GREEN LAKE COUNTY

571 County Road A, Green Lake, WI 54941

Original Post Date: 2/7/19

Amended* Post Date:

The following documents are included in the packet for the Judicial Law Enforcement and Emergency Management Committee on February 13, 2019:

1) Agenda
2) Minutes from 01/16/19
3) Correspondence
4) Resolution Regarding the Hazard Mitigation Plan Update
5) Department Reports
    a. Clerk of Courts
    b. Coroner
    c. Emergency Management
    d. Sheriff
6) Budget Adjustments/Line Item Transfers
7) Monthly Sheriff Reports

JUDICIAL/LAW ENFORCEMENT AND EMERGENCY MANAGEMENT COMMITTEE

Judicial/Law Enforcement and Emergency Management Committee

Meeting Notice

Date: February 13, 2019 Time: 10:30 AM
Green Lake County Government Center,
County Board Room, 571 County Rd A, Green Lake WI

AGENDA

Committee Members

Larry Jenkins, Chair
Sue Wendt, Vice-Chair
Peter Wallace
Kathy Morris
Keith Hess

Lori Evans, Secretary

1. Call to Order
2. Certification of Open Meeting Law
3. Pledge of Allegiance
4. Agenda
5. Minutes: 01/16/2019
6. Public Comments 3 Min Limit
7. Correspondence
8. Purchase Requests
9. Credit Card Approval
10. Resolutions/Ordinances
    - Hazard Mitigation Plan Update
11. Department Related Reports
    - Clerk of Courts
    - Circuit Court/Register in Probate
    - District Attorney
    - Coroner
    - Emergency Management
    - Sheriff's Office
12. Budget Adjustments/Line Item Transfers
13. Monthly Sheriff Reports
14. Expense & Revenue Monthly Reports
15. Lexipol Law Enforcement Policy and Procedure
    - #318 Canines
16. Future Meeting Dates: Regular Meeting March 13, 2019, at 10:30 am
17. Future Agenda items for action & discussion:
18. Adjourn

Kindly arrange to be present, if unable to do so or if there are any changes, please notify Samantha at 4005.

Please note: Meeting area is accessible to the physically disabled. Anyone planning to attend who needs visual or audio assistance, should contact the County Clerk's Office, 294-4005, not later than 3 days before date 0f the meeting.

JUDICIAL/LAW ENFORCEMENT AND EMERGENCY MANAGEMENT COMMITTEE

January 16, 2019

The regular Judicial/Law Enforcement and Emergency Management Committee meeting was called to order by Chairman Larry Jenkins at 10:30 a.m. on January 16, 2019 in the County Board room of the Green Lake County Justice Center, 571 County Road A, Green Lake, WI. The requirements of the open meeting law were certified as being met.

Present: Larry Jenkins – Chairman
Sue Wendt-Vice-Chairman
Peter Wallace
Keith Hess
Kathy Morris

Others Present:
Lori Evans, Admin. Ass't to Sheriff
Gary Podoll – Emergency Management
Dawn Klockow – Corp. Counsel
Mark Putzke, Chief Deputy
Sheriff Mark Podoll

PLEDGE OF ALLEGIANCE

The Pledge of Allegiance was recited by the group.

MINUTES

Motion/Second (Hess/Wallace) to approve the minutes of the December 12, 2018 meeting as written. All Ayes. Motion carried.

PUBLIC COMMENTS

None

CORRESPONDENCE

Thank you from the Family of Grace Reuter – Rudolf to Lynn, the Victim Witness Coordinator in the DA's Office for her hard work, diligence, and the loving positive impact and education she provides to victims and their families.

Thank you to Detective Scott Cody from Debra Garetson HR Director of the Green Lake Conference Center for the dedication and sacrifice he showed them in a case that they had with an employee recently. They feel his actions ensured that the residents of the County and the Conference Center in particular, feel secure.

Letter from the Administrator of DCI acknowledging the fine job that Deputy Jeremiah Hanson did at the specialized training they had in the fall regarding Internet Crimes Against Children. Deputy Hanson scored a 97% on his final exam and ranked second in the class.

Jim Gelhar from A.F. Gelhar Company sent a thank you to Detective Chad Holdorf for the time and effort he put in providing a very informative shooter training for their company recently. Mr. Gelhar concluded in saying the citizens of Green Lake County are fortunate to have such a dedicated officer serving in his role.

A thank you from Chief Deputy (now Sheriff) Ryan Waldschmidt from Fond du Lac County for all the help we provided them on December 25th on a lengthy and treacherous search that had a very positive outcome. (Our drone was of great assistance in this search).

PURCHASE REQUESTS

None

CREDIT CARD APPROVAL

None

RESOLUTIONS/ORDINANCES

Corp. Counsel Dawn Klockow explained the resolution regarding Peddlers, Canvassers and Transient Merchants that was in the packet. Discussion was held.

Motion/Second (Hess/Wendt) to approve the resolution as presented. All Ayes. Motion carried.

DEPARTMENT RELATED REPORTS

Written reports were included in the packet from the Sheriff's Office, Clerk of Circuit Court, Coroner, and Emergency Management.
Gary Podoll, Emergency Management Director added that last Tuesday he and Angie Petruske, the County Financial Coordinator attended a Directors meeting where the head of Finance for Emergency Government for the State spoke. They learned a lot more about grants, auditing and disaster expenditures that will help us in the future. He also reported that Next Gen 911 was tested in the Mobile Command Center yesterday. He was pleased with the results. Gary also reported that Mark Piechowski, retired EM director from Waushara County offered to volunteer his services to our EM program wherever he was needed. Gary checked and Mr. Piechowski is covered under the County liability insurance as a volunteer. Mr. Piechowski will be of great assistance to Gary, which Gary was very pleased about.
Sheriff Podoll reported that since the written report was presented there were three more CTU calls to the jail. He also reported that for the length of his new term he has appointed Dennis McConnell as a non-paid Undersheriff. He was pleased to report that our County was one of only 13 Counties in the State that had no traffic fatalities in 2018. We were the only county in the State that had no traffic fatalities in the last two years.

BUDGET ADJUSTMENTS/LINE ITEM TRANSFERS

Line Item transfers:

Emergency Management – request to move $597.10 from Capital Equipment to two accounts. $100 to the Disaster line for the purchase of sandbags for Aug/Sept. disaster and $497.10 to travel for mileage overage due to Aug/Sept. tornado and flooding disaster.

Sheriff's Office – request to move $1,700 from the 2018 budget, Office Supplies to Uniforms as the Uniform expenses were higher than expected due to hiring more than anticipated new employees. The Honor Guard uniforms, Stetsons and hat badges cost more than expected too.

Sheriff's Office – request to move the following funds from the 2018 budget. $89.00 from Small items of Equipment to Capital Equipment as the 24 Hour jail chair was $589.00. We had only budgeted $500 for it.

Motion/Second (Hess/Wendt) to approve the Line Item Transfers as presented. All Ayes. Motion carried.

Budget Adjustments:

Emergency Management – Two new accounts were created for disaster funds. It is being requested that $800 be added to both the revenue and expenditure accounts for reimbursement and sandbag costs arising from the Aug/Sept. disaster.

Sheriff's Office – request to increase both the 2018 Jail Janitorial Expenses and the Safekeeper revenue by $1,339.65 to cover overages in the Jail Janitorial account due to holding Safekeepers. We also had increased revenues due to holding more Safekeepers than expected.

Sheriff's Office - request to increase both the Inmate Phone expense and revenue accounts by $10,150.00 as they were both higher than expected due to an increase in the number of Safekeepers we held.

Sheriff's Office – request to increase both the Commissary expense and revenue accounts by $620.83 again as they were both higher than expected due to an increase in the number of Safekeepers that we held.

Motion/Second (Hess/Wallace) to approve the Budget Adjustments as presented. All Ayes. Motion carried.

Budget Adjustments for one-time carry-overs from the 2018 budget to the 2019 budget were also presented by the Sheriff's Office. The format as to how they should go to County Board was uncertain. The Committee was in full support of the following carry-overs as proposed in whatever format the County Administrator would like them to be presented. They were as follows:

$1,975.00 from the 2018 general travel account and $1,500 from the 2018 Staff Development account for a total of $3,475 to go to the 2019 Staff Development budget to cover the bi-annual costs of CPR/AED/FIT/Hearing training. This was budgeted for, but the overall Staff development budget was capped at $10,000 which will not be enough to cover all of the other trainings that are essential to the operation of the department as well as the Bi-Annual CPR/AED/FIT/Hearing mandatory training.

$900 from the 2018 Boat repair and maintenance account to the 2019 Boat repair and maintenance to cover the unforeseen cost of a secure boat slip for 2019. The one used in 2018 near Hattie Sherwood Park did not prove to work out well.

$1,016.62 from the 2018 Firearms account to the 2019 Firearms account to cover items that were ordered in 2018 and were either back-ordered or not posted to the Credit card until 2019, though they were ordered in 2018.

$800 from the 2018 Buoy Budget to the 2019 Buoy Budget to cover Buoy's that were ordered in 2018, but were not posted to the credit card until 2019.

MONTHLY SHERIFF REPORTS

The monthly Sheriff's reports were reviewed and accepted as presented.

EXPENSE AND REVENUE MONTHLY REPORTS

The monthly expense and revenue reports were reviewed and accepted as presented.

LEXIPOL

There were no Lexipol policies to present at this meeting. However at the March meeting the entire Lexipol Custody Policy Manual will be presented. The manual is over 300 pages. The Chief Deputy asked the Committee how they would like to receive it. It was unanimous that they would like to receive it electronically.

FUTURE MEETING DATE AND AGENDA ITEMS

The next regular meeting is set for February 13, 2019 at 10:30 a.m. in the County Board Room of the County Justice Center, 571 County Road A, Green Lake.

ADJOURN

Motion/Second (Hess/Wendt) to adjourn. All Ayes. Motion carried.
Meeting adjourned at 11:28 a.m.
Respectfully submitted,
Lori Evans, Administrative Assistant to the Sheriff

Lynn,

We want to thank you for all of your kindness, support, and guidance during a very difficult and horriable event that our family was left to understand and process regarding Grace. Our entire family reconizes that we had someone who not only was a great resource but your Compassion, Knowledge, and Professionalism were second to none. Most Important, you went above and beyond our expectations to make sure our family was taken care of in every possiable way. Please know that your patience and caring way did not go unoticed.

With our whole hearts we thank you for always being available to answer our questions, explain our rights, and guide us through the court system as well as through our grief. Through your kind words and actions you allowed our hearts and minds to rest easier knowing we had and advocate supporting us.

For everything

you have done...

for everything

you have given...

THANK YOU.

I believe Grace sent us all and angel through you to help us voice our love and to find justice and for that we are forever grateful.

Thank-you!

Grace Reiter-Rudolph
Family

#190143

45/Coliower

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www.kinasexcavating.com

MAILED TO FOR EMPLOYEE'S FILE 01/22/19

January 21, 2019

TO: Green Lake County Sheriff's Department
Fax: 920-294-3850

FROM: Bill Kinas

On January 17, 2019 around 4:20 p.m., I received a call from one of our truck drivers stating that the rear of the truck was on fire. He pulled over and used our truck fire extinguisher on it but it did not go completely out. He then called the Sheriff's Office to page the Fire Department. Once paged one of your Officers arrived and provided an additional fire extinguisher that did put the fire out. The Fire Department did arrive and made sure the fire was out. At this point we found that the airlines and wiring to the rear of the truck were burned up and the truck was not drivable or movable due to the brakes being set and knowing that a tow truck would not be able to move our truck with a load on it. At this time it was dark and your Officer stayed on the scene to direct any traffic around our truck until we could safely move it back to our shop. I just wanted to personally thank you for doing this and I am glad that we live in a smaller county where people look out and help each other.

Evans, Lori

From: Evans, Lori
Sent: Tuesday, January 15, 2019 10:28 AM
To: Vande Kolk, Matt
Cc: Podoll, Mark; Putzke, Mark
Subject: Adams Columbia Thank you

Duane from Adams Columbia Electric just called and wanted to express his thanks to Deputy Matt Vande Kolk for doing the right thing. Recently there was an accident where the driver ran off the road into an Adams Columbia power pole. The driver was uninjured but couldn't get out of the car. Deputy Vande Kolk made the correct decision to leave the person and the car as it was until crews from the power company arrived. Duane stated that this doesn't always happen. He wanted to thank Deputy Vande Kolk for making the right decision and pass his thanks on to the management team.

Lori L. Evans
Administrative Assistant
Green Lake County Sheriff's Office
571 County Road A
Green Lake, WI 54941-8630
920-294-4134, Ext. 6
Fax 920-294-3850

RESOLUTION NUMBER -2019

ADOPTION THE GREEN LAKE COUNTY ALL HAZARDS MITIGATION PLAN

The County Board of Supervisors of Green Lake County, Green Lake, duly assembled at its regular meeting begun on the 19th day of February 2019, does resolve as follows:

WHEREAS, Green Lake 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 adopted all hazard mitigation plan is required by FEMA as a condition of future grant funding for mitigation projects; and

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

Majority vote is needed to pass.

