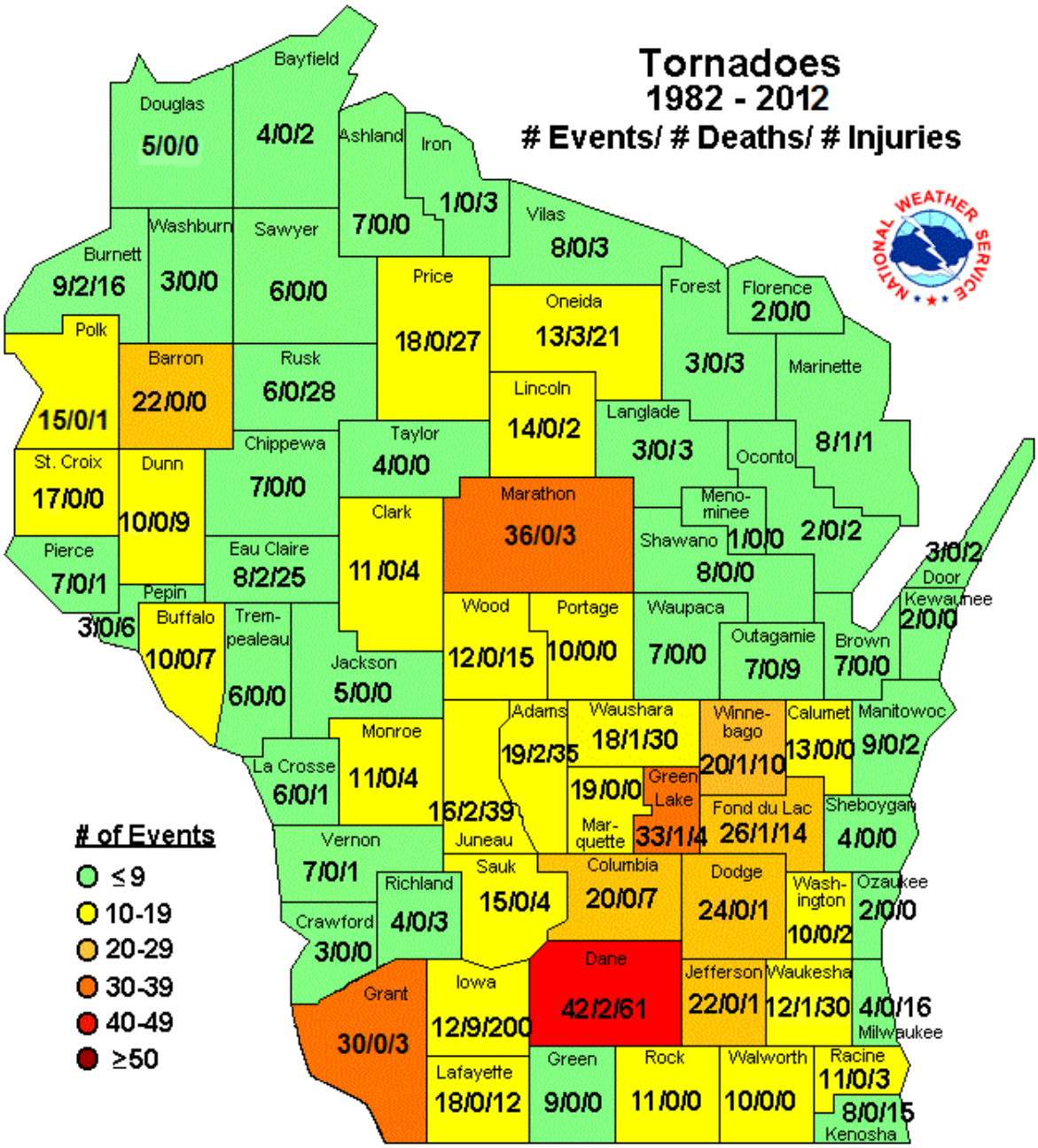
[171] http://www.crh.noaa.gov/images/mkx/severe/hurricwinds100mph.gif

Wisconsin Hurricane-force (74+ mph) Thunderstorm Winds[172]



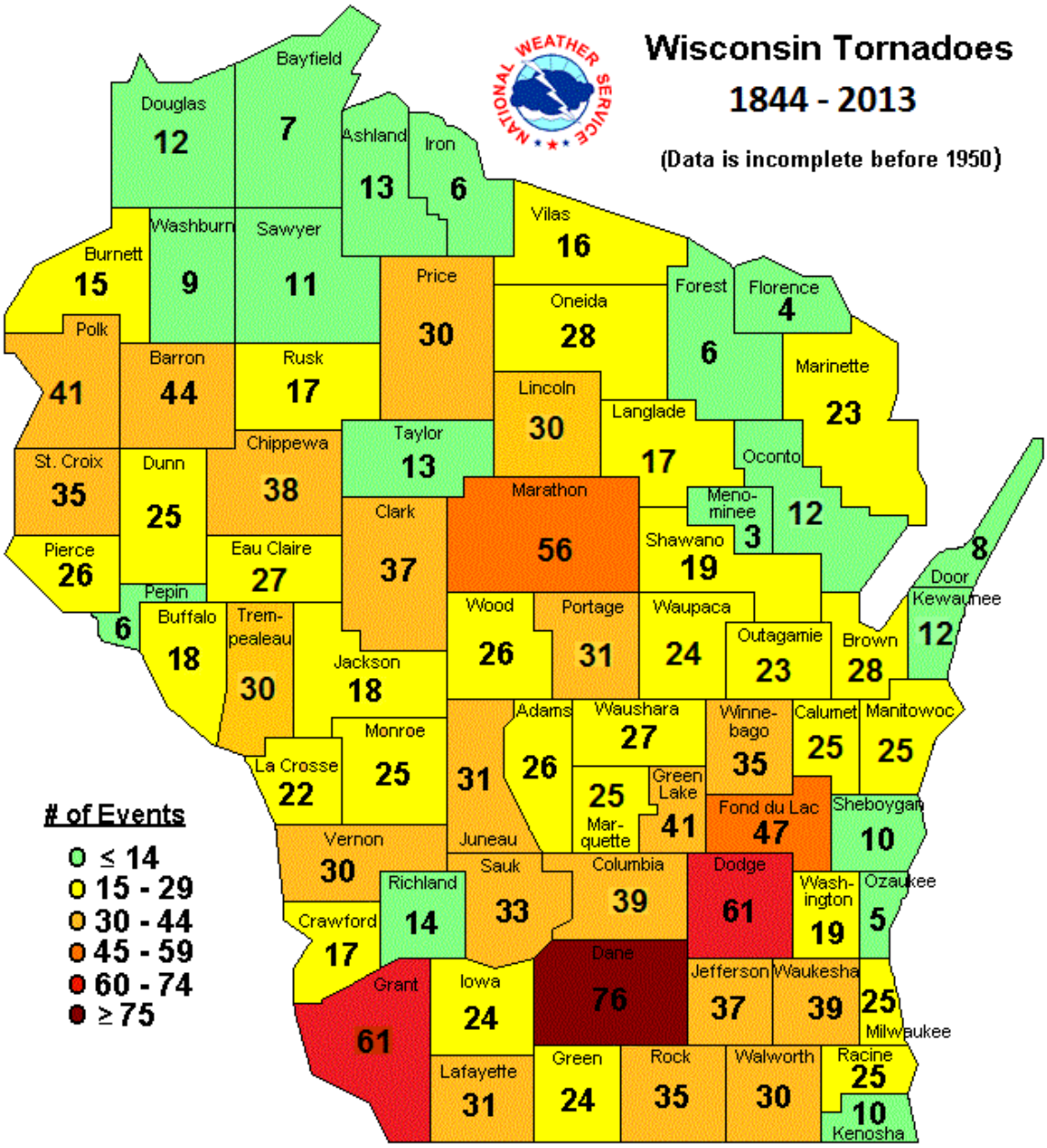
[172] http://www.crh.noaa.gov/images/mkx/severe/hurricwinds75mph.gif

Wisconsin Tornadoes [173]



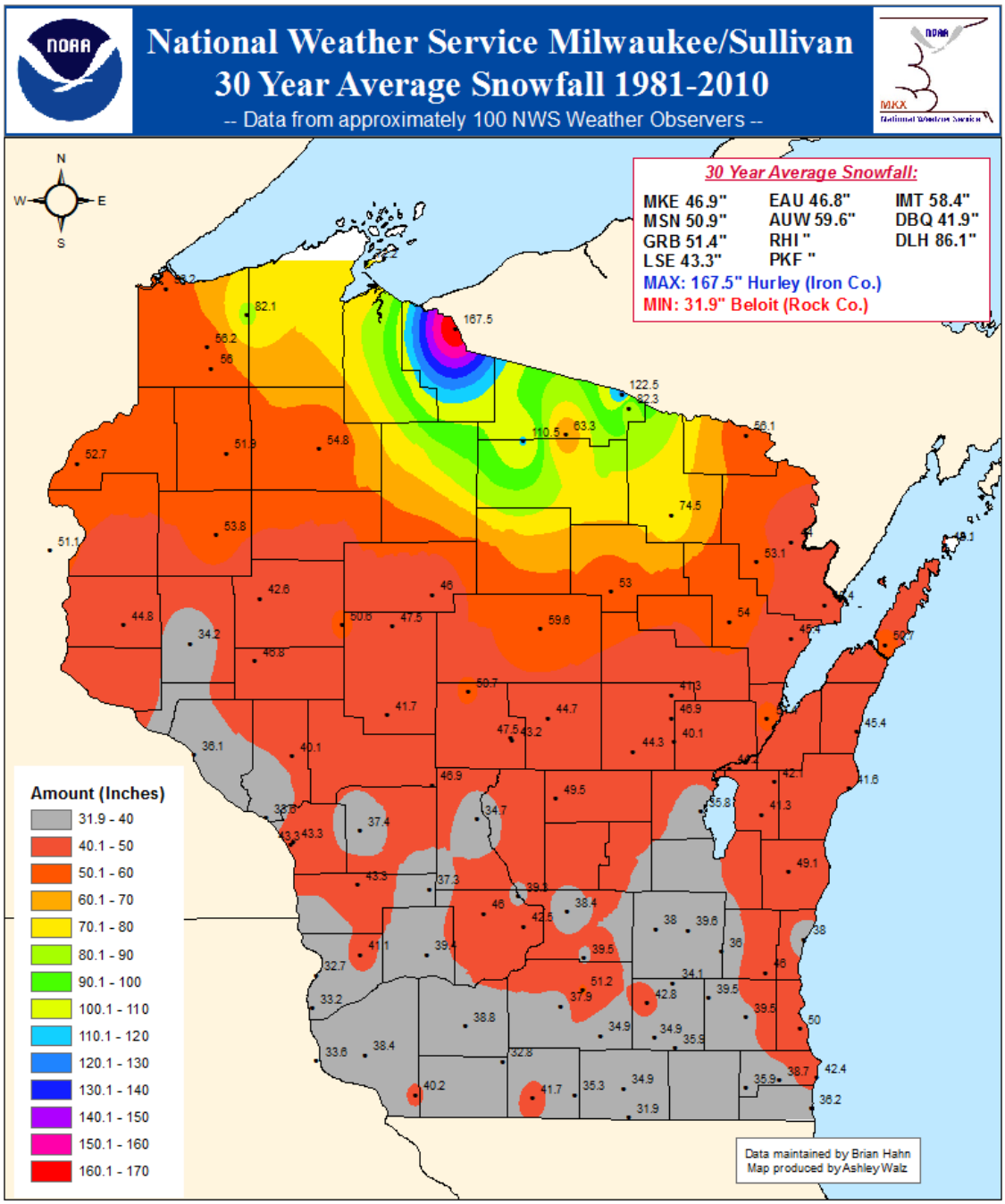
[173] http://www.crh.noaa.gov/images/mkx/severe/tor-event-death-injury.gif

Wisconsin Tornadoes (1844-2013) [174]



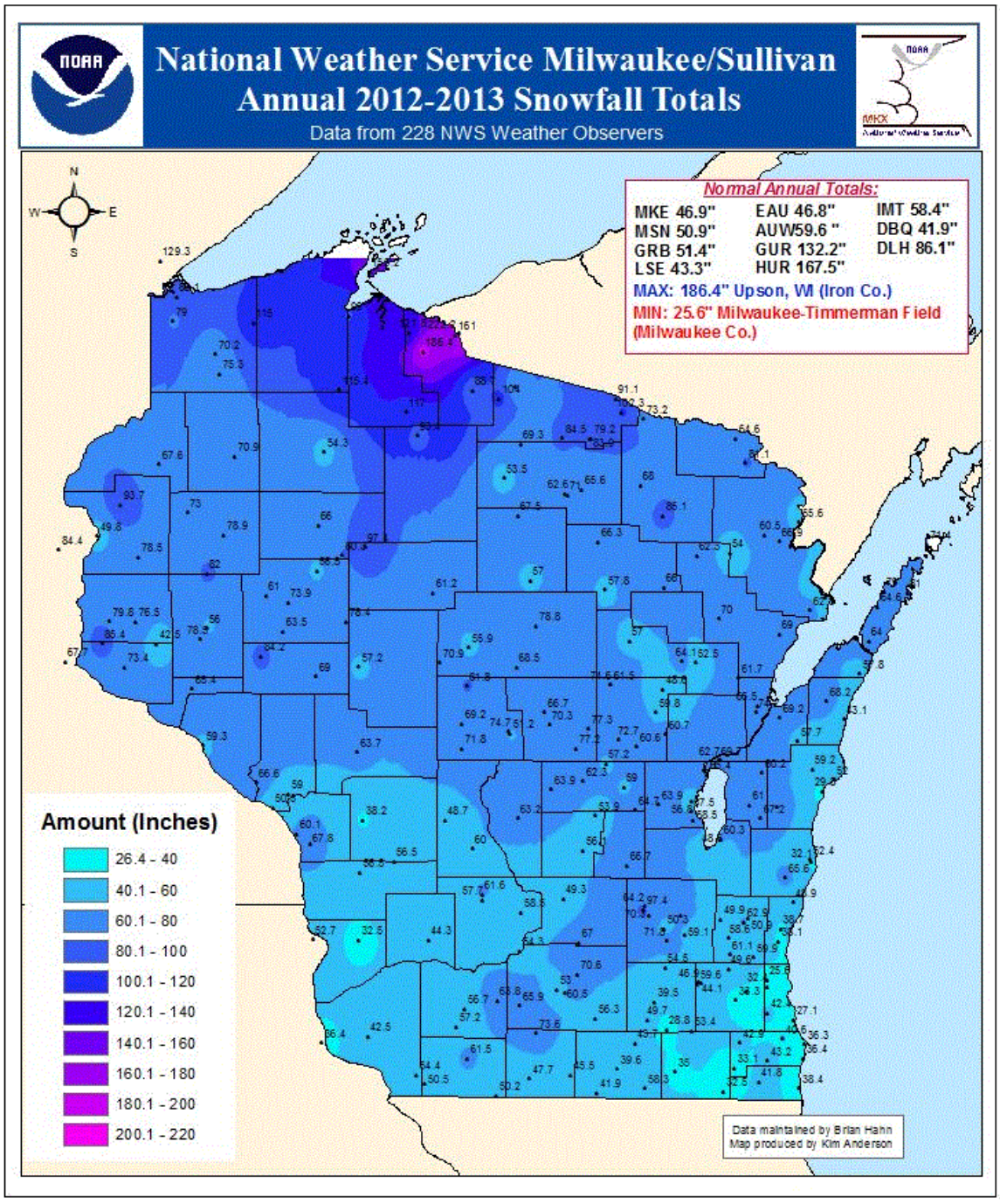
[174] http://www.crh.noaa.gov/images/mkx/severe/WiCoTorPlot.gif

Wisconsin 30-Year Average Snowfall [175]



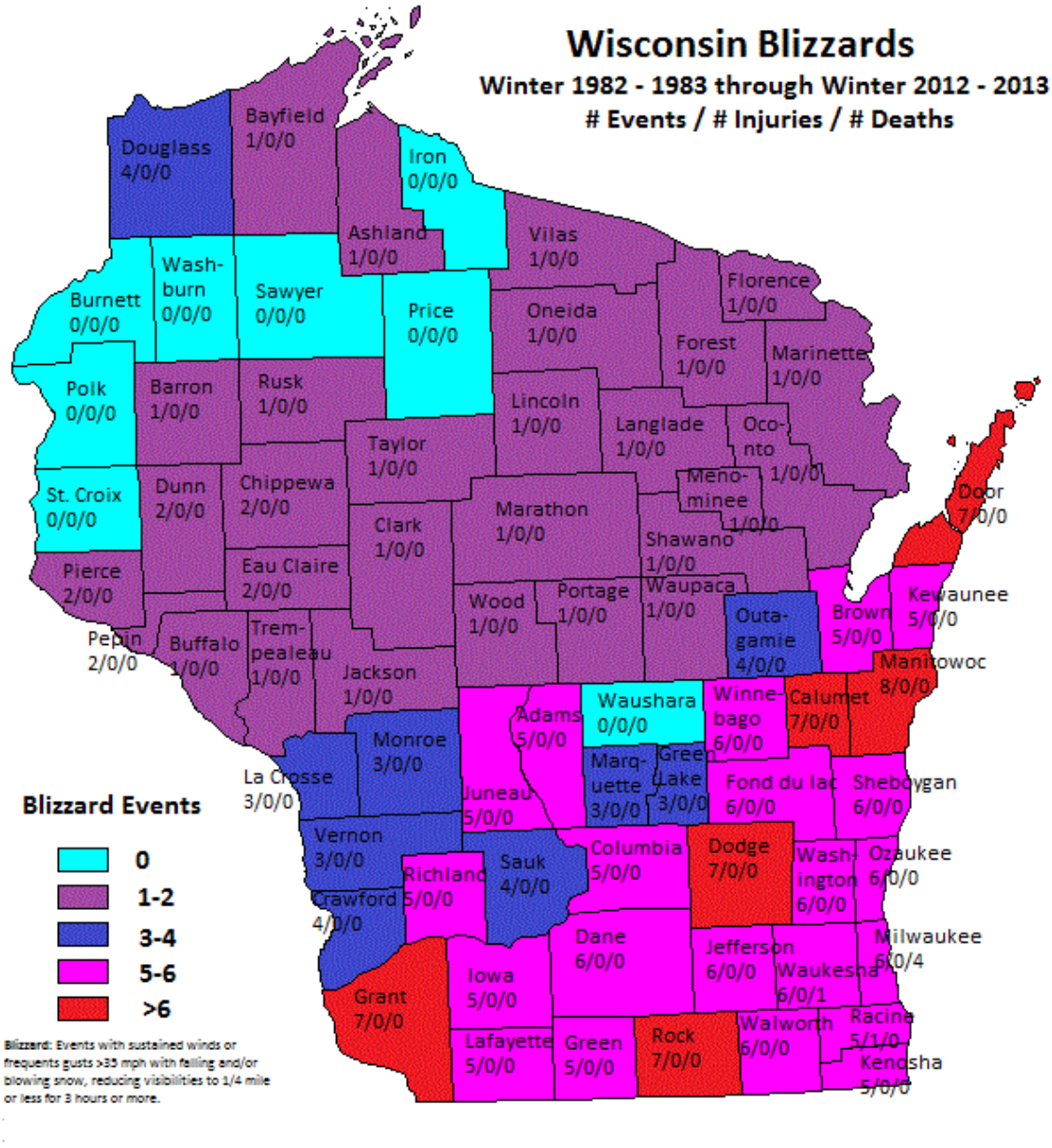
[175] http://www.crh.noaa.gov/images/mkx/climate/avg_30_year_snowfall.png

Wisconsin Annual 2012-2013 Snowfall[176]



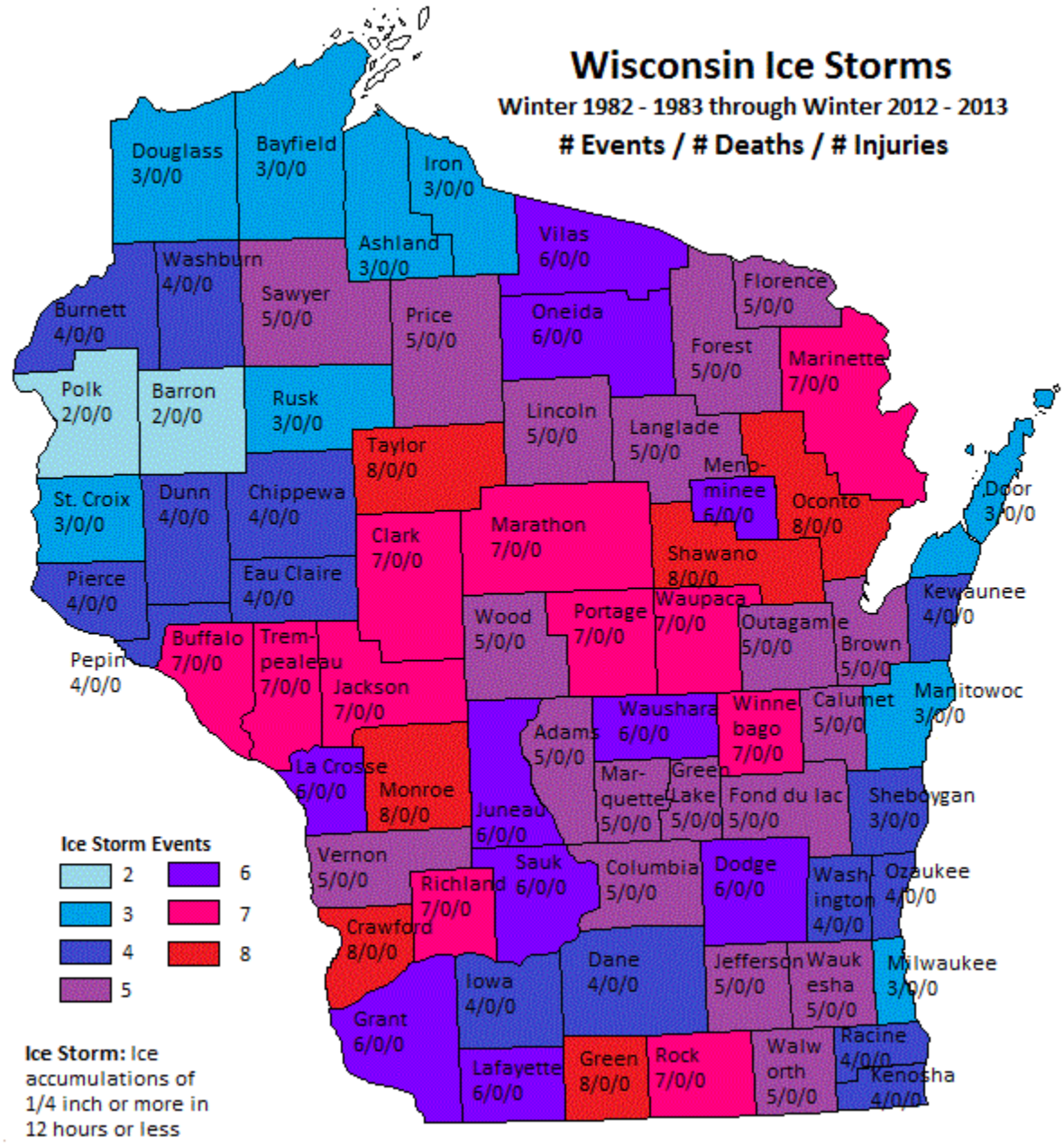
[176] http://www.crh.noaa.gov/images/mkx/pcpn/2013/1213snow.gif

Wisconsin Blizzards (1982-2013)[177]



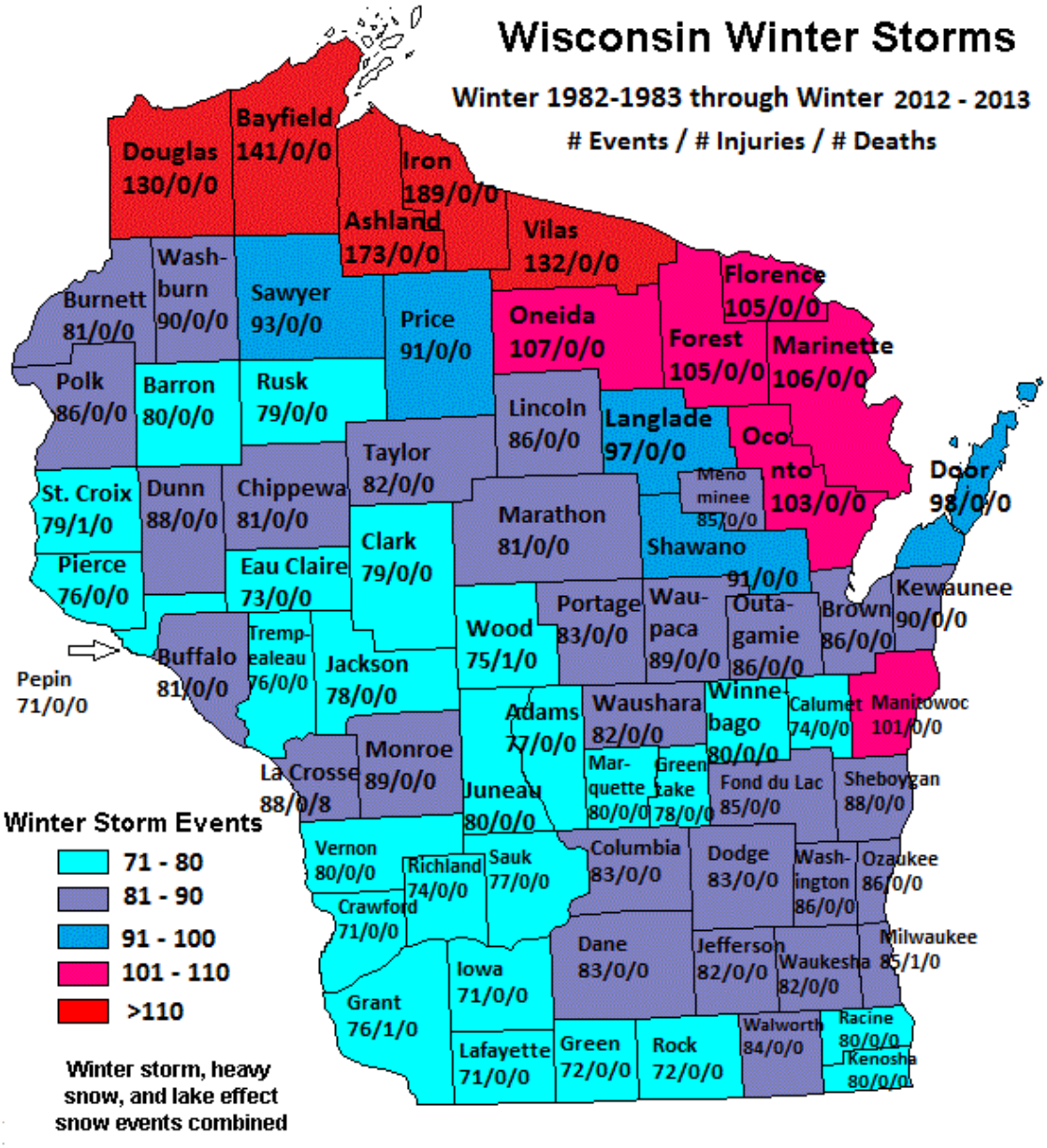
[177] http://www.crh.noaa.gov/images/mkx/severe/blizzards.gif

Wisconsin Ice Storms (1982-2013)[178]



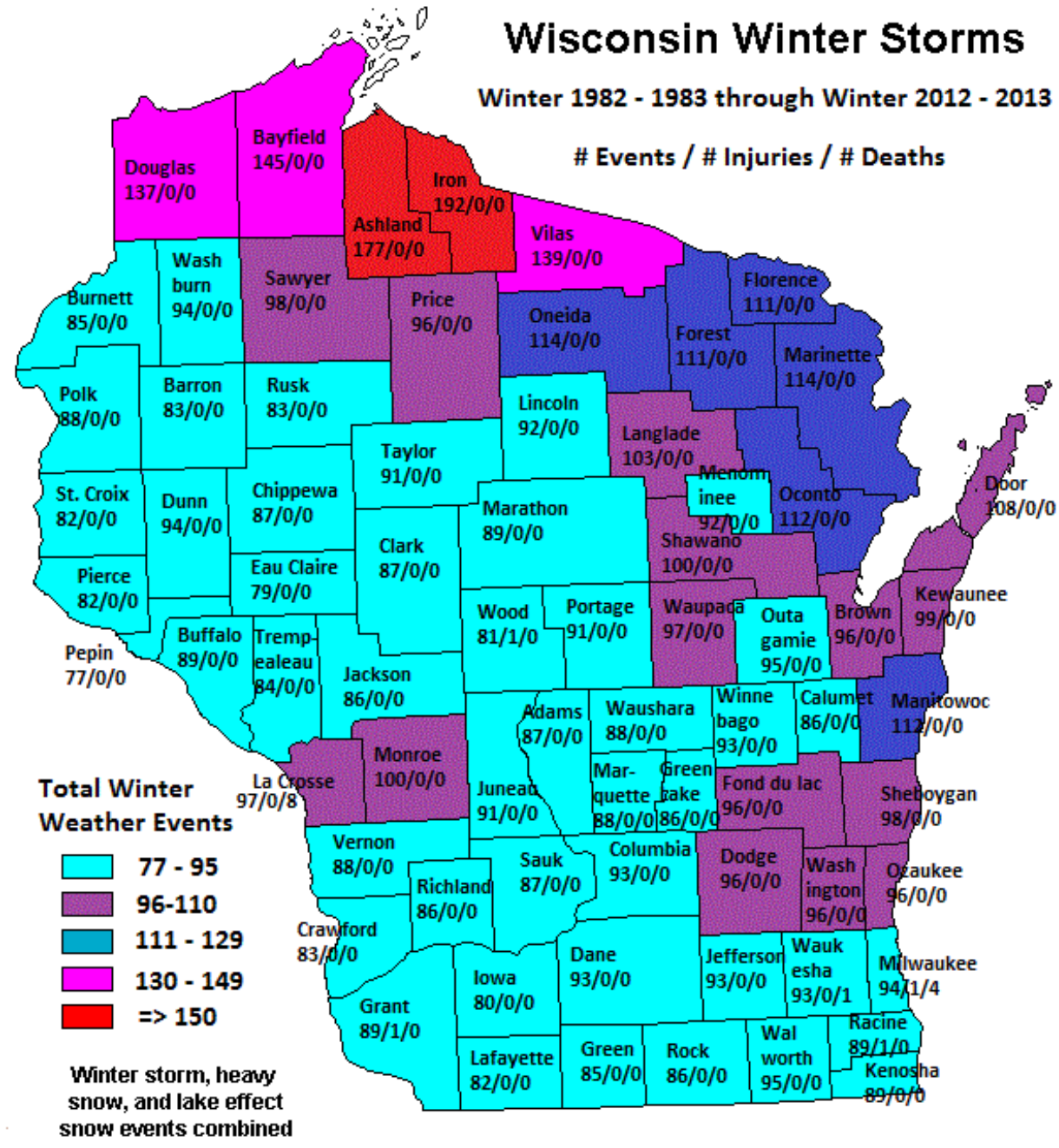
[178] http://www.crh.noaa.gov/images/mkx/severe/icestorms.gif