Roll Call on Resolution No. -2019

Submitted by Judicial/Law Enforcement & Emergency Management Committee:

Ayes , Nays , Absent , Abstain

Passed and Adopted/Rejected this 19th day of February, 2019.

Larry Jenkins, Chair

Sue Wendt, Vice-Chair

County Board Chairman

Peter Wallace

ATTEST: County Clerk

Kathy Morris

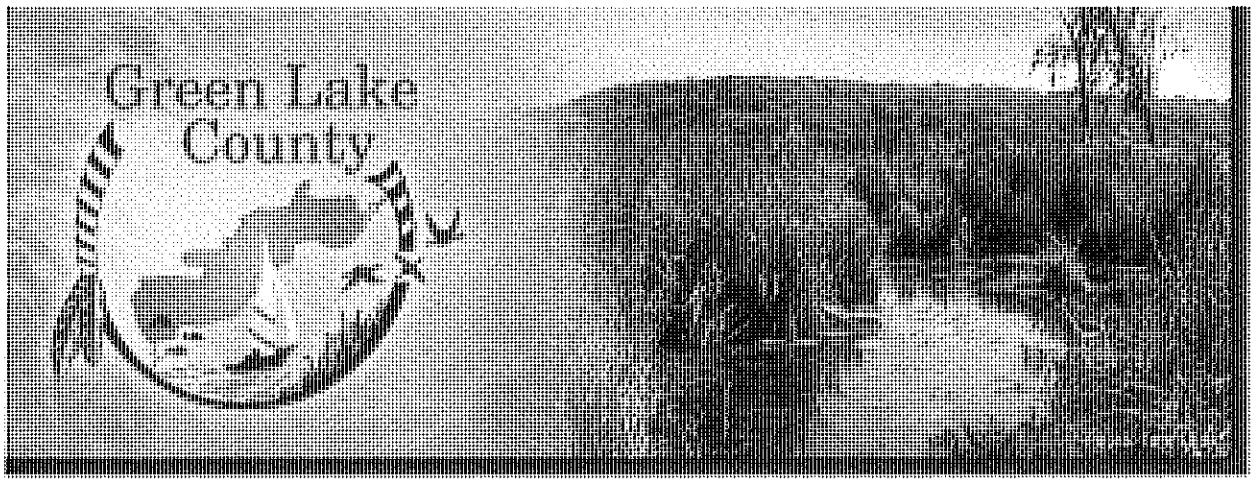
Approve as to Form:

Corporation Counsel

Keith Hess

NOW, THEREFORE, BE IT RESOLVED, that Green Lake County Board of Supervisors hereby adopts the Green Lake County All Hazards Mitigation Plan as an official plan; and

BE IT FURTHER RESOLVED, that the Green Lake County Emergency Management Department will submit, on behalf of the participating municipalities, upon its adoption by all such municipalities, the adopted All Hazards Mitigation Plan to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final review and approval. Minor changes to be made upon advice from Wisconsin Emergency Management and Federal Emergency Management Agency will not require re-adopting this resolution.



Hazard Mitigation Plan

Green Lake County, Wisconsin

Original Plan Date – September, 2018

EPTEC, Inc.
Lenora Borchardt
7027 Fawn Lane
Sun Prairie, WI 53590-9455
608-834-0802
LenoraB@EPTECInc.com

Table of Contents

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
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
CFR	Code of Federal Regulations
CI	City
CO	County
CO HWY	County Highway Department
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
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 Multi-hazard
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
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
TN	Township
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
WEM	Wisconsin Emergency Management
WISP	Wisconsin Irrigation Scheduling Program

Introduction and Background

The Green Lake County Hazard Mitigation Plan is intended to provide strategies for reducing susceptibility to future damage to public and private infrastructure in the county. The Green Lake County Emergency Management Office applied for and received a hazard mitigation planning grant in 2017. 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. FEMA rules for implementing Section 409 are in 44 CFR Part 206 Subpart M.

Section 409 states that the county is obligated to try to reduce damage susceptibility to any hazard that has received relief funding in the past. Developing a hazard mitigation plan provides an opportunity for communities to meet this requirement by developing strategies for reduction of potential losses from future natural disasters. Hazard mitigation planning is the process of developing a set of actions designed to reduce or eliminate long-term risk to people and property from hazards and their effects. Completion of this plan should put Green Lake 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 Green Lake County by presenting:

- A profile and analysis of past hazardous events

- An assessment of vulnerability of community assets
- Potential hazard mitigation strategies
- Methods for building community support and ensuring plan adoption

Plan Overview

The Green Lake County Hazard Mitigation Plan provides background information on Green Lake 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 Green Lake County Emergency Management Office has completed and regularly updates a hazard vulnerability analysis (HVA). This 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 Green Lake County departments or municipalities, which were used as reference materials for this plan, including:

Green Lake County Code of Ordinances[1]

Chapter 32	Emergency Management
Chapter 280	Comprehensive Plan
Chapter 284	Construction Site Erosion Control and Storm Water Management
Chapter 300	Floodplain Zoning
Chapter 315	Land Division and Subdivision
Chapter 323	Nonmetallic Mining Reclamation
Chapter 338	Shoreland Protection
Chapter 350	Zoning

City of Berlin Code of Ordinances[2]

Chapter 14	Buildings and Building Regulations
Chapter 62	Subdivisions
Chapter 82	Zoning

City of Green Lake Municipal Code[3]

Title 13	Zoning
Title 14	Subdivision Regulations
Title 15	Building Code

City of Markesan Building Regulations[4]

Part III, Chapter 366	Comprehensive Plan
Part III, Chapter 370	Floodplain Zoning
Part III, Chapter 377	Official Map
Part III, Chapter 385	Shoreland-Wetland Zoning
Part III, Chapter 390	Subdivision of Land
Part III, Chapter 400	Zoning

City of Princeton Code of Ordinances[5]

Part III, Chapter 395	Floodplain Zoning
Part III, Chapter 410	Shoreland-Wetland Zoning
Part III, Chapter 415	Subdivision of Land
Part III, Chapter 430	Zoning

The local HVA serves as the starting point for the hazard mitigation plan. Other data on historical events is gathered from the National Weather Service's storm report database, recent news reports, local resources (e.g., website; local community ordinances; local plans such as the comprehensive plan, stormwater management

[1] https://www.ecode360.com/GR2053
[2] http://www.municode.com/resources/gateway.asp?pid=13496&sid=49
[3] http://cityofgreenlake.com/municipal-code/
[4] https://www.ecode360.com/MA3155
[5] https://ecode360.com/PR3158

plans), the FEMA Region V mitigation survey and from the memories of the local planning team members. Team members are presented with this educational background data and asked to rank their concern (likelihood of future occurrences and amount of disruption/damage should it occur) on a five-point scale (very high, high, medium, low, very low). From that, team members, members of the community, survey respondents and other planning participants are asked to determine hazard mitigation strategies that might benefit their communities. Local existing plans are referenced again at this time, with the members and authors of these plans (e.g., comprehensive, stormwater management) serving as core members of the workgroup committee. The selected mitigation strategies are recorded and detail 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 Green Lake 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:

- Gary Podoll, Green Lake County Emergency Management
- Mark Podoll, Green Lake County Sheriff

- Gerald Stanuch, Green Lake County Land Use Planning & Zoning
- Matt Kirkman, Green Lake County Land Use Planning & Zoning
- Kathy Munsey, Green Lake County Department of Health & Human Services
- Julia McCarroll, Green Lake County Department of Health & Human Services
- Lindsey Kemnite, City of Berlin
- Mike Ross, City of Markesan
- Marylou Neubauer, City of Princeton
- Lenora Borchardt, EPTEC, Inc. (Contractor)

An informational brochure was created and copies were distributed throughout the community at local community gathering points such as municipal halls, libraries, etc. Meetings were held with chief elected officials from the municipalities to explain and gather input regarding the program (e.g., previous occurrences, mitigation strategies.) The FEMA Region V survey was sent to every Green Lake 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 Green Lake 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 also has been passed by the Green Lake County board, the Cities of Berlin, Green Lake, Markesan and Princeton; the Villages of Kingston and Marquette and the Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca, and St. Marie. The Towns of XXX have not individually adopted the plan but, as towns, are considered under the county's adoption. Scanned copies of the adoption resolutions can be found in Appendix C. The final plan has been submitted to WEM for review and certification and notice of acceptance has been received of FEMA plan approval as of XXX.

The Disaster Mitigation Act of 2000 requires the monitoring, evaluation and updating of the hazard mitigation plan every five years. This hazard mitigation plan is designed to be a "living" document and therefore will be reviewed and updated within five

years from its approval date. The Green Lake 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 he receives information between the five-year update periods (e.g., comprehensive or capital improvement plans) that might be included, it will be added to Appendix H: Inter-Revision Updates. Green Lake 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 may solicit updates from the plan's stakeholders (county offices, municipalities, the public, etc.). The solicitation would seek to determine if there are new elements for the mitigation plan as well as 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 and update community ordinances and other planning such as zoning, shoreland, floodplain, wetland, 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 emergency management is notified that they are up for renewal, they will provide any relevant planning materials (from the hazard mitigation plan and any additional information received since the plan's approval). Municipalities with planning departments are also encouraged to refer 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. Green Lake County Emergency Management will also refer to this plan in their emergency preparedness activities.

Physical Characteristics of Green Lake County

General Community Introduction

Green Lake County has only existed since 1858 but its settlement started much earlier. Originally under the judicial jurisdiction of Brown County, the territory was established as Marquette County in 1836 and fully organized in 1848 with the county seat at Marquette. Green Lake County was separated from Marquette County by an Act of Legislation in 1858 with the county seat at Berlin. In 1862, the citizens voted to move the county seat to Dartford, (now known as Green Lake). In 1863 the first courthouse was built in Dartford at the present site. In 1866 dissension between the factions moved the county seat to Princeton with an early morning raid on the records. In the same year, the Supreme Court ordered the county seat back to Dartford. Later attempts were made to detach the western towns from Fond du Lac County to Green Lake County and make Ripon the county seat. Those efforts failed.

Luther Gleason is credited with being the first to settle in the new territory near the village of Marquette on the Fox River, migrating from Vermont in 1831. He was an Indian trader and kept a store. James Powell settled in the Town of Green Lake in 1835 or before. Hiram McDonald was the third settler in the County. He located in the town of Mackford in 1836.

Anson Dart and his two sons located at the outlet of Twin Lakes in 1840 and put up the first frame house. In 1843 William Dakin and Satterlee Clark settled near the Center House. The first post office in the county was at Mr. Clark's. Mr. W.A. Millard was probably the first settler on the Village of Manchester site, arriving in 1846. In 1846, R. Day, J. Burt, Henry Pratt and others came to Little Green. In 1847 the county comprised three electoral precincts, Puckaway, Lake Marie and Big Green. In that same year Mr. Atkins put up a log cabin in the Town of Berlin.

In May of 1847 Nathan Strong entered the land on which part of the City of Berlin now stands. Joel Day erected the first frame house here in 1848 and the settlement was originally called Strongsville. Also in 1847 Datus Lewis, J. Larkin and others commenced the Seventh Day Baptist settlement in the town of Berlin on the east side of the river and named the area Berlin after their former home in upstate New York. John Winchell built a log cabin in the Town of

Princeton in 1848. In July of 1848, Royal Treat purchased 132 acres and plotted out the city in 1849. It was originally called Treat's Landing. The Town of Brooklyn at first settlement was called Lexington. On its organization in January of 1849 the name was changed to Arcade and again changed to Brooklyn in the winter of 1850.

The first settler in Seneca, Mr. Ayshford, arrived about 1850. The Village of Kingston organized in 1858 and Green Lake County is officially recognized.[6]

Plan Area

Green Lake County, covering approximately 354 square miles in central Wisconsin, is one of the smallest counties in the state. It was formed in 1856 from Marquette County and contains Wisconsin's deepest lake, Green Lake. The county seat is the City of Green Lake. The largest city in Green Lake County is Berlin. Green Lake County is home to approximately 18,556 people.

Green Lake County lies within the Central Plain geographic province in the northwest portion of the county and within the Eastern Ridges and Lowlands geographical province in the southeast portion of the county. The Central Plain of Wisconsin is a crescent- shaped belt covering about 13,000 square miles. All of it is floored by the weak Cambrian sandstone, except in the northwest where the removal of the sandstone has exposed the underlying Keweenawan lavas for a small area

Topographic features in the Eastern Ridges and Lowlands are distinct, but they are low. Alternate weak and resistant rock layers are carved by streams and weather into a belted plain. This plain has parallel strips of upland and lowland corresponding to the more important resistant and weak strata. The uplands are called cuestas. A cuesta is a ridge which has a steep escarpment on one side and a long gentle slope of the other. The topography of the Eastern Ridges and Lowlands is controlled by cuestas.[7]

Green Lake County is bordered on the east by Winnebago and Fond du Lac Counties, on the south by Dodge and Columbia

[6] http://www.co.green-lake.wi.us/general.iml?mdl=history.mdl
[7] http://www.wisconline.com

Counties, on the west by Marquette County and on the north by Waushara County.

In Wisconsin, there are three types of sub-county, full-service local government units: towns, which are unincorporated, and villages and cities, which are incorporated. Green Lake County contains the Cities of Berlin, Green Lake, Markesan and Princeton; the Villages of Kingston and Marquette and the Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca and St. Marie. (See Appendix A for a map of Green Lake County.) Green Lake County and the Cities of Berlin, Green Lake, Markesan and Princeton; the Villages of Kingston and Marquette and the Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca, and St. Marie have adopted the plan. The Towns of XXX have not individually adopted the plan but, as towns, are considered under the county's adoption. (Copies of the adoptions can be found in Appendix C.)

Geology

The high plain or plateau in the southeastern part of the county is underlain by dolomite and sandstone. Dolomite is the upper bedrock layer and is within a few feet of the surface in many places. Natural crevices and fissures are present in the dolomite and sinkholes are scattered throughout the southeastern part of the county.

Sandstone underlies the dolomite. Although it is not exposed in many places, it has influenced many of the soils and landforms in the county. In most places where the protective dolomite cap has been removed by erosion, the sandstone has also been removed. Scattered throughout the county are a few exposures of sandstone which are generally on the lower slopes below outcrops of dolomite. In many places where the dolomite outcrops, the underlying sandstone is not visible because it is mantled by soil material eroded from the higher slopes. In the areas underlain by dolomite, many deep valleys have been formed by geological erosion of the relatively soft sandstone.

Much of the loose sand which mantles the western parts of the county came from sandstone weathered by glaciers. The sand was moved by glacial melt water and by wind and left thick deposits of valley fill.

There are four outcropping of bedrock in Green Lake County and they are located in Berlin, Mackford, Marquette and Seneca Townships.[8] This bedrock is of the rhyolite variety.[9]

Topography

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

The Northern Highlands, a plateau extending across northern Wisconsin, is an area of about 15,000 square miles with elevations from 1,000 to 1,800 feet. This area has many lakes and is the origin of most of the major streams in the state. The slope down to the narrow Lake Superior plain is quite steep. A comparatively flat, crescent-shaped lowland lies immediately south of the Northern Highlands and embodies nearly one-fourth of Wisconsin. The eastern ridges and lowlands to the southeast of the Central Plains are the most densely populated and have the highest concentration of industry and farms. The uplands of southwestern Wisconsin west of the ridges and lowlands and south of the Central Plains make up about one-fourth of the state. This is the roughest section of the state, rising 200 to 350 feet above the Central Plains and 100 to 200 feet above the Eastern Ridges and Lowlands. The Mississippi River bluffs rise 230 to 650 feet.[10]

Green Lake County is about 75 percent uplands, 18 percent wetlands and 7 percent water. The plateau in the southeastern part of the county has an average elevation of about 1,000 feet above sea level (ASL). The northwestern part of the county has an

[8] Soil Survey of Green Lake County, 1977
[9] Wisconsin Geological and Natural History Survey on the Building and Ornamental Stones of Wisconsin. Ernest Robertson Buckley, PhD. 1898.
[10] http://www.uwex.edu/sco/state.html

average elevation ranging from 760 to 800 feet ASL. The rest of the county consists of knolls and valleys that have an average elevation of 800 to 900 feet ASL.[11]

Climate

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

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

[11] Soil Survey of Green Lake County, 1977

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.

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. Green Lake County's growing season averages 137 days. Shallow lakes normally freeze in late November and remain frozen until late March or early April.[12]

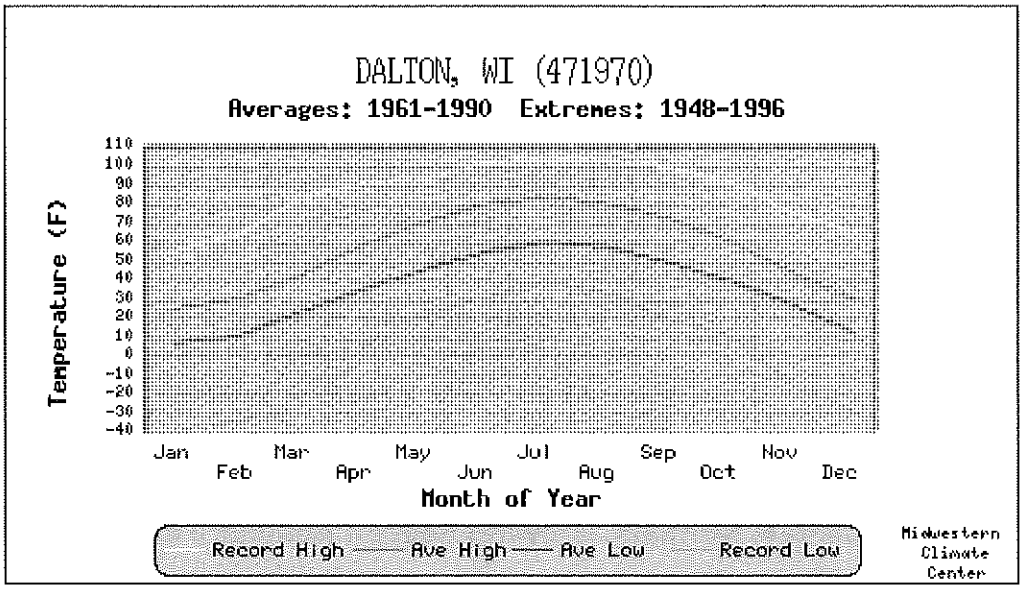
Climate Normals, Growing Season Summary and Climate Change [13]

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. Green Lake County's growing season averages 137 days with a range of 119 to 154 days. Green Lake County's median date of last frost in the spring is May 12th and the median date of the first frost in the fall is September 28th.

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

[13] Midwestern Regional Climate Center http://www.wisconline.com/counties/greenlake/climate.html

Climate Normals[14]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Ave Daily High (F°)	25.5	30.2	42.7	57.6	69.8	79.7	83.7	81.0	73.2	61.6	45.8	30.9
Ave Daily Low (F°)	5.4	9.9	22.9	34.9	45.4	54.6	59.4	56.5	47.9	36.7	25.9	12.1
Growing Degree Days	0	2	32	143	333	510	645	578	376	185	34	3
Heating Degree Days	1519	1243	1014	567	259	56	8	26	146	474	876	1352
Cooling Degree Days	0	0	0	0	36	107	207	150	17	5	0	0
Ave Precipitation (")	1.08	1.04	2.14	2.79	3.31	3.76	3.29	3.61	4.11	2.38	2.14	1.54
Ave Snowfall (")	9.3	7.5	8.3	2.2	0.1	0.0	0.0	0.0	0.0	0.3	3.6	10.9



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.

[14] Data from the weather station at Dalton, latitude 43°39' N, longitude 89°12' W, elevation 857 ft.

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.[15]

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,

[15] *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

eastern Wisconsin, including Green Lake County, drains into Lake Michigan.

Most of the streams and lakes in the state are ice-covered from late November to late March. Snow covers the ground in practically all the winter months except in extreme southern areas. Flooding is most frequent and most serious in April due to the melting of snow and spring rains. During this period, flood conditions are often aggravated by ice jams which back up the flood waters. Excessive rains of the thunderstorm type sometimes produce tributary flooding or flash flooding along the smaller streams and creeks.[16]

The Fox, Puchyan, White and Grand Rivers flow through Green Lake County, all of which eventually flow into Lake Michigan to the east. Major lakes include Green Lake, Puckaway Lake, Little Green Lake, Grand Lake, Spring Lake and Lake Maria. Green Lake is the deepest natural lake in the state with depths up to 236 feet.[17]

Eleven watersheds are contained completely or partially within Green Lake County.[18] The watersheds in the Upper Fox Water Management Unit (WMU) drain into Lake Michigan and include:

- White River[19]: The White River Watershed is located primarily in Waushara County but extends south to Green Lake and Marquette counties. The watershed is 95,879 acres in size and contains 156 miles of streams and rivers, 1,017 acres of lakes and 18,495 acres of wetlands. The watershed is dominated by forest (29%), grassland (27%), agriculture (21%) and wetlands (19%), and is ranked high for nonpoint source issues affected groundwater.

- Mecan River[20]: The Mecan River Watershed is located in Waushara and Marquette counties, with a tiny area in Green Lake County. The watershed is 94,917 acres in size and contains 166 miles of streams and rivers, 1,837 acres of lakes, and 18,622 acres of wetlands. The watershed is dominated by forest (33%), agriculture (22%), grassland (22%) and wetlands (19%) and is ranked high for nonpoint sources affecting groundwater.

[16] http://www.uwex.edu/sco/state.html
[17] Wisconsin Lakes, Wisconsin Department of Natural Resources, 2005
[18] https://dnr.wi.gov/water/watershedsearch.aspx
[19] https://dnr.wi.gov/water/watershedDetail.aspx?key=924854
[20] https://dnr.wi.gov/water/watershedDetail.aspx?key=924925

- Fox River[21]: The Fox River Watershed is located primarily in Winnebago County but extends west to Green Lake County and south to Fond du Lac County. The watershed is 76,643 acres in size and contains 236 miles of streams and rivers, 3102 acres of lakes and 13,826 acres of wetlands. The watershed is dominated by agriculture (66%) and wetlands (18%) and is ranked high for nonpoint source issues affecting streams, lakes and groundwater.

- Fox River – Berlin[22]: The Fox River-Berlin Watershed is located primarily in Green Lake County, but extends into parts of Waushara, Winnebago and Marquette counties. The watershed is 133,595 acres is size and contains 328 miles of streams and rivers, 453 acres of lakes and 41,067 acres of wetlands. The watershed is dominated by agriculture (41%), wetlands (30%), forest (12%) and grassland (11%) and is ranked high for nonpoint source issues affecting groundwater and medium for nonpoint source issues affecting streams.

- Buffalo and Puckaway Lakes[23]: The Buffalo and Puckaway Lakes Watershed is located in Marquette, Green Lake and Columbia counties. The watershed is 144,072 acres in size and contains 305 miles of streams and rivers, 5,877 acres of lakes and 35,513 acres of wetlands. The watershed is dominated by agriculture (27%), wetlands (24%), forest (23%) and grasslands (16%) and is ranked high for nonpoint source issues affecting groundwater.

- Lower Grand River[24]: The Lower Grand River Watershed is located primarily in Green Lake County, but also in Marquette, Columbia and Dodge counties. It is 70,011 acres in size and includes 185 miles of streams and rivers, 1,264 acres of lakes and 13,715 acres of wetlands. The watershed is dominated by agriculture (44%), wetlands (19%), forest (17%) and grassland (14%) and is ranked high for nonpoint source issues affecting groundwater.

- Big Green Lake[25]: The Big Green Lake Watershed is located primarily in Green Lake County, but extends east

[21] https://dnr.wi.gov/water/watershedDetail.aspx?key=924853
[22] https://dnr.wi.gov/water/watershedDetail.aspx?key=924749
[23] https://dnr.wi.gov/water/watershedDetail.aspx?key=924750
[24] https://dnr.wi.gov/water/watershedDetail.aspx?key=924855
[25] https://dnr.wi.gov/water/watershedDetail.aspx?key=924895

into Fond du Lac County and edges just a bit into the southwestern corner of Winnebago County. The watershed is 68,676 acres in size and contains 141 miles of streams and rivers, 655 acres of lakes and 5,102 acres of wetlands.

At the time of the 2010 Census, the Wisconsin Population Lab determined the Big Green Lake Watershed hosted 12,429 inhabitants. The majority of the land cover in the Big Green Lake Watershed is dominated by Agriculture (65%) followed by Open Land and Water (15.53%). Forest also covers a sizeable portion of the watershed (8.76%) followed by Wetlands, which constitute approximately five and three-quarters of the watershed. The last reasonably sized land cover is Suburban (3.22%). The remainder of land cover constitutes slightly over one and a half percent of the total land cover; these include Urban (0.87%), Grassland (0.81%) and Barren (.07%).

- Upper Grand River[26]: The Upper Grand River Watershed is located in Fond du Lac and Green Lake counties. It is 39,651 acres in size and contains 85 miles of rivers and streams, 41 acres of lake and 2,973 acres of wetlands. The watershed is dominated by agriculture (76%) and grasslands (8%) and is ranked high for nonpoint source issues affecting groundwater and medium for nonpoint source issues affecting streams

- Swan Lake[27]: The Swan Lake Watershed is located in Green Lake and Columbia counties. It is 51,592 acres in size and contains 113 miles of rivers and streams, 943 acres of lakes and 6,862 acres of wetlands. The watershed is dominated by agriculture (48%), forest (19%), grasslands (16%) and wetlands (13%) and is ranked high for nonpoint source issues affecting groundwater and medium for nonpoint source issues affecting streams.

The watersheds in the Upper Rock WMU drain into the Mississippi River and include:

- Beaver Dam River[28]: The Beaver Dam River Watershed is located primarily in Dodge County, with small segments lying in Columbia, Green Lake and Fond du Lac Counties.