Wisconsin Winter Storm Events (1982-2013)[179]



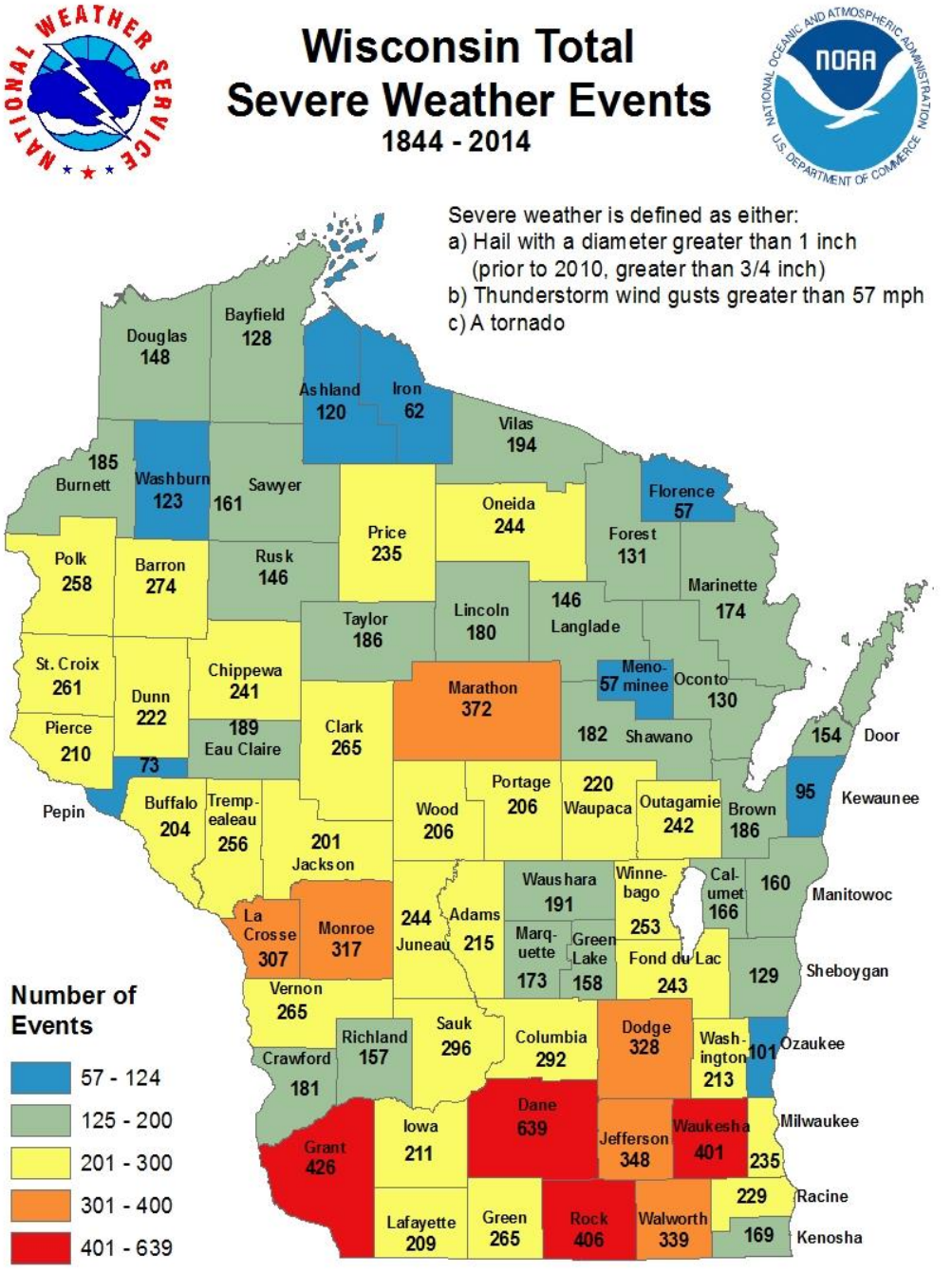
[179] http://www.crh.noaa.gov/images/mkx/severe/winterstorms.gif

Wisconsin Total Winter Weather Events (1982-2013)[180]



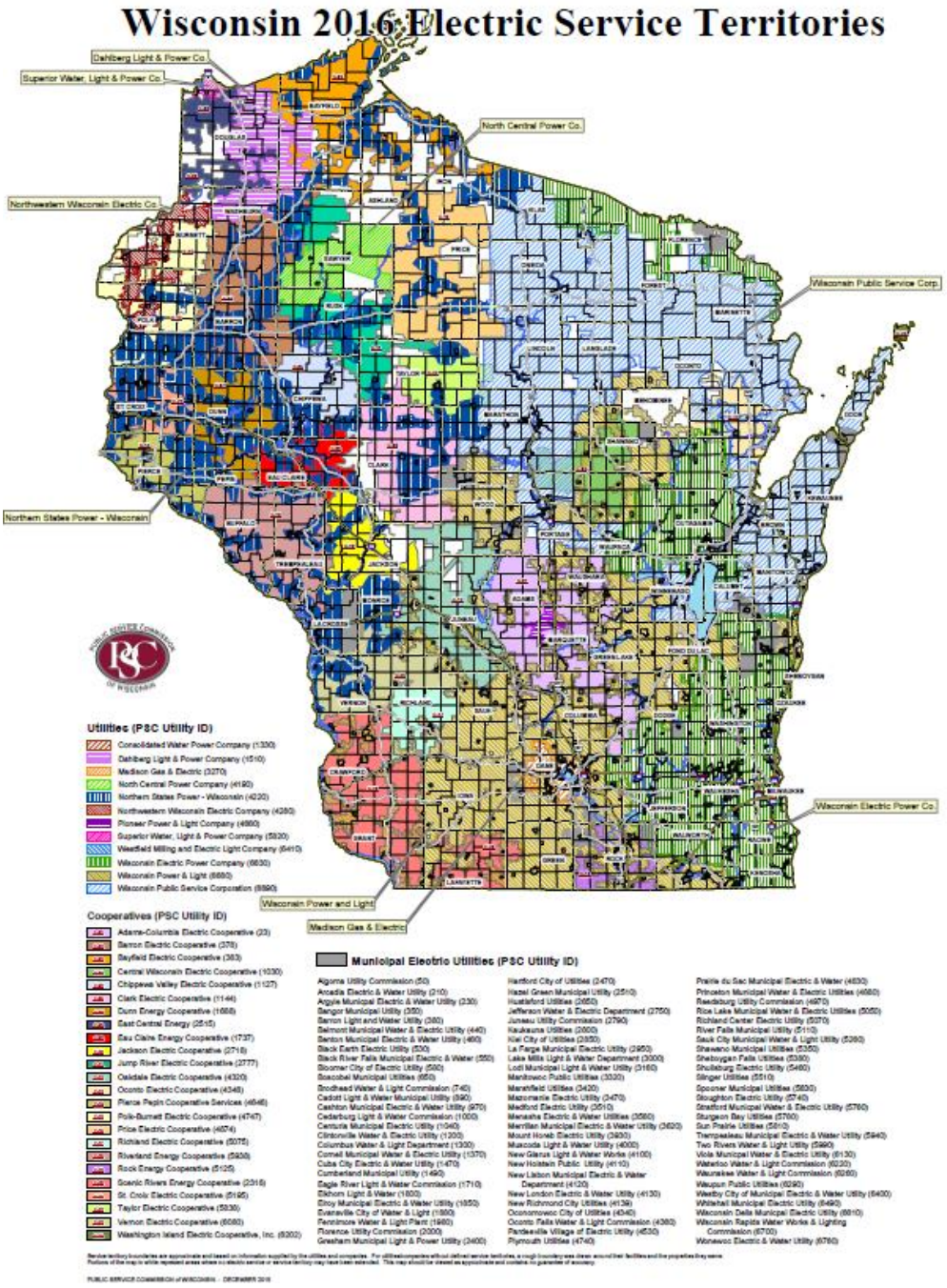
[180] http://www.crh.noaa.gov/images/mkx/severe/totalevents.gif

Wisconsin Total Severe Weather Events [181]



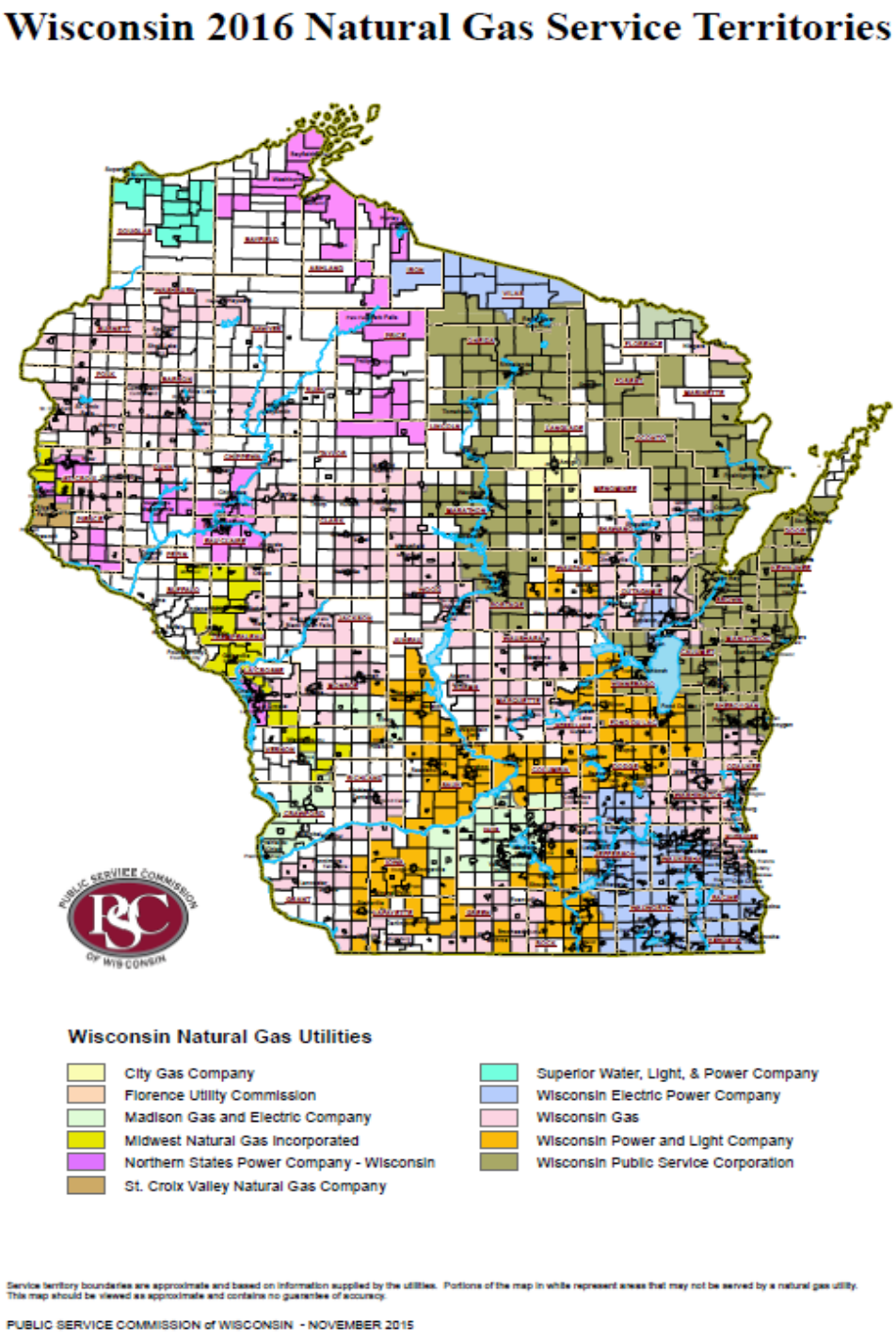
[181] http://www.ready.wi.gov/tornado/images/Sever-weather-statistics/TotalSevere.jpg

Wisconsin 2016 Electric Service Territories[182]



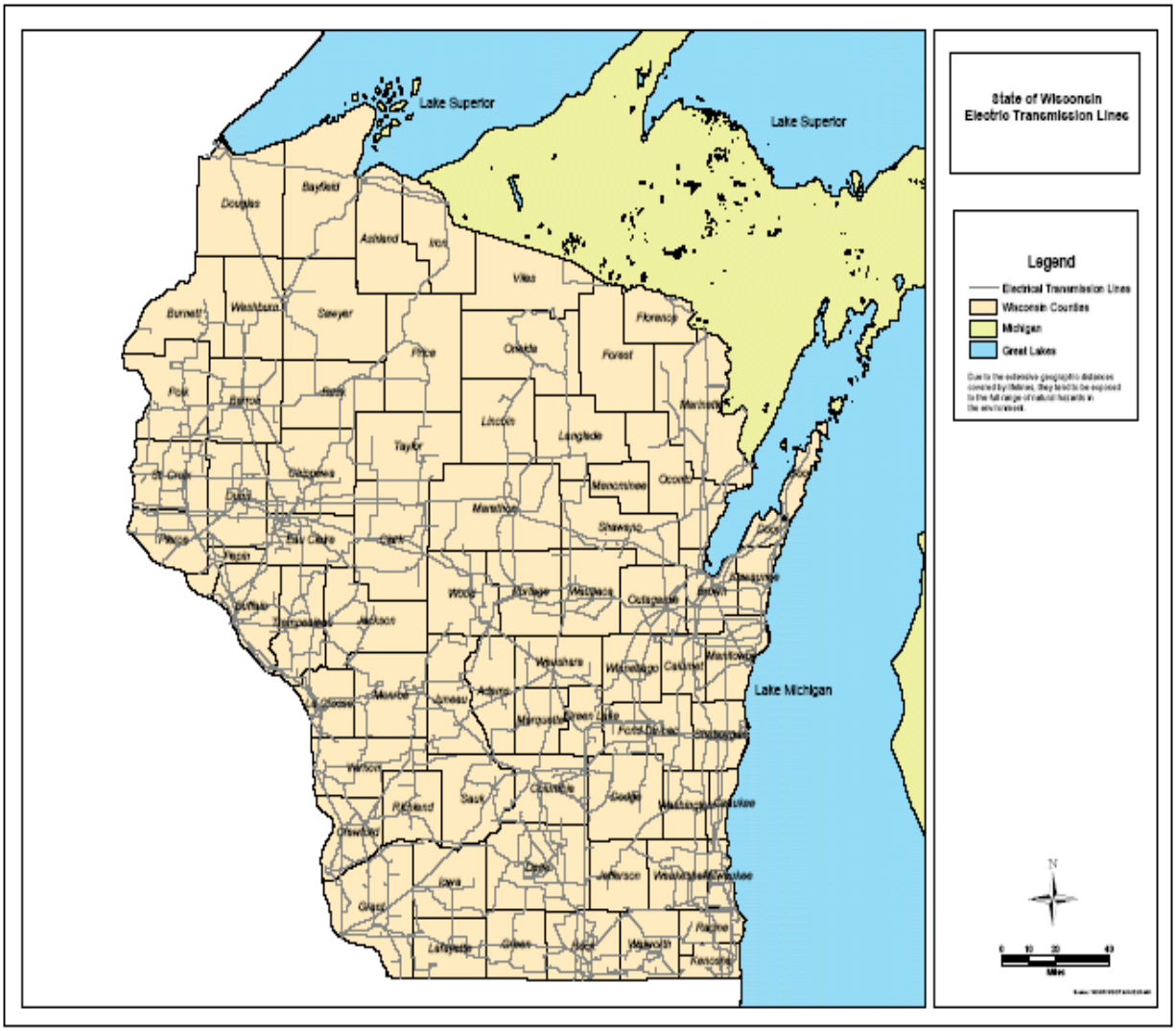
[182] http://www.psc.wi.gov/utilityinfo/maps/documents/largeElectricMap.pdf

Wisconsin 2016 Natural Gas Service Territories[183]



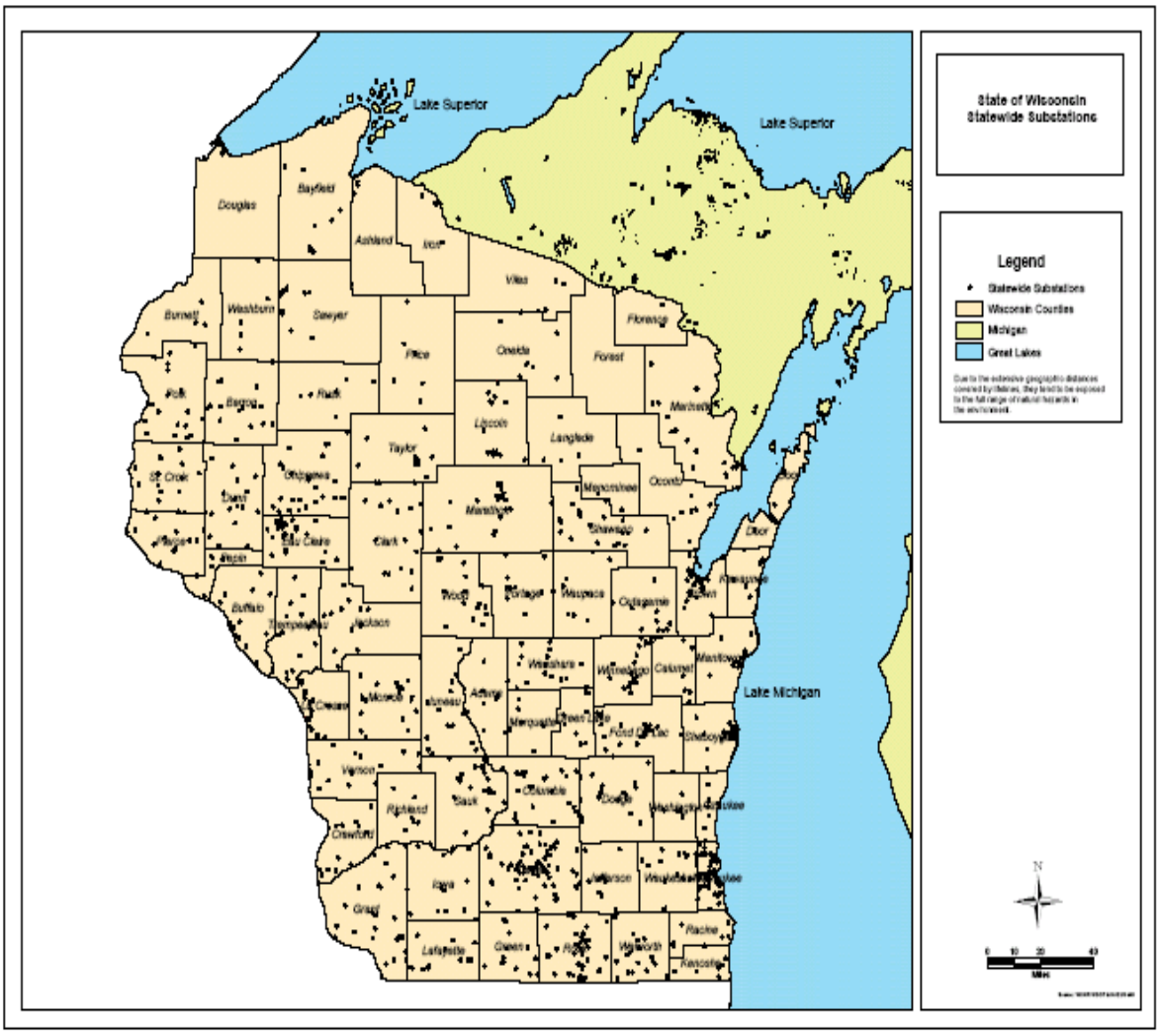
[183] https://psc.wi.gov/utilityInfo/maps/documents/medGasMap.pdf

Electric Transmission Lines [184]



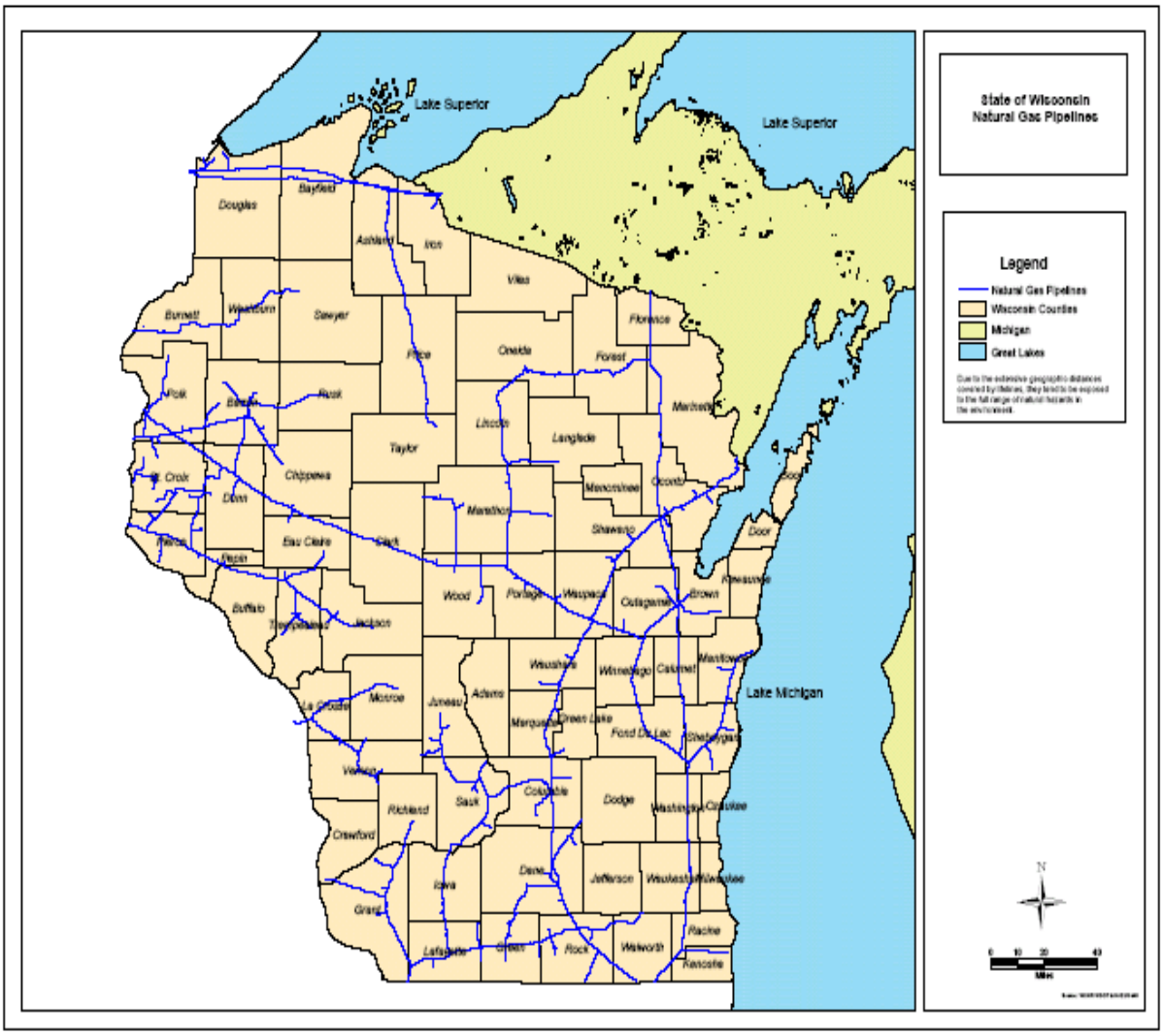
[184] State of Wisconsin Hazard Mitigation Plan

Electrical Substations [185]



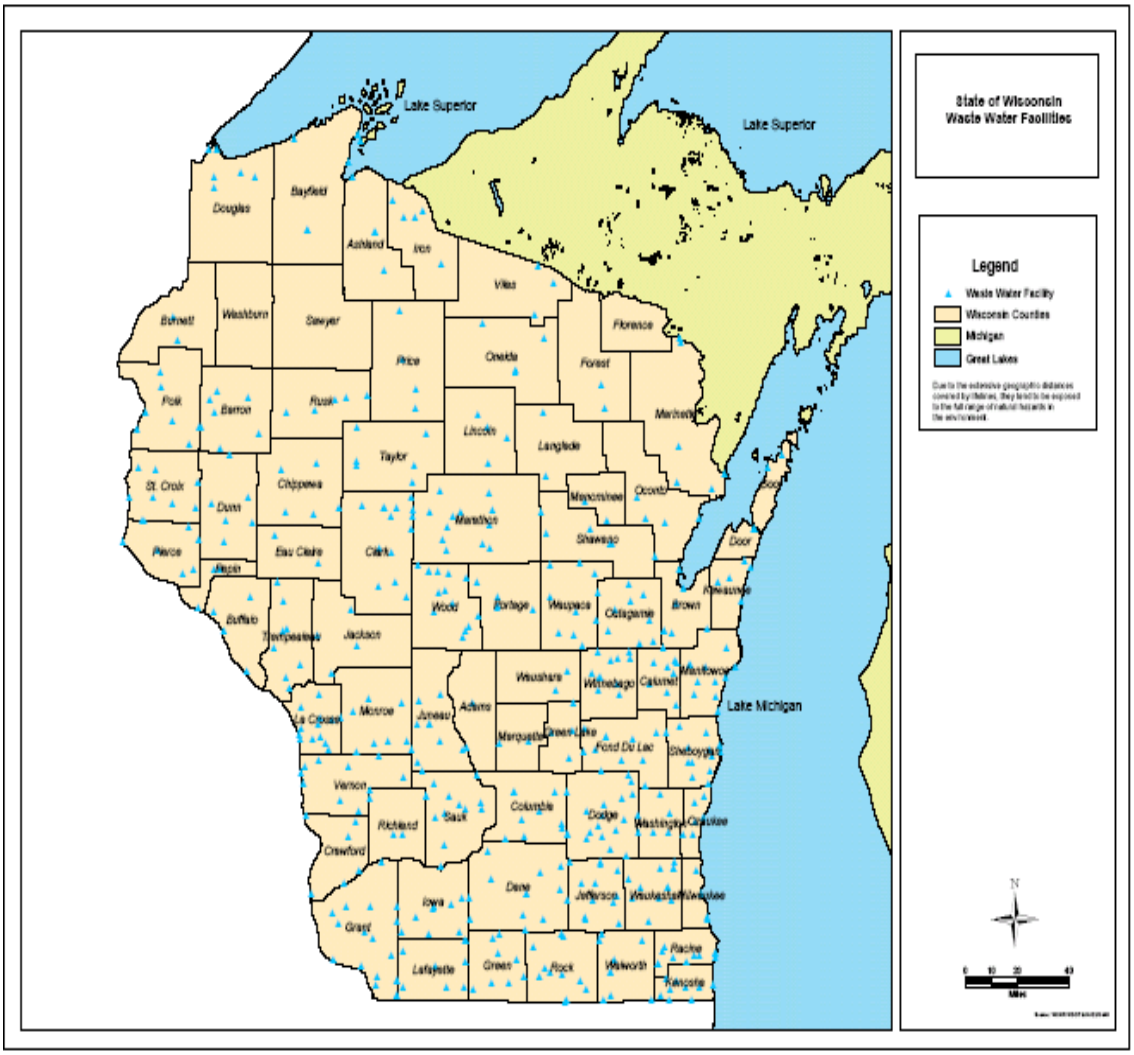
[185] State of Wisconsin Hazard Mitigation Plan

Natural Gas Pipelines [186]



[186] Wisconsin State Hazard Mitigation Plan

Wastewater Facilities [187]



[187] Wisconsin State Hazard Mitigation Plan

Appendix B: Frequency of Occurrence

The following tables detail Rock 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 31 May 2017.[188]

DROUGHT					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
ROCK COUNTY	8/1/2002	0	0	0	$500,000
ROCK COUNTY	8/1/2003	0	0	0	0
ROCK COUNTY	9/1/2003	0	0	0	0
ROCK COUNTY	10/1/2003	0	0	0	0
ROCK COUNTY	11/1/2003	0	0	0	0
ROCK COUNTY	12/1/2003	0	0	0	0
ROCK COUNTY	7/1/2005	0	0	0	0
ROCK COUNTY	8/1/2005	0	0	0	0
ROCK COUNTY	9/1/2005	0	0	0	0
ROCK COUNTY	10/1/2005	0	0	0	0
ROCK COUNTY	11/1/2005	0	0	0	0
ROCK COUNTY	6/26/2012	0	0	0	0
ROCK COUNTY	7/1/2012	0	0	0	0
ROCK COUNTY	8/1/2012	0	0	0	0
ROCK COUNTY	9/1/2012	0	0	0	0
ROCK COUNTY	10/1/2012	0	0	0	0
ROCK COUNTY	11/1/2012	0	0	0	0