[26] https://dnr.wi.gov/water/watershedDetail.aspx?key=924751
[27] https://dnr.wi.gov/water/watershedDetail.aspx?key=924753
[28] https://dnr.wi.gov/water/watershedDetail.aspx?key=924754

As in the basin's other watersheds, land use is primarily agricultural (64%), with dairy farming and cash grain cropping predominant. Water quality monitoring indicates that polluted runoff effects are severe on most streams and lakes. Because of this, WDNR selected the watershed as a priority watershed project in 1990 and it began in 1991. Communities with municipal wastewater discharges in the watershed are Beaver Dam, Fox Lake, Randolph, Lowell and Reeseville. The Fox Lake Correctional Institution and four industrial facilities also discharge in the watershed.

The Beaver Dam River Watershed drains 292 square miles of land in Dodge, Columbia, Green Lake and Fond du Lac counties in South Central Wisconsin. The watershed is part of the Upper Rock River Basin. The Beaver Dam River drains to Crawfish River. The Beaver Dam River Watershed was divided into 17 smaller drainage areas, called subwatersheds, for this planning effort. Land use in the watershed is mainly agricultural, and is currently dominated by dairy and cash grain farming. The watershed population is stable approximately 35,000 people. About half the population of the watershed lives in rural areas, while half live in the cities of Beaver Dam, Fox Lake, and Juneau.

- Upper Rock River[29]: The Upper Rock River Watershed is divided roughly in half by a county boundary, with the northern portion of the watershed in Fond du Lac County and the southern portion in Dodge County. This watershed encompasses approximately 258 square miles and includes 335 total stream miles, 1,629 total lake acres, and 40,443 total wetland acres. Wetlands and lakes make up 25% of the water resources in the watershed. The dominant water resources in this watershed are both the West and South branches of the Rock River as well as all of Horicon Marsh. The primary land use is agricultural (59%), but urbanization continues to grow. There are three municipal wastewater facilities discharging into the watershed: Brandon, Burnett, and Waupun. The Kekoskee Sanitary District and one industrial facility also discharge in the watershed.

  The watershed encompasses approximately 259 square miles and includes 335 total stream miles, 1,629 total lake acres, and 34,062 total wetland acres. Agriculture activities and wetlands dominate the landscape in the watershed, with

[29] https://dnr.wi.gov/water/watershedDetail.aspx?key=924760

open water/open space and suburban development occurring as minor features.

There are three municipal wastewater facilities discharging into the watershed: Brandon, Burnett and Waupun. The Kekoskee Sanitary District and one industrial facility also discharge in the watershed.

Groundwater reservoirs are recharged by direct precipitation. Spring is a prime time for recharge because evapotranspiration is low and melting snow and rainfall infiltrate and percolate the water table on unfrozen ground. Fall is another prime time for high recharge. During the summer, groundwater levels drop because precipitation is lower causing losses to evaporation and transpiration to exceed precipitation. In addition, groundwater is lost to surface waters by discharge in the form of springs.[30] The winter period normally lacks infiltration because of frozen ground.

Groundwater resources constitute an extremely valuable element of the natural resource base of Green Lake 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.

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 Green Lake County are:[31]

- Assemble Creek - All
- Snake Creek - To town road bisecting S15 T16N R12
- White Creek - All

[30] DeVaul, 1967
[31] http://dnr.wi.gov/topic/SurfaceWater/oerw/orwerw_county.pdf

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% of Wisconsin residents and 95% of Wisconsin communities. From 1979 to 2005, total water use in Green Lake County has increased from 3.8 million gallons per day to 8.3 million gallons per day. The increase in total water use is due primarily to an increase in aquaculture and irrigation. The proportion of county water use supplied by groundwater has fluctuated between 94% and 99% during the period 1979 to 2005.

The state has nearly 11,500 public water systems which meet the daily water needs of about 4 million people. Public water systems that are owned by a community are called municipal water systems and Green Lake County has five: [32]

- Berlin Waterworks
- Dalton Waterworks
- Green Lake Waterworks
- Markesan Waterworks
- Princeton Waterworks

In addition to the public water systems, about 850,000 private wells provide drinking water to Wisconsin's population. Unlike public water systems, protection and maintenance of a private well is largely the responsibility of homeowners.

Green Lake County obtains all of its domestic drinking water from groundwater sources, including both 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. Ways to protect groundwater include:

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

[32] https://wi.water.usgs.gov/gwcomp/find/greenlake/watersystems.html

implements the wellhead protection plan by controlling land uses in the wellhead protection area. Of the five municipal water systems, only Berlin and Markesan have wellhead protection plans with Berlin also having a wellhead protection ordinances.

- Animal Waste Management Ordinances: Most Wisconsin counties, including Green Lake County, have adopted an animal waste management ordinance that applies to all unincorporated areas of the county (areas outside of city and village boundaries). While the purposes of such ordinances vary among counties, a key purpose is often to protect the groundwater and surface water resources. This is accomplished by regulations such as:

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

- Nitrate - The county's aquifers are close to the land surface and their limited natural protection make them vulnerable to pollution. From 1990-2006, 81% of 208 private well samples collected in Green Lake County met the health-based drinking water limit for nitrate-nitrogen (NO_3-N) with 78 (38%) containing 2-10 mg/L of NO_3-N and serve as indicators that land use has likely affected groundwater quality. Another 39 (19%) of samples exceeded the 10 mg/L limit levels. See the map in Appendix A for locations where limits were exceeded.

  In 2006, the Wisconsin DNR and DATCP reported that NO_3-N is the most widespread groundwater contaminant in Wisconsin and that the nitrate problem is increasing both in extent and severity with 80% of nitrate inputs originate from manure spreading, agricultural fertilizers, and legume

cropping systems. Septic systems can also be a significant nitrate source in densely populated areas, areas where fractured bedrock is near the surface, or areas with coarse-textured soils. Additionally, concentrations of NO_3-N in private wells frequently exceed the drinking water limit. For example, in 2005 11.6% of 48,818 private wells exceeded the nitrate limit.

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

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

  A 2002 study estimated that 36% of private drinking water wells in the region of Wisconsin that includes Green Lake County contained a detectable level of an herbicide or herbicide metabolite. Pesticides occur in groundwater more commonly in agricultural regions, but

can occur anywhere pesticides are stored or applied. 14,380 acres of land in Green Lake County are in atrazine prohibition areas.

- Arsenic - Arsenic is an element that occurs naturally in some of Wisconsin's aquifers and may contaminate well water drawn from those aquifers. It is a particular problem in parts of the Fox River valley of northeastern Wisconsin. However, arsenic has been detected in wells in every county in Wisconsin, and arsenic concentrations greater than the drinking water limit of 10 µg/L (micrograms per liter, or parts per billion) have been documented in 51 of Wisconsin's 72 counties. 100% of 10 private well samples collected in Green Lake County met the health standard for arsenic. Of the 16 water samples analyzed for arsenic in Green Lake County, six samples (38%) have detectable arsenic and no samples are greater than the recently reduced drinking water limit of 10 µg/L (or parts per billion). Most private wells in the county have unknown arsenic levels.

- Contaminated Groundwater and/or Soil - Properties that were or are contaminated with hazardous substances can be found using the WDNR's Bureau for Remediation and Redevelopment Tracking System (BRRTS).[33] Green Lake County has 13 open leaking underground storage tank (LUST) sites which have contaminated soil and/or groundwater with petroleum, which includes toxic and cancer-causing substances. However, given time, petroleum contamination naturally breaks down in the environment. There are eight environmental repair (ERP) sites which are sites other than LUSTs that have contaminated soil and/or groundwater. Examples include industrial spills or dumping, buried containers of hazardous substances, and closed landfills that have caused contamination.

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

- Concentrated Animal Feeding Operations (CAFO) - There are four concentrated animal feeding operations (i.e., greater than 1,000 animal units) in Green Lake County. Three (i.e., Hilltop Dairy, LLC; MAM Farms, Pride View Dairy) have current operating permits and one has an expired permit (i.e., Trillium Hill Farms).[34] CAFOs are required under their Wisconsin Pollutant Discharge Elimination System (WPDES) permits to practice proper manure management and ensure that adverse impacts to water quality do not occur. Permit applicants must submit detailed information about the operation, a manure management plan, plans and specifications for all manure storage facilities, and a completed environmental analysis questionnaire. Once a WPDES CAFO permit is issued, operators must comply with the terms of the permit by following approved construction specifications and manure spreading plans, conducting a monitoring and inspection program, and providing annual reports. Other potential groundwater contaminants from agriculture include fertilizers and pesticides. Large amounts of nitrogen fertilizers are used when fields are planted continuously with corn, and they can leach into groundwater as nitrate.[35]

- Licensed Landfills and Superfund Sites – There is one licensed landfill (WMWI – Valley Trail in Berlin) and no Superfund sites in Green Lake County.

- Cleanup -

  - Petroleum Environmental Cleanup Fund Award - Over $11 million have been spent in Green Lake County on petroleum cleanup from leaking underground storage tanks, which equates to $579 per county resident. The Petroleum Environmental Cleanup Fund Award (PECFA) program was created in response to enactment of federal regulations requiring release prevention from underground storage tanks and

[34] https://www.dnr.state.wi.us/topic/AgBusiness/data/CAFO/cafo_cty.asp?CountyChoice=Green+Lake&Submit=Submit
[35] https://dnr.wi.gov/topic/AgBusiness/CAFO/

cleanup of existing contamination from those tanks. PECFA is a reimbursement program returning a portion of incurred remedial cleanup costs to owners of eligible petroleum product systems, including home heating oil systems. As of May 31, 2007, $11,089,396 have been reimbursed by the PECFA fund to clean up 61 petroleum-contaminated sites in Green Lake County. This equates to $579 per county resident, which is more than double the statewide average of $264 per resident.

- Nitrate Removal Systems – As of 2005, over 20 municipal water systems in Wisconsin have spent over $24 million reducing nitrate concentrations in municipal water systems. In Green Lake County, the Village of Dalton has spent $35,000 on a well reconstruction project to reduce nitrate concentrations in its municipal water system. This equates to $117 per person in its service district and incurs $940 in annual maintenance costs.

Soil Types

The soil of Green Lake County is similar to that found throughout Wisconsin, which 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 Green Lake County are suitable for agricultural pursuits (i.e., farming crops such as corn, soybeans or vegetables and/or livestock production). A Green Lake County soil survey was prepared by the Natural Resources Conservation Service[36].

A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil. According to the "Soil Survey of Green Lake County, Wisconsin[37]" there are seven soil associations in Green Lake County:

[36] http://websoilsurvey.nrcs.usda.gov/app/
[37] Soil Survey of Green Lake County, 1977 - https://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/wisconsin/green_lakeWI1977/greenlake.pdf

- Plano-Mendota-St. Charles association is described as well drained and moderately well drained, nearly level to sloping soils that have a subsoil mainly of silt loam and silty clay loam underlain by calcareous, gravelly or very gravelly sandy loam glacial till.

- Kidder-Rotamer-Grellton association is described as well draiand moderately well drained, nearly level to steep soils that have a subsoil mainly of loam, clay loam and sandy clay loam underlain by calcareous, gravelly sandy loam glacial till.

- Lapeer-Mecan-Okee association is described as well drained and somewhat excessively drained, gently sloping to steep soils that have a subsoil of sandy loam underlain by calcareous, gravelly sandy loam or gravelly loamy sand glacial till.

- Oakville-Brems-Granby association is described as well drained, moderately well drained, and poorly drained, nearly level to steep soils that have a subsoil of fine sand underlain by fine and medium sand.

- Boyer-Oshtemo-Gotham association is described as well drained and somewhat excessively drained, nearly level to steep soils that have a subsoil mainly of loamy fine sand, sandy loam, and loamy sand underlain by sand or stratified sand and gravel outwash.

- Willette-Poy-Poygan association is described as very poorly drained and poorly drained, nearly level organic soils and soils that have a subsoil of silty clay and clay underlain by sand or calcareous clay and silty clay.

- Adrian-Houghton association is described as very poorly drained, nearly level organic soils underlain by sandy, loamy, or clayey material or marl.

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.[38]

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

[38] http://dnr.wi.gov/topic/wetlands/

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 Green Lake County are the Wisconsin Department of Natural Resources and municipal zoning agencies. The Land Use Planning and 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, Green Lake County has approximately 58,816 acres of wetlands (approximately 25.9% of its total area). This is 1.1% of the total statewide acreage of wetlands.[39]

Land Use and Development Trends

Green Lake County is primarily a rural community in the east-central portion of the state. The land in Green Lake County consists of farmland, shoreland and forests as well as commercial, residential and industrial land. The total land area is 354 square miles. The total water area is 26 square miles. The county has some natural areas that will not be developed and some rural farming areas as well as light manufacturing and other primarily service businesses that have chosen to locate in the area.

The Wisconsin Department of Revenue (WDOR) tax assessment data classifies the land use in Green Lake County as follows[40]:

- *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.