DENSE FOG					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
ROCK COUNTY	11/13/1999	0	0	0	0
ROCK COUNTY	12/3/1999	0	0	0	0

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

DENSE FOG					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
ROCK COUNTY	12/12/1999	0	0	0	0
ROCK COUNTY	1/9/2000	0	0	0	0
ROCK COUNTY	2/25/2000	0	0	0	0
ROCK COUNTY	3/20/2000	0	0	0	0
ROCK COUNTY	8/23/2000	0	0	0	0
ROCK COUNTY	8/24/2000	0	0	0	0
ROCK COUNTY	10/23/2000	0	0	0	0
ROCK COUNTY	10/25/2000	0	0	0	0
ROCK COUNTY	1/12/2001	0	0	0	0
ROCK COUNTY	1/14/2001	0	0	0	0
ROCK COUNTY	2/24/2001	0	0	0	0
ROCK COUNTY	3/22/2001	0	0	0	0
ROCK COUNTY	4/7/2001	0	0	0	0
ROCK COUNTY	5/25/2001	0	0	0	0
ROCK COUNTY	7/30/2001	0	0	0	0
ROCK COUNTY	8/3/2001	0	0	0	0
ROCK COUNTY	8/22/2001	0	0	0	0
ROCK COUNTY	9/30/2001	0	0	0	0
ROCK COUNTY	10/22/2001	0	0	0	0
ROCK COUNTY	11/15/2001	0	0	0	0
ROCK COUNTY	12/2/2001	0	0	0	0
ROCK COUNTY	12/16/2001	0	0	0	0
ROCK COUNTY	2/20/2002	0	0	0	0
ROCK COUNTY	4/13/2002	0	0	0	0
ROCK COUNTY	9/6/2002	0	0	0	0
ROCK COUNTY	3/20/2003	0	0	0	0
ROCK COUNTY	3/23/2003	0	0	0	0
ROCK COUNTY	2/26/2004	0	0	0	0
ROCK COUNTY	10/12/2004	0	0	0	0
ROCK COUNTY	12/9/2004	0	0	0	0
ROCK COUNTY	1/12/2005	0	0	0	0
ROCK COUNTY	12/27/2005	0	0	0	0
ROCK COUNTY	3/6/2006	0	0	0	0
ROCK COUNTY	3/9/2006	0	0	0	0
ROCK COUNTY	3/29/2006	0	0	0	0
ROCK COUNTY	5/9/2006	0	0	0	0

DENSE FOG					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
ROCK COUNTY	9/14/2006	0	0	0	0
ROCK COUNTY	9/23/2006	0	0	0	0
ROCK COUNTY	12/11/2006	0	0	0	0
ROCK COUNTY	12/21/2006	0	0	0	0
ROCK COUNTY	3/9/2007	0	0	0	0
ROCK COUNTY	3/23/2007	0	0	0	0
ROCK COUNTY	6/1/2007	0	0	0	0
ROCK COUNTY	12/19/2007	0	0	0	0
ROCK COUNTY	12/21/2007	0	0	0	0
ROCK COUNTY	1/5/2008	0	0	0	0
ROCK COUNTY	1/7/2008	0	0	0	0
ROCK COUNTY	2/4/2008	0	0	0	0
ROCK COUNTY	12/26/2008	0	0	0	0
ROCK COUNTY	9/10/2009	0	0	0	0
ROCK COUNTY	9/12/2009	0	0	0	0
ROCK COUNTY	3/7/2010	0	0	0	0
ROCK COUNTY	3/10/2010	0	0	0	0
ROCK COUNTY	5/21/2010	0	0	0	0
ROCK COUNTY	8/1/2010	0	0	0	0
ROCK COUNTY	12/30/2010	0	0	0	0
ROCK COUNTY	1/23/2012	0	0	0	0
ROCK COUNTY	1/26/2012	0	0	0	0
ROCK COUNTY	2/1/2012	0	0	0	0
ROCK COUNTY	2/15/2012	0	0	0	0
ROCK COUNTY	8/26/2012	0	0	0	0
ROCK COUNTY	10/3/2012	0	0	0	0
ROCK COUNTY	10/23/2012	0	0	0	0
ROCK COUNTY	11/16/2012	0	0	0	0
ROCK COUNTY	11/20/2012	0	0	0	0
ROCK COUNTY	12/1/2012	0	0	0	0
ROCK COUNTY	12/2/2012	0	0	0	0
ROCK COUNTY	1/11/2013	0	0	0	0
ROCK COUNTY	12/3/2013	0	0	0	0

FLOOD					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
ROCK COUNTY	6/18/1996	0	0	$1M	$17.5M
ROCK COUNTY	2/20/1997	0	0	0	$5,000
JANESVILLE	7/20/1998	0	0	0	0
BELOIT	8/5/1998	0	0	0	0
EVANSVILLE	5/16/1999	0	0	0	0
JANESVILLE	6/28/1999	0	0	0	0
BELOIT	7/20/1999	0	0	0	0
JANESVILLE	7/10/2000	0	0	0	0
JANESVILLE	8/5/2000	0	0	0	0
ROCK COUNTY	2/9/2001	0	0	$10,000	0
COUNTYWIDE	8/2/2001	0	0	0	0
MILTON	8/18/2001	0	0	0	0
BELOIT	9/7/2001	0	0	0	0
EDGERTON	8/21/2002	0	0	0	0
NEWARK	8/21/2002	0	0	0	0
ROCK COUNTY	5/24/2004	0	0	$300,000	$500,000
ROCK COUNTY	6/1/2004	0	0	$1M	$2M
ROCK COUNTY	7/1/2004	0	0	$200,000	0
ROCK COUNTY	2/15/2005	0	0	$5,000	0
PRAIRIE AIRPORT	3/11/2013	0	0	$5,000	$1,000
AFTON	4/8/2013	0	0	$10,000	$3,000
CHARLIE BLUFF	4/10/2013	0	0	$8,000	$2,000
MALLWOOD	4/11/2013	0	0	$5,000	$2,000
PRAIRIE AIRPORT	4/18/2013	0	0	$3,000	$1,000
AVALON	6/25/2013	0	0	$5,000	$3,000
PRAIRIE AIRPORT	6/25/2013	0	0	$5,000	$3,000
COOKSVILLE	6/26/2013	0	0	$8,000	$3,000

FLASH FLOOD					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
BELOIT	6/7/1996	0	0	$40,000	0
COOKSVILLE	6/17/1996	0	0	$150,000	$2M
JANESVILLE	8/5/1998	0	0	$550,000	0
JANESVILLE	8/5/1998	0	1	$1.5M	$150,000

CLINTON	8/5/1998	0	2	$250,000	0
COUNTYWIDE	6/1/2000	0	0	$300,000	$4M
BELOIT	3/13/2006	0	0	$20,000	0
BELOIT	6/18/2007	0	0	$30,000	0
EVANSVILLE	8/22/2007	0	0	$500,000	$500,000
ORFORDVILLE	6/12/2008	0	0	$462,160	$300,000
DOWNTOWN JANESVILLE	7/12/2008	0	0	$30,000	0
DOWNTOWN JANESVILLE	8/9/2009	0	0	$30,000	0
EDGERTON	6/26/2013	0	0	$2,000	$1,000
(JVL) ROCK CO ARPT JA	6/26/2013	0	0	$2,000	$1,000
BELOIT	5/27/2014	0	0	$1,000	0
LEYDEN	7/21/2016	0	0	$5,000	0

EXCESSIVE HEAT					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
ROCK COUNTY	2/23/2000	0	0	0	0
ROCK COUNTY	7/17/2011	0	0	0	0
ROCK COUNTY	7/2/2012	0	0	0	0

HEAT					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
ROCK COUNTY	1/2/1998	0	0	0	0
ROCK COUNTY	9/27/1998	0	0	0	0
ROCK COUNTY	11/28/1998	0	0	0	0
ROCK COUNTY	12/1/1998	0	0	0	0
ROCK COUNTY	2/11/1999	0	0	0	0
ROCK COUNTY	7/4/1999	0	0	0	0
ROCK COUNTY	7/23/1999	0	0	0	0
ROCK COUNTY	7/29/1999	0	0	0	0
ROCK COUNTY	11/8/1999	0	0	0	0
ROCK COUNTY	11/13/1999	0	0	0	0
ROCK COUNTY	7/21/2001	0	0	0	0

HEAT					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
ROCK COUNTY	7/31/2001	0	0	0	0
ROCK COUNTY	8/6/2001	0	0	0	0
ROCK COUNTY	4/15/2002	0	0	0	0
ROCK COUNTY	6/22/2002	0	0	0	0
ROCK COUNTY	6/30/2002	0	0	0	0
ROCK COUNTY	7/1/2002	0	0	0	0
ROCK COUNTY	7/8/2002	0	0	0	0
ROCK COUNTY	7/21/2002	0	0	0	0
ROCK COUNTY	7/24/2005	0	0	0	0
ROCK COUNTY	7/30/2006	0	0	0	0
ROCK COUNTY	8/1/2006	0	0	0	0
ROCK COUNTY	7/14/2010	0	0	0	0
ROCK COUNTY	8/11/2010	0	0	0	0
ROCK COUNTY	7/1/2011	0	0	0	0
ROCK COUNTY	7/21/2011	0	0	0	0
ROCK COUNTY	6/16/2012	0	0	0	0
ROCK COUNTY	6/28/2012	0	0	0	0
ROCK COUNTY	7/16/2012	0	0	0	0
ROCK COUNTY	7/18/2012	0	0	0	0
ROCK COUNTY	7/23/2012	0	0	0	0
ROCK COUNTY	7/25/2012	0	0	0	0
ROCK COUNTY	7/16/2013	0	0	0	0
ROCK COUNTY	8/30/2013	0	0	0	0
ROCK COUNTY	7/22/2014	0	0	0	0
ROCK COUNTY	7/21/2016	0	0	0	0

EXTREME COLD/WINDCHILL					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
ROCK COUNTY	2/10/2008	0	0	0	0
ROCK COUNTY	1/15/2009	0	0	0	0
ROCK COUNTY	1/6/2014	0	0	0	0

COLD/WIND CHILL					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
ROCK COUNTY	1/30/1996	0	0	0	0
ROCK COUNTY	1/31/1996	0	0	0	0
ROCK COUNTY	2/1/1996	0	0	0	0
ROCK COUNTY	1/17/1997	0	0	0	0
ROCK COUNTY	1/5/1999	0	0	0	0
ROCK COUNTY	12/18/2005	0	0	0	0
ROCK COUNTY	2/17/2006	0	0	0	0
ROCK COUNTY	2/18/2006	0	0	0	0
ROCK COUNTY	2/3/2007	0	0	$2,000	0
ROCK COUNTY	1/19/2008	0	0	0	0
ROCK COUNTY	1/30/2008	0	0	0	0
ROCK COUNTY	12/15/2008	0	0	0	0
ROCK COUNTY	12/21/2008	0	0	0	0
ROCK COUNTY	1/13/2009	0	0	0	0
ROCK COUNTY	1/14/2009	0	0	0	0
ROCK COUNTY	1/24/2009	0	0	0	0
ROCK COUNTY	1/21/2011	0	0	0	0
ROCK COUNTY	1/21/2013	0	0	0	0
ROCK COUNTY	1/22/2014	0	0	0	0
ROCK COUNTY	1/27/2014	1	0	0	0
ROCK COUNTY	1/7/2015	0	0	0	0
ROCK COUNTY	1/9/2015	0	0	0	0
ROCK COUNTY	12/14/2016	0	0	0	0
ROCK COUNTY	12/18/2016	0	0	0	0

HAIL						
Location	*Date*	*Diameter (Inches)*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
ROCK COUNTY	8/4/1961	0.75	0	0	0	0
ROCK COUNTY	6/5/1962	1	0	0	0	0
ROCK COUNTY	7/22/1962	1	0	0	0	0
ROCK COUNTY	5/12/1970	1.5	0	0	0	0
ROCK COUNTY	6/4/1975	3	0	0	0	0
ROCK COUNTY	6/4/1975	1.75	0	0	0	0

HAIL						
Location	*Date*	*Diameter (Inches)*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
ROCK COUNTY	6/4/1975	2	0	0	0	0
ROCK COUNTY	4/3/1978	1.75	0	0	0	0
ROCK COUNTY	7/20/1980	1	0	0	0	0
ROCK COUNTY	8/29/1984	1.75	0	0	0	0
ROCK COUNTY	4/5/1988	1.13	0	0	0	0
ROCK COUNTY	4/5/1988	1.5	0	0	0	0
ROCK COUNTY	3/13/1990	0.75	0	0	0	0
ROCK COUNTY	3/13/1990	1.5	0	0	0	0
ROCK COUNTY	4/15/1992	1.75	0	0	0	0
ROCK COUNTY	7/19/1992	1	0	0	0	0
AVON	5/25/1994	1	0	0	0	0
BELOIT	5/25/1994	0.88	0	0	0	0
JANESVILLE	7/7/1994	1	0	0	0	0
EVANSVILLE	7/19/1994	0.75	0	0	0	0
MILTON	6/27/1995	0.75	0	0	0	0
BELOIT	4/19/1996	1.75	0	0	0	0
EVANSVILLE	6/20/1997	1	0	0	0	0
JANESVILLE	6/25/1998	1	0	0	0	$1,000
JANESVILLE	6/25/1998	2	0	0	0	$3,000
JOHNSTOWN CENTER	9/6/1998	1	0	0	0	0
JANESVILLE	2/11/1999	0.75	0	0	0	0
EVANSVILLE	6/6/1999	0.75	0	0	0	0
MILTON	9/19/1999	1	0	0	0	0
MILTON	3/8/2000	0.75	0	0	0	0
MILTON	5/8/2000	1	0	0	0	0
JANESVILLE	5/18/2000	1	0	0	0	0
MILTON	6/30/2000	0.75	0	0	0	0
JOHNSTOWN	9/11/2000	1	0	0	0	0
JANESVILLE	4/8/2001	0.75	0	0	0	0
ORFORDVILLE	10/23/200	0.88	0	0	0	0
AFTON	10/23/200	1.75	0	0	0	0
AVALON	10/23/200	1.75	0	0	0	0
EVANSVILLE	4/18/2002	1	0	0	0	0
JANESVILLE	4/18/2002	0.75	0	0	0	0
JOHNSTOWN	4/18/2002	0.75	0	0	0	0
AVALON	6/3/2002	0.75	0	0	0	0

HAIL						
Location	*Date*	*Diameter (Inches)*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
BELOIT	5/28/2003	0.75	0	0	0	0
CLINTON	7/6/2003	0.75	0	0	0	0
ORFORDVILLE	7/31/2003	0.75	0	0	0	0
EDGERTON	8/1/2003	1.75	0	0	$50,000	0
MILTON	8/1/2003	1	0	0	0	0
JANESVILLE	8/2/2003	0.75	0	0	0	0
MILTON	8/3/2003	1	0	0	0	$25,000
ORFORDVILLE	10/29/2003	0.75	0	0	0	0
JANESVILLE	3/7/2005	0.75	0	0	0	0
FOOTVILLE	5/19/2005	0.75	0	0	0	0
JANESVILLE	5/19/2005	0.88	0	0	0	0
AFTON	5/19/2005	1.25	0	0	0	0
AFTON	5/19/2005	0.75	0	0	0	0
JANESVILLE	5/19/2005	0.88	0	0	0	0
JANESVILLE	5/19/2005	1	0	0	0	0
BELOIT	5/19/2005	1	0	0	0	0
BELOIT	5/19/2005	1.75	0	0	0	0
JANESVILLE	6/5/2005	0.88	0	0	0	0
MILTON	7/25/2005	1.75	0	0	0	$26,000
MILTON	7/25/2005	1	0	0	0	0
AFTON	9/22/2005	1	0	0	0	0
BELOIT	3/12/2006	0.88	0	0	0	0
UNION	4/13/2006	1.75	0	0	$436,000	0
MILTON	5/17/2006	0.75	0	0	0	0
BELOIT	6/21/2006	0.75	0	0	0	0
EVANSVILLE	8/23/2006	0.75	0	0	0	0
JANESVILLE	8/24/2006	1.75	0	0	0	0
MILTON	8/24/2006	0.75	0	0	0	0
FOOTVILLE	8/24/2006	2.5	0	0	0	0
NEWVILLE	8/25/2006	0.75	0	0	0	0
MILTON	10/2/2006	0.75	0	0	0	0
DOWNTOWN JANESVILLE	10/2/2006	0.88	0	0	0	0
EDGERTON	3/21/2007	1	0	0	0	0
UNION	3/21/2007	1	0	0	0	0
EVANSVILLE	3/21/2007	0.88	0	0	0	0

HAIL						
Location	*Date*	*Diameter (Inches)*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
ORFORDVILLE	4/29/2007	1	0	0	0	0
MILTON	7/9/2007	1	0	0	0	0
MILTON	6/5/2008	1	0	0	0	0
MILTON	6/7/2008	0.75	0	0	0	0
ORFORDVILLE	6/20/2008	0.88	0	0	0	0
BELOIT	6/28/2008	0.88	0	0	0	0
FOOTVILLE	5/31/2010	1	0	0	0	0
MILTON	5/31/2010	1	0	0	0	0
NEWVILLE	6/21/2010	1.5	0	0	0	$10,00
(JVL)ROCK CO ARPT JA	9/21/2010	0.75	0	0	0	0
BELOIT	9/21/2010	0.75	0	0	0	0
AFTON	5/13/2011	0.75	0	0	0	0
MILTON	5/22/2011	0.75	0	0	0	0
DOWNTOWN JANESVILLE	8/2/2011	2.25	0	0	0	0
NEWARK	8/20/2011	0.75	0	0	0	0
NEWARK	8/20/2011	1.25	0	0	0	0
ORFORDVILLE	3/17/2012	0.75	0	0	0	0
EDGERTON	5/6/2012	1	0	0	0	0
DOWNTOWN JANESVILLE	5/6/2012	1	0	0	0	0
EVANSVILLE	5/28/2012	0.75	0	0	0	0
EVANSVILLE	7/18/2012	1	0	0	0	0
ORFORDVILLE	7/18/2012	2	0	0	$6,000	0
DOWNTOWN JANESVILLE	9/19/2013	1	0	0	0	0
ROCK COUNTY	4/13/2014	0.75	0	0	0	0
ROCK COUNTY	4/13/2014	1	0	0	0	0
EDGERTON	5/12/2014	0.75	0	0	0	0
BELOIT	5/12/2014	1.75	0	0	0	0
BELOIT	8/1/2014	1	0	0	0	0
DOWNTOWN JANESVILLE	8/15/2015	0.88	0	0	0	0
BELOIT	9/3/2015	1	0	0	0	0
EDGERTON	3/15/2016	1	0	0	0	0

HAIL						
Location	*Date*	*Diameter (Inches)*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
DOWNTOWN JANESVILLE	5/28/2016	0.88	0	0	0	0
CLINTON	7/23/2016	1	0	0	0	0
DOWNTOWN JANESVILLE	8/18/2016	0.75	0	0	0	0
DOWNTOWN JANESVILLE	5/17/2017	1	0	0	0	0
DOWNTOWN JANESVILLE	5/17/2017	1	0	0	0	0

LIGHTNING					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
JANESVILLE	4/14/1996	0	0	$7,000	0
EDGERTON	8/5/1996	0	0	$15,000	0
JOHNSTOWN	10/17/1996	0	0	$75,000	0
BELOIT	5/12/1998	0	0	$10,000	0
ORFORDVILLE	5/28/1998	0	0	$40,000	0
JANESVILLE	6/18/1998	0	5	0	0
ORFORDVILLE	6/29/1998	0	0	$1,000	0
JANESVILLE	7/20/1998	0	0	$50,000	0
BELOIT	8/24/1998	0	0	$3.5M	0
JANESVILLE	2/11/1999	0	0	$1,000	0
JANESVILLE	5/16/1999	0	0	$40,000	0
JANESVILLE	5/16/1999	0	0	$40,000	0
JANESVILLE	7/20/1999	0	0	$35,000	0
JANESVILLE	5/18/2000	0	0	$25,000	0
JANESVILLE	7/10/2000	0	0	$10,000	0
JANESVILLE	3/9/2002	0	0	$30,000	0
JANESVILLE	8/12/2002	0	0	$20,000	0
JANESVILLE	8/21/2002	0	0	$2,500	0
BELOIT	7/8/2003	0	0	$3,000	0
BELOIT	8/3/2004	0	0	$10,000	0
ORFORDVILLE	7/25/2005	0	0	$8,000	0
ORFORDVILLE	7/25/2005	0	0	$1,000	0

LIGHTNING					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
MILTON	7/20/2006	0	0	$15,000	0
MILTON	7/20/2006	0	0	$50,000	0
BELOIT	8/25/2006	0	0	$5,000	0
DOWNTOWN JANESVILLE	7/3/2007	0	0	$275,000	0
DOWNTOWN JANESVILLE	8/6/2007	0	0	$25,000	0
(JVL)ROCK CO ARPT JA	7/23/2009	0	0	$2,000	0
CLINTON	7/23/2009	0	1	0	0
EVANSVILLE	7/1/2011	0	0	$20,000	0
BELOIT JCT	7/22/2011	0	0	$25,000	0
CHARLIE BLUFF	7/27/2011	0	0	$3,000	0
LIMA CENTER	7/27/2011	0	0	$2,000	0
BELOIT	8/23/2011	0	0	$1,000	0
EDGERTON	5/28/2012	0	0	$75,000	0
ORFORDVILLE	7/18/2012	0	0	$3,000	0
DOWNTOWN JANESVILLE	6/30/2014	1	0	0	0

THUNDERSTORM WIND						
Location	*Date*	*MPH*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
BELOIT	4/19/1996		0	0	$800,000	0
CLINTON	4/19/1996		0	0	$5,000	0
BELOIT	6/2/1996		0	0	$5,000	0
EMERALD GROVE	6/2/1996		0	0	$2,000	0
FOOTVILLE	8/5/1996		0	0	$18,000	0
MILTON	8/5/1996		0	0	$15,000	0
HANOVER	10/29/1996		0	0	$15,000	0
UNION	10/29/1996		0	0	$20,000	0
EVANSVILLE	10/29/1996		0	0	$10,000	0
BELOIT	10/29/1996		0	0	$20,000	0
BELOIT	4/5/1997		0	0	$65,000	0
JANESVILLE	4/5/1997		0	0	$5,000	0
JOHNSTOWN	4/5/1997		0	0	$5,000	0

THUNDERSTORM WIND						
Location	*Date*	*MPH*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
MILTON	6/15/1997		0	0	$1,000	0
FOOTVILLE	6/15/1997		0	0	$1,000	0
JANESVILLE	6/15/1997		0	0	$1,000	0
BELOIT	6/24/1997		0	0	$1,000	0
EDGERTON	6/24/1997		0	0	$1,000	0
EVANSVILLE	8/3/1997		0	0	$1,000	0
BELOIT	8/3/1997		0	0	$1,000	0
JANESVILLE	9/16/1997		0	0	$1,000	0
BELOIT	9/19/1997		0	0	$1,000	0
CLINTON	9/19/1997		0	0	$300	0
NEWARK	5/12/1998		0	0	$2,000	0
FOOTVILLE	5/12/1998		0	0	$2,000	0
JANESVILLE	5/15/1998		0	0	$500	0
BELOIT	5/15/1998		0	0	$5,000	0
JANESVILLE	5/28/1998		0	0	$7,000	0
COUNTYWIDE	5/31/1998		0	0	$20,000	0
CLINTON	6/18/1998		0	0	$57,000	0
EDGERTON	6/18/1998		0	0	$11,000	0
JANESVILLE	6/18/1998	52	0	0	$19,000	0
FOOTVILLE	6/18/1998		0	0	$5,000	0
JANESVILLE	6/25/1998	56	0	0	$4,000	0
EVANSVILLE	6/27/1998		0	0	$3,000	0
JANESVILLE	6/27/1998		0	0	$1,500	0
EVANSVILLE	7/19/1998		0	0	$3,000	0
BELOIT	7/19/1998		0	0	$7,000	0
CLINTON	7/20/1998	63	0	0	0	0
JANESVILLE	7/20/1998	60	0	0	$100,000	0
BELOIT	7/21/1998		0	0	$10,000	0
EMERALD GROVE	5/17/1999	61	0	0	$75,000	0
JANESVILLE	5/17/1999		0	0	$175,000	0
HANOVER	6/6/1999		0	0	$1,000	0
ORFORDVILLE	6/6/1999		0	0	$2,000	0
EVANSVILLE	6/6/1999	65	0	2	$3,000	0
AFTON	6/6/1999		0	0	$10,000	0
JANESVILLE	7/3/1999		0	0	$2,000	0

THUNDERSTORM WIND						
Location	*Date*	*MPH*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
ORFORDVILLE	7/20/1999		0	0	$300,000	$50,000
UNION	7/23/1999		0	0	$1,000	0
JANESVILLE	7/23/1999		0	0	$1,500	0
NEWVILLE	7/23/1999		0	0	$1,000	0
EDGERTON	7/25/1999		0	0	$1,000	0
CLINTON	7/25/1999		0	0	$1,000	0
BELOIT	7/29/1999		0	0	$3,000	0
FULTON	5/8/2000		0	0	$2,000	0
MILTON	6/1/2000		0	0	$2,000	0
EVANSVILLE	6/1/2000		0	0	$3,000	0
JANESVILLE	7/10/2000		0	0	$15,000	0
EVANSVILLE	8/5/2000	100	0	2	$5M	$12,500
ORFORDVILLE	8/6/2000		0	0	$50,000	0
HANOVER	4/11/2001	70	0	0	0	0
EVANSVILLE	4/11/2001	60	0	0	$300,000	0
EVANSVILLE	5/3/2001	51	0	0	0	0
COUNTYWIDE	6/11/2001	52	0	0	$50,000	0
JANESVILLE	6/14/2001	52	0	0	0	0
ORFORDVILLE	8/9/2001	52	0	0	$25,000	0
EVANSVILLE	9/7/2001	56	0	0	0	0
BELOIT	9/7/2001	56	0	0	$10,000	0
EMERALD GROVE	3/9/2002	52	0	0	0	0
MILTON	4/18/2002	57	0	0	0	0
(JVL)ROCK CO ARPT JA	4/18/2002	55	0	0	$10,000	0
CLINTON	6/10/2002	56	0	0	0	0
EDGERTON	6/10/2002	56	0	0	0	0
JANESVILLE	7/8/2002	52	0	0	0	0
EDGERTON	7/27/2002	52	0	0	0	0
MILTON	7/27/2002	56	0	0	$10,000	0
EDGERTON	8/21/2002	56	0	0	0	0
CLINTON	8/21/2002	52	0	0	0	0
BELOIT	6/18/2003	56	0	0	0	0
EVANSVILLE	6/25/2003	65	0	0	0	0
EVANSVILLE	6/25/2003	52	0	0	0	$15,000
JANESVILLE	7/6/2003	52	0	0	0	0

THUNDERSTORM WIND						
Location	*Date*	*MPH*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
CLINTON	7/6/2003	65	0	0	$5,000	0
EVANSVILLE	7/15/2003	56	0	0	$2,000	0
NEWVILLE	3/1/2004	52	0	0	$5,000	0
CLINTON	3/5/2004	56	0	0	$1,000	0
CLINTON	3/5/2004	65	0	0	$40,000	0
ORFORDVILLE	3/5/2004	52	0	0	$1,000	0
JANESVILLE	3/5/2004	52	0	0	$1,000	0
JOHNSTOWN CENTER	3/5/2004	52	0	0	$1,000	0
MILTON	3/5/2004	56	0	0	$1,000	0
BELOIT	5/17/2004	56	0	0	0	0
BELOIT	5/21/2004	50	0	0	0	0
CLINTON	5/21/2004	50	0	0	0	0
JANESVILLE	5/21/2004	50	0	0	0	0
MILTON	5/23/2004	52	0	0	0	0
AFTON	8/3/2004	61	0	0	$100,000	0
BELOIT	8/27/2004	56	0	0	0	0
ORFORDVILLE	10/29/2004	56	0	0	0	0
JANESVILLE	6/4/2005	52	0	0	0	0
EVANSVILLE	6/4/2005	52	0	0	0	0
MILTON	6/26/2005	52	0	0	0	0
NEWARK	6/30/2005	65	0	0	0	0
JANESVILLE	6/30/2005	52	0	0	0	0
JANESVILLE	6/30/2005	52	0	0	0	0
JANESVILLE	6/30/2005	52	0	0	0	0
MILTON	6/30/2005	56	0	0	0	0
MILTON	7/23/2005	56	0	0	$1,000	0
MILTON	7/23/2005	56	0	0	$1,000	0
MILTON	7/25/2005	65	0	0	$100,000	0
MILTON	7/25/2005	65	0	0	$200,000	0
JANESVILLE	9/7/2005	52	0	0	0	0
SHOPIERE	9/13/2005	52	0	0	0	0
JOHNSTOWN CENTER	9/13/2005	56	0	0	0	0
JANESVILLE	5/17/2006	52	0	0	0	0
COUNTYWIDE	5/24/2006	56	0	0	$20,000	0