[39] http://dnr.wi.gov/topic/wetlands/acreage.html
[40] https://www.revenue.wi.gov/slfreportscotvc/2017soaGReenLake.pdf

- *Residential* - Lands containing dwelling units and related improvements not associated with agricultural use.
- *Commercial* - Lands, including improvements, devoted primarily to commercial operations, including, but not limited to dining, lodging, and retail sales establishments.
- *Manufacturing* - Lands, including improvements, devoted primarily to manufacturing and industrial operations, including, but not limited to, assembling, processing, and fabricating.
- *Undeveloped* - Lands generally unfit for any of the aforementioned uses, including, but not limited to, parks, hunting grounds, wetlands, ponds, gravel pits, and road rights of way.

Land Uses Changes Based on 2017 WDOR Green Lake County Tax Assessment Data[41]

Land Use Category	2016 Equalized Value	2017 Equalized Value	Percent Change
Agricultural	$2,010,100	$2,037,600	1%
Agricultural Forest	$1,239,000	$1,239,000	0%
Forest	$1,938,000	$1,938,000	0%
Residential	$68,645,500	$70,638,700	3%
Commercial	$9,657,500	$9,657,500	0%
Manufacturing	$688,300	$688,300	0%
Undeveloped	$4,467,500	$5,358,300	20%
Other	$12,566,300	$13,552,500	8%
Total	**$101,212,200**	**$105,109,900**	**4%**

As can be seen by the total, county real estate values by category are primarily stable or experiencing low growth with the exception of the Undeveloped sector, which experienced a 20% increase. The county is experiencing slow growth on par with other demographically similar Wisconsin counties and it is expected that growth trends will mirror those of the general national, state and regional economy.

The mission of the Green Lake County Land Use and Planning Department is: "To assist towns with creating goals for their communities relative to the way that they develop, and to regulate

[41] https://www.revenue.wi.gov/Pages/EQU/2017-expegv.aspx

land uses within the county through the enforcement of comprehensive zoning, shoreland, subdivision, and floodplain ordinances, as well as related Wisconsin Administrative Codes, to achieve those stated goals. The uses of land are regulated through a permitting process whereby applicants identify anticipated uses and structural setbacks and the department ensures compliance with the applicable codes. Such uses are regulated to maintain the health, safety, and welfare of the citizenry as well as the integrity of the environment." To that end, the following projects were identified by the municipalities for potential future development and/or improvement within the county:

- City of Green Lake: Improvements of the Industrial Park on STHs 23 and 49.
- City of Markesan: Expansion of the industrial park.
- City of Princeton: In the next 3 years, we plan to replace water and sewer mains as well as put storm sewers in on CTH D and Water Street.
- Village of Marquette: Rebuild the village hall after the water heater explosion and improve the pavilion.

Natural Areas

Green Lake County also has many natural areas including:

- Berlin Fen State Natural Area contains two mound fens, the smaller on the south side near the abandoned railroad trail and the larger covering nearly the entire northern portion of the site. The mounds are dome-shaped piles of wet calcareous peat and have unique combinations of plants. The larger mound is dominated by shrubby cinquefoil and chairmaker's rush while the smaller mound is dominated by prairie grasses.
- Fountain Creek Wet Prairie State Natural Area is a large wet, low prairie situated in the basin of the Grand River Marsh. The wet prairie, a rare community type in Wisconsin, is characterized by prairie cord grass, bottle gentian, blue-joint grass, Kalm's brome, mountain mint, prairie blazing-star, marsh fern and Michigan lily.
- Grand River Marsh State Public Hunting Grounds is a 7,000 acre property located in southwest Green Lake County and southeast Marquette County near Lake Puckaway. The property consists of open marsh/emergent cattail wetland, upland prairie/oak savannah and shrub carr/wet meadow.

- Mascoutin Valley State Trail is 9-mile long and goes past farms and wetlands and the communities of Ripon and Berlin.
- Princeton Prairie State Natural Area is located in an extensive basin where the meandering White and Puchyan Rivers empty into the Fox River, Princeton Prairie features a high quality wetland complex with numerous rare plants and animals. The site contains a diversity of wetland communities with southern sedge meadow, wet-mesic prairie and open marsh.
- Puchyan Prairie State Natural Area features a mosaic of wetland communities including a large wet-mesic prairie, marsh and sedge meadow in the floodplain of the Puchyan River
- Rogers Memorial State Habitat Preserve is comprised of the Central Sand Hills Ecological Landscape.
- Snake Creek Fen State Natural Area features a high-quality calcareous fen and associated springs located within a large wetland complex in the Snake Creek corridor. The fen is characterized by saturated soil and is dominated by prairie grasses and forbs along with several indicator fen species.
- White River Marsh State Wildlife Area is a 12,000 acre property that consists of open marsh/wet meadow, swamp hardwoods/tamarack swamp, upland prairie/oak savannah and shrub carr.
- White River Prairie-Tamaracks State Natural Area contains one of the largest tamarack bogs and one of the largest and least disturbed wet prairies remaining in Wisconsin. The tamarack bog contains a dense canopy of tamarack with an understory dominated by sphagnum moss with a sparse willow and dogwood component. The low, wet prairie contains an excellent flora with some fen aspects and is dominated by a great diversity of native species.
- White River Sedge Meadow State Natural Area features the largest southern sedge meadow in Wisconsin, and contains a full variety of environmental gradients due to the extensive size of the natural area. The wetland complex contains a deep marsh with cattails and tussock sedge and contains a good variety of emergent aquatic species to the south. Scattered shrub-carr islands are also present. Because of its size, White River Sedge Meadow has been identified as the best opportunity within Wisconsin to manage wet meadow birds.
- Zobel Memorial County Park is a 40 acre wayside offering a panoramic view of the area from its overlook tower.

Vegetation

The vegetation in Green Lake County consists of mostly oak savanna. In the north and west, large areas of soft maple are present. In the southeast areas of prairie bluestem and composites are present.[42]

[42] http://www.wisconline.com/counties/greenlake/index.html

Demographics

Human Settlement Patterns

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

Between 1670 and 1680, the first Europeans to visit this land were the French traders to establish trading and military posts in the name of France, and the Jesuits to bring Christianity to the native inhabitants. Because the French made no definite settlement of the territory they yielded their rights to the English in 1761, who claimed possession until after the Revolutionary War. By the Treaty of 1835, the Indian tribes gave up their homeland and were moved to the country west of the Mississippi.

Green Lake County has only existed since 1858 but its settlement started much earlier. Originally under the judicial jurisdiction of Brown County, the territory was established as Marquette County in 1836 and fully organized in 1848 with the county seat at Marquette. Green Lake County was separated from Marquette County by an Act of Legislation in 1858 with the county seat at Berlin. In 1862, the citizens voted to move the county seat to Dartford, (now known as Green Lake). In 1863 the first courthouse was built in Dartford at the present site. In 1866 dissension between the factions moved the county seat to Princeton with an early morning raid on the records. In the same year, the Supreme Court ordered the county seat back to Dartford. Later attempts were made to detach the western towns from Fond du Lac County to Green Lake County and make Ripon the county seat. Those efforts failed.

Luther Gleason is credited with being the first to settle in the new territory near the village of Marquette on the Fox River, migrating from Vermont in 1831. He was an Indian trader and kept a store. James Powell settled in the Town of Green Lake in 1835 or before. Hiram McDonald was the third settler in the County. He located in the town of Mackford in 1836.

Anson Dart and his two sons located at the outlet of Twin Lakes in 1840 and put up the first frame house. In 1843 William Dakin and Satterlee Clark settled near the Center House. The first Post Office in the County was at Mr. Clark's. Mr. W.A. Millard was probably the first settler on the Village of Manchester site, arriving in 1846. In 1846, R. Day, J. Burt, Henry Pratt and others came to Little Green. In 1847 the county comprised three electoral precincts, Puckaway, Lake Marie and Big Green. In that same year Mr. Atkins put up a log cabin in the Town of Berlin.

In May of 1847 Nathan Strong entered the land on which part of the City of Berlin now stands. Joel Day erected the first frame house here in 1848. The settlement was originally called Strongsville. Also in 1847 Datus Lewis, J. Larkin and others commenced the Seventh Day Baptist settlement in the town of Berlin on the east side of the river and named the area Berlin after their former home in upstate New York. John Winchell built a log cabin in the town of Princeton in 1848. In July of 1848, Royal Treat purchased 132 acres and plotted out the city in 1849. It was originally called Treat's Landing. The Town of Brooklyn at first settlement was called Lexington. On its organization in January of 1849 the name was changed to Arcade and again changed to Brooklyn in the winter of 1850.

The first settler in Seneca, Mr. Ayshford, arrived about 1850. The Village of Kingston organized in 1858 and Green Lake County is officially recognized.[43]

Population

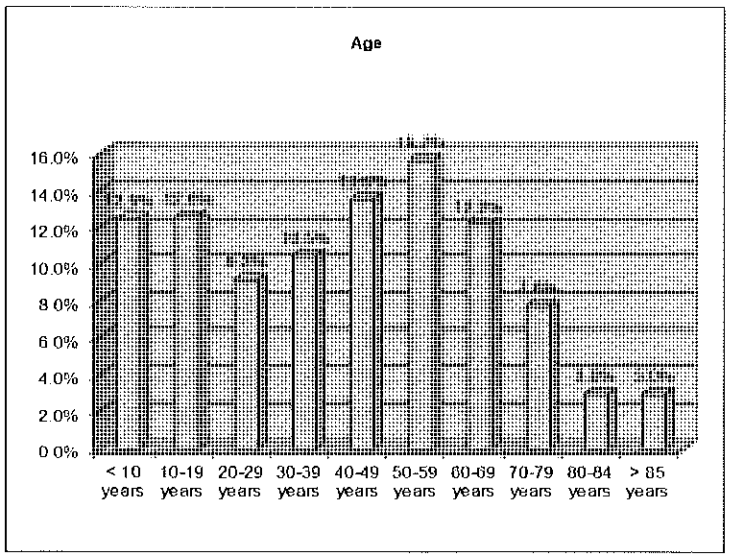
Green Lake County has experienced a trend of slowly declining populations. In the 2000 U.S. Census, the county was home to 19,105 people, in 2010 the survey reported 19,051, and the 2017 projection is that 18,760 people reside in Green Lake County.

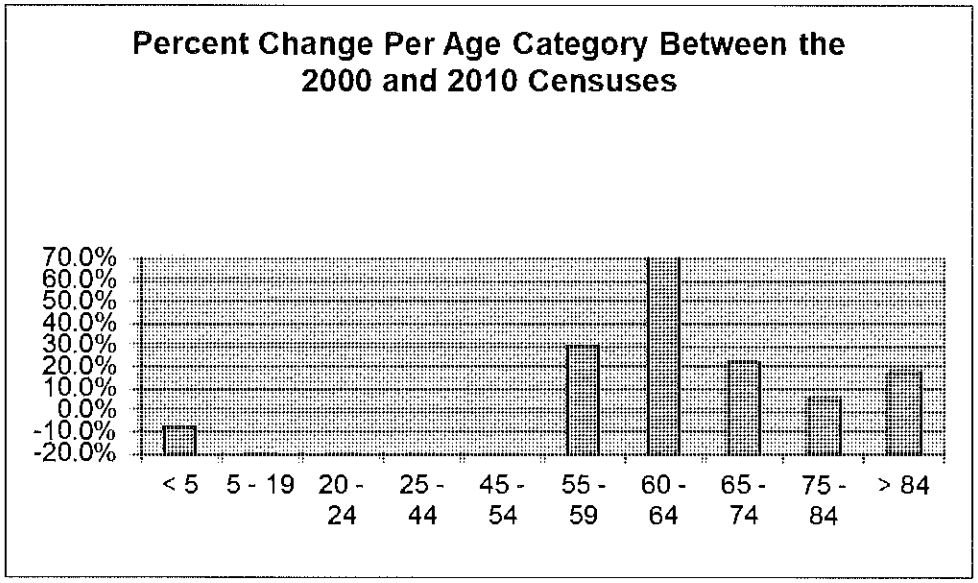
According to the 2016 U.S. census projection, there are 7,939 households in Green Lake County with an average of 2.35 people per household. The same projection indicates that the median household income was $47,174 and that the per capita income was $26,115. Approximately 11.6% of the people live below the poverty line. The 2016 projection also indicated that there were approximately 10,721 housing units within the county. All of these

[43] https://www.census.gov/quickfacts/fact/table/greenlakecountywisconsin/PST045217

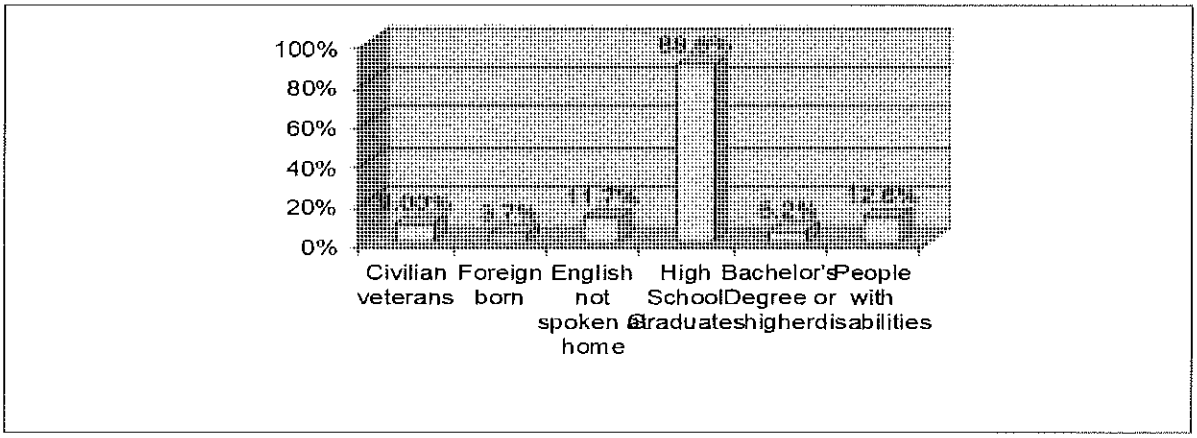
show that there has been less than 1% change in any of these categories since the 2010 census and that overall, the county has been fairly stable since the 2000 census.