THUNDERSTORM WIND						
Location	*Date*	*MPH*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
BELOIT	5/27/2006	56	0	0	$5,000	0
EVANSVILLE	5/29/2006	52	0	0	$25,000	0
BELOIT	6/21/2006	52	0	0	0	0
BELOIT	6/21/2006	56	0	0	$20,000	0
BELOIT	6/21/2006	56	0	0	0	0
JANESVILLE	6/21/2006	56	0	0	0	0
JANESVILLE	6/28/2006	52	0	0	0	0
UNION	7/20/2006	56	0	0	$75,000	0
BELOIT	8/24/2006	56	0	0	$5,000	0
(JVL)ROCK CO ARPT JA	10/2/2006	61	0	0	$20,000	0
FOOTVILLE	10/2/2006	52	0	0	0	0
DOWNTOWN JANESVILLE	8/6/2007	52	0	0	$15,000	0
CLINTON	5/2/2008	56	0	0	$100	0
EVANSVILLE	6/5/2008	65	0	0	$75,000	0
MILTON	6/6/2008	50	0	0	0	0
ORFORDVILLE	6/7/2008	56	0	0	$30,000	0
BELOIT	6/7/2008	56	0	0	$25,000	0
EVANSVILLE	6/7/2008	56	0	0	0	0
ORFORDVILLE	6/8/2008	65	0	0	$25,000	0
BELOIT	6/8/2008	56	0	0	$20,000	0
DOWNTOWN JANESVILLE	6/12/2008	56	0	0	$25,000	0
ORFORDVILLE	6/20/2008	56	0	0	0	0
ORFORDVILLE	6/28/2008	50	0	0	0	0
CLINTON	6/28/2008	56	0	0	0	0
DOWNTOWN JANESVILLE	7/7/2008	56	0	0	$25,000	0
EVANSVILLE	7/7/2008	56	0	0	$10,000	0
BELOIT	7/7/2008	50	0	0	$10,000	0
DOWNTOWN JANESVILLE	7/10/2008	65	0	0	$10,000	0
MAGNOLIA	7/12/2008	56	0	0	0	0
NEWARK	7/31/2008	56	0	0	$15,000	0
EDGERTON	3/24/2009	56	0	0	$25,000	0
NEWVILLE	6/8/2009	56	0	0	0	0
EVANSVILLE	6/18/2009	56	0	0	$15,000	0

THUNDERSTORM WIND						
Location	*Date*	*MPH*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
BELOIT	6/19/2009	56	0	0	0	0
NEWVILLE	6/23/2009	65	0	0	$5,000	0
EVANSVILLE	8/9/2009	65	0	0	0	0
MILTON	8/9/2009	65	0	0	0	0
ORFORDVILLE	8/9/2009	65	0	0	$10,000	0
MILTON	8/9/2009	68	0	0	$150,000	0
ORFORDVILLE	6/18/2010	65	0	0	$10,000	0
BELOIT	6/18/2010	65	0	0	0	0
DOWNTOWN JANESVILLE	6/18/2010	56	0	0	0	0
DOWNTOWN JANESVILLE	6/18/2010	70	0	0	$100,000	0
EDGERTON	6/21/2010	65	0	0	0	0
EDGERTON	8/9/2010	65	0	0	0	0
DOWNTOWN JANESVILLE	8/20/2010	50	0	0	0	0
BELOIT	9/21/2010	52	0	0	0	0
DOWNTOWN JANESVILLE	10/26/2010	65	0	0	0	0
BELOIT	10/26/2010	65	0	0	$5,000	0
BELOIT JCT	4/19/2011	65	0	0	0	0
BELOIT	5/22/2011	52	0	0	0	0
EVANSVILLE	6/8/2011	61	0	0	$50,000	0
EVANSVILLE	6/8/2011	51	0	0	0	0
EVANSVILLE	6/8/2011	70	0	0	0	0
CLINTON	6/8/2011	70	0	0	0	0
ORFORDVILLE	7/11/2011	65	0	0	$125,000	$700,000
COOKSVILLE	5/28/2012	65	0	0	$5,000	0
EVANSVILLE	5/28/2012	56	0	0	$5,000	0
ORFORDVILLE	7/18/2012	50	0	0	0	0
ORFORDVILLE	7/18/2012	56	0	0	0	0
EVANSVILLE	7/24/2012	61	0	0	0	0
BELOIT	7/24/2012	65	0	0	0	0
EVANSVILLE	9/4/2012	56	0	0	$4,000	0
BELOIT	9/17/2012	55	0	0	0	0
CLINTON	5/14/2013	61	0	0	$10,000	0
EVANSVILLE	5/19/2013	52	0	0	$5,000	0

THUNDERSTORM WIND						
Location	*Date*	*MPH*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
AFTON	5/19/2013	65	0	0	$50,000	0
ORFORDVILLE	5/19/2013	65	0	0	$20,000	0
ORFORDVILLE	5/30/2013	56	0	0	$5,000	0
EDGERTON	5/30/2013	56	0	0	$5,000	0
NEWARK	5/30/2013	56	0	0	$5,000	0
(JVL)ROCK CO ARPT JA	6/25/2013	50	0	0	$2,000	0
CLINTON	6/25/2013	56	0	0	$4,000	0
MILTON	7/22/2013	58	0	0	$7,000	0
BELOIT	7/22/2013	65	0	0	$15,000	0
LEYDEN	9/19/2013	52	0	0	$20,000	0
LEYDEN	5/11/2014	52	0	0	$500	0
CENTER	5/11/2014	52	0	0	$1,000	0
DOWNTOWN JANESVILLE	5/12/2014	50	0	0	$2,000	0
BELOIT	5/12/2014	50	0	0	0	0
ORFORDVILLE	6/17/2014	55	0	0	$20,000	0
CHARLIE BLUFF	6/17/2014	65	0	0	$60,000	0
EVANSVILLE	6/30/2014	50	0	0	$1,000	0
DOWNTOWN JANESVILLE	6/30/2014	50	0	0	$1,000	0
EVANSVILLE	6/22/2015	61	0	0	$10,000	0
LEYDEN	7/13/2015	60	0	0	$10,000	0
EVANSVILLE	7/18/2015	55	0	0	$20,000	0
DOWNTOWN JANESVILLE	9/17/2015	70	0	0	$40,000	0
ORFORDVILLE	11/11/2015	50	0	0	$1,000	0
LEYDEN	5/28/2016	50	0	0	$10,000	0
BELOIT	5/28/2016	50	0	0	$10,000	0
EVANSVILLE	7/5/2016	56	0	0	$8,000	0
MAGNOLIA	7/5/2016	52	0	0	$8,000	0
JANESVILLE AIRPORT	7/6/2016	52	0	0	$3,000	$31,000
MILTON	7/21/2016	52	0	0	$8,000	0
DOWNTOWN JANESVILLE	8/18/2016	56	0	0	$50,000	0
CHARLIE BLUFF	9/25/2016	50	0	0	$1,000	0

THUNDERSTORM WIND						
Location	*Date*	*MPH*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
LEYDEN	3/6/2017	70	0	0	$10,000	0
NEWARK	3/6/2017	50	0	0	$1,000	0
AVON	3/6/2017	50	0	0	$1,000	0
ORFORDVILLE	3/6/2017	50	0	0	$1,000	0
BELOIT JCT.	5/17/2017	61	0	0	$40,000	0
DOWNTOWN JANESVILLE	5/17/2017	70	0	0	$10,000	0
FAIRFIELD	5/17/2017	70	0	0	$40,000	0

HIGH WIND						
Location	*Date*	*MPH*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
ROCK COUNTY	4/6/1997		0	0	$250,000	0
ROCK COUNTY	3/8/1998		0	0	$5,000	0
ROCK COUNTY	11/10/1998		0	0	$600,000	$100,000
ROCK COUNTY	4/7/2001	50	0	1	0	0
ROCK COUNTY	10/25/2001	56	0	0	0	0
ROCK COUNTY	3/9/2002		0	0	$20,000	0
ROCK COUNTY	11/12/2003	56	0	0	$4,000	0
ROCK COUNTY	12/23/2007	38	0	0	$5,000	0
ROCK COUNTY	7/24/2009	50	0	0	0	0
ROCK COUNTY	10/26/2010	50	0	1	$250,000	0
ROCK COUNTY	4/10/2013	50	0	0	0	0
ROCK COUNTY	2/20/2014	37	1	0	0	0
ROCK COUNTY	2/19/2016	35	0	0	$100,000	0
ROCK COUNTY	3/16/2016	50	0	0	$7,000	0
ROCK COUNTY	3/8/2017	50	0	0	$15,000	0

STRONG WIND						
Location	*Date*	*MPH*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
JANESVILLE	9/29/1997		0	1	$1,000	0

STRONG WIND						
Location	*Date*	*MPH*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
BELOIT	9/29/1997		0	0	$500	0
ROCK COUNTY	5/24/2000		0	0	0	0
ROCK COUNTY	9/19/2001		0	0	0	0
ROCK COUNTY	12/5/2001		0	0	$5,000	0
ROCK COUNTY	3/7/2004	36	0	0	$2,000	0
ROCK COUNTY	3/14/2004	42	0	0	$4,000	0
ROCK COUNTY	4/18/2004	42	0	0	$10,000	0
ROCK COUNTY	12/12/2004	39	0	0	$2,000	0
ROCK COUNTY	1/24/2006	39	0	0	$5,000	0
ROCK COUNTY	3/13/2006	39	0	0	$5,000	0
ROCK COUNTY	3/31/2006	39	0	0	$2,000	0
ROCK COUNTY	5/11/2006	37	0	0	$1,000	0
ROCK COUNTY	2/22/2007	39	0	0	$2,000	0
ROCK COUNTY	5/24/2007	39	0	0	$2,000	0
ROCK COUNTY	6/7/2007	39	0	0	$5,000	0
ROCK COUNTY	8/27/2007	39	0	0	$10,000	0
ROCK COUNTY	11/5/2007	39	0	0	$5,000	0
ROCK COUNTY	4/26/2008	45	0	0	$5,000	0
ROCK COUNTY	10/26/2008	26	0	0	$2,000	0
ROCK COUNTY	10/6/2009	26	0	0	$5,000	0
ROCK COUNTY	4/2/2010	43	0	1	$1,000	0
ROCK COUNTY	5/5/2010	39	0	0	$10,000	0
ROCK COUNTY	9/7/2010	39	0	0	$10,000	0
ROCK COUNTY	4/15/2011	47	0	0	$10,000	0
ROCK COUNTY	5/15/2011	40	0	0	$5,000	0
ROCK COUNTY	9/29/2011	48	0	0	$2,000	0
ROCK COUNTY	11/13/2011	26	0	0	$1,000	0
ROCK COUNTY	1/1/2012	39	0	0	$1,000	0
ROCK COUNTY	4/15/2012	42	0	0	$1,000	0
ROCK COUNTY	4/16/2012	26	0	0	$1,000	0
ROCK COUNTY	6/18/2012	39	0	0	$10,000	0
ROCK COUNTY	9/19/2012	39	0	0	$2,000	0
ROCK COUNTY	1/19/2013	44	0	0	$5,000	0

FUNNEL CLOUD					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
JANESVILLE	6/18/1996	0	0	0	0
ORFORDVILLE	6/6/1999	0	0	0	0
JANESVILLE	6/10/2000	0	0	0	0
ORFORDVILLE	8/6/2000	0	0	0	0
HANOVER	8/6/2000	0	0	0	0
BELOIT	8/19/2000	0	0	0	0
SHOPIERE	10/23/2001	0	0	0	0
CLINTON	4/18/2002	0	0	0	0
EVANSVILLE	5/23/2004	0	0	0	0
EVANSVILLE	5/19/2005	0	0	0	0
EVANSVILLE	6/12/2008	0	0	0	0

TORNADO						
Location	*Date*	*Strength*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
ROCK COUNTY	5/28/1955	F1	0	0	$25,000	0
ROCK COUNTY	11/15/1960	F2	0	0	$2,500	0
ROCK COUNTY	9/22/1961	F2	0	0	$25,000	0
ROCK COUNTY	4/11/1965	F1	0	0	$2.5M	0
ROCK COUNTY	9/9/1965	F1	0	0	$2,500	0
ROCK COUNTY	5/18/1967	F1	0	0	$25,000	0
ROCK COUNTY	6/26/1969	F1	0	0	$250,000	0
ROCK COUNTY	10/9/1970	F2	0	1	$250,000	0
ROCK COUNTY	11/1/1971	F2	0	1	$250,000	0
ROCK COUNTY	5/14/1972	F1	0	0	0	0
ROCK COUNTY	6/4/1975	F1	0	0	$2,500	0
ROCK COUNTY	4/5/1978		0	0	$250,000	0
ROCK COUNTY	7/3/1983	F1	0	0	$30	0
ROCK COUNTY	5/8/1988	F2	0	0	$250,000	0
ROCK COUNTY	3/27/1991	F2	0	0	$2.5M	0
ROCK COUNTY	5/22/1991	F1	0	0	$250,000	0
LEYDEN	6/25/1998	F2	0	0	$845,000	$3,000
EVANSVILLE	8/5/2000	F0	0	0	$5,000	0
AVON	5/30/2003	F1	0	0	0	0

Appendix B: Frequency of Occurrence

TORNADO						
Location	*Date*	*Strength*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
MILTON	7/25/2005	F1	0	0	$300,000	0
SHOPIERE	8/26/2006	F0	0	0	0	$2,000
MILTON JCT	6/23/2009	EF0	0	0	$8,000	0
PRAIRIE AIRPORT	9/21/2010	EF0	0	0	$1,000	0
JOHNSTOWN	7/18/2015	EF1	0	0	$100,000	$1,000

BLIZZARD					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
ROCK COUNTY	1/29/1996	0	0	0	0
ROCK COUNTY	1/16/1997	0	0	0	0
ROCK COUNTY	1/2/1999	0	0	0	0
ROCK COUNTY	2/24/2007	0	0	0	0
ROCK COUNTY	12/11/2010	0	0	0	0
ROCK COUNTY	2/1/2011	0	0	0	0
ROCK COUNTY	12/20/2012	0	0	0	0

HEAVY SNOW					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
ROCK COUNTY	1/26/1996	0	0	0	0
ROCK COUNTY	12/25/1996	0	0	0	0
ROCK COUNTY	12/24/1997	0	0	0	0
ROCK COUNTY	12/11/2000	0	0	0	0
ROCK COUNTY	12/18/2000	0	0	0	0
ROCK COUNTY	3/2/2002	0	0	0	0
ROCK COUNTY	1/21/2008	0	0	0	0

ICE STORM					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
ROCK COUNTY	2/4/1997	0	0	0	0
ROCK COUNTY	12/11/2007	0	0	0	0
ROCK COUNTY	2/17/2008	0	0	$20,000	0

ICE STORM					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
ROCK COUNTY	12/23/2009	0	0	0	0

WINTER STORM					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
ROCK COUNTY	4/11/1997	0	0	0	0
ROCK COUNTY	1/8/1998	0	0	0	0
ROCK COUNTY	3/8/1999	0	0	0	0
ROCK COUNTY	2/17/2000	0	0	0	0
ROCK COUNTY	4/7/2000	0	0	0	0
ROCK COUNTY	1/6/2005	0	0	0	0
ROCK COUNTY	1/22/2005	0	0	0	0
ROCK COUNTY	2/16/2006	0	0	0	0
ROCK COUNTY	12/1/2006	0	0	0	0
ROCK COUNTY	2/25/2007	0	0	0	0
ROCK COUNTY	4/11/2007	0	0	$10,000	0
ROCK COUNTY	12/1/2007	0	0	0	0
ROCK COUNTY	1/29/2008	0	0	0	0
ROCK COUNTY	2/5/2008	0	0	0	0
ROCK COUNTY	3/21/2008	0	0	0	0
ROCK COUNTY	11/30/2008	0	0	0	0
ROCK COUNTY	12/1/2008	0	0	0	0
ROCK COUNTY	12/8/2008	0	0	0	0
ROCK COUNTY	12/18/2008	0	0	0	0
ROCK COUNTY	12/20/2008	0	0	0	0
ROCK COUNTY	2/21/2009	0	0	0	0
ROCK COUNTY	3/28/2009	0	0	0	0
ROCK COUNTY	12/8/2009	0	0	0	0
ROCK COUNTY	1/7/2010	0	0	0	0
ROCK COUNTY	3/2/2012	0	0	0	0
ROCK COUNTY	3/5/2013	0	0	0	0
ROCK COUNTY	12/22/2013	0	0	0	0
ROCK COUNTY	1/26/2014	0	0	0	0
ROCK COUNTY	2/1/2015	0	0	0	0

WINTER STORM					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
ROCK COUNTY	11/20/2015				
ROCK COUNTY	12/28/2015	0	0	0	0
ROCK COUNTY	12/10/2016	0	0	0	0
ROCK COUNTY	16/16/2016	0	0	0	0

WINTER WEATHER					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
ROCK COUNTY	1/16/1996	0	0	0	0
ROCK COUNTY	1/23/1996	0	0	0	0
ROCK COUNTY	2/3/2003	0	0	0	0
ROCK COUNTY	4/7/2003	0	0	0	0
ROCK COUNTY	1/4/2004	0	0	0	0
ROCK COUNTY	1/16/2004	0	0	0	0
ROCK COUNTY	2/8/2004	0	0	0	0
ROCK COUNTY	3/7/2004	0	0	0	0
ROCK COUNTY	11/30/2004	0	0	0	0
ROCK COUNTY	12/18/2004	0	0	0	0
ROCK COUNTY	1/1/2005	0	0	0	0
ROCK COUNTY	11/10/2006	0	0	0	0
ROCK COUNTY	1/12/2007	0	0	0	0
ROCK COUNTY	1/14/2007	0	0	0	0
ROCK COUNTY	1/21/2007	0	0	0	0
ROCK COUNTY	2/23/2007	0	0	0	0
ROCK COUNTY	3/2/2007	0	0	0	0
ROCK COUNTY	11/21/2007	0	0	0	0
ROCK COUNTY	12/4/2007	0	0	0	0
ROCK COUNTY	12/15/2007	0	0	0	0
ROCK COUNTY	12/22/2007	0	0	0	0
ROCK COUNTY	12/28/2007	0	0	0	0
ROCK COUNTY	2/9/2008	0	0	0	0
ROCK COUNTY	2/11/2008	0	0	0	0
ROCK COUNTY	2/25/2008	0	0	0	0
ROCK COUNTY	11/24/2008	0	0	0	0
ROCK COUNTY	12/3/2008	0	0	0	0

WINTER WEATHER					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
ROCK COUNTY	12/16/2008	0	0	0	0
ROCK COUNTY	12/23/2008	0	0	0	0
ROCK COUNTY	12/24/2008	0	0	0	0
ROCK COUNTY	12/25/2008	0	0	0	0
ROCK COUNTY	12/27/2008	0	0	0	0
ROCK COUNTY	1/3/2009	0	0	0	0
ROCK COUNTY	1/9/2009	0	0	0	0
ROCK COUNTY	1/9/2009	0	0	0	0
ROCK COUNTY	1/12/2009	0	0	0	0
ROCK COUNTY	2/26/2009	0	0	0	0
ROCK COUNTY	2/8/2010	0	0	0	0
ROCK COUNTY	3/19/2010	0	0	0	0
ROCK COUNTY	12/3/2010	0	0	0	0
ROCK COUNTY	12/9/2010	0	0	0	0
ROCK COUNTY	12/20/2010	0	0	0	0
ROCK COUNTY	1/17/2011	0	0	0	0
ROCK COUNTY	2/6/2011	0	0	0	0
ROCK COUNTY	2/21/2011	0	0	0	0
ROCK COUNTY	1/12/2012	0	0	0	0
ROCK COUNTY	1/17/2012	0	0	0	0
ROCK COUNTY	1/20/2012	0	0	0	0
ROCK COUNTY	1/22/2012	0	0	0	0
ROCK COUNTY	2/23/2012	0	0	0	0
ROCK COUNTY	1/27/2013	0	0	0	0
ROCK COUNTY	1/30/2013	0	0	0	0
ROCK COUNTY	2/3/2013	0	0	0	0
ROCK COUNTY	2/7/2013	0	0	0	0
ROCK COUNTY	2/21/2013	0	0	0	0
ROCK COUNTY	2/26/2013	0	0	0	0
ROCK COUNTY	3/18/2013	0	0	0	0
ROCK COUNTY	12/8/2013	0	0	0	0
ROCK COUNTY	12/19/2013	0	0	0	0
ROCK COUNTY	12/31/2013	0	0	0	0
ROCK COUNTY	1/10/2014	0	0	0	0
ROCK COUNTY	1/14/2014	0	0	0	0

WINTER WEATHER					
Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
ROCK COUNTY	1/24/2014	0	0	0	0
ROCK COUNTY	1/26/2014	0	0	0	0
ROCK COUNTY	2/13/2014	0	0	0	0
ROCK COUNTY	2/17/2014	0	0	0	0
ROCK COUNTY	3/4/2014	0	0	0	0
ROCK COUNTY	11/22/2014	0	0	0	0
ROCK COUNTY	11/24/2014	0	0	0	0
ROCK COUNTY	1/3/2015	0	0	0	0
ROCK COUNTY	1/8/2015	0	0	0	0
ROCK COUNTY	3/3/2015	0	0	0	0
ROCK COUNTY	3/22/2015	0	0	0	0
ROCK COUNTY	2/14/2016	0	0	0	0
ROCK COUNTY	2/29/2016	0	0	0	0
ROCK COUNTY	3/1/2016	0	0	0	0
ROCK COUNTY	3/24/2016	0	0	0	0
ROCK COUNTY	4/2/2016	0	0	0	0
ROCK COUNTY	4/8/2016	0	0	0	0
ROCK COUNTY	12/4/2016	0	0	0	0
ROCK COUNTY	12/19/2016	0	0	0	0
ROCK COUNTY	12/23/2016	0	0	0	0
ROCK COUNTY	1/3/2017	0	0	0	0
ROCK COUNTY	1/10/2017	0	0	0	0
ROCK COUNTY	1/11/2017	0	0	0	0
ROCK COUNTY	1/16/2017	0	0	0	0
ROCK COUNTY	1/24/2017	0	0	0	0
ROCK COUNTY	2/24/2017	0	0	0	0
ROCK COUNTY	3/12/2017	0	0	0	0

Appendix C: Plan Adoption

This plan has been adopted by Rock County and some of its municipal bodies including the Cities of Edgerton, Janesville, and Milton; the Villages of Footville and Orfordville; and the Towns of Avon, Beloit, Bradford, Center, Clinton, Fulton, Harmony, Janesville, Johnstown, LaPrairie, Magnolia, Milton, Plymouth, Porter, Rock, Spring Valley and Turtle.

The Cities of Beloit, Brodhead, and Evansville; the Village of Clinton; and the Towns of Lima, Newark, and Union had not adopted this plan at the time of printing but may choose to do so at a later time. Please note that the City of Brodhead is a border community and will be covered in the Green County Plan.

STATE OF WISCONSIN

DEPARTMENT OF MILITARY AFFAIRS

DIVISION OF EMERGENCY MANAGEMENT

Brian M. Satula
Administrator

Scott Walker
Governor

October 18, 2016

Eric Kuklewski
Risk Analysis Branch, Mitigation Division
Federal Emergency Management Agency
536 S. Clark Street, 6th Floor
Chicago, IL 60605

Attn: Christine Meissner

Dear Christine:

I am pleased to submit the *Rock County, Wisconsin, Hazard Mitigation Plan* update that meets the requirements of 44 CFR §201.6 and §78.5. Enclosed are the completed Local Hazard Mitigation Plan Review Tool and a CD containing an electronic copy of the Plan and the Plan Review Tool.

Rock County updated the plan utilizing an FFY 2014 PDM planning grant. With this submission, I'm requesting that the plan be conditionally approved. Upon final approval of the plan, the County and participating jurisdictions will be eligible to apply for mitigation funds through the Hazard Mitigation Grant Program, Pre-Disaster Mitigation program, and Flood Mitigation Assistance program.

If you have questions, please call me at (608) 242-3222.

Sincerely,

K Sommers

Katie Sommers, CFM
State Hazard Mitigation Officer

Enclosures

Cc: Shena Kohler, Rock County Emergency Management Director
Paul France, Southwest Regional Emergency Management Director
Lenora Borchardt, EPTEC, Inc.

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

U.S. Department of Homeland Security
Region V
536 S. Clark St., 6th Floor
Chicago, IL 60605-1509

FEMA

JUN 15 2017

Ms. Katie Sommers
State Hazard Mitigation Officer
Wisconsin Emergency Management
2400 Wright Street, P.O. Box 7865
Madison, WI 53707-7865

Dear Ms. Sommers:

Thank you for submitting the adoption documentation for Rock County Hazard Mitigation Plan. The plan was reviewed based on the local plan criteria contained in 44 CFR Part 201, as authorized by the Disaster Mitigation Act of 2000. Rock County met the required criteria for a multi-jurisdiction hazard mitigation plan and the plan is now approved for the county, the cities of Edgerton and Janesville, the villages of Footville ard Orfordville, and the towns of Beloit, Bradford, Center, Clinton, La Prairie, Magnolia, Milton, Plymouth, Rock, Spring Valley and Turtle. Please submit the adoption resolutions for any remaining jurisdictions who participated in the planning process.

The approval of this plan ensures continued availability of the full complement of Hazard Mitigation Assistance (HMA) Grants. All requests for funding, however, will be evaluated individually according to the specific eligibility ard other requirements of the particular program under which the application is submitted.

We encourage Rock County and the participating jurisdictions to follow the plan's schedule for monitoring and updating the plan, and continue their efforts to implement the mitigation measures. The expiration date of the Rock County Plan is five years from the date of this letter. In order to continue project grant eligibility, the plan must be reviewed, revised as appropriate, resubmitted, and approved no later than the plan expiration date.

Please pass on our congratulations to the county and jurisdictions for completing this significant action. If you or the communities have any questions, please contact Christine Meissner at (312) 408-4460 or christine.meissner@fema.dhs.gov.

Sincerely,

Mark J. Peterson, Acting Director
Mitigation Division

STATE OF WISCONSIN

DEPARTMENT OF MILITARY AFFAIRS

DIVISION OF EMERGENCY MANAGEMENT

Brian M. Satula
Administrator

Scott Walker
Governor

June 16, 2017

Ms. Shena Kohler, Director
Rock County Emergency Management
3530 N County Trunk F
PO Box 0920
Janesville, WI 53547-0920

Dear Shena:

It gives me great pleasure to inform you that the *Hazard Mitigation Plan, Rock County, Wisconsin* has officially been approved by FEMA for Rock County and many municipalities! Approval for the remaining participating municipalities is contingent upon receipt of their adoption resolutions.

The plan complies with the requirements of the Disaster Mitigation Act of 2000. Rock County is eligible to apply for funding through the Hazard Mitigation Grant Program, Pre-Disaster Mitigation program, and Flood Mitigation Assistance program through June 14, 2022, for projects identified in the Plan. Per regulation, the Plan must be updated and resubmitted for approval every five years to remain eligible for mitigation funding.

Along with the FEMA Meets Requirements letter, you received the Local Mitigation Plan Review Tool, which includes recommended revisions for the five-year update.

Congratulations on the approval of your Plan! Our office commends the County for its commitment to mitigation and reducing future disaster losses, and we look forward to working with you in the future.

If you have any questions, please call me at (608) 242-3222 or Roxanne Gray at (608) 242-3211.

Sincerely,

K Sommers

Katie Sommers, CFM
State Hazard Mitigation Officer

Enclosure

Cc: Paul France, Southwest Regional Emergency Management Director
Lenora Borchardt, EPTEC, Inc.

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

ROCK COUNTY BOARD OF SUPERVISORS

Sheriff Robert D. Spoden
INITIATED BY

Public Safety & Justice Committee
SUBMITTED BY

Sergeant Shena Kohler
DRAFTED BY

January 23, 2017
DATE DRAFTED

ADOPTING THE UPDATED ROCK COUNTY HAZARD MITIGATION PLAN

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

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

WHEREAS, an updated All Hazards Mitigation Plan is required by FEMA as a condition of future grant funding for mitigation projects; and,

WHEREAS, Rock County participated jointly in the planning process with the other local units of government within the County to prepare an updated All Hazards Mitigation Plan, which was made available for review via a Legal Notice and a copy of which will reside permanently in the Rock County Emergency Management Office.

NOW, THEREFORE, BE IT RESOLVED, that the Rock County Board of Supervisors duly assembled this 9th day of February 2017, adopts the updated Rock County All Hazards Mitigation Plan as an official countywide mitigation plan; and,

BE IT FURTHER RESOLVED, that the Rock County Sheriff's Office – Emergency Management Bureau will submit, on behalf of the participating municipalities, upon its adoption by all such municipalities, the updated All Hazards Mitigation Plan to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final review and approval, without further adoptions being necessary post-revisions.

17-2A-214

Respectfully submitted,

PUBLIC SAFETY AND JUSTICE COMMITTEE

Mary Beaver, Chair

Henry Brill

Terry Fell

Brian Knudson

Phillip Owens

FISCAL NOTE:

No fiscal impact in and by itself.

Sherry Oja
Finance Director

LEGAL NOTE:

The County Board is authorized to take this action pursuant to §§ 59.01 and 59.51, Wis. Stats.

Jeffrey S. Kuglitsch
Corporation Counsel

ADMINISTRATIVE NOTE:

Recommended.

Josh Smith
County Administrator

Rock County received a FEMA Pre-Disaster Mitigation Grant to pay for the cost of writing an *All-Hazards Mitigation Plan* that was originally approved by the state in 2005. The plan must be updated every five years. The Plan covers all underlying jurisdictions in Rock County and is a prerequisite to receiving federal Disaster Mitigation funding as well as the Hazard Mitigation Grant Program (HMGP) funds.