The population of Green Lake County fell from 19,105 to 19,051 between the 2000 and 2010 censuses. This is a decrease of 54 people—a population growth rate of -0.28%. 50.1% of the population is female and 49.9% is male.





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.[44]



Green Lake County contains the Cities of Berlin, Green Lake, Markesan and Princeton; the Villages of Kingston and Marquette; and the Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca, and St. Marie.

Transportation Network

Green Lake County has an adequate transportation network. State and county roads connect the population centers. There are no interstate highways located within the county. STH 91 and STH 49 pass through Berlin. STH 49 connects Berlin and Green Lake. SHT 23 traverses east-west through the center of the county and connects Green Lake and Princeton. STH 44 connects Markesan, Manchester, Kingston and Dalton. STH 73 enters Green Lake County from Columbia County in the south and merges with STH 23 near Princeton and continues northward from Princeton and into Marquette County. A large network of county roads connects the rural and urban areas of Green Lake County as well. Green Lake County has maintained these roads along with others to provide a safe and efficient transportation system. With continued maintenance, these roads will continue to serve the population effectively.

[44] http://quickfacts.census.gov/qfd/states/55/55047.html

Public Safety Support

Medical

The Green Lake 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. Green Lake County communities are served by a complete 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.

There is one hospital located within the county: [45]

- **ThedaCare Medical Services Center–Berlin Inc.**
  225 Memorial Drive, Berlin, WI 54923

Green Lake County relies on a mix of volunteer, paid-on-call and paid staff to provide pre-hospital emergency medical services (See Green Lake County Ambulance Zones Map in Appendix A for district boundary details.) Details for pre-hospital medical units and their licensing levels are listed below[46]:

- **Berlin Emergency Medical Service**
  Berlin, WI 54923
  License Level: EMT-Paramedic
- **Green Lake Area TEMS Unit**
  Green Lake, WI 54941
  License Level: TEMS Team
- **Green Lake/Brooklyn First Responders**
  Green Lake, WI 54941
  920-229-6135
  License Level: First Responder
- **Princeton Ambulance Service**
  Princeton, WI 54968
  License Level: EMT-Basic
- **Southern Green Lake County Ambulance Service**
  Markesan, WI 53946
  License Level: EMT-Intermediate Technician

[45] https://www.dhs.wisconsin.gov/guide/hospitaldir.pdf
[46] https://www.dhs.wisconsin.gov/ems/provider/greenlake.htm

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

Green Lake County is served by seven fire departments which are staffed by primarily all volunteer firefighters who attend regularly-scheduled training activities. (See Green Lake County Fire Zones Map in Appendix A for district boundary details.)

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:[47]

- Berlin Fire Department
- Dalton Volunteer Fire Department
- Green Lake-Brooklyn Fire Department
- Kingston Volunteer Fire Department
- Grand River Fire District Markesan Fire Department
- Marquette Volunteer Fire Department
- Princeton Fire and Rescue Department

Law Enforcement

Several departments in Green Lake County are responsible for law enforcement duties within the county. The Green Lake County Sheriff's Office provides deputies for unincorporated areas of the county, and those without full-time coverage. Also, the Wisconsin State Patrol provides limited coverage from their North Central Region office in Wausau. [48] (See the Green lake County Police Zones and the Green Lake County ESN Zones Maps in Appendix A

[47] https://www.firedepartment.net/directory/wisconsin/green-lake-county
[48] http://wisconsindot.gov/Documents/about-wisdot/who-we-are/dsp/dsp-regions-map.pdf

for district boundary details.) Additional details for law enforcement agencies are listed below: [49]

Berlin Police Department[50]
108 N. Capron St., Berlin

Green Lake Police Department[51]
534 Mill St., Green Lake

Green Lake Sheriff's Office[52]
571 County Road A, Green Lake

Markesan Police Department [48]
150S. Bridge St., Markesan

Princeton Police Department[53]
531 S. Fulton St., Princeton

Special Teams

Hazardous materials (HazMat) response is performed by Type II and Type III Teams in the Southwest Task Force. [54] 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

[49] https://wilenet.org/html/directory/Law%20Enforcement%20Directory%202018-2-15.pdf
[50] http://www.cityofberlin.net/modules/web/index.php/id/13/PoliceDepartment
[51] http://cityofgreenlake.com/police/
[52] http://www.co.green-lake.wi.us/departments.html?Department=19
[53] https://www.cityofprincetonwi.com/index.asp?SEC=4E893179-B26F-4105-9584-5C61595C1F77&Type=B_BASIC
[54] http://emergencymanagement.wi.gov/training/docs/Regional_Hazardous_Materials_Resp_Teams_Map.pdf

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. [55]

Archaeological and Historical Resources

The National Register of Historic Places also includes a listing of locations in Green Lake County.[56] As mitigation projects are considered, the county is committed to ensuring that archaeological and historical sites are preserved.

Historic Sites		
Historic Site Name	**Address**	**Municipality or Township**
Vacant/Not in Use[57]		
Beckwith House Hotel	101 W. Huron St.	Berlin
Historic Districts[58]		
Huron Street Historic District	Roughly, Huron St. from Fox R. to 124 E. Huron, including adjacent side streets	Berlin
Princeton Downtown Historic District	Approximately .33 miles E from Jct. WI 23 and WI 73	Princeton
State Listing[59]		
Beckwith House Hotel	101 W. Huron St.	Berlin
Beckwith, Nelson F., House	179 E. Huron St.	Berlin
Berlin Post Office	122 South Pearl St.	Berlin

[55] http://emergencymanagement.wi.gov/epcra/hazmat.asp
[56] https://nationalregisterofhistoricplaces.com/wi/green+lake/state.html
[57] https://nationalregisterofhistoricplaces.com/wi/green+lake/vacant.html
[58] https://nationalregisterofhistoricplaces.com/wi/green+lake/districts.html
[59] https://nationalregisterofhistoricplaces.com/wi/green+lake/state.html

Historic Sites		
Historic Site Name	**Address**	**Municipality or Township**
Berlin High School	289 E. Huron St.	Berlin
Green Lake County Courthouse	492 Hill St.	Green Lake
Green Lake Village Hall	534 Mill Street	Green Lake
Hamilton-Brooks Site	Address Restricted	Berlin
Huron Street Historic District	Roughly, Huron St. from Fox R. to 124 E. Huron, including adjacent side streets	Berlin
Ketchum, Daniel and Catherine, Cobblestone House	147 East Second Street	Marquette
Luther, J. P., Company Glove Factory	139 S. Pearl St.	Berlin
McClelland--Kasuboski House	W404 W. Hillside Rd.	Berlin
Nathan Strong Park Historic District	Roughly bounded by North Wisconsin, East Moore, North Swetting and East Huron streets	Berlin
Princeton Downtown Historic District	.33 miles between Jct. WI 23 and WI 73	Princeton
Thrasher Opera House	506 Mill St.	Green Lake
Wisconsin Power and Light – Berlin Power Plant	143 Water Street	Berlin

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.

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

Hazard Analysis and Previous Mitigation Projects

The following sections identify those hazards that have occurred or could occur in Green Lake 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 October, 2016. 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 Green Lake County Emergency Management Coordinator 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 Green Lake County due to its location (i.e., not coastal) or topography (i.e., mostly flat plains).

For this plan the Green Lake 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" (5), "high" (4), "medium" (3), "low" (2), or "very low" (1) by the

workgroup based on their evaluation and experience with the data. The term "agriculture" was defined by the workgroup as comprising primarily dairy and supporting crops along with some poultry. A copy of the table follows:

Hazard	Likelihood of Occurrence*	Severity of Effects if It Does Happen*	Misc. Notes
Drought/Dust Storm	Low to Medium	High (farmers) Medium (all others)	
Earthquake	Very Low	Medium	There have been "frost quakes" in the state (Waupaca County).
Floods: Flash Flood River Flood Dam Failure	 Medium High Low	 High Med/High High	 Urban areas do not have spillover areas that can exacerbate effects. Special dams of concern are the dam in the City of Green Lake and the Montello dam in Marquette County that would affect Princeton and then Berlin.
Wildland Fire: Grass Forest Fires	 Low Medium	 Low Medium	 The effects will likely be in less improved properties (e.g., marshes) and in environmental concerns.
Landslide	Low	Low (infrastructure) Medium (environmental)	Loss of the streambanks exacerbated the 2008 flooding
Karst	Very Low Low (SE part of the county)	Low	
Severe Temperature: Heat Cold	 Low Low	 Low Low	
Hail	Medium	High (for crops, cars and roofs)	
Lightning	Very High	Low	

Hazard	Likelihood of Occurrence*	Severity of Effects if It Does Happen*	Misc. Notes
Thunderstorm	Very High	High	
Tornado	High	High	
Derecho/High Wind	High	High	
Winter (Snow & Ice)	High	High	
Utility Failure	Medium	High	Sewer, potable water, electricity, natural gas, internet There is also a concern about water quality (arsenic) in the Town of Green Lake along the south shore of Little Green Lake where they are installing a reverse osmosis system.
Manure Spill	Low	Low (infrastructure) Medium (environmental)	Concern is from large farming operations in the southern part of the county.

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. Green Lake County Emergency Management is committed to working with municipalities and the private sector to ensure that county mitigation information is shared and it is incorporated into their planning as appropriate.

Each community will be given a copy of the plan to use as a reference during their own preparedness activities (i.e., planning, training, permitting, zoning). Communities that have their own comprehensive plan will reference this mitigation plan and its contents in the next scheduled plan update during public meetings, workgroup sessions and as texts are written. Municipalities that do not have comprehensive plans either are under the purview of and request assistance from the Green Lake County Planning, Resources

and Land Management Department or have their own planning departments. Members of the County Land Use Planning and Zoning Department and municipal planning departments were included on the Hazard Mitigation Workgroup and are aware of the benefits and requirements to utilizing this plan as they go about their preparedness activities.

Green Lake 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.[60] Hazard Mitigation Grant Program (HMGP) Projects Funded in Green Lake County:
    - 2008 DR-1768 Green Lake, City $36,360 New
- **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.[61]
- **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

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

insurance coverage and that will result in the greatest savings to the National Flood Insurance Fund (NFIF) in the shortest period of time.[62] There have been no Flood Mitigation Assistance (FMA) Projects Funded in Green Lake County.[63]

- **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.[64]

- **CDBG** – The U.S. Department of Housing and Urban Development (HUD) Community Development Block Grant-Disaster Recovery Assistance provides flexible grants to help cities, counties and states recover from Presidentially-declared disasters, especially in low-income areas, subject to availability of supplemental appropriations. In response to disasters, Congress may appropriate additional funding for the CDBG program as disaster recovery grants to rebuild the affected areas and provide crucial seed money to start the recovery process. Since CDBG Disaster Recovery assistance may fund a broad range of recovery activities, HUD can help communities and neighborhoods that otherwise might not recover due to limited resources. Disaster Recovery grants often supplement

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

[63] Note that several grants to the State of Wisconsin/WEM are listed when searching for Green Lake County projects. These state projects are deemed as benefiting the state's counties but are not listed in this plan because they were not directly received by the county.

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

the disaster programs of FEMA, the SBA and the U.S. Army Corps of Engineers (i.e., these funds can be used for the local matching requirement of other federal grants).[65] CDBG Emergency Assistance Program (EAP) Projects:

- EAP #05-03 Cities of Berlin and Green Lake ($356,314) - Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures and acquisition/relocation
- EAP #05-04 Green Lake County ($275,000) - Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures and acquisition/relocation
- EAP #08-08 Green Lake County ($275,000) - Rehabilitation of damaged housing units

- **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.[66] Municipal Flood Control Grant Program Projects Funded in Green Lake County:

  - 2014-15 MFC-24206-14 City of Berlin, Green Lake/Waushara Counties $92,975.40 Marquette Street Storm Sewer Relief

- **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.[67]

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

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

- **Objective 1:** To preserve life and minimize the potential for injuries or death.
- **Objective 2:** To preserve and enhance the quality of life throughout Green Lake 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. Green Lake County will maintain the following:

- Facilities, systems and procedures to activate warning and communication capabilities,
- Systems to support communications, including:
    - Sirens to warn the public
    - Telephone and radio to notify public personnel
    - Local television, radio and newspaper to spread warning information
    - Local law enforcement, fire and rescue communications
    - An emergency communications center,
- Green Lake County Sheriff's office to receive and distribute warning information to the public and emergency management agencies.