The Rock County Hazard Mitigation Plan supports the implementation of long-term hazard mitigation measures following a major disaster declaration within the State of Wisconsin. Rock County was awarded a Pre-Disaster Mitigation Program Grant for the update in 2014, authorizing EPTEC, Inc. to assist with the update, awarding $24,953.35 with a $6,238.35 local share.

Following public review, Rock County and the local municipalities adopt the plan, maintaining eligibility for mitigation grant programs made available through FEMA. Adopting the newly updated plan would help expedite access to federal funds should they be needed in the future.

CITY OF EDGERTON RESOLUTION No. 06-17

ADOPTING THE UPDATED ROCK COUNTY ALL HAZARDS MITIGATION PLAN

FISCAL IMPACT: None

WHEREAS, the City of Edgerton recognizes the threat that natural hazards pose to people and property; and

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

WHEREAS, an updated All Hazards Mitigation Plan is required by FEMA as a condition of future grant funding for mitigation projects; and

WHEREAS, the City of Edgerton participated jointly in the planning process with Rock County and the other local units of government within the County to prepare an updated All Hazards Mitigation Plan, which was made available for review via a Legal Notice and a copy of which will reside permanently in the Rock County Emergency Management Office;

NOW, THEREFORE, BE IT RESOLVED, that the City Council of the City of Edgerton adopts the updated Rock County All Hazards Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED, that the Rock County Emergency Management Department will submit, on behalf of the City, the updated All Hazards Mitigation Plan to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final review and approval. Minor changes made upon advice from Wisconsin Emergency Management and Federal Emergency Management Agency will not require re-adopting this resolution.

Passed and adopted this 6th day of February, 2017

Motion by: Mark Wellnitz
Seconded by: Matt McIntyre

Roll Call: Yeas: 5 Noes: -0-

Christopher W. Lund, Mayor

ATTEST:

Ramona Flanigan, City Administrator

FILE RESOLUTION NO. 2017 - 1386

A resolution adopting the updated Rock County All Hazards Mitigation Plan

WHEREAS, the City of Janesville recognizes the threat that natural hazards pose to people and property; and

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

WHEREAS, an updated All Hazards Mitigation Plan is required by FEMA as a condition of future grant funding for mitigation projects; and

WHEREAS, an adoption of the updated Rock County All Hazards Mitigation Plan does not require the City Council of the City of Janesville to provide funding to implement the Plan; and

WHEREAS, the City of Janesville participated jointly in the planning process with Rock County and the other local units of government within the County to prepare an updated All Hazards Mitigation Plan, which was made available for review via a Legal Notice and a copy of which will reside permanently in the Rock County Emergency Management Office; and

WHEREAS, the City Council of the City of Janesville find that the Rock County All Hazards Mitigation Plan and related submissions are in the best interest of, and benefit to, the City of Janesville and its residents and businesses.

NOW, THEREFORE, BE IT RESOLVED, that the City Council of the City of Janesville adopts the updated Rock County All Hazards Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED, that the Rock County Emergency Management Department will submit, on behalf of the City, the updated All Hazards Mitigation Plan to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final review and approval. Minor changes made upon advice from Wisconsin Emergency Management and Federal Emergency Management Agency will not require re-adopting this resolution.

ADOPTED: January 23, 2017

APPROVED:

Mark A. Freitag, City Manager

ATTEST:

David T. Godek, City Clerk-Treasurer

APPROVED AS TO FORM:

Wald Klimczyk, City Attorney

Proposed by: Rock County Emergency Management
Prepared by: City Manager's Office

Motion by: Consent				
Second by: Consent				
Councilmember	**Aye**	**Nay**	**Pass**	**Absent**
Deupree	X			
Gruber	X			
Jorgensen	X			
Liebert	X			
Marklein	X			
Tidwell				X
Williams	X			

RESOLUTION # 2017-19
ADOPTING THE UPDATED ROCK COUNTY
ALL HAZARDS MITIGATION PLAN

WHEREAS, the City of Milton recognizes the threat that natural hazards pose to people and property; and

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

WHEREAS, an updated All Hazards Mitigation Plan is required by FEMA as a condition of future grant funding for mitigation projects; and

WHEREAS, the City of Milton participated jointly in the planning process with Rock County and the other local units of government within the County to prepare an updated All Hazards Mitigation Plan, which was made available for review via a Legal Notice and a copy of which will reside permanently in the Rock County Emergency Management Office;

WHEREAS, there is no fiscal impact to the City of Milton by being a part of the All Hazards Mitigation Plan; and

NOW, THEREFORE, BE IT RESOLVED, that the City Council of the City of Milton adopts the updated Rock County All Hazards Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED, that the Rock County Emergency Management Department will submit, on behalf of the City, the updated All Hazards Mitigation Plan to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final review and approval. Minor changes made upon advice from Wisconsin Emergency Management and Federal Emergency Management Agency will not require re-adopting this resolution.

I hereby certify that the foregoing resolution was duly adopted by City of Milton Common Council meeting on the 19th day of September, 2017.

CITY OF MILTON:

Anissa Welch, Mayor

Attest:

Leanne Schroeder, City Clerk

RESOLUTION # 2017-02

ADOPTING THE UPDATED ROCK COUNTY ALL HAZARDS MITIGATION PLAN

FISCAL IMPACT: None

WHEREAS, the Village of Footville recognizes the threat that natural hazards pose to people and property; and

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

WHEREAS, an updated All Hazards Mitigation Plan is required by FEMA as a condition of future grant funding for mitigation projects; and

WHEREAS, the Village of Footville participated jointly in the planning process with Rock County and the other local units of government within the County to prepare an updated All Hazards Mitigation Plan, which was made available for review via a Legal Notice and a copy of which will reside permanently in the Rock County Emergency Management Office;

NOW, THEREFORE, BE IT RESOLVED, that the Village Board of the Village of Footville, hereby adopts the updated Rock County All Hazards Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED, that the Rock County Emergency Management Department will submit, on behalf of the Village, the updated All Hazards Mitigation Plan to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final review and approval. Minor changes made upon advice from Wisconsin Emergency Management and Federal Emergency Management Agency will not require re-adopting this resolution.

PASSED: 2-2-2017

Certifying Official

RESOLUTION # R-2017-01

ADOPTING THE UPDATED ROCK COUNTY ALL HAZARDS MITIGATION PLAN

FISCAL IMPACT: None

WHEREAS, the Village of Orfordville recognizes the threat that natural hazards pose to people and property; and

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

WHEREAS, an updated All Hazards Mitigation Plan is required by FEMA as a condition of future grant funding for mitigation projects; and

WHEREAS, the Village of Orfordville participated jointly in the planning prooooo with Rock County and the other local units of government within the County to prepare an updated All Hazards Mitigation Plan, which was made available for review via a Legal Notice and a copy of which will reside permanently in the Rock County Emergency Management Office;

NOW, THEREFORE, BE IT RESOLVED, that the Village Board of the Village of Orfordville, hereby adopts the updated Rock County All Hazards Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED, that the Rock County Emergency Management Department will submit, on behalf of the Village, the updated All Hazards Mitigation Plan to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final review and approval. Minor changes made upon advice from Wisconsin Emergency Management and Federal Emergency Management Agency will not require re-adopting this resolution.

PASSED: 2-13-17 Unanimously

David Olsen- Village President

Attest: Sherri L Waege

Sherri Waege-Village Clerk

TOWN OF AVON

RESOLUTION # 2017-March 8

ADOPTING THE UPDATED ROCK COUNTY ALL HAZARDS MITIGATION PLAN

FISCAL IMPACT: None

WHEREAS, The Town of Avon recognizes the threat that natural hazards pose to people and property; and

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

WHEREAS, an updated All Hazards Mitigation Plan by FEMA as a condition of future grant funding for mitigation projects; and

WHEREAS, The Town of Avon participated jointly in the planning process with Rock County and the other local units of government within the County to prepare an updated All Hazards Mitigation Plan, which was made available to review via a Legal Notice and a copy of which will reside permanently in the Rock County Emergency Management Office;

NOW, THEREFORE, BE IT RESOLVED, that the Rock County Emergency Management Department will submit, on behalf of the Town, the updated All Hazards Mitigation Plan to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final review and approval. Minor changes made upon advice from Wisconsin Emergency Management and Federal Emergency Management Agency will not require re-adopting this resolution.

Passed 3-7-2017

Signed by Michael F Moore

Posted March 8 2017

TOWN OF BELOIT Wisconsin

2871 S. Afton Rd.
Beloit, WI 53511
608.364.2980 Phone
608.364.2986 Fax
www.townofbeloit.org

RESOLUTION # 17-02

ADOPTING THE UPDATED ROCK COUNTY ALL HAZARDS MITIGATION PLAN

FISCAL IMPACT: None

WHEREAS, the Town of Beloit recognizes the threat that natural hazards pose to people and property; and

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

WHEREAS, an updated All Hazards Mitigation Plan is required by FEMA as a condition of future grant funding for mitigation projects; and

WHEREAS, the Town of Beloit participated jointly in the planning process with Rock County and the other local units of government within the County to prepare an updated All Hazards Mitigation Plan, which was made available for review via a Legal Notice and a copy of which will reside permanently in the Rock County Emergency Management Office;

NOW, THEREFORE, BE IT RESOLVED, that the Town Board of the Town of Beloit, hereby adopts the updated Rock County All Hazards Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED, that the Rock County Emergency Management Department will submit, on behalf of the Town, the updated All Hazards Mitigation Plan to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final review and approval. Minor changes made upon advice from Wisconsin Emergency Management and Federal Emergency Management Agency will not require re-adopting this resolution.

PASSED: 1-30-2017.

Diane M. Greenlee
Certifying Official

RESOLUTION # 2016-64

ADOPTING THE UPDATED ROCK COUNTY ALL HAZARDS MITIGATION PLAN

FISCAL IMPACT: None

WHEREAS, the Town of Bradford recognizes the threat that natural hazards pose to people and property; and

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

WHEREAS, an updated All Hazards Mitigation Plan is required by FEMA as a condition of future grant funding for mitigation projects; and

WHEREAS, the Town of Bradford participated jointly in the planning process with Rock County and the other local units of government within the County to prepare an updated All Hazards Mitigation Plan, which was made available for review via a Legal Notice and a copy of which will reside permanently in the Rock County Emergency Management Office;

NOW, THEREFORE, BE IT RESOLVED, that the Town Board of the Town of Bradford, hereby adopts the updated Rock County All Hazards Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED, that the Rock County Emergency Management Department will submit, on behalf of the Town, the updated All Hazards Mitigation Plan to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final review and approval. Minor changes made upon advice from Wisconsin Emergency Management and Federal Emergency Management Agency will not require re-adopting this resolution.

PASSED: Unanimously 1-17-2017

Certifying Official

RESOLUTION # 2017-01

ADOPTING THE UPDATED ROCK COUNTY ALL HAZARDS MITIGATION PLAN

FISCAL IMPACT: None

WHEREAS, the Town of Center recognizes the threat that natural hazards pose to people and property; and

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

WHEREAS, an updated All Hazards Mitigation Plan is required by FEMA as a condition of future grant funding for mitigation projects; and

WHEREAS, the Town of Center participated jointly in the planning process with Rock County and the other local units of government within the County to prepare an updated All Hazards Mitigation Plan, which was made available for review via a Legal Notice and a copy of which will reside permanently in the Rock County Emergency Management Office;

NOW, THEREFORE, BE IT RESOLVED, that the Town Board of the Town of Center, hereby adopts the updated Rock County All Hazards Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED, that the Rock County Emergency Management Department will submit, on behalf of the Town, the updated All Hazards Mitigation Plan to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final review and approval. Minor changes made upon advice from Wisconsin Emergency Management and Federal Emergency Management Agency will not require re-adopting this resolution.

PASSED: 2-20-17

Deanna Udulutsch, Clerk
Certifying Official

RESOLUTION # 17-2

ADOPTING THE UPDATED ROCK COUNTY ALL HAZARDS MITIGATION PLAN

FISCAL IMPACT: None

WHEREAS, the Town of Clinton recognizes the threat that natural hazards pose to people and property; and

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

WHEREAS, an updated All Hazards Mitigation Plan is required by FEMA as a condition of future grant funding for mitigation projects; and

WHEREAS, the Town of Clinton participated jointly in the planning process with Rock County and the other local units of government within the County to prepare an updated All Hazards Mitigation Plan, which was made available for review via a Legal Notice and a copy of which will reside permanently in the Rock County Emergency Management Office;

NOW, THEREFORE, BE IT RESOLVED, that the Town Board of the Town of Clinton, hereby adopts the updated Rock County All Hazards Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED, that the Rock County Emergency Management Department will submit, on behalf of the Town, the updated All Hazards Mitigation Plan to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final review and approval. Minor changes made upon advice from Wisconsin Emergency Management and Federal Emergency Management Agency will not require re-adopting this resolution.

PASSED: 3/20/2017

Certifying Official

RESOLUTION # 2017-1

ADOPTING THE UPDATED ROCK COUNTY ALL HAZARDS MITIGATION PLAN

FISCAL IMPACT: None

WHEREAS, the Town of Fulton recognizes the threat that natural hazards pose to people and property; and

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

WHEREAS, an updated All Hazards Mitigation Plan is required by FEMA as a condition of future grant funding for mitigation projects; and

WHEREAS, the Town of Fulton participated jointly in the planning process with Rock County and the other local units of government within the County to prepare an updated All Hazards Mitigation Plan, which was made available for review via a Legal Notice and a copy of which will reside permanently in the Rock County Emergency Management Office;

NOW, THEREFORE, BE IT RESOLVED, that the Town Board of the Town of Fulton, hereby adopts the updated Rock County All Hazards Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED, that the Rock County Emergency Management Department will submit, on behalf of the Town, the updated All Hazards Mitigation Plan to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final review and approval. Minor changes made upon advice from Wisconsin Emergency Management and Federal Emergency Management Agency will not require re-adopting this resolution.

Adopted by the Town Board of the Town of Fulton on February 14, 2017.

Evan Sayre, Town Chair

Attest: Connie Zimmerman – Town Clerk

TOWN OF HARMONY
ROCK COUNTY, WISCONSIN

RESOLUTION NO. 020617

RECITALS

A. The Town of Harmony recognizes the threat that natural hazards pose to people and property; and

B. The Town of Harmony believes that undertaking hazard mitigation actions before disasters occur will reduce the potential harm to people and property and save tax payer dollars; and

C. An updated All Hazards Mitigation Plan is required by FEMA as a condition of future grant funding for mitigation projects;

D. The Town of Harmony participated jointly in the planning process with Rock County and the other local units of government within the County to prepare an updated All Hazards Mitigation Plan, which was made available for review via a Legal Notice and a copy of which will reside permanently in the Rock County Emergency Management Office.

Upon the foregoing recitals, THIS RESOLUTION is adopted by the Town Board of the Town of Harmony, Rock County, Wisconsin, and the Rock County All Hazards Mitigation Plan is adopted as the official plan for the Town of Harmony;

IT IS FURTHER RESOLVED, that the Rock County Emergency Management Department will submit, on behalf of the Town, the updated All Hazards Mitigation Plan to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final review and approval. Minor changes made upon advice from Wisconsin Emergency Management and Federal Emergency Management Agency will not require re-adopting this resolution.

DATE: 2/6/17

John C. Bergman, Town Chair

CERTIFICATE

I hereby certify that the above Resolution was adopted by the Town Board of the Town of Harmony on the 6 day of Feb, 2017, and that on the 7 day of Feb, 2017, a copy of the above Resolution was posted in three places in the Town as follows:

Harmony Town Hall
Fanning Excavating
Town of Harmony.com

Tim Tollefson, Town Clerk
Town of Harmony

RESOLUTION # 170216

ADOPTING THE UPDATED ROCK COUNTY ALL HAZARDS MITIGATION PLAN

FISCAL IMPACT: None

WHEREAS, the Town of Janesville recognizes the threat that natural hazards pose to people and property; and

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

WHEREAS, an updated All Hazards Mitigation Plan is required by FEMA as a condition of future grant funding for mitigation projects; and

WHEREAS, the Town of Janesville participated jointly in the planning process with Rock County and the other local units of government within the County to prepare an updated All Hazards Mitigation Plan, which was made available for review via a Legal Notice and a copy of which will reside permanently in the Rock County Emergency Management Office;

NOW, THEREFORE, BE IT RESOLVED, that the Town Board of the Town of Janesville, hereby adopts the updated Rock County All Hazards Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED, that the Rock County Emergency Management Department will submit, on behalf of the Town, the updated All Hazards Mitigation Plan to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final review and approval. Minor changes made upon advice from Wisconsin Emergency Management and Federal Emergency Management Agency will not require re-adopting this resolution.

ADOPTED by the Town Board of the Town of Janesville on the 6th day of February, 2017.

TOWN OF JANESVILLE

By: Bruce Schneider
Bruce Schneider, Town Chair

Attest: Linda Fewell
Linda Fewell, Town Clerk

RESOLUTION # 17-2

ADOPTING THE UPDATED ROCK COUNTY ALL HAZARDS MITIGATION PLAN

FISCAL IMPACT: None

WHEREAS, the Town of Johnstown recognizes the threat that natural hazards pose to people and property; and

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

WHEREAS, an updated All Hazards Mitigation Plan is required by FEMA as a condition of future grant funding for mitigation projects; and

WHEREAS, the Town of Johnstown participated jointly in the planning process with Rock County and the other local units of government within the County to prepare an updated All Hazards Mitigation Plan, which was made available for review via a Legal Notice and a copy of which will reside permanently in the Rock County Emergency Management Office;

NOW, THEREFORE, BE IT RESOLVED, that the Town Board of the Town of Johnstown, hereby adopts the updated Rock County All Hazards Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED, that the Rock County Emergency Management Department will submit, on behalf of the Town, the updated All Hazards Mitigation Plan to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final review and approval. Minor changes made upon advice from Wisconsin Emergency Management and Federal Emergency Management Agency will not require re-adopting this resolution.

PASSED: 2-20-17

Dennis Fogltanz

Certifying Official

RESOLUTION

ADOPTING THE 2017 UPDATE OF THE ROCK COUNTY ALL HAZARDS MITIGATION PLAN

WHEREAS, the Town of La Prairie recognizes the threat that natural hazards pose to people and property; and

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

WHEREAS, an updated All Hazards Mitigation Plan is required by FEMA as a condition of future grant funding for mitigation projects; and

WHEREAS, the Town of La Prairie participated jointly in the planning process with Rock County and the other local units of government within the County to prepare an updated All Hazards Mitigation Plan, which was made available for review via a Legal Notice and a copy of which will reside permanently in the Rock County Emergency Management Office;

NOW, THEREFORE, BE IT RESOLVED, that the Town Board of the Town of La Prairie on this 8th day of February 2017, hereby adopts the updated Rock County All Hazards Mitigation Plan as the Town's official All Hazards Mitigation Plan; and

BE IT FURTHER RESOLVED, that the Rock County Emergency Management Department will submit, on behalf of the Town, the updated All Hazards Mitigation Plan to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final review and approval. Minor changes made upon advice from Wisconsin Emergency Management and Federal Emergency Management Agency will not require re-adopting this resolution.

ATTEST:

Passed: 2/8/2017

La Gena Crawford, Town Clerk

Allen Arndt, Chair

RESOLUTION # 1 - 2017

ADOPTING THE UPDATED ROCK COUNTY ALL HAZARDS MITIGATION PLAN

FISCAL IMPACT: None

WHEREAS, the Town of Magnolia recognizes the threat that natural hazards pose to people and property; and

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

WHEREAS, an updated All Hazards Mitigation Plan is required by FEMA as a condition of future grant funding for mitigation projects; and

WHEREAS, the Town of Magnolia participated jointly in the planning process with Rock County and the other local units of government within the County to prepare an updated All Hazards Mitigation Plan, which was made available for review via a Legal Notice and a copy of which will reside permanently in the Rock County Emergency Management Office;

NOW, THEREFORE, BE IT RESOLVED, that the Town Board of the Town of Magnolia, hereby adopts the updated Rock County All Hazards Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED, that the Rock County Emergency Management Department will submit, on behalf of the Town, the updated All Hazards Mitigation Plan to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final review and approval. Minor changes made upon advice from Wisconsin Emergency Management and Federal Emergency Management Agency will not require re-adopting this resolution.

PASSED: 2-14-2017

Kurt Bartlett

Kurt Bartlett, Town Chairman

RESOLUTION ADOPTING THE UPDATED ROCK COUNTY ALL HAZARDS MITIGATION PLAN

TOWN OF MILTON
ROCK COUNTY, WISCONSIN

RESOLUTION NO. **2017-2**

RECITALS

A. The Town of Milton recognizes the threat that natural hazards pose to people and property; and

B. The Town of Milton believes that undertaking hazard mitigation actions before disasters occur will reduce the potential harm to people and property and save tax payer dollars; and

C. An updated All Hazards Mitigation Plan is required by FEMA as a condition of future grant funding for mitigation projects;

D. The Town of Milton participated jointly in the planning process with Rock County and the other local units of government within the County to prepare an updated All Hazards Mitigation Plan, which was made available for review via a Legal Notice and a copy of which will reside permanently in the Rock County Emergency Management Office.

Upon the foregoing recitals, THIS RESOLUTION is adopted by the Town Board of the Town of Milton, Rock County, Wisconsin, and the Rock County All Hazards Mitigation Plan is adopted as the official plan for the Town of Milton;

IT IS FURTHER RESOLVED, that the Rock County Emergency Management Department will submit, on behalf of the Town, the updated All Hazards Mitigation Plan to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final review and approval. Minor changes made upon advice from Wisconsin Emergency Management and Federal Emergency Management Agency will not require re-adopting this resolution.

DATE: 2-13-17

Bryan Meyer, Town Chairman

TOWN OF PLYMOUTH
RESOLUTION # 2017- 01

ADOPTING THE UPDATED ROCK COUNTY ALL HAZARDS MITIGATION PLAN

FISCAL IMPACT: None

WHEREAS, the Town of Plymouth recognizes the threat that natural hazards pose to people and property; and

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

WHEREAS, an updated All Hazards Mitigation Plan is required by FEMA as a condition of future grant funding for mitigation projects; and

WHEREAS, the Town of Plymouth participated jointly in the planning process with Rock County and the other local units of government within the County to prepare an updated All Hazards Mitigation Plan, which was made available for review via a Legal Notice and a copy of which will reside permanently in the Rock County Emergency Management Office;

NOW, THEREFORE, BE IT RESOLVED, that the Town Board of the Town of Plymouth, hereby adopts the updated Rock County All Hazards Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED that the Rock County Emergency Management Department will submit, on behalf of the Town, the updated All Hazards Mitigation Plan to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final review and approval. Minor changes made upon advice from Wisconsin Emergency Management and Federal Emergency Management Agency will not require re-adopting this resolution.

February 14, 2017

Dean Connell, Chairperson

ATTEST:

Susan Douglas, Clerk

RESOLUTION # 2017-10

ADOPTING THE UPDATED ROCK COUNTY ALL HAZARDS MITIGATION PLAN

FISCAL IMPACT: None

Whereas, the Town of Porter recognizes the threat that natural hazards pose to people and property; and

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

Whereas, an updated All Hazard Mitigation Plan is required by FEMA as a condition for future grant funding for mitigation projects; and

Whereas, the Town of Porter participated jointly in the planning process with Rock County and other local units of government within the County to prepare an updated All Hazards Mitigation Plan, which was made available for review via a Legal Notice and a copy of which will reside permanently in the Rock County Emergency Management Office;

Now, Therefore Be It Resolved, that the Town Board of the Town of Porter, hereby adopts the updated Rock County All Hazards Mitigation Plan; and

Be It Further Resolved. That the Rock County Emergency Management Department will submit, on behalf of the Town, the updated All Hazards Mitigation Plan to Wisconsin Emergency Management and Federal Emergency Management Agency and will not require re-adopting this resolution.

Adopted by the Town Board of the Town of Porter on October 16, 2017.

David Viney, Town Chairman

Attest: Nancy Towns, Clerk

TOWN OF ROCK
RESOLUTION NO. 2017 - 01

RESOLUTION FOR ADOPTION OF THE AMENDED AND UPDATED ROCK COUNTY HAZARD MITIGATION PLAN

The Town Board of the Town of Rock, Rock County, Wisconsin, hereby adopts the following resolution:

BE IT RESOLVED by the Town Board of the Town of Rock, Rock County, Wisconsin that:

(1) The Town of Rock (the "Town") recognizes that natural hazards pose a threat to residents and property of the Town.

(2) Undertaking hazard mitigation actions before disasters occur will reduce the potential for harm to people and property and will ultimately save taxpayer dollars.

(3) In order to be eligible for future grant funding for mitigation projects, FEMA requires the Town and Rock County to update the All Hazards Mitigation Plan

(4) The Town participated jointly in the planning process with Rock County and other local units of government within the County to update the All Hazards Mitigation Plan, which was made available for review via a Legal Notice, and a copy of which will reside permanently in the Rock County Emergency Management Office.

BE IT FURTHER RESOLVED, that the Rock County Emergency Management Department will submit, on behalf of the Town, the updated All Hazards Mitigation Plan to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final review and approval. Minor changes made upon advice from Wisconsin Emergency Management and Federal Emergency Management Agency will not require re-adopting this resolution.

This resolution is adopted by the Town Board of the Town of Rock, Rock County, Wisconsin, this 6th day of February, 2017.

TOWN OF ROCK

By: Mark P. Gunn
Mark Gunn, Town Chairperson

By: _____
Tony Dubanowich, Town Supervisor

By: _____
Peter Parker, Town Supervisor

I hereby certify that the above resolution was adopted by the Town Board of the Town of Rock on the 6th day of June, 2017, and on the 8th day of June, 2017, copies of the above resolution were posted by me in three (3) public places in the Town of Rock, Rock County, Wisconsin.

_____
Deborah Bennett, Town Clerk
Town of Rock, Rock County, Wisconsin

Subscribed and sworn to before me this
_____ day of _____, 2017.

_____
Notary Public, Rock County, Wisconsin
My Commission expires _____

Resolution for Adoption of Hazard Mitigation Plan-033016

TOWN OF SPRING VALLEY
RESOLUTION #2017-0213

ADOPTING THE UPDATED ROCK COUNTY ALL HAZARDS MITIGATION PLAN

FISCAL IMPACT: None

WHEREAS, the Town of Spring Valley recognizes the threat that natural hazards pose to people and property; and

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

WHEREAS, an updated All Hazards Mitigation Plan is required by FEMA as a condition of future grant funding for mitigation projects; and

WHEREAS, the Town of Spring Valley participated jointly in the planning process with Rock County and the other local units of government within the County to prepare an updated All Hazards Mitigation Plan, which was made available for review via a Legal Notice and a copy of which will reside permanently in the Rock County Emergency Management Office;

NOW, THEREFORE, BE IT RESOLVED, that the Town Board of the Town of Spring Valley, hereby adopts the updated Rock County All Hazards Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED, that the Rock County Emergency Management Department will submit, on behalf of the Town, the updated All Hazards Mitigation Plan to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final review and approval. Minor changes made upon advice from Wisconsin Emergency Management and Federal Emergency Management Agency will not require re-adopting this resolution.

PASSED: 2/13/2017

David J Breitkau SUPERVISOR I - ACTING CHAIR.
Certifying Official

RESOLUTION # 2017-01

ADOPTING THE UPDATED ROCK COUNTY ALL HAZARDS MITIGATION PLAN

FISCAL IMPACT: None

WHEREAS, the Town of Turtle recognizes the threat that natural hazards pose to people and property; and

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

WHEREAS, an updated All Hazards Mitigation Plan is required by FEMA as a condition of future grant funding for mitigation projects; and

WHEREAS, the Town of Turtle participated jointly in the planning process with Rock County and the other local units of government within the County to prepare an updated All Hazards Mitigation Plan, which was made available for review via a Legal Notice and a copy of which will reside permanently in the Rock County Emergency Management Office;

NOW, THEREFORE, BE IT RESOLVED, that the Town Board of the Town of Turtle, hereby adopts the updated Rock County All Hazards Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED, that the Rock County Emergency Management Department will submit, on behalf of the Town, the updated All Hazards Mitigation Plan to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final review and approval. Minor changes made upon advice from Wisconsin Emergency Management and Federal Emergency Management Agency will not require re-adopting this resolution.

PASSED: 4-5-17

Certifying Official

Appendix D: Summary of Mitigation Strategies

Hazard Type	Mitigation Action	Priority	Estimated Cost	Responsible Management Agency	Communities Benefiting	Project Timeframe	Comments
All Hazards	Conduct public outreach to promote emergency preparedness and awareness	High	Covered by department annual budgets	County Emergency Management, Public Health Department, UW-Extension	Rock County, C. of Beloit, Brodhead, Edgerton, Evansville, Janesville, Milton; V of Clinton, Footville, Orfordville; and T of Avon, Beloit, Bradford, Center, Clinton, Fulton, Harmony, Janesville, Johnstown, LaPrairie, Lima, Magnolia, Milton, Newark, Plymouth, Porter, Rock, Spring Valley, Turtle, Union	Ongoing	Look for opportunities to incorporate materials into events and on county websites as applicable Tailor for all hazards, tornados/high winds, severe storms, winter storms, extreme temperatures, flooding, etc., as appropriate

Hazard Type	Mitigation Action	Priority	Estimated Cost	Responsible Management Agency	Communities Benefiting	Project Timeframe	Comments
All Hazards	Continue to promote the use of National Oceanic and Atmospheric Administration (NOAA) weather radios	Medium	Covered by department annual budget	County Emergency Management	Rock County, C. of Beloit, Brodhead, Edgerton, Evansville, Janesville, Milton; V of Clinton, Footville, Orfordville; and T of Avon, Beloit, Bradford, Center, Clinton, Fulton, Harmony, Janesville, Johnstown, LaPrairie, Lima, Magnolia, Milton, Newark, Plymouth, Porter, Rock, Spring Valley, Turtle, Union	Ongoing	Including for places which hold large public gatherings like Rhythm and Booms, the County Fair, 4H events, etc.

Hazard Type	Mitigation Action	Priority	Estimated Cost	Responsible Management Agency	Communities Benefiting	Project Timeframe	Comments
All Hazards	Investigate newer technology options for a county-wide emergency alert program for county and city residents and businesses	High	County or municipal budget for scope/bid process	County Emergency Management, Sheriff's Department, Communications Center	Rock County, C. of Beloit, Brodhead, Edgerton, Evansville, Janesville, Milton; V of Clinton, Footville, Orfordville; and T of Avon, Beloit, Bradford, Center, Clinton, Fulton, Harmony, Janesville, Johnstown, LaPrairie, Lima, Magnolia, Milton, Newark, Plymouth, Porter, Rock, Spring Valley, Turtle, Union	2020	E.g., Reverse 911 system, smart phone apps Could be used in the event of tornados/ high winds, severe storms (thunder/lightning), severe winter storms, flooding, extreme heat or cold, etc.

Hazard Type	Mitigation Action	Priority	Estimated Cost	Responsible Management Agency	Communities Benefiting	Project Timeframe	Comments
All Hazards	Coordinate with the American Red Cross as needed to support their shelter inventory work in the county	Medium	Covered by department annual budgets	County Emergency Management	Rock County, C. of Beloit, Brodhead, Edgerton, Evansville, Janesville, Milton; V of Clinton, Footville, Orfordville; and T of Avon, Beloit, Bradford, Center, Clinton, Fulton, Harmony, Janesville, Johnstown, LaPrairie, Lima, Magnolia, Milton, Newark, Plymouth, Porter, Rock, Spring Valley, Turtle, Union	Ongoing	

Hazard Type	Mitigation Action	Priority	Estimated Cost	Responsible Management Agency	Communities Benefiting	Project Timeframe	Comments
All Hazards	Conduct annual school assessments and continue to coordinate to receive and maintain copies of emergency plans for county schools and some daycares	Medium	Covered by department annual budget	County Emergency Management	Rock County, C. of Beloit, Brodhead, Edgerton, Evansville, Janesville, Milton; V of Clinton, Footville, Orfordville; and T of Avon, Beloit, Bradford, Center, Clinton, Fulton, Harmony, Janesville, Johnstown, LaPrairie, Lima, Magnolia, Milton, Newark, Plymouth, Porter, Rock, Spring Valley, Turtle, Union	Ongoing	

Hazard Type	Mitigation Action	Priority	Estimated Cost	Responsible Management Agency	Communities Benefiting	Project Timeframe	Comments
All Hazards	Expand Wisconsin Interoperable System for Communications (WISCOM) in the southern part of the county	Medium-High	To Be Determined – funded by county and grant dollars	Sheriff's Department, Communications Center, Rock County Fire Officer's Association, municipalities	Rock County, C. of Beloit, Brodhead, Edgerton, Evansville, Janesville, Milton; V of Clinton, Footville, Orfordville; and T of Avon, Beloit, Bradford, Center, Clinton, Fulton, Harmony, Janesville, Johnstown, LaPrairie, Lima, Magnolia, Milton, Newark, Plymouth, Porter, Rock, Spring Valley, Turtle, Union	2021	Also look into public/private partnership options to add signal boosters to larger buildings – police and fire digital radios don't penetrate; building codes require boosters for new buildings but upgrades are needed for existing structures

Hazard Type	Mitigation Action	Priority	Estimated Cost	Responsible Management Agency	Communities Benefiting	Project Timeframe	Comments
Drought/Dust Storm	County should be prepared to provide information to farmers during times of drought (including information on the purchase of crop insurance)	Low	Covered by annual budget	UW-Ext./FSA with	Rock County, C. of Beloit, Brodhead, Edgerton, Evansville, Janesville, Milton; V of Clinton, Footville, Orfordville; and T of Avon, Beloit, Bradford, Center, Clinton, Fulton, Harmony, Janesville, Johnstown, LaPrairie, Lima, Magnolia, Milton, Newark, Plymouth, Porter, Rock, Spring Valley, Turtle, Union	As needed	

Hazard Type	Mitigation Action	Priority	Estimated Cost	Responsible Management Agency	Communities Benefiting	Project Timeframe	Comments
Fog	Assisting motorists in the fog primarily involve notification and warning of the risks and include: • Fog area warnings • School delays • Road warnings/flashers in areas with higher than average risk.	Medium	Covered by annual budget	National Weather Service; Local School Districts; State, County and Municipal Law Enforcement and Highway/Public Works Dept.	Rock County, C. of Beloit, Brodhead, Edgerton, Evansville, Janesville, Milton; V of Clinton, Footville, Orfordville; and T of Avon, Beloit, Bradford, Center, Clinton, Fulton, Harmony, Janesville, Johnstown, LaPrairie, Lima, Magnolia, Milton, Newark, Plymouth, Porter, Rock, Spring Valley, Turtle, Union	Ongoing	

Hazard Type	Mitigation Action	Priority	Estimated Cost	Responsible Management Agency	Communities Benefiting	Project Timeframe	Comments
Flooding*	Explore potential solutions for high-risk properties (including county resources) at risk of flooding and, as appropriate, investigate acquisition or other mitigation strategies for repetitive-loss properties	Medium	Scope/decision process covered by department or municipal budgets	County Planning, Economic, & Community Development; affected departments and/or municipalities	Rock County, C. of Beloit, Brodhead, Edgerton, Evansville, Janesville, Milton; V of Clinton, Footville, Orfordville; and T of Avon, Beloit, Bradford, Center, Clinton, Fulton, Harmony, Janesville, Johnstown, LaPrairie, Lima, Magnolia, Milton, Newark, Plymouth, Porter, Rock, Spring Valley, Turtle, Union	Ongoing	Some specific, known projects are identified in subsequent items
Flooding	Explore potential solutions for at-risk properties on Clear Lake	Low	Scope/decision process covered by department or municipal budgets	T of Milton with Rock County	Town of Milton	2022	

Hazard Type	Mitigation Action	Priority	Estimated Cost	Responsible Management Agency	Communities Benefiting	Project Timeframe	Comments
Flooding	Explore potential solutions for high-risk properties along Lake Koshkonong; between Janesville and Beloit along Highway 51; and in the area of River Rd., Walworth, Community Ave.	Medium-High	Scope/decision process covered by department or municipal budgets; explore grant or other funding opportunities for implementation of identified solutions	County Land Conservation, affected municipalities	T of Rock	2022	The Highway 51 area of concern is mostly low income (including trailer park and 6-8 houses) Review structures that had flooding, make contact with owners to assess interest and evaluate ongoing issues, plan strategies (buyouts, berming, etc.)
Flooding	Explore potential solutions for at-risk properties in Starview subdivision	Medium	Scope/decision process covered by department or municipal budgets	T of Harmony with Rock Co.	T of Harmony	2022	

Hazard Type	Mitigation Action	Priority	Estimated Cost	Responsible Management Agency	Communities Benefiting	Project Timeframe	Comments
Flooding	Investigate potential solutions for Beloit Box Board Company flooding issues	Medium	Scope/decision process covered by department or municipal budgets; explore grant or other funding opportunities for implementation of identified solutions	C. Beloit Engineering in cooperation with Beloit Box Board	C of Beloit	2022	100-year-old building built right along river: water floods the parking lots and comes in windows C. Beloit changed some landscaping and added raised beds but more is needed; also need to upgrade from dirt to concrete Company has pumps that run constantly during wet weather Review structure; make contact with owners to assess interest, evaluate ongoing issues, plan strategies

Hazard Type	Mitigation Action	Priority	Estimated Cost	Responsible Management Agency	Communities Benefiting	Project Timeframe	Comments
Flooding*	Continue to support homeowners with small flood mitigation projects	Medium-High	Covered by department annual budgets	County Land Conservation	Rock County, C. of Beloit, Brodhead, Edgerton, Evansville, Janesville, Milton; V of Clinton, Footville, Orfordville; and T of Avon, Beloit, Bradford, Center, Clinton, Fulton, Harmony, Janesville, Johnstown, LaPrairie, Lima, Magnolia, Milton, Newark, Plymouth, Porter, Rock, Spring Valley, Turtle, Union	Ongoing	Example might be elevating functionals (e.g., washer/dryer, HVAC)

Hazard Type	Mitigation Action	Priority	Estimated Cost	Responsible Management Agency	Communities Benefiting	Project Timeframe	Comments
Flooding	Investigate potential solutions for flooding in the Turtle Creek floodplain area	Medium-High	Scope/decision process covered by department or municipal budgets; explore grant or other funding opportunities for implementation of identified solutions	County Land Conservation with C of Beloit and T of Turtle	C of Beloit and T of Turtle	2022	Ongoing flooding in T. Turtle and C. Beloit and South Beloit

Hazard Type	Mitigation Action	Priority	Estimated Cost	Responsible Management Agency	Communities Benefiting	Project Timeframe	Comments
Flooding*	Update zoning ordinances as needed based on updated floodplain mapping:	Medium	Covered by department annual budgets	C. Beloit and Janesville	Rock County, C. of Beloit, Brodhead, Edgerton, Evansville, Janesville, Milton; V of Clinton, Footville, Orfordville; and T of Avon, Beloit, Bradford, Center, Clinton, Fulton, Harmony, Janesville, Johnstown, LaPrairie, Lima, Magnolia, Milton, Newark, Plymouth, Porter, Rock, Spring Valley, Turtle, Union	Ongoing	

Hazard Type	Mitigation Action	Priority	Estimated Cost	Responsible Management Agency	Communities Benefiting	Project Timeframe	Comments
Flooding*	Ensure developers use detention and retention ponds to mitigate potential flooding in new and existing development	Low-Medium	Covered by department annual budgets	County Planning, Economic, & Community Development	Rock County, C. of Beloit, Brodhead, Edgerton, Evansville, Janesville, Milton; V of Clinton, Footville, Orfordville; and T of Avon, Beloit, Bradford, Center, Clinton, Fulton, Harmony, Janesville, Johnstown, LaPrairie, Lima, Magnolia, Milton, Newark, Plymouth, Porter, Rock, Spring Valley, Turtle, Union	Ongoing	

Hazard Type	Mitigation Action	Priority	Estimated Cost	Responsible Management Agency	Communities Benefiting	Project Timeframe	Comments
Flooding	Investigate options and possible funding sources for tying navigable rivers and shorelines into mile marker system.	Low-Medium	Scope/investigation process covered by department or municipal annual budgets	County Planning, Economic, & Community Development, Rock County Fire Officer's Association, Rock River Coalition	Rock County, C. of Beloit, Brodhead, Edgerton, Evansville, Janesville, Milton; V of Clinton, Footville, Orfordville; and T of Avon, Beloit, Bradford, Center, Clinton, Fulton, Harmony, Janesville, Johnstown, LaPrairie, Lima, Magnolia, Milton, Newark, Plymouth, Porter, Rock, Spring Valley, Turtle, Union	2022	Would allow those who call in with emergencies, including flood conditions, to accurately pinpoint their location. Rock River Coalition: active on IL side but trying to push activity up into WI; primarily focus on tourism but may be a source of labor and/or funding for this

Hazard Type	Mitigation Action	Priority	Estimated Cost	Responsible Management Agency	Communities Benefiting	Project Timeframe	Comments
*Flooding and Dam Failure	Promote public awareness regarding flooding and dam safety	Medium	Covered by department annual budgets	County Emergency Management, DNR	Rock County, C. of Beloit, Brodhead, Edgerton, Evansville, Janesville, Milton; V of Clinton, Footville, Orfordville; and T of Avon, Beloit, Bradford, Center, Clinton, Fulton, Harmony, Janesville, Johnstown, LaPrairie, Lima, Magnolia, Milton, Newark, Plymouth, Porter, Rock, Spring Valley, Turtle, Union	Ongoing	Examples include: Post-flood recovery plans/programs to help rebuild and implement mitigation measures to protect against future floods Distribute NFIP information Provide information/ offer education to make people aware of natural floodplain resources and functions and how they can protect them. Promote public awareness regarding dam safety, which is done annually during Dam Safety Week.

Hazard Type	Mitigation Action	Priority	Estimated Cost	Responsible Management Agency	Communities Benefiting	Project Timeframe	Comments
Dam Failure	Investigate options for conducting a study to determine the effects of removal of the Monterey Dam	Low	Covered by department annual budgets	C. Janesville	C of Janesville	2021	Would be part of downtown shoreline projects
Dam Failure	Explore options for protecting properties downstream of the Indianford Dam.	Low	Strategy discussions will be covered by annual budget. Projects costs TBD based on any strategies selected.	Rock Koshkonong Lake District with C of Beloit and Janesville	C of Beloit and Janesville	2021	The Indianford Dam near T. Fulton holds back Lake Koshkonong, a significant amount of water. While it is still considered to have a low likelihood of failure, there is considerable downstream risk of severe effects if this dam were to fail. Downstream of the Indianford Dam are the Janesville Central and Monterey Dams (C. Janesville) and the Beloit Dam (C. Beloit). Failure of Indianford Dam would therefore put C. Beloit and Janesville at risk.

Hazard Type	Mitigation Action	Priority	Estimated Cost	Responsible Management Agency	Communities Benefiting	Project Timeframe	Comments
Wildfires	Conduct field/range training for local fire departments	Medium	Covered by department annual budgets	DNR, Rock County Fire Officer's Association, municipal fire departments	Rock County, C. of Beloit, Brodhead, Edgerton, Evansville, Janesville, Milton; V of Clinton, Footville, Orfordville; and T of Avon, Beloit, Bradford, Center, Clinton, Fulton, Harmony, Janesville, Johnstown, LaPrairie, Lima, Magnolia, Milton, Newark, Plymouth, Porter, Rock, Spring Valley, Turtle, Union	Ongoing	Training (generally in spring) with DNR fire rangers

Hazard Type	Mitigation Action	Priority	Estimated Cost	Responsible Management Agency	Communities Benefiting	Project Timeframe	Comments
Wildfires	Promote public awareness on fire protection and fire safety	Medium	Covered by department annual budgets	County Emergency Management, Rock County Fire Officer's Association, municipal fire departments, DNR	Rock County, C. of Beloit, Brodhead, Edgerton, Evansville, Janesville, Milton; V of Clinton, Footville, Orfordville; and T of Avon, Beloit, Bradford, Center, Clinton, Fulton, Harmony, Janesville, Johnstown, LaPrairie, Lima, Magnolia, Milton, Newark, Plymouth, Porter, Rock, Spring Valley, Turtle, Union	Ongoing	Spring fire risk level awareness; annual Fire Safety Week in October

Hazard Type	Mitigation Action	Priority	Estimated Cost	Responsible Management Agency	Communities Benefiting	Project Timeframe	Comments
Extreme Temperatures	Continue public outreach and collaborative systems to ensure that those with functional needs and the elderly are checked for welfare as appropriate during times of extreme temperatures	Medium	Covered by department annual budgets	County Emergency Management, Council on Aging, Developmental Disabilities, Human Services, Public Health, Veterans Service Office	Rock County, C. of Beloit, Brodhead, Edgerton, Evansville, Janesville, Milton; V of Clinton, Footville, Orfordville; and T of Avon, Beloit, Bradford, Center, Clinton, Fulton, Harmony, Janesville, Johnstown, LaPrairie, Lima, Magnolia, Milton, Newark, Plymouth, Porter, Rock, Spring Valley, Turtle, Union	Ongoing	

Hazard Type	Mitigation Action	Priority	Estimated Cost	Responsible Management Agency	Communities Benefiting	Project Timeframe	Comments
Extreme Temperatures	Coordinate with the American Red Cross as needed to support their shelter inventory work in the county	Medium	Covered by department annual budgets	County Emergency Management	Rock County, C. of Beloit, Brodhead, Edgerton, Evansville, Janesville, Milton; V of Clinton, Footville, Orfordville; and T of Avon, Beloit, Bradford, Center, Clinton, Fulton, Harmony, Janesville, Johnstown, LaPrairie, Lima, Magnolia, Milton, Newark, Plymouth, Porter, Rock, Spring Valley, Turtle, Union	Ongoing	

Hazard Type	Mitigation Action	Priority	Estimated Cost	Responsible Management Agency	Communities Benefiting	Project Timeframe	Comments
Storms: Hail	Conduct outreach to mobile home park owners, campground owners, recreational vehicle park owners, and other owners associations regarding severe weather considerations	Medium	Covered by department annual budget	County Emergency Management	Rock County, C. of Beloit, Brodhead, Edgerton, Evansville, Janesville, Milton; V of Clinton, Footville, Orfordville; and T of Avon, Beloit, Bradford, Center, Clinton, Fulton, Harmony, Janesville, Johnstown, LaPrairie, Lima, Magnolia, Milton, Newark, Plymouth, Porter, Rock, Spring Valley, Turtle, Union	Ongoing	E.g., annual form letter requesting updates to contact info, giving information regarding emergency planning, etc.

Hazard Type	Mitigation Action	Priority	Estimated Cost	Responsible Management Agency	Communities Benefiting	Project Timeframe	Comments
Storms: Lightning	Conduct public outreach to promote awareness	Medium	Covered by department annual budget	County Emergency Management	Rock County, C. of Beloit, Brodhead, Edgerton, Evansville, Janesville, Milton; V of Clinton, Footville, Orfordville; and T of Avon, Beloit, Bradford, Center, Clinton, Fulton, Harmony, Janesville, Johnstown, LaPrairie, Lima, Magnolia, Milton, Newark, Plymouth, Porter, Rock, Spring Valley, Turtle, Union	Ongoing	Outreach focus during Severe Weather Awareness Week Conduct storm spotter training as necessary based on interest

Hazard Type	Mitigation Action	Priority	Estimated Cost	Responsible Management Agency	Communities Benefiting	Project Timeframe	Comments
Tornado/High Winds	Conduct public outreach to promote tornado preparedness and awareness	Medium	Covered by department annual budget	County Emergency Management	Rock County, C. of Beloit, Brodhead, Edgerton, Evansville, Janesville, Milton; V of Clinton, Footville, Orfordville; and T of Avon, Beloit, Bradford, Center, Clinton, Fulton, Harmony, Janesville, Johnstown, LaPrairie, Lima, Magnolia, Milton, Newark, Plymouth, Porter, Rock, Spring Valley, Turtle, Union	Ongoing	Outreach focus during Severe Weather Awareness Week Include information regarding mobile home tie-downs and other engineering control options as applicable

Hazard Type	Mitigation Action	Priority	Estimated Cost	Responsible Management Agency	Communities Benefiting	Project Timeframe	Comments
Tornado/High Winds	Encourage storm shelter construction within mobile home parks, recreational vehicle parks, and campgrounds; investigate shelter options and grant funding (e.g., state disaster mitigation funds, CDBG-EAP)	Medium to high (see comments)	Covered by department annual budget for outreach and investigation of shelter/funding options	County Emergency Management; T. Lima, Beloit, Union, Fulton, Rock, Magnolia, Bradford; C. Edgerton; V. Clinton, Orfordville.	Rock County, C. of Beloit, Brodhead, Edgerton, Evansville, Janesville, Milton; V of Clinton, Footville, Orfordville; and T of Avon, Beloit, Bradford, Center, Clinton, Fulton, Harmony, Janesville, Johnstown, LaPrairie, Lima, Magnolia, Milton, Newark, Plymouth, Porter, Rock, Spring Valley, Turtle, Union	2020	Focusing on those with highest population concentrations (as funding allows – smaller grants may be sufficient to address the needs of smaller, lower priority locations): • Rockvale Mobile Home Park (high) • Newville area (high) • Evansville (medium) • Clinton (medium)

Hazard Type	Mitigation Action	Priority	Estimated Cost	Responsible Management Agency	Communities Benefiting	Project Timeframe	Comments
Severe Thunderstorms	Conduct public outreach to promote severe storm preparedness and awareness	Medium	Covered by department annual budget	County Emergency Management	Rock County, C. of Beloit, Brodhead, Edgerton, Evansville, Janesville, Milton; V of Clinton, Footville, Orfordville; and T of Avon, Beloit, Bradford, Center, Clinton, Fulton, Harmony, Janesville, Johnstown, LaPrairie, Lima, Magnolia, Milton, Newark, Plymouth, Porter, Rock, Spring Valley, Turtle, Union	Ongoing	Outreach focus during Severe Weather Awareness Week

Hazard Type	Mitigation Action	Priority	Estimated Cost	Responsible Management Agency	Communities Benefiting	Project Timeframe	Comments
Winter Storms	Promote public awareness of and personal preparedness for winter weather	Medium	Covered by department annual budgets	County Emergency Management, All participating jurisdictions	Rock County, C. of Beloit, Brodhead, Edgerton, Evansville, Janesville, Milton; V of Clinton, Footville, Orfordville; and T of Avon, Beloit, Bradford, Center, Clinton, Fulton, Harmony, Janesville, Johnstown, LaPrairie, Lima, Magnolia, Milton, Newark, Plymouth, Porter, Rock, Spring Valley, Turtle, Union	Ongoing	Outreach focus during November Winter Weather Week May include information on winter driving and cold weather safety

Hazard Type	Mitigation Action	Priority	Estimated Cost	Responsible Management Agency	Communities Benefiting	Project Timeframe	Comments
Winter Storms	Continue to update existing, or as necessary create new, mutual aid agreements among county and municipal Public Works departments.	High	Covered by department annual budgets	County and municipal Public Works departments	Rock County, C. of Beloit, Brodhead, Edgerton, Evansville, Janesville, Milton; V of Clinton, Footville, Orfordville; and T of Avon, Beloit, Bradford, Center, Clinton, Fulton, Harmony, Janesville, Johnstown, LaPrairie, Lima, Magnolia, Milton, Newark, Plymouth, Porter, Rock, Spring Valley, Turtle, Union	Ongoing	Need to address equipment and manpower assistance/ sharing in response to inclement weather. Without written mutual aid agreements, aiding municipalities' departments cannot get reimbursed from disaster assistance to a municipality with a declared disaster.

Hazard Type	Mitigation Action	Priority	Estimated Cost	Responsible Management Agency	Communities Benefiting	Project Timeframe	Comments
Utility Failure: Electrical	Promote public awareness of and personal preparedness for possible utility failure	Medium	Covered by department annual budgets	County Emergency Management, Public Health Department, All participating jurisdictions	Rock County, C. of Beloit, Brodhead, Edgerton, Evansville, Janesville, Milton; V of Clinton, Footville, Orfordville; and T of Avon, Beloit, Bradford, Center, Clinton, Fulton, Harmony, Janesville, Johnstown, LaPrairie, Lima, Magnolia, Milton, Newark, Plymouth, Porter, Rock, Spring Valley, Turtle, Union	Ongoing	Could include: how to determine appropriate generator; what supplies to have on hand; fuel availability (most gas stations do not have generators that will power the gas pumps)

Hazard Type	Mitigation Action	Priority	Estimated Cost	Responsible Management Agency	Communities Benefiting	Project Timeframe	Comments
Utility Failure: Electrical	Encourage the burying of utility lines as feasible/ appropriate to reduce risks of power outages	Medium	Covered by department annual budgets	County Planning & Development Agency	Rock County, C. of Beloit, Brodhead, Edgerton, Evansville, Janesville, Milton; V of Clinton, Footville, Orfordville; and T of Avon, Beloit, Bradford, Center, Clinton, Fulton, Harmony, Janesville, Johnstown, LaPrairie, Lima, Magnolia, Milton, Newark, Plymouth, Porter, Rock, Spring Valley, Turtle, Union	Ongoing	Most likely to be economically feasible for new subdivisions or possibly in areas undergoing major infrastructure updates
Utility Failure: Electrical	Investigate potential funding sources for burying power lines along specific corridors (e.g., Highway 81, McKinley Rd., Milwaukee Rd.)	Medium	Scope/decision process covered by department or municipal budgets	C. Beloit Public Works, C. Beloit Utilities, C. Beloit Engineering	C. of Beloit	2022	

Hazard Type	Mitigation Action	Priority	Estimated Cost	Responsible Management Agency	Communities Benefiting	Project Timeframe	Comments
Utility Failure: Water/Sewer	Investigate potential solutions for flooding around the Colley Rd. lift station power station in C. Beloit)	Medium-High	Scope/decision process covered by department or municipal budgets; explore grant or other funding opportunities for implementation of identified solutions	C. Beloit Engineering; DNR	C. of Beloit	2022	The lift station flooded in 2008 and during flash flooding in 2013. When lift station goes down, the north side of the city loses sewer, dumps sewage into Turtle Creek.

Hazard Type	Mitigation Action	Priority	Estimated Cost	Responsible Management Agency	Communities Benefiting	Project Timeframe	Comments
Cyber Attack	Evaluate risks to information technology infrastructure and investigate options for reinforcing those systems to ensure security and prevent unauthorized access or system failure.	Low-Medium	Scope/investigation process covered by department or municipal budgets; explore grant or other funding opportunities for implementation of identified solutions	Municipal IT departments	Rock County, C. of Beloit, Brodhead, Edgerton, Evansville, Janesville, Milton; V of Clinton, Footville, Orfordville; and T of Avon, Beloit, Bradford, Center, Clinton, Fulton, Harmony, Janesville, Johnstown, LaPrairie, Lima, Magnolia, Milton, Newark, Plymouth, Porter, Rock, Spring Valley, Turtle, Union	2022	

* - Denotes those mitigation strategies that support continued compliance with the National Flood Insurance Program (NFIP)

EM Dept. = Rock County Emergency Management
LWCD = Rock County Land Conservation Department
DPW = Department of Public Works
WDOC = Wisconsin Department of Commerce
FSA = Farm Services Agency
EDA = US Economic Development Administration
DNR = Wisconsin Department of Natural Resources
UW Ext. = University of Wisconsin Extension Service
WEM = Wisconsin Emergency Management
FEMA = Federal Emergency Management Agency
USGS = United States Geological Survey
GIS = Geographic Information System

CDBG = Community Development Block Grant
PDM = Pre-Disaster Mitigation
ARC = American Red Cross
FMA = Flood Mitigation Program
EOC = Emergency Operations Center

Appendix E: Summary of Updated Mitigation Strategies

Hazard Type	Mitigation Measures	Current Approximate Costs	Responsible Management Agency	Potential Revenue Source(s)	Project Timetable	Comments	Updates
Tornados	Rock County shall establish a program to annually improve the emergency warning system for rural development concentrations of people, mobile home parks, recreational vehicle parks and campgrounds.	Costs vary	Rock County Emergency Management	Department budget	2010-2015	Currently providing, ongoing	Have expanded outdoor warning system (sirens) in place (put in 2007-08) At the Blackhawk Technical College system, faculty and students can sign up for notification system (sends texts, emails, and voice mail notifications based on National Weather Service and other such alerts) Have done community outreach to mobile home parks This will be rolled into a public outreach action item moving forward.
Tornados	Inventory and maintain a list of buildings that can provide protection to the public in the event of a tornado.	Costs vary	Salvation Army, Red Cross	Salvation Army Red Cross	In place & ongoing	Currently providing, ongoing	Red Cross has and maintains a shelter inventory by county Salvation Army no longer involved with sheltering This item will be carried forward in a modified form.

Hazard Type	Mitigation Measures	Current Approximate Costs	Responsible Management Agency	Potential Revenue Source(s)	Project Timetable	Comments	Updates
Tornados	Work with National Weather Service to improve the timing of severe weather warning to the Rock County Communications Center (9-1-1) using weather services in Northern Illinois and Southern Wisconsin.	Covered by department budget	Rock County Emergency Management and Rock County Communications Center	Department budgets	2010-2015	Currently providing, ongoing activity	This item is outside the span of control of county agencies and will not be carried forward.
Tornados	Encourage schools in Rock County to have and use weather radios to receive severe weather warnings.	Department budget	Rock County Emergency Management	Department budget	2010-2015	Currently providing, ongoing	School assessments and public outreach are conducted every year Coordinate to receive and maintain copies of emergency plans for county schools and some daycares Support municipalities with outreach to municipal schools (Milton, Janesville, Beloit, Clinton, Evansville) Annual assessments will be carried forward.
Tornados	Encourage places with public gatherings to have weather radios to monitor inclement weather situations.	Covered by department budget	Rock County Emergency Management	Department budget	2010-2015	Currently providing, ongoing	Rhythm and Booms, County Fair, 4H This will be rolled into a public outreach action item moving forward.

Hazard Type	Mitigation Measures	Current Approximate Costs	Responsible Management Agency	Potential Revenue Source(s)	Project Timetable	Comments	Updates
Tornados	Work with mobile home park owners, campground owners, recreational vehicle park owners, and other owners associations to assess the effects of a tornado and how guests and owners would be alerted to storms.	Covered by department budget	Rock County Emergency Management	Department budget	2010-2015	Currently providing, ongoing	Because these are private facilities, assessments like this are not feasible This will be changed to an outreach/communication item moving forward.
Tornados	Encourage storm shelters be constructed (for 110% of the population served) within mobile home parks, recreational vehicle parks and campgrounds.	$500,000 per site	Rock County Emergency Management, Towns of Lima, Beloit, Union, Fulton, Rock, Magnolia, Bradford, City of Edgerton, Villages of Clinton, Orfordville.	FEMA pre-disaster mitigation program - CDBG-EAP	2010-2015	1 site per year for next 5 years, no activity-need funding	Have done public education/outreach but no funding received to build shelters This item will be carried forward in a modified form.
Tornados	The County shall promote citizen and institutional purchase of weather radios.	Covered by department budget	Rock County Emergency Management	Department budget	2010-2015	Currently providing, ongoing	This will be rolled into a general public outreach action item moving forward.
Tornados	Work with the provider of weather radios to provide broader coverage at a lower cost per unit.	Covered by department budget	Rock County Emergency Management	Department budget	2010-2015	Currently providing, ongoing	This item is outside the span of control of county agencies and will not be carried forward.