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

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

With the above-mentioned program projects, Green Lake County and its municipal partners 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, and
- Plan for alternative means and resources in the event of a warning or communication system breakdown.

Green Lake County will prepare facilities, systems and procedures to activate warning and communication. During an emergency, Green Lake County will deliver prompt and accurate warnings to businesses and residents.

Interoperable Communications

The county budget to maintain communications systems has thus far been sufficient and as technology improves and additional interoperability grant funding is made available, the County Emergency Management and Sheriff's Office will monitor and improve the system as able. Green Lake County has recognized the need to improve interoperable communications between municipalities and the county by:

- Bring the Markesan School District and school bus companies from the UHF band to the VHF band.
- Purchase eight new hand-held radios and one base station with new required frequency. The goal is to have radios for all utility employees in an emergency situation.

Website

Geographic information system (GIS) mapping data is available from the Green Lake County website.[68] The county emergency management office has a general webpage and will continue to update it to include links for general preparedness topics from agencies such as the Department of Homeland Security/FEMA, the

[68] http://gis.co.green-lake.wi.us/gisweb/GIS_Viewer/

American Red Cross and Wisconsin Emergency Management. The county would also like to create a website for people to access during times of disaster so that they can receive the most current information. The Cities of Green Lake and Markesan also have emergency management webpages that they will continue to update for preparedness links. Once these projects are completed, the communities would like to publicize the updates so that the public is aware of the resource.

Planning

Green Lake County and its municipalities have committed to creating and maintaining the emergency plans required to guide the community through all phases of emergency management including:

- Green Lake County and Cities of Berlin and Princeton have completed a Comprehensive Plan, which will be implemented on an ongoing basis and updated every ten years.
- Green Lake County has created an emergency plan with the Union Pacific Railroad to include action items for people with functional and access needs. This plan was tested with a tabletop (8/10/16) and a functional (8/24/17) exercise.
- The City of Princeton created an Emergency Operations Manual, which will be reviewed and updated annually.

Equipment

Green Lake County and its municipalities have identified the following weather station and siren projects:

- City of Markesan: Purchase and install three more weather data collection stations. The goal is to purchase web-enabled devices that could share information with the National Weather Service as well as provide current information to citizens on city web site.
- Upgrade area early warning sirens:
    - City of Markesan: Has four sirens and two need replacing.

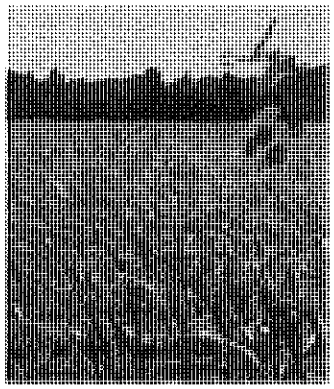
- City of Markesan/Town of Green Lake: Siren for the Soldiers & Sailors City Park.
- City of Green Lake: Continue maintaining the civil defense siren on the downtown courthouse or move to a new location if the courthouse is sold to a private developer.

- City of Princeton: The existing siren is very old and replacing it with a new one will be enable it to be set off from a remote location.

The City of Princeton would like to explore the purchase of emergency lighting equipment since Princeton owns the Electric Utility and would be responsible for emergency lighting when outages take place.

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 Green Lake 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 Green Lake County. This assertion is further bolstered by the fact that, while there is some irrigation done within the county, the soils in Green Lake 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 value for each month that the event continues. The positive sum of the SPI for all the months within a drought event can be termed the drought's "magnitude." Current SPI maps for the United States are available online[69].

SPI Values[70]	
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

[69] http://www.drought.unl.edu/monitor/spi.htm
[70] http://www.drought.unl.edu/whatis/indices.htm#spi

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

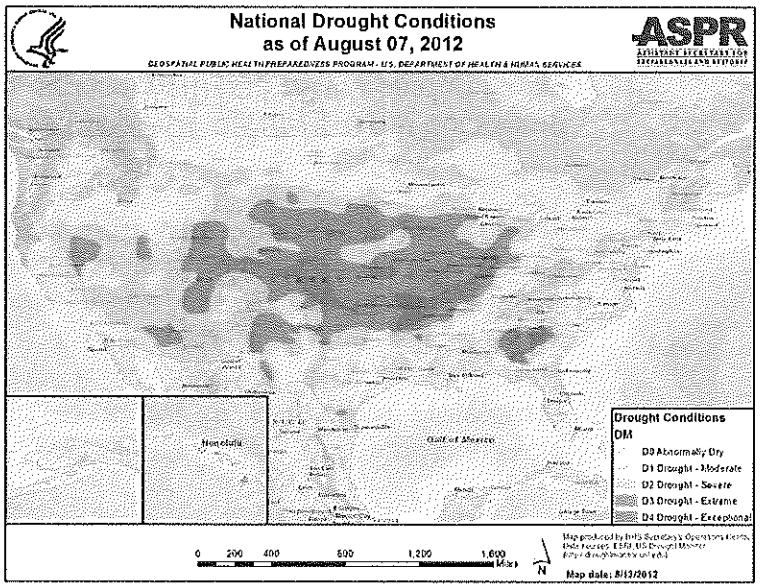
Drought conditions may vary from below-normal precipitation for a few weeks to a severe lack of normal precipitation for several months. Drought primarily affects agricultural areas because the amount and timing of rainfall has a significant impact on crop production. The severity of a drought cannot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

Frequency of Occurrence

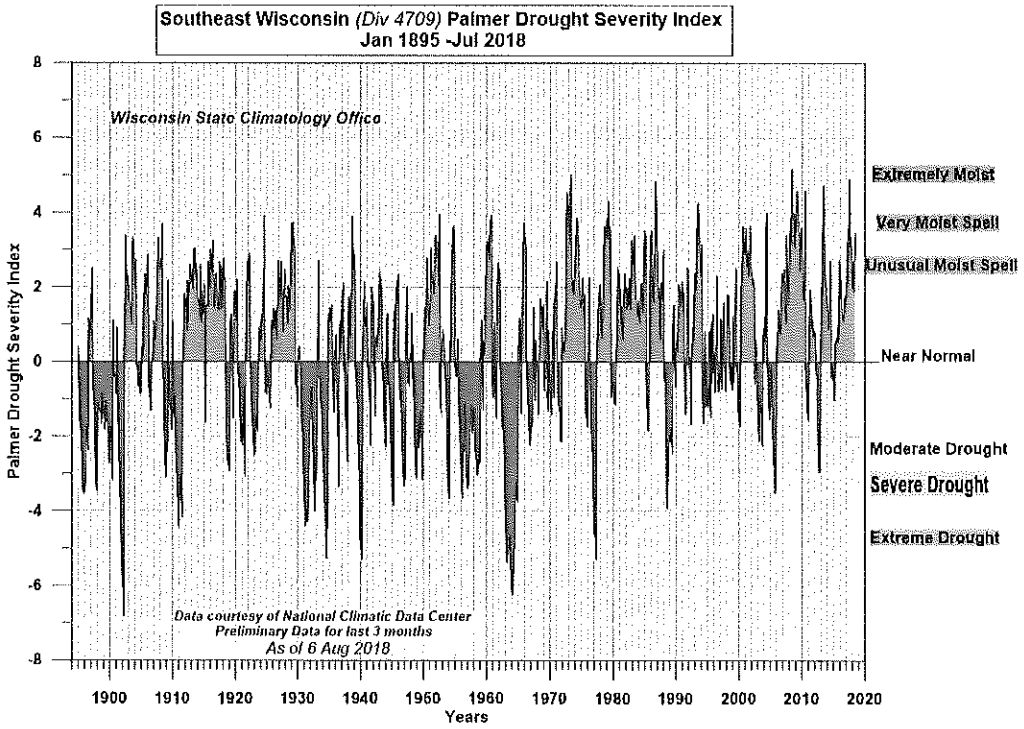
Drought is a relatively common phenomenon in Wisconsin and has occurred statewide in 1895, 1910, 1939, 1948, 1958, 1976, 1988, 1992, 2003 and 2005. The 1976 drought received a Presidential Emergency Declaration with damage to 64 Wisconsin counties, including Green Lake. Estimated losses of $624 million primarily affected the agricultural sector. Reports show that Green Lake 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 U.S. had record and near-record warmth for the seven-month period, except the Pacific Northwest, which was near average. The August 7, 2012 Drought Monitor map shows 52.27% of the United States and Puerto Rico in moderate drought or worse with Green Lake County in the D2 – Severe Drought category.[71]

[71] 2012 Heat & Drought Federal Report, HHS ESF 8, UPDATE #2, U.S. Department of Health and Human Services, Assistant Secretary for Preparedness and Response



The Palmer Index chart for the years between January, 1895 and April, 2012 in Southeast Wisconsin, which includes Green Lake County follows[72]:



[72] http://www.aos.wisc.edu/~sco/clim-watch/graphics/pdsi-ts-09-l.gif

As can be seen from the frequency table above, Green Lake 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."[73]

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

Considering past occurrences, it can be surmised that Green Lake County has a moderate probability of drought occurrence in the future and the likelihood of damage due to drought and dust storm is considered medium for human impacts while the likelihood of damage to agricultural resources is considered high.

Vulnerability

Droughts and dust storms could impact Green Lake County disproportionately because approximately 50% 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 Green Lake County economy and that the

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

losses, which have ranged from $75,000 (2007) to $4.4 million (2002) in past events could be staggering:

- Average size of farms: 221 acres
- Average value of agricultural products sold per farm: $68,294
- Average value of crops sold per acre for harvested cropland: $203.53
- The value of livestock, poultry and their products as a percentage of the total market value of agricultural products sold: 56.55%
- Harvested cropland as a percentage of land in farms: 66.05%
- Average number of cattle and calves per 100 acres of all land in farms: 16.93
- Corn for grain: 45,183 harvested acres
- All wheat for grain: 3,350 harvested acres
- Soybeans for beans: 16,638 harvested acres
- Vegetables: 10,016 harvested acres
- Land in orchards: 25 acres[74]

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 Green Lake County, the population that lives outside of the cities and villages are generally on well water. There could be 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.

[74] http://www.city-data.com/county/Green_Lake_County-WI.html

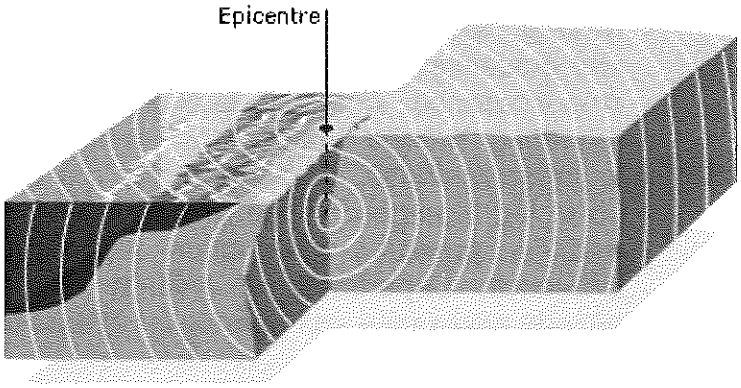
Some Green Lake County communities have adopted water usage regulations during drought conditions but in general, mitigation strategies for periods of drought include preparing informational releases and plans for farmers and homeowners that can be used if needed.

Green Lake County farmers can contact the Green Lake County U.W. Extension Office and applicable programs sponsored by the U.S. Department of Agriculture {e.g., Farm Service Agency (FSA), Natural Resources Conservation Service (NRCS)} for information and guidance related to drought mitigation and/or 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 Green Lake 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.)[75]



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

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

strength of an earthquake and does not consider the effect at any specific location. The Modified Mercalli Intensity (MMI) Scale measures the strength of a shock at a particular location (i.e., intensity.)

A third less often used way of measuring an earthquake's severity involves comparing its acceleration to the normal acceleration caused by the force of gravity. The acceleration due to gravity, often noted "g," is equal to 9.8 meters per second. Peak Ground Acceleration (PGA) measures the rate of change of motion relative to the rate of acceleration due to gravity and is expressed as a percentage. These three scales can be roughly correlated, as expressed in the table that follows[76]:

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.