Hazard Type	Mitigation Measures	Current Approximate Costs	Responsible Management Agency	Potential Revenue Source(s)	Project Timetable	Comments	Updates
Tornados	Mobile homes to install tie-downs with ground anchors per manufacturer's recommendations, in local zoning ordinance.	$600 per unit	Town, City, Village and County Zoning, Towns of Lima, Beloit, Union, Fulton, Rock, Magnolia, Bradford, City of Edgerton, Villages of Clinton, Orfordville.	FEMA pre-disaster mitigation program - CDBG	2010-2015	Local Zoning Ordinance requested. On- going.	The lack of countywide zoning makes this item logistically impossible. This will be rolled into a general public outreach action item moving forward.
Tornados	Public awareness programs shall be conducted to depict the danger of straight-line winds.	Covered by department budget	Rock County Emergency Management	Department budget	2010-2015	Currently providing, ongoing	Part of yearly plan of work outreach This will be rolled into a public outreach action item moving forward.
Tornados	Encourage the burying of utility lines to help reduce power outages.	Costs vary	Rock County Planning & Development Agency	Utility companies and developers	2010-2015	Currently providing, ongoing	This has not proven to be economically feasible (3x more expensive to bury) for established locations. It is a possible strategy for new subdivisions but there have not been any in the county since 2008. This item will be carried forward in a modified form.
Floods	The County shall update the countywide floodplain and flood insurance maps in cooperation with DNR and FEMA.	$315,000	Rock County P & D Agency, WDNR, FEMA	WDNR & FEMA	2009-2015	Complete. Assists to remove structures from flooding (NFIP) high priority, complete.	The county completed process last year; FEMA has also completed floodplain mapping. This item is now complete and will not be carried forward.

Hazard Type	Mitigation Measures	Current Approximate Costs	Responsible Management Agency	Potential Revenue Source(s)	Project Timetable	Comments	Updates
Floods	Investigate potential funding sources that would provide monies to purchase structures in the floodplain that have received repetitive loss declarations funding from FEMA.	$1,100,000	Rock County Planning & Development Agency, Janesville, Rock, Fulton.	FEMA, Hazard Mitigation Grant, PDM program.	2009-2011	Total of six Janesville. Remove repetitive loss structures (NFIP) High priority-complete.	This item will be carried forward in a modified form.
Floods	Investigate potential funding sources that would provide monies to purchase existing structures on a voluntary basis in the floodplain with the intention of removing them. Flood proof existing structures within the flood plain.	$11,000,000	Rock County Planning & Development Agency, Fulton, Rock, Janesville, Beloit	FEMA pre-disaster mitigation program, FEMA, CDBG EAP, HMPG	2010-2015	2 per year for 5 years. NFIP compliance measure high priority on-going	This is considered to be part of the preceding item.
Floods	A Turtle Creek floodplain spillway should be designed and development along Philhower Road to Rock River to help alleviate flooding in the Town of Turtle, City of Beloit and South Beloit.	$2,500,000	Rock County P&D Agency, City of Beloit, Town of Beloit, Town of Turtle	FEMA, Hazard Mitigation Grant, FEMA PDM grant	2010 - 2015	Lack of funding, stopping project.	This is still an ongoing issue. This item will be carried forward in modified form.

Hazard Type	Mitigation Measures	Current Approximate Costs	Responsible Management Agency	Potential Revenue Source(s)	Project Timetable	Comments	Updates
Floods	First floor elevations and basement window elevation for all new buildings shall be established in the County Shore Land area and on lots that abut a stormwater swales.	$1,000	Rock County P & D Agency, private developers	Department budget	2010-2015	Existing program (NFIP)	This is being done for floodplain areas.
Floods	Promote changes to local building codes such as the installation of backwater valves to prevent basement flooding.	$2,000	Rock County P & D Agency, private developers	Department budget	2010-2015	Existing program (NFIP)	C. Beloit requires installation of backflow valves
Floods	Clean ditches and construct stormwater conveyance infrastructure.	$1,000,000	Local Governments, Town of Porter	FEMA, Local Budget, CDBG, EAP; DNR	2010-2015	Annual Allocation	County and all municipalities; under storm water regulations; carryover item with land conservation item from earlier T. Harmony cleaned out storm sewers to stop Waterman subdivision flooding in 2014 ($32,000).

Hazard Type	Mitigation Measures	Current Approximate Costs	Responsible Management Agency	Potential Revenue Source(s)	Project Timetable	Comments	Updates
Floods	Flood proof existing municipal infrastructure.	$1,000,000	Municipal owned dams, Cities of Beloit, Edgerton, Evansville, Janesville, Milton, Villages of Clinton, Footville, Orfordville, Towns of Avon, Beloit, Bradford, Center, Clinton, Fulton, Harmony, Johnstown, Janesville, La Prairie, Lima, Magnolia, Milton, Newark, Plymouth, Porter, Rock, Spring Valley, Turtle, Union.	FEMA, Local Budget, CDBG, EAP	2010-2015	Annual Allocation, high priority for municipalities	Riprapping/seawall by post office and heritage view in C. Beloit was done ~2013 Side of Monterey dam spillway in C. Janesville was washing out. It was reinforced to reconstruct/ maintain spillway; ~2012; ~$200,000 Riverside park – C. Beloit; shoreline restoration was conducted 2013-2015; ~$800,000 (from Riverside park to downtown, including along ironworks) This item is considered complete and will not be carried forward. Berming by the lift station power station (Colley Rd., C. Beloit) was rejected by DNR. This project will be moved forward as a new item.

Hazard Type	Mitigation Measures	Current Approximate Costs	Responsible Management Agency	Potential Revenue Source(s)	Project Timetable	Comments	Updates
Floods	Dam maintenance activity to strengthen structures	$1,000,000		FEMA, CDBG	2010-2015		Dam maintenance is done on a private basis in Rock County. This item will not be carried forward, although some dam-specific projects will be added as new items.
Floods	Investigate potential funding sources to aid in the stabilization of the Yahara River bank in Murwin County Park.	$150,000	Rock County Parks	FEMA, public assistance program	2005-2006	Completed	This item was previously completed and will not be carried forward.
Floods	The County shall locate via GIS mapping the structures currently located in the 100-year floodplain and notify these property owners as to possible mitigation options after the floodplain maps and FIRM maps have been updated.	$2,000	Rock County Planning & Development Agency	Department budget		Completed in 2008.	New mapping was conducted in 2014. GIS data layers have been updated based on the new mapping and the updated floodplain map adoptions began in 2015. This item is considered complete and will not be carried forward.
Floods	Investigate potential funding sources that would provide monies to purchase the seven homes located in the Sugar River floodplain on a voluntary basis.	Covered by department budget.	Rock County P & D Agency and Town of Avon	FEMA PDM Grant	2010-2015	Not completed due to lack of funding. Low priority.	Brought forward for consideration.

Hazard Type	Mitigation Measures	Current Approximate Costs	Responsible Management Agency	Potential Revenue Source(s)	Project Timetable	Comments	Updates
Floods	The County shall amend the County Floodplain and Shore Land Ordinance to discontinue building in the floodplain.	$2,000	Rock County Planning & Development Agency	Department budget	2006	Completed.	This item was previously completed and will not be carried forward.
Floods	Flood control improvements along Allen's Creek and Lake Leota in Evansville shall be designed and implemented.	$3,000,000	City of Evansville	FEMA PDM Grant	2006	Completed in 2009.	This item was previously completed and will not be carried forward.
Floods	Utilize detention and retention ponds to mitigate potential flooding in new and existing development.	$50,000 per year	Rock County P&D Agency, private developers.	Developer's cost	2005-2009	On-going current program.	This is of standard practice for County Planning, Economic, & Community Development as they work with developers. This item will be carried forward as an ongoing strategy.
Summer Storms	Public awareness programs shall be conducted to depict the dangers of lightning strikes.	Covered by department budget	Rock County Emergency Management	Department budget	2010-2015	Ongoing program. Successful	Conducted as part of spring Severe Weather Awareness Week. The county also conducted annual storm spotter training. This item will be carried forward in modified form.

Hazard Type	Mitigation Measures	Current Approximate Costs	Responsible Management Agency	Potential Revenue Source(s)	Project Timetable	Comments	Updates
Summer Storms	Establish a method of contacting the functional needs population during severe weather events.	Covered by department budget	Rock County Emergency Management/Communications Center	Department budgets	2010-2015	Ongoing program. Added list of facilities to plan.	This was explored but found to not be feasible to do (in part due to HIPAA). This item is considered complete and will not be carried forward.
Winter Storms	Public awareness programs on driving skills and cold weather safety shall be promoted during the winter months.	Costs vary	Sheriff Department, Cities of Beloit, Edgerton, Evansville, Janesville, Milton, Villages of Clinton, Footville, Orfordville, Towns of Avon, Beloit, Bradford, Center, Clinton, Fulton, Harmony, Johnstown, Janesville, La Prairie, Lima, Magnolia, Milton, Newark, Plymouth, Porter, Rock, Spring Valley, Turtle, Union.	Department budgets	2010-2015	Continue program	Annual awareness program done by county (county press releases often then reposted by municipalities) C. Janesville: some media outreach has been done, regular weather alert postings online This will be rolled into a public outreach action item moving forward.
Winter Storms	Mutual aid agreements between Public Works Agencies for equipment and manpower assistance to address inclement weather shall be established.	Covered by department budget	Public Works Departments	Department budgets	2010-2015	Continue program of mutual assistance.	Cities of Beloit and Janesville Public Works departments have mutual aid agreements. There are some restrictions on county Public Works which are not addressed in mutual aid agreements. This item will be carried forward in modified form.

Hazard Type	Mitigation Measures	Current Approximate Costs	Responsible Management Agency	Potential Revenue Source(s)	Project Timetable	Comments	Updates
Winter Storms	Buildings shall be inventoried that will provide protection to the public in the event of a winter storm event.	Costs vary	Salvation Army, Red Cross	Salvation Army, Red Cross	2010-2015	Continue program.	Red Cross has and maintains a shelter inventory by county Salvation Army no longer involved with sheltering This item will be carried forward in a modified form.
Winter Storms	The County and local communities are encouraged to expand the use of snow fences on major highways for public safety.	Costs vary	Public Works Departments	Department budgets	2005-2009	This program has ended. No money to do financing.	Some individual farmers help the community with leaving a few rows of corn standing or lining up hay bales to act as snow fences. This item was previously completed and will not be carried forward.

Hazard Type	Mitigation Measures	Current Approximate Costs	Responsible Management Agency	Potential Revenue Source(s)	Project Timetable	Comments	Updates
Extreme Temperatures	Establish a procedure for checking in on the elderly, and functional needs during such events.	Costs vary	Health Department, Social Services	Department budgets	2010-2015	Continue program. Added list of	County Emergency Management conducted regular outreach (partnering with health department) to put out information on signs/ symptoms to watch out for, etc. This item will be carried forward in a modified form. Change going forward to focus on Collaborative effort to check on people as they're part of existing systems (rather than setting up new system)

Hazard Type	Mitigation Measures	Current Approximate Costs	Responsible Management Agency	Potential Revenue Source(s)	Project Timetable	Comments	Updates
Wildland Fires	The County shall work with DNR on public awareness efforts to landowners on protecting their homes and structures from wildfires.	Costs vary	Rock County P & D, County & DNR Forester.	Department budgets	2010-2015	Continue program.	Annual fire awareness outreach (including work with Culvers in Beloit to do on-scene outreach) – County, Beloit, Janesville Partner with ARC to address functional needs folks in Beloit to replace batteries in smoke detectors DNR fish station at Newville but no ranger station in county Some local fire departments with wooded areas have qualified for grants for special gear for wildfires Moving forward: Wrap into public outreach/education
Wildland Fires	Local fire departments shall continue to provide training for grass and forest fires.	Costs vary	Cities of Beloit, Edgerton, Evansville, Janesville, Milton, Villages of Clinton, Footville, Orfordville, Towns of Avon, Beloit, Bradford, Center, Clinton, Fulton, Harmony, Johnstown, Janesville, La Prairie, Lima, Magnolia, Milton, Newark, Plymouth, Porter, Rock, Spring Valley, Turtle, Union., DNR	Department budgets	2010-2015	Continue program to train firefighters.	Moving forward: Rock County Fire Officers' Association to work with DNR rangers to get training for wildland fire fighting

Hazard Type	Mitigation Measures	Current Approximate Costs	Responsible Management Agency	Potential Revenue Source(s)	Project Timetable	Comments	Updates
Wildland Fires	Encourage homeowners to maintain a 75-foot open space area around structures in forested areas.	Department Budget	Rock County P & D - Community Development	Department budget	2010-2015	Continue program education.	Moving forward: Wrap into public outreach/education
Dam Failure Flooding	Annually monitor the conditions of the Wisconsin Department of Natural Resources Dam Inspection reports on the 21 dams located in Rock County.		Rock County P & D - County Engineer	Department budget	2010-2015	County staff will review inspections.	
	Rock County shall develop an Emergency Action Plan for all dams.	Covered by department budget	Rock County P & D - Community Development	Department budget	2005-2009	Not County's responsibility - removed from plan 2010.	This item is outside the span of control of county agencies and will not be carried forward.
General	The County web site should be utilized to continually update information concerning natural hazards and how to respond when such an event occurs.	Covered by department budget	Rock County Emergency Management - Rock County Information Technologies	Department budget	2010-2015	Continue program	
General	Investigate Human Service organizations that may aid in the payment of utility bills for those unable to pay during extreme inclement weather.	Covered by department budget	Social Services	Department budget	2010-2015	Continue program	

Hazard Type	Mitigation Measures	Current Approximate Costs	Responsible Management Agency	Potential Revenue Source(s)	Project Timetable	Comments	Updates
General	Continue to notify Rock County Communities that have not adopted this Plan by resolution, that Federal and State disaster funding will not be available to their community until they have adopted a Natural Hazard Mitigation Plan that is approved by Wisconsin Emergency Management and the Federal Emergency Management Agency.	Covered by department budget	Rock County P & D, and Emergency Management	Department budget	2010-2015	Complete, municipalities will approve this plan amendment.	This is addressed in plan adoption language and will not be carried forward as a strategy.

* - Denotes those mitigation strategies that support continued compliance with the National Flood Insurance Program (NFIP)

EM Dept. = Rock County Emergency Management Department
LWCD = Rock County Land Conservation Department
DPW = Department of Public Works
WDOC = Wisconsin Department of Commerce
FSA = Farm Services Agency
EDA = US Economic Development Administration
CDBG = Community Development Block Grant
PDM = Pre-Disaster Mitigation
ARC = American Red Cross
DNR = Wisconsin Department of Natural Resources
UW Ext. = University of Wisconsin Extension Service
WEM = Wisconsin Emergency Management
FEMA = Federal Emergency Management Agency
USGS = United States Geological Survey
GIS = Geographic Information System
FMA = Flood Mitigation Program
EOC = Emergency Operations Center

Appendix F: HAZUS Vulnerability Assessment

Identify Hazards

The hazards in this section were defined by the Rock County Mitigation Plan. Rock County is located in the southern region of Wisconsin. Dane County borders to the northwest, Jefferson borders to the northeast, Green borders to the west, and Walworth to the east. According to the 2000 US Census, Rock County has 152,307 residents within 4,314 census blocks.

Rock County is drained entirely by the Rock River and its tributaries. The Rock River's major tributaries are the Yahara River, the Sugar River, Raccoon Creek and Turtle Creek. The Yahara River and its major tributary, Badfish Creek, drain the northwestern corner of the county along Allen and Marsh Creeks. The Sugar River, Raccoon Creek, and their tributaries drain the southwestern region of the county. This area is under major threat in the event of a 100-year flood. Raccoon Creek flows into the Sugar River in Illinois, which, in turn, empties into the Rock River. The southeastern portion of the county is drained by Turtle Creek, which confluences with the Rock River in South Beloit.

Major flooding has occurred in Rock County, generally along the Rock River in 1881, 1918, 1929, 1937,1938,1959, 1971, 1978, 1990, 1993, 1996, 1998 and 2000. According to Wisconsin Emergency Management, Rock County has ranked above average for Wisconsin Counties in the number of flood-related emergencies and disasters since 1971.

HAZUS-MH Hazard Analysis

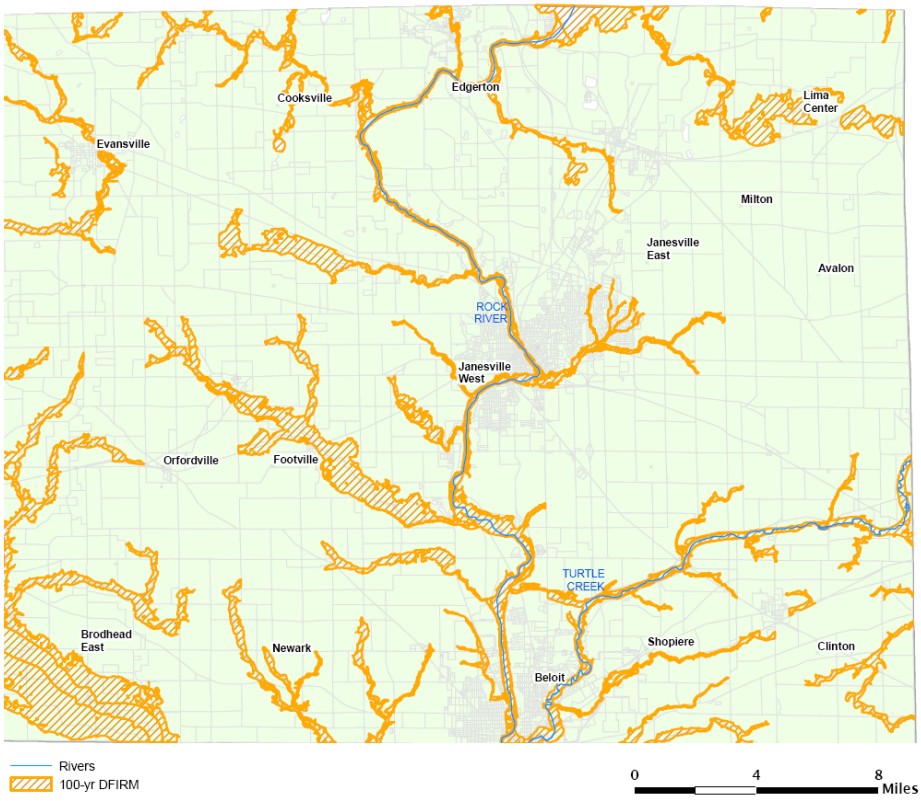
Flood analysis for Rock County was performed using HAZUS-MH MR3 released in July 2007. The bundled aggregated general building stock was updated to Dun & Bradstreet 2006. Building valuations were updated to R.S. Means 2006. Building counts based on census housing unit counts are available for RES1 (single-family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

The site specific inventory (specifically Schools, Hospitals, Emergency Operation Centers, 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 by clipping the USGS 30m DEM to the DFIRM boundary.

Figure 1 depicts the flood boundary from the HAZUS-MH analysis. The majority of damages due to flooding occur along the Rock River and Turtle Creek.

Figure 1: Rock 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 Rock County. An estimated 485 buildings will be damaged totaling $124 million in building losses and $317 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 72 census blocks 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 Figures 3a and 3b.

Table 1: Rock 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	1	0	$81,877	$3,047	$717
Commercial	520	20	$2,000,959	$91,531	$21,128
Education	2	0	$159,612	$4,445	$624
Government	10	0	$87,659	$9,322	$1,024
Industrial	78	3	$882,318	$76,789	$20,977
Religious/Non-Profit	20	3	$217,114	$8,334	$1,111
Residential	51,793	459	$9,316,606	$123,373	$78,093
Total	**52,424**	**485**	**$12,746,145**	**$316,841**	**$123,674**

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: Rock County Total Economic Loss - 100-Year Flood

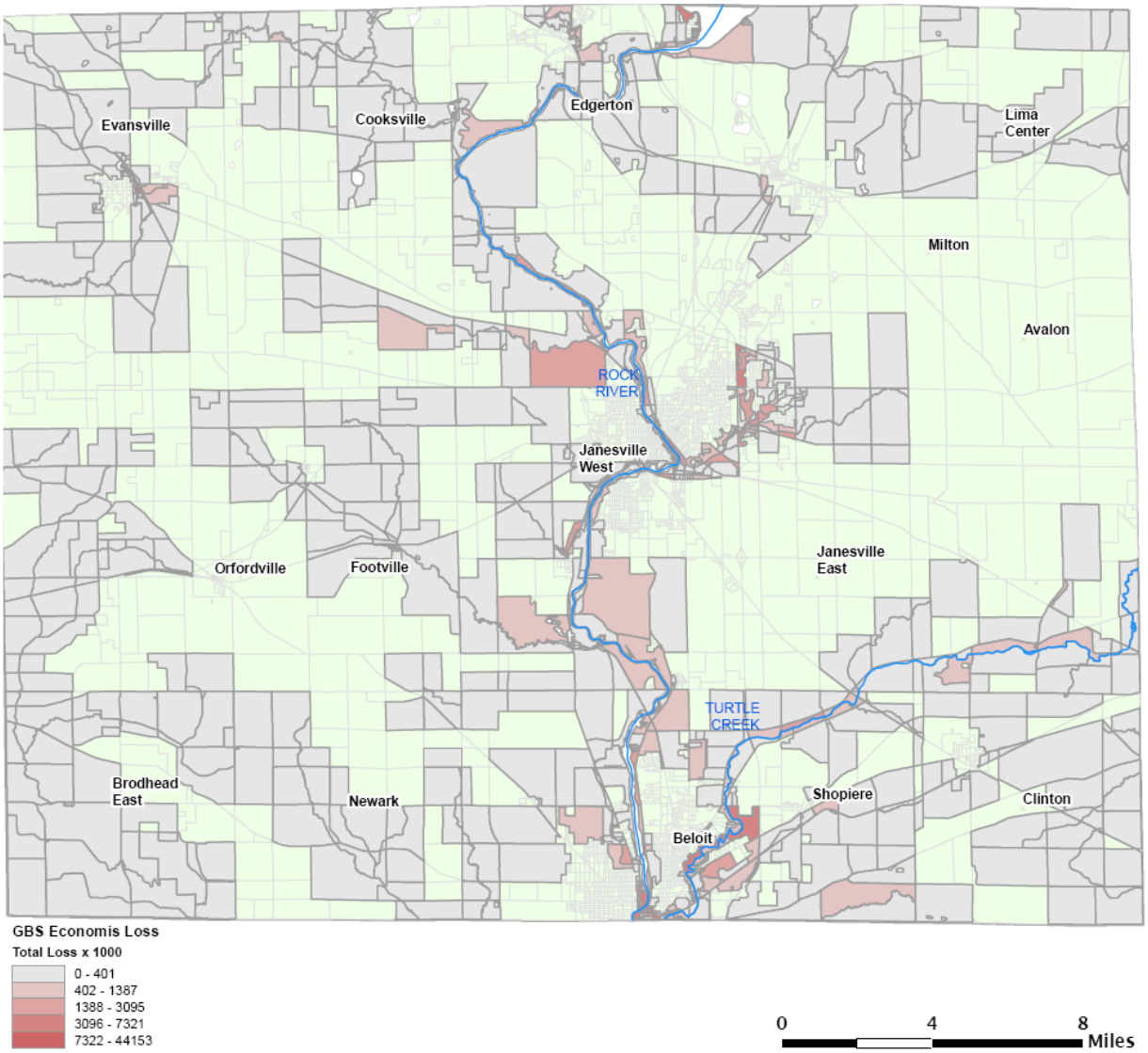


Figure 3a: Flood Damage Exposure in Janesville

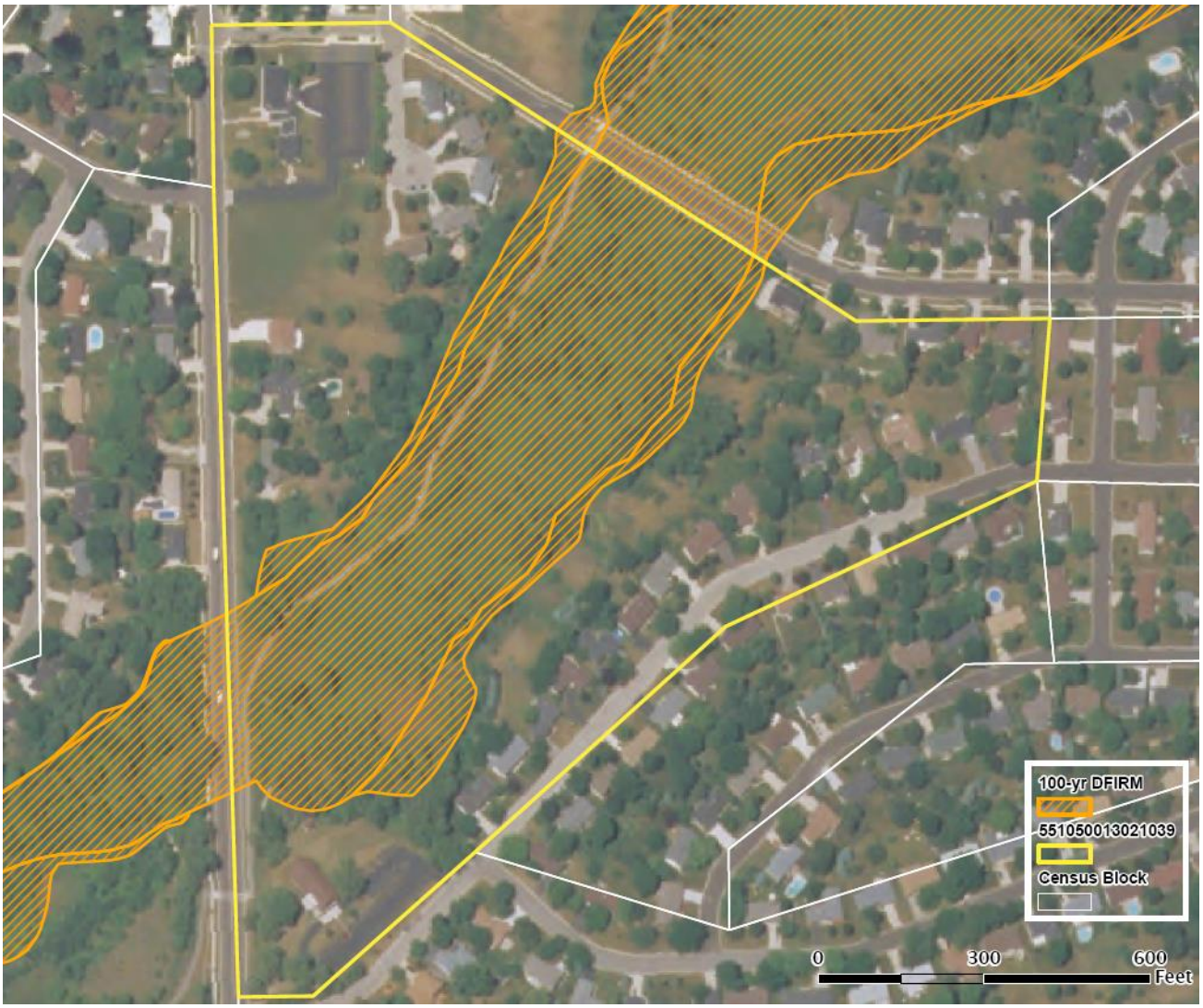


Figure 3a shows census blocks overlaid with the flood boundary and orthophoto of an area in eastern portion of Janesville. Census block 551050013021039 has an estimated building loss of $886,000, with a combined replacement cost of $1.4 million. Although the orthophoto shows significant flooding in this census block, very few buildings are at risk to experience damage.

Figure 3b: Flood Damage Exposure Northeast of Beloit

Figure 3b shows census blocks overlaid with the flood boundary and orthophoto of Beloit. Census block 551050026021010 has an estimated building loss of $188,000 with a combined replacement cost of $462,000. Although the orthophoto shows significant flooding, no buildings appear to even be in this census block, showing the damage estimates to be unwarranted.

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 (i.e. a damaged police station will no longer be able to serve the community).

The HAZUS-MH analysis identified 0 facilities that may be subject to flooding.

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

Class	Building Count	At Least Moderate Damage	At Least Substantial Damage	Loss of Use
Care Facilities	12	0	0	0
EOC	0	0	0	0
Fire Stations	10	0	0	0
Police Stations	17	0	0	0
Schools	82	0	0	0
Total	**121**	**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 2,172 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these 3,831 people (out of a total population of 152,307) 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 3 provides a list of state properties impacted by the flood boundary. Figures 4a and 4b show examples of the inundated areas.