[76] 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

Also in Wisconsin, a 2012 article published in the Milwaukee Journal-Sentinel discussed an incident in Waupaca County that was not an earthquake as traditionally discussed and understood. This episode is highlighted in this plan because it was widely reported in the state and could be a concern for Green Lake County citizens:[77]

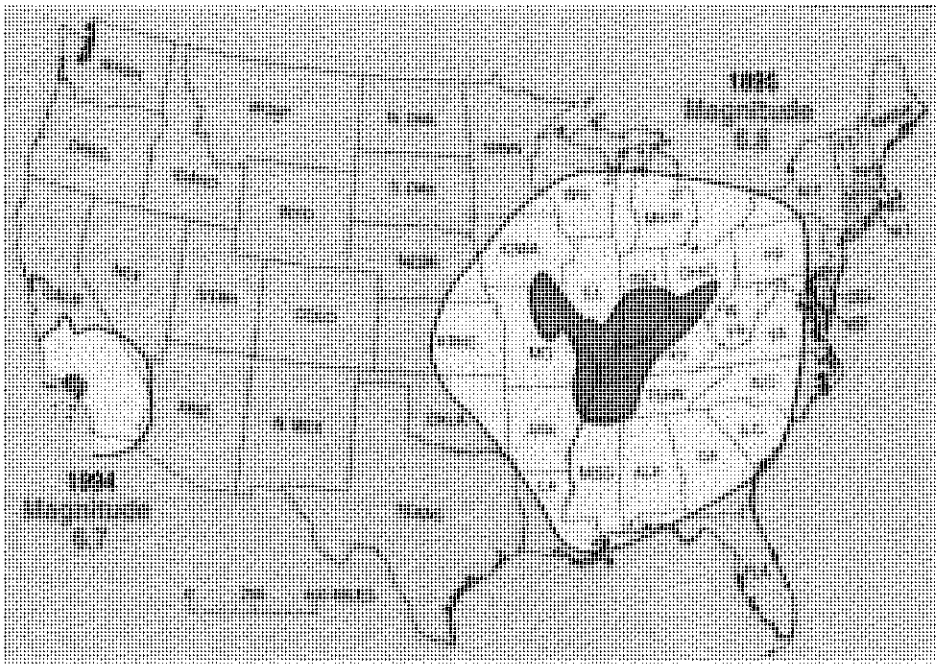
> *A 1.5-magnitude earthquake was recorded at 12:15 a.m. March 20 beneath Clintonville, according to the National Earthquake Information Center. The center is operated by the U.S. Geological Survey.*
>
> *The U.S. Geological Survey said several days of booms and vibrations that rattled windows and nerves 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.*

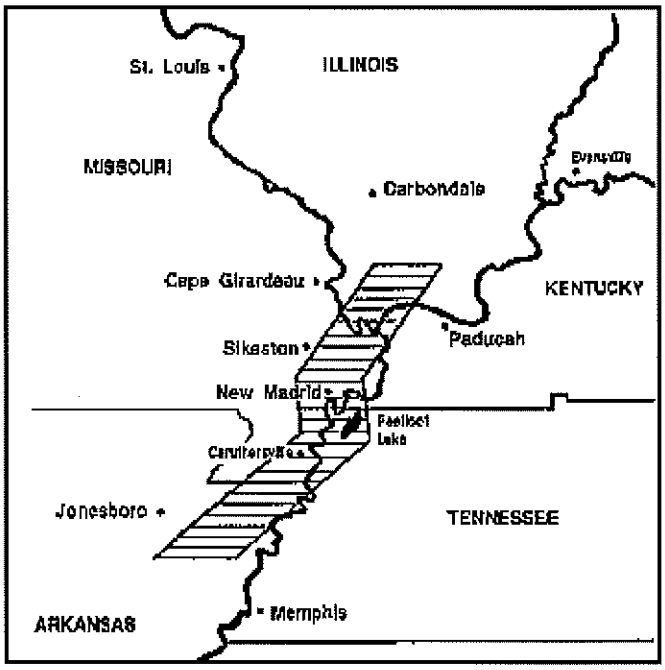
This phenomenon was widely reported in local, state and national news and drew interest from the public.

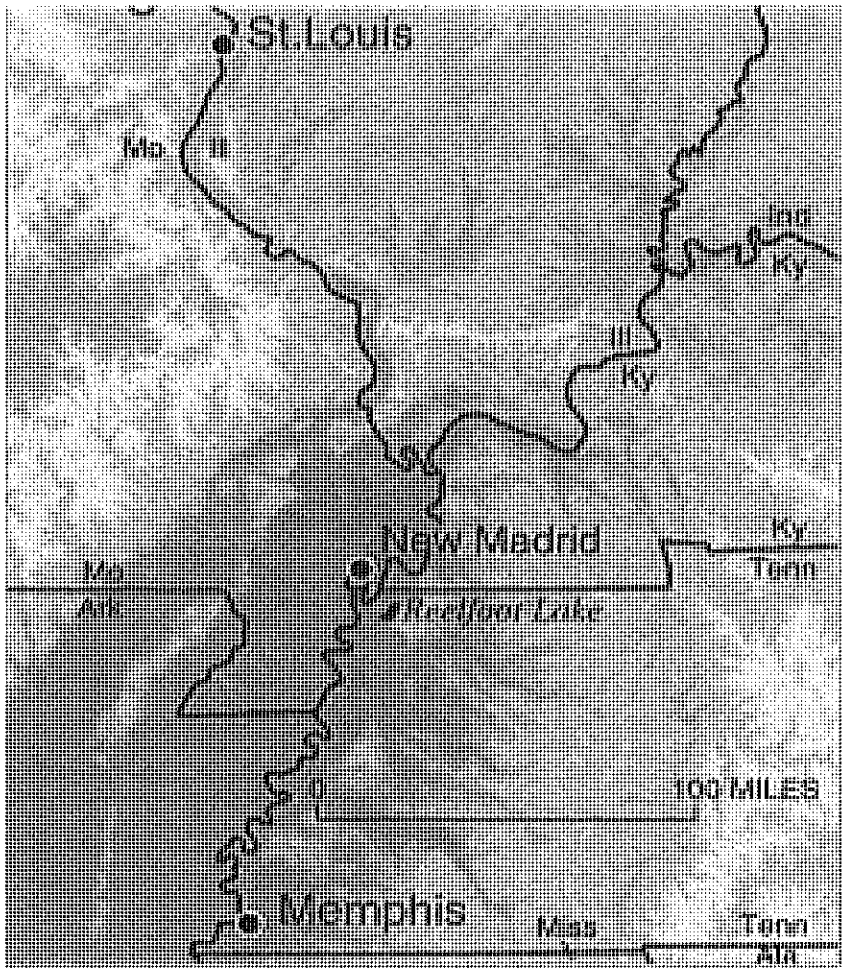
The nearest major active fault is the New Madrid Fault, stretching along the central Mississippi River Valley in Missouri. In recent years, considerable attention has focused on seismic activity in the New Madrid seismic zone that lies within the central Mississippi Valley, extending from northeast Arkansas 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

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

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.







As seen on the map in Appendix A, the earthquake threat to most of Green Lake County is considered very low (the 50-year acceleration probability is 2%) while a small section of the southern part of the county is considered low (the 50-year acceleration probability is 4%). Minor damage (e.g., cracked plaster, broken windows) from earthquakes has occurred in Wisconsin but most often the results have been only rattling windows and shaking ground. There is little risk except to structures that are badly constructed. Most of the felt earthquakes reported have been centered in other nearby states. The causes of these local quakes are poorly understood and are thought to have resulted from the still-occurring rebound of the earth's crust after the retreat of the last glacial ice. The likelihood of damage from an earthquake is also very low.

Vulnerability

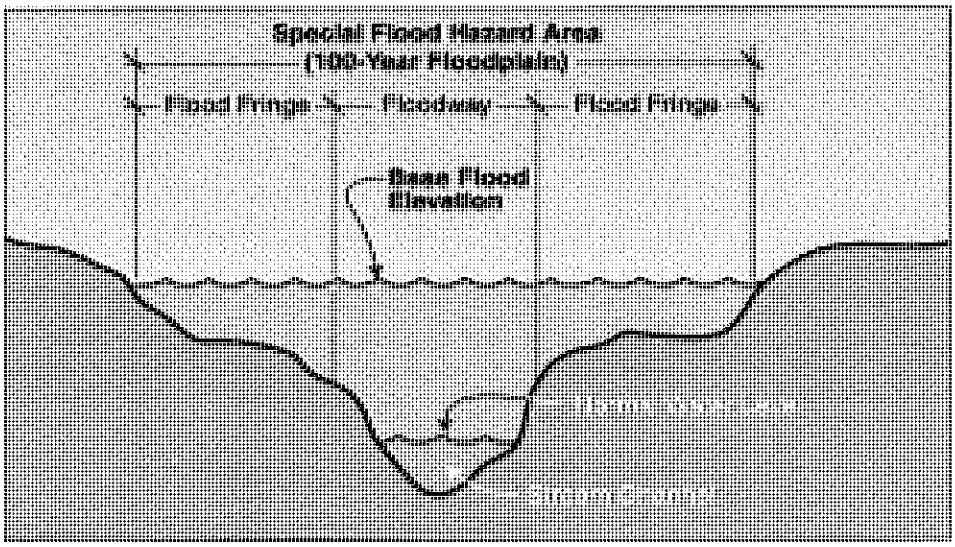
Any impact in the community from earthquake would likely be due to a few broken windows and personal effects that fell in the earthquake. The damage to critical infrastructure and buildings would be negligible.

Hazard Mitigation Strategies

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

Flooding and Dam Failure

Flooding is defined as a general condition of partial or complete inundation of normally dry land (i.e., the floodplains) caused by the overflow of inland waters or the unusual and rapid accumulation or runoff of surface waters from any source. Floodplains are the lowlands next to a body of water that are susceptible to recurring floods.[78]



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 two, then slowly recedes. Generally the timing and

[78] FEMA, August 2001

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.

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[79]

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

The Wisconsin Department of Natural 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

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

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 Green Lake County[80]:

Dam Official Name (Popular Name)*	Size	Latitude	Longitude	Owner Type	Waterway Name (Downstream City)
Kingston	Large	43.6964544	-89.1260222	Village of Kingston	Grand
Manchester	Large	43.68769	-89.04771	Green Lake County	Grand
Upper Green Lake	Large	43.8465856	-88.9602689	City of Green Lake	Puchyan
Stellmacher, H	Small	43.864054	-88.9337107		TR Silver River
Berlin	Small	43.9519978	-88.9593403	WI DNR	Fox
Lower Green Lake	Small	43.8569416	-88.9466139	Town of Brooklyn	Puchyan
Princeton	Large	43.82566	-89.16223	WI DNR	Fox
White River	Small	43.90291	-89.08429	WI DNR	Fox
Little Green Lake Outlet	Large	43.7344727	-88.9728235	Little Green Lake Protection and Rehab Dist.	Little Green Lake Outlet
Twin Lakes	Small	43.7983348	-88.9685096	Town of Green Lake	Little Hills Creek
Dobrinski, Pat	Small	43.8676696	-88.9593999		TR- Puchyan River
Hunter, Gerald	Small	43.6911809	-89.236798		TR- Belle Fountain Creek
Seward, L.J.	Small	43.941943	-88.9594508		TR-Fox River
Spaulding, T.	Small	43.8286847	-89.0073628		No waterway
White River Wildlife	Small	43.9417971	-89.1455996	WI DNR	TR-White River
Schram, Victor	Small	43.9295945	-88.9032194		No waterway
Sobieski,Thomas	Small	43.9305395	-88.9459724		TR-Fox River
Sondalle,James	Small	43.8445734	-89.1768872		Millrace Creek
Markesan	Small	43.7071396	-88.9839963		Grand River
Princeton	Small	43.8499404	-89.1352038	WI Power & Light Co.	Mecan River
Zeratsky	Small	43.8505634	-88.8941437		Unnamed TR to Silver Creek
Squirrel Woods	Small	43.9296289	-89.1303765	WI DNR	TR-White River
Junk Woods	Small	43.9529509	-89.0328971	WI DNR	
Rick Stel	Small	43.7541124	-89.08181		
Berm A	Small	43.7314168	-88.9051587	WI DNR	Drainage Ditch
Berm B	Small	43.7314183	-88.9051212	WI DNR	Drainage Ditch
Renner, James	Small	43.6590468	-89.0759362		Tributary to Fox River
Little Green Lake Prot & Reha	Small	43.738982	-88.9760381	Little Green Lake Protection and Rehab Dist.	
Wilke, David & Teresa	Small	43.6817218	-88.9075778		TR to Grand River
Paul Olson #2	Small	43.9635745	-89.1027079	NRCS	

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

Dam Official Name (Popular Name)*	Size	Latitude	Longitude	Owner Type	Waterway Name (Downstream City)
Paul Olson #1	Small	43.9687349	-89.1023441	NRCS	
Green Lake Holding Company	Small	43.7933052	-89.0006923	Green Lake Holding Co.	Unnamed TR to Big Green Lake
Bernhagen	Small	43.6865	-89.03735		Unnamed TR to Grand River
Stel	Small	43.75788	-89.09445		TR to Lake Puckaway
Nowatzski	Small	43.6925511	-89.0221409		
MCGUIRE	Small	43.6819772	-89.0018697		TR to Grand River
Burdick	Small	43.7970138	-88.9392024		Unnamed TR to Hill Creek
Justmann	Small	43.70325	-88.94932		
Witthun	Small	43.6589215	-89.0717821		TR to Lower Grand River
Mike Norton	Small	43.8885788	-89.1008875		TR to Fox River
Wabiszewski #2	Small	43.7930854	-88.9878189	Green Lake Holding Co.	
Schattschneider	Small	43.7797719	-89.0116107		Unnamed

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

Watersheds

Green Lake County has 11 total watersheds