Table 3: Rock County State Property Flood Inundation

State Property	Percent Inundated	Acres
Avon Bottoms Wildlife Area	97%	2,669
Lima Marsh Wildlife Area	37%	777
Extensive Wl Habitat	47%	314
Turtle Creek Wildlife Area	87%	279
Statewide Natural Area	48%	262
Evansville Wildlife Area	29%	202
Gift Lands	92%	119
Stream Bank Protection Fee Program	45%	100
Storrs Lake Wildlife Area	11%	83
Lima Marsh Rough Fish Station	87%	14
Newville Rough Fish Station	92%	5
Ice Age Trail	28%	0

Figure 4a: Boundary of 100-Year Flood Overlaid with State of Wisconsin Properties

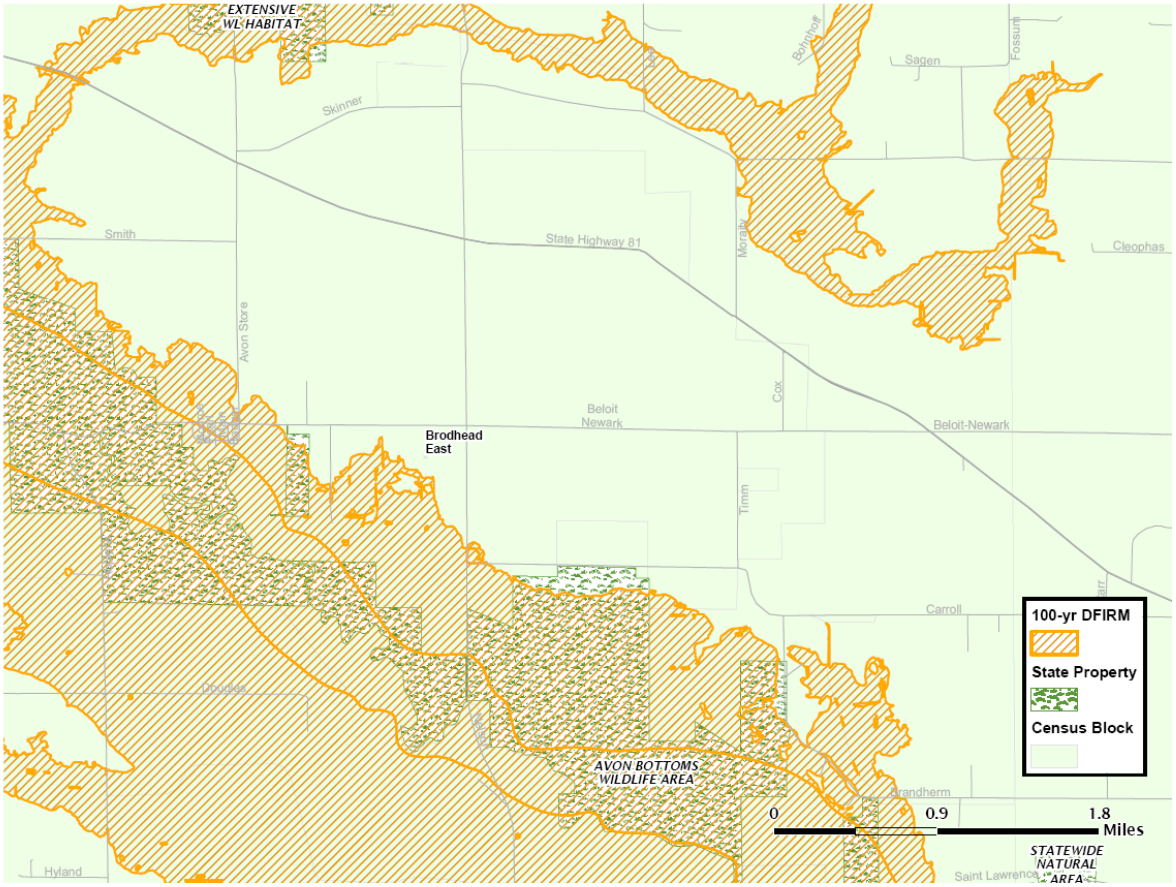
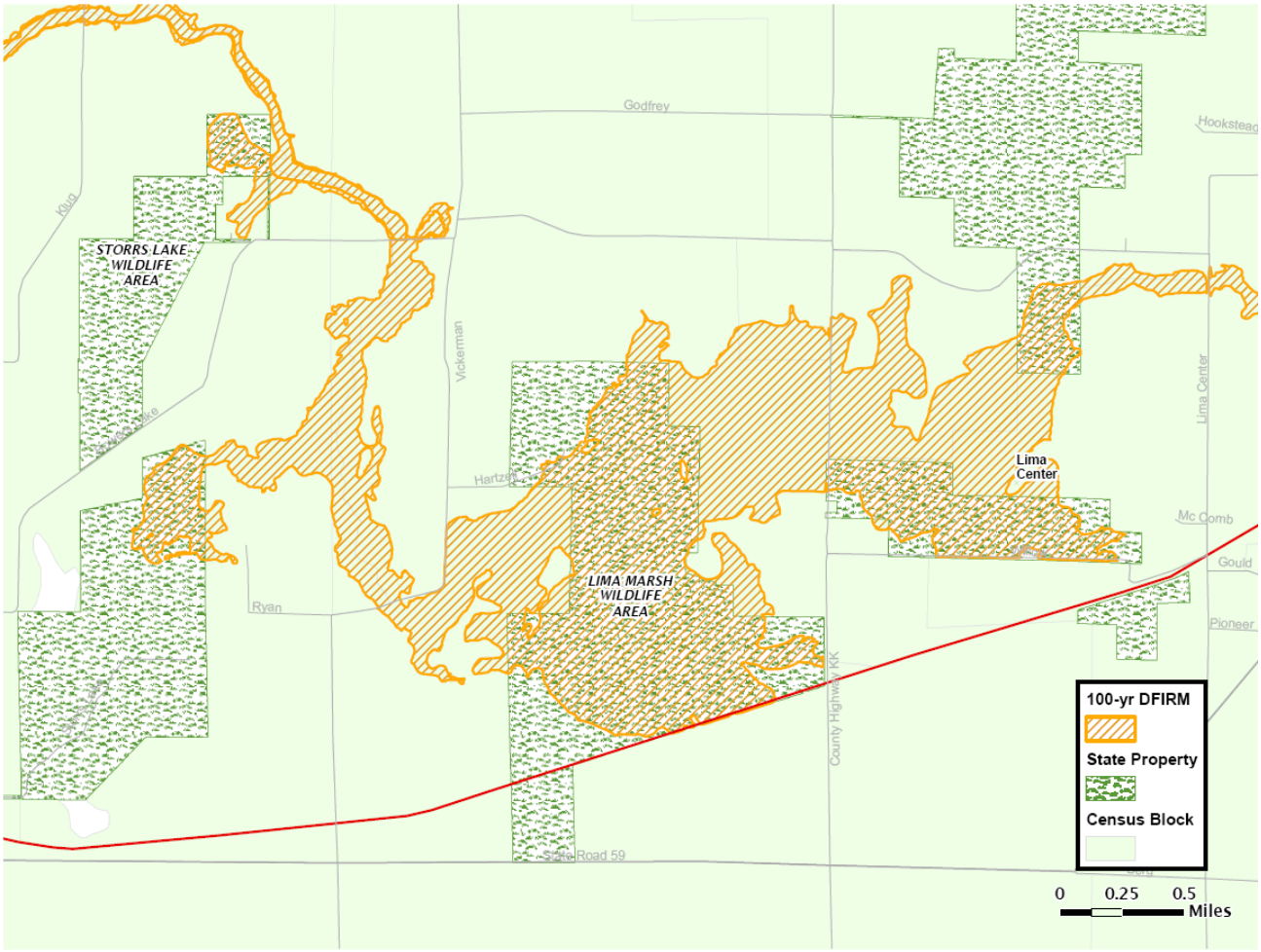


Figure 4b: Boundary of 100-Year Flood Overlaid with State of Wisconsin Properties



Appendix G: Community Input

Rock County believes in the importance of gathering public input from interested parties in the community. To achieve this goal, the Emergency Management Office took every opportunity available to utilize various methods to publicize the opportunity for people to participate in the planning process and to gather input from interested parties. The table that follows outlines the major opportunities that were created to discuss the plan. The table includes dates of workgroup meetings, meetings with public officials and media opportunities.

DATE	SUMMARY OF OPPORTUNITY
May 2015	The project brochure was put in public areas informing people of the project and mitigation in general.
5/5/15	Survey on mitigation ideas, development, etc. sent to all municipalities and applicable county departments. The letter with the survey (see below) requests that municipalities discuss the survey and mitigation at their meetings, which per the WI Open Meetings Law, is noticed to the public, with the agenda, prior to the meeting. Meetings are open to the public and minutes are also publicly posted after the meeting.
5/8/15	Initial press release to the public inviting people from the general public to become part of the PDM workgroup.
5/14/15	The County EM director attended the Rock County Law Enforcement Workgroup (RCLEA) meeting to discuss hazard mitigation.
5/17/15	Rock County PDM Workgroup Meeting
6/25/15	Rock County PDM Workgroup Meeting
8/6/15	Rock County PDM Workgroup Meeting

Q3 2016	Provided the draft plan to the workgroup for review and comment. Received comments and edited the draft.
January 2017	Press release notifying the public of the end of the plan and the open comment period. Printed in community papers (see scan following).
1/10/17	Municipalities provided with draft copy of the plan for review and adoptions.
1/12/17	Legal Public Notice printed in the Janesville Gazette notifying the public of the open comment period on the draft plan.
Q1 – 3, 2017	Adoption meetings at the county and municipalities, which per the WI Open Meetings Law, are noticed to the public, with an agenda, prior to the meetings. Meetings are open to the public and minutes are also publically posted after the meeting. Copies of the adoptions are found in Appendix C.

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.

ROBERT D. SPODEN
ROCK COUNTY SHERIFF

BARBARA J. TILLMAN
CHIEF DEPUTY

NEWS RELEASE

Rock County Hazard Mitigation Plan Update: Workgroup Members

For Immediate Release
Date : 05/08/2015

Contact Person
Sergeant Shena Kohler
(608) 758-8440

ROCK COUNTY BEGINS HAZARD MITIGATION PLAN UPDATE

The Rock County Sheriff's Office - Emergency Management Bureau has applied and been approved for a Hazard Mitigation Grant Program (HMGP) planning grant through the Federal Emergency Management Agency (FEMA). Hazard mitigation plans and projects reduce overall risks to the population and structures, while also reducing reliance on funding from actual disaster declarations. For example, the rigorous building standards adopted by over 20,000 communities across the country are saving the nation more than $1.1 billion a year in prevented flood damages.

The awarded planning grant enables us to complete an update to the current Rock County Hazard Mitigation Plan. This plan is designed to analyze the risks and vulnerabilities Rock County experiences in natural disasters, as well as, highlight cost-effective mitigation strategies that could reduce future losses. Upon approval and adoption, the Hazard Mitigation Plan has the potential to qualify for future available mitigation grant funds, serving as a road-map that outlines, community specific, hazard mitigation activities and projects.

As part of this planning update process, the Rock County Sheriff's Office is assembling a workgroup to review and guide the planning activities. This workgroup will evaluate the current plan and begin identifying new information and hazard mitigation strategies for the update. The public input, provided by members of the workgroup and other community stakeholders can have a long-lasting impact, making Rock County a safer and more disaster-resistant community.

FEMA has recognized the importance of having members of the community involved in the process and Sheriff Spoden would like to ensure that all those interested have an opportunity to participate in this workgroup and provide input. If you are interested in more information about the plan or would like to provide feedback, please contact Sgt. Shena Kohler at (608) 758-8440.

ROBERT D. SPODEN
SHERIFF

By: Sgt. Shena Kohler #11519
Emergency Management

200 EAST U. S. HIGHWAY 14
JANESVILLE, WISCONSIN 53545-9601
PHONE: (608) 757-8000 FAX: (608)757-7997

ROBERT D. SPODEN
ROCK COUNTY SHERIFF
BARBARA J. TILLMAN
CHIEF DEPUTY

May 5, 2015

Dear Community Leaders:

The Rock County Sheriff's Office - Emergency Management Bureau has applied and been approved for a Hazard Mitigation Grant Program (HMGP) planning grant through the Federal Emergency Management Agency (FEMA). The awarded planning grant allows us to complete an update to the current Rock County Hazard Mitigation Plan, which will serve as a roadmap, outlining potential cost-effective hazard mitigation activities. These Hazard Mitigation activities, once approved and adopted have the potential to qualify for future available mitigation grant funds. The plan is designed to analyze the risks and vulnerabilities Rock County experiences in natural disasters and to highlight mitigation strategies that would reduce future losses.

Due to the extensive outreach, planning, and development required for this updated plan, we are asking for your assistance.

To help us identify the current concerns of your municipality and any suggestions you may have for improving the disaster resilience of your community, we have attached a short survey. If you would, please place this item on your next scheduled municipal agenda. Participation in these surveys is greatly appreciated and highly recommended to secure any future applicable mitigation grant funds. Please email completed surveys to our office at kohler@co.rock.wi.us. We need to have all surveys returned by May 31, 2015.

What's next?

The information gathered from the collected surveys will be incorporated into the plan update draft, guided by a workgroup of interested agencies and public members. If anyone from your leadership council, your municipal staff or your general community would like to join the workgroup, please have them contact me.

Upon completion of a final draft, we will send copies of the updated plan to each municipality for final review and future adoption.

Important:

- Adoption of the Rock County Hazard Mitigation Plan, will not cost anything and does not commit the community to any of the suggested mitigation activities and/or projects outlined in the plan. The suggested mitigation activities will simply provide ideas to consider when qualifying funding opportunities become available.
- If you do not adopt the Rock County Hazard Mitigation Plan, your community will not be eligible to apply for and receive mitigation project funding in the future.

200 EAST U. S. HIGHWAY 14 • JANESVILLE, WISCONSIN 53545-9601
PHONE: (608) 757-8000 • FAX: (608) 757-7997

On behalf of the Rock County Sheriff's Office, I thank you for your assistance in this project. This small investment of your time, today, helps strive towards becoming a stronger and more disaster resistant community, in the years ahead. I look forward to receiving your completed surveys by May 31, 2015.

If you are interested in more information about the plan or would like to provide additional feedback, please feel free to contact me at (608) 758-8440 or by email at kohler@co.rock.wi.us.

Kind Regards,

Sergeant Shena Kohler #11519
Rock County Sheriff's Office – Emergency Management Bureau
County Emergency Management Director

Hazard Mitigation Workgroup Meeting

May 17, 2015 9:00 am - 12:00 pm

Sign-In

Name (Print Please)	Agency	Number	Email
Brad Smith	Blackhawk Tech	743-4596	bsmith320@blackhawk.edu
Chris Walsh	City of Beloit	364-2918	walshc@beloitwi.gov
Deuce Slagoski	City of Beloit	364-2929	slagoskib@beloitwi.gov
Lisa Tollefson	T. Harmony	868-6065	townclerk@townofharmony.com
Duane Jorgenson	R.C. DPW	757-5450	jorgend@co.rock.wi.us
Loren Lippincott	M/T Fire	868-2842	lippincott@m-tfire.com
Michelle [illegible]	Head Start	289-3227	msgethe0418@yahoo.com
Inga Cushman	Milton	868-6900	icushman@milton-wi.gov
John Whitcomb	COJ	755-3114	whitcombj@ci.janesville.wi.us
Ben Hein	Red Cross	608-232-7466	benjamin.hein@redcross.org
Dave Botts	COJ	755-3116	bottsd@ci.janesville.wi.us
Shena Kohler	Rock Co	7588446	kohler@co.rock.wi.us
Beth Klune	Ro Co	758 8446	klineb@co.rock.wi.us
Bradley Liggett	City of Beloit	7516201	liggettb@beloitwi.gov

SIGN-IN

Event: Second PDM Mtg **Date:** 25 Jun 2015 **Location:** Janesville

Name (Please Print)	Agency/Department	Email/Phone Number
Brad Smith	BTC	bsmith320@blackhawk.edu 743-4556
LISA TOLLEFSON	T. HARMONY ROCK COUNTY	townclerk@townofharmony.com tollefson@co.rock.wi.us
Norm Tadt	Rock County Land Conservation	NTadt@co.rock.WI.US 608-290-7617
Robert Wildermuth	Farm & File	WildermuthRT6B.com 608 676 4684
TOM HARTZELL	CITY OF EDGERTON	THARTZELL@cityofEDGERTON.com 608-290-5590
Kamron Nielson	City of Janesville	nielsonk@ci.janesville.wi.us 608-755-3102
Allan Arndt	Twn of LaPRAIRIE	ARNDT@T6B.com 608-774-0136
Dave Botts	City of Janesville	bottsd@ci.Janesville.wi.us 608-755-3156
BETH KLINE	ROCK CO. EM.	on file
SHENA KOHLER	ROCK CO. SHERIFF'S	↓
PAUL FRANCE	DNR/WEM/WSIL	↓
		↓

ROBERT D. SPODEN
ROCK COUNTY SHERIFF
BARBARA J. TILLMAN
CHIEF DEPUTY

Rock County Hazard Mitigation Planning

Workgroup Meeting # 2

Please join us on June 25, 2015 for the second meeting of the Rock County Hazard Mitigation Planning Workgroup. For any questions, please contact the Emergency Management office at, 608-758-8440. We look forward to seeing you there.

Where: Janesville Wastewater Utility
3300 W. Tripp Road, Janesville
West of Afton Road, just south of the HWY 11 Bypass

When: June 25, 2015 – 9:00 am

EMERGENCY MANAGEMENT BUREAU
3530 N CTH F PO BOX 0920
JANESVILLE, WISCONSIN 53547-0920
PHONE: (608) 758-8440 FAX: (608) 758-8401

August 6, 2015 Meeting

ROBERT D. SPODEN
ROCK COUNTY SHERIFF
BARBARA J. TILLMAN
CHIEF DEPUTY

January 10, 2017

Dear Town, Village and Municipal Community Leaders of Rock County,

The State of Wisconsin has endured billions of dollars in damages over the past three decades, as a result of various disasters including severe weather and flooding events, major snowstorms, and powerful tornados. While the costs of each disaster may vary greatly, the impact is always the hardest at the local level, impacting our communities the most.

The State of Wisconsin, in partnership with FEMA, have identified opportunities to assist communities in reducing future losses through several mitigation activities. Mitigation efforts may result in a significate decline in the cost of a disaster's impact down the road. In fact, for every dollar spent on mitigation activities, $2 - $3 dollars in future damages may be avoided.

Hazard mitigation breaks the cycle of damage and repair by reducing or eliminating the long-term risk to human life and property caused by the potential hazards. These preventative actions may be as simple as elevating a furnace in a basement, in an effort to prevent water damage. Mitigation efforts may also take a more 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 Rock County's vulnerability to disaster, the Rock County Sheriff's Office - Emergency Management Bureau, applied for, received, and has now updated the Rock County Hazard Mitigation Plan through a Pre-Disaster Mitigation (PDM) planning grant. The updated plan serves as a roadmap that outlines potential cost-effective hazard mitigation activities, some of which might be available for future grant funding. The plan highlights the risks and vulnerabilities that Rock County faces from natural disasters and highlights mitigation strategies that may reduce future losses.

As this project nears completion, we are sending copies of the final updated plan and a draft resolution template for you to use for the re-adoption of the Rock County Hazard Mitigation Plan. Please note:

1. **Adoption of this plan will not cost your community anything.** You will not be committing to completing any of the projects listed; instead it is a list of triaged ideas that could be accomplished should the funding and will to complete them become available.

2. **If you do not adopt this plan, your community will not be eligible to apply for and receive mitigation project funding in the future.**

We are asking that you please include adoption of this resolution on your next meeting agenda and provide a copy of the final resolution as soon as it is passed, to the **Rock County Sheriff's Office - Emergency Management Bureau,** P.O. Box 0920, Janesville, WI 53547-0920. If you have any questions or comments regarding this plan update, please feel free to contact me at (608) 758-8440 or by email at shena.kohler@co.rock.wi.us

We thank you in advance for your assistance with completing the 2017 Rock County Hazard Mitigation Plan. This small investment of your time will help make our community a safer, healthier and more disaster-resistant community for years to come.

Respectfully,

Sergeant Shena Kohler
Rock County Sheriff's Office – Emergency Management Bureau

200 EAST U. S. HIGHWAY 14
JANESVILLE, WISCONSIN 53545-9601
PHONE: (608)757-8000 FAX: (608)757-7997

Public Notice

Rock County has completed the final draft of a Rock County Hazard Mitigation Plan - Update, prepared in accordance with the Disaster Mitigation Act of 2000 (Public Law 106-390; DMA2K). The draft is available for public comment until January 24, 2017. The plan is available for public review Monday through Friday between the hours of 8:00 am and 4:00 pm at the lobby of the Rock County Healthcare Center, located at 3530 North County Highway F, Janesville WI and may be viewed online at:
http://www.co.rock.wi.us/images/web_documents/departments/emergency_management/hazard_mitigation_plan.pdf

If you have questions related to this notice or its application in Rock County, call the Rock County Sheriff's Office - Emergency Management Bureau at (608) 758-8440.

ROBERT D. SPODEN
ROCK COUNTY SHERIFF
BARBARA J. TILLMAN
CHIEF DEPUTY

NEWS RELEASE

Rock County Hazard Mitigation Plan – Updated Draft Ready for Public Review

For Immediate Release
Date : 01/09/2017

Contact Person
Sergeant Shena Kohler
(608) 758-8440

The State of Wisconsin has endured billions of dollars in damages over the past three decades, as a result of various disasters including severe weather and flooding events, major snowstorms, and powerful tornados. While the costs of each disaster may vary greatly, the impact is always the hardest at the local level, impacting our communities the most.

A recent study by the Multi-Hazard Mitigation Council shows that each dollar spent on mitigation saves society an average of four dollars in future costs. Hazard mitigation breaks the cycle of damage and repair by reducing or eliminating the long-term risk to human life and property caused by the potential hazards. These preventative actions may be as simple as elevating a furnace in a basement, in an effort to prevent water damage. Mitigation efforts may also take a more 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 Rock County's vulnerability to disaster, the Rock County Sheriff's Office - Emergency Management Bureau, applied for, received, and has now updated the Rock County Hazard Mitigation Plan through a Pre-Disaster Mitigation (PDM) planning grant. The updated plan serves as a roadmap that outlines potential cost-effective hazard mitigation activities, some of which might be available for future grant funding. The plan highlights the risks and vulnerabilities that Rock County faces from natural disasters and highlights mitigation strategies that may reduce future losses.

The draft is available for public comment until Tuesday, January 24, 2017. The plan is available for public review Monday through Friday between the hours of 8:00 am and 4:00 pm at the lobby of the Rock County Healthcare Center, located at 3530 North County Highway F, Janesville WI and may be viewed online at http://www.co.rock.wi.us/images/web_documents/departments/emergency_management/hazard_mitigation_plan.pdf

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ROBERT D. SPODEN
SHERIFF

By: Sgt. Shena Kohler #11519
Emergency Management

200 EAST U. S. HIGHWAY 14
JANESVILLE, WISCONSIN 53545-9601
PHONE: (608) 757-8000 FAX: (608)757-7997

ROCK COUNTY DEVELOPING DISASTER RESPONSE PLAN

January 14, 2017 at 10:00 am | By AUSTIN MONTGOMERY Staff writer

JANESVILLE — A draft of a disaster mitigation plan from the Rock County Sheriff's Office is open to public comment until Jan. 24. The plan will serve as a road map for conducting cost-effective hazard mitigation activities.

"It just makes sense to have a plan in place ahead of time," said Rock County Sheriff's Office Commander Try Knudson. "Something like this fills the gap to give us strategies to be prepared in the event of a natural disaster or hazardous scenario."

Knudson said having the plan already has paid off, after multiple Rock County agencies responded to a fatal crash involving a semi truck carrying chemicals last weekend.

On Jan. 7 authorities were called to an accident between a Toyota Camry and the truck that contained methanol and hydrogen peroxide. The Rock County Hazardous Materials Response Team was one of the seven agencies on scene, and the interstate was closed for seven hours, causing traffic to be rerouted from early Saturday morning until Saturday afternoon.

"Having a plan in place is very critical in helping us coordinate all responding agencies and coordinating things like traffic patterns and alternate routes," Knudson said. "That incident really highlighted the importance of pre-planning."

The plan was submitted for public comment after the Federal Emergency Management Agency (FEMA) deemed the draft ready for approval, according to plan specifics. Before heading to FEMA, the plan was reviewed by state officials.

The department recently received funds to update the plan through a Pre-Disaster Mitigation (PDM) grant. The plan highlights risks those in Rock County face from natural disasters and highlights various strategies to reduce future losses.

The disaster plan claimed the Rock County area is most prone to seasonal flooding, severe thunderstorms during warmer months and snowstorms during the winter. The detailed document used an overall risk matrix to determine the likelihood of each event occurring. The mitigation effort was then sent to each municipality in the county for reference and further added input. 189

189 http://www.beloitdailynews.com/article/20170114/ARTICLE/170119858

Rock County Sgt. Shena Kohler said mitigation strategies for Beloit centered on flooding issues, and the Town of Turtle and city officials will hold a meeting on Feb. 7 to investigate issues surrounding the Turtle Creek flood plain, something that was labeled a high priority in the plan. The meeting will help officials draft a FEMA "Risk Map" to determine areas in the flood plain most prone to flooding.

The meeting will start at 1 p.m. at South Beloit City Hall, 519 Blackhawk Boulevard, and is open to the public. The draft of the plan will be distributed to each municipality in Rock County for review, and each village, city or town can submit possible changes or additions to the plan, Kohler said.

"There are things we miss," she added. "We want to make sure that community stakeholders can get input into the plan."

Other areas in Beloit were also identified for possible flood risk. The Gateway Business Park in Beloit lacks a drainage system, making it susceptible to flash floods, according to the report.

"Aside from severe weather, flooding is actually the biggest threat to the area," Kohler said.

Along the Interstate 90 corridor, the area could be prone to seasonal wildfires in crop and grasslands. Extreme temperatures during the summer are expected to continue, the plan stated, meaning the area could see prolonged droughts in the summer.

In the plan, officials outline various extra-budget funding sources for disaster preparation, and also covers notification systems used by area municipalities for disaster alerts. Through adding mitigation strategies, each municipality will be eligible for federal funding in the event of a disaster, if included in the plan.

"It's a huge asset for us," Kohler said. "We want to make sure that this is a community effort. Everyone's given so much of their time for this."

The plan can be reviewed Monday through Friday from 8 a.m. to 4 p.m. in the lobby of the Rock County Healthcare Center, 3530 N. County Road F in Janesville. The plan is also available for viewing online at co.rock.wi.us.

Governmental & Public Input

Planning creates a way to solicit and consider input from diverse interests. Successful community mitigation begins with a commitment from government officials throughout the county.

Involving stakeholders is essential to building community-wide support for the plan. In addition to emergency managers, the planning process involves other government agencies (e.g., zoning, floodplain management, public works, community and economic development), businesses, civic groups, environmental groups and schools. Vital information provided by these groups helps insure that the plan is workable within the framework of the community's priorities.

Adoption of the Plan

Local units of government participating in a multi-jurisdictional planning process must adopt the final plan for the municipality to be eligible for future mitigation funds including grants available through FEMA. **Local units (i.e., towns, villages, cities) that do not participate would be ineligible to receive such funds** until such time that they meet these requirements and adopt a plan.

MITIGATION PLANNING FACTS

► A recent study by the Multi-hazard Mitigation Council shows that each dollar spent on mitigation saves society an average of four dollars.

► The rigorous building standards adopted by 20,000 communities across the country are saving the nation more than $1.1 billion a year in prevented flood damages.

► Hazard mitigation plans and projects reduce overall risks to the population and structures while also reducing reliance on funding from actual disaster declarations.

► In Wisconsin alone over $3 billion in disaster-related damages in the last 3 decades.

For further information please contact:

Rock County Sheriff's Office:
Emergency Management Bureau
3530 N. County Highway F
P.O. Box 920
Janesville, WI 53545

Sergeant Shena Kohler #11519
Emergency Management Director
Phone: 608-758-8440
Email: kohler@co.rock.wi.us

Pre-Disaster Mitigation Planning

Creating Safe,

Sustainable

Communities

Prepared by:

Rock County Sheriff's Office
Emergency Management Bureau

Like many other people, the residents of Merkel, Texas didn't think much about flooding. Besides, it had not flooded in Merkel for 45 years. It wasn't until the heavy rains in the summer of 2007 that residents realized flooding can hit anyone, at any time. After the flooding finally subsided, officials knew they had to do something: mitigate.

What is Hazard Mitigation?

Hazard mitigation is sustained action taken to reduce or eliminate long-term risk to people and their property from hazards.

Floods, ice storms, tornadoes and forest/wild fires, 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. The results from past outcomes, can be appreciably different, if our community takes mitigation action today.

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

Why Develop A Plan?

Mitigation plans form the foundation for a community's long-term strategy to reduce disaster losses and break the cycle of disaster damage, reconstruction and repeated damage. The planning process is as important as the plan itself. It creates a framework for risk-based decision-making to reduce damages to lives, property and the economy from future disasters.

State, tribal and local governments are required to develop a hazard mitigation plan as a condition for receiving certain types of non-emergency disaster assistance. The Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288), as amended by the Disaster Mitigation Act of 2000, provides the legal basis for state, local and tribal governments to undertake a risk-based approach to reducing risks from natural hazards through mitigation planning.

Risk Reduction

The goal of risk reduction is to reduce the risk to life and property, which includes existing structures and future construction, in the pre- and post-disaster environments. This is achieved through regulations, local ordinances, land use, building practices and mitigation projects that reduce or eliminate long-term risk from hazards and their effects.

Hazard Mitigation Planning Process

1. Organize Resources- From the start, communities should focus the resources needed for a successful mitigation planning process. Essential steps include identifying and organizing interested members of the community, particularly those with the technical expertise required during the planning process.

2. Assess Risks- Communities next need to identify the characteristics and potential consequences of natural hazards. It is important to understand how much of the community can be affected by specific hazards and what the likely impacts would be for important community assets.

3. Develop a Mitigation Plan- Armed with an understanding of the risks posed by natural hazards, communities need to determine what their priorities should be and then look at possible ways to avoid or minimize the undesired effects. The result is a natural hazard mitigation plan and strategy for implementation.

4. Implement the Plan & Monitor Progress- Communities can bring the plan to life in a variety of ways ranging from implementing specific mitigation projects to changes in the day-to-day operation of the local government. To ensure the success of an on-going program, it is critical that the plan remains effective. Thus, it is important to conduct periodic evaluations and make revisions as needed.

Appendix H: Inter-Revision Updates

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

Potential Areas of Concern Identified:

- No additional concerns have been identified to date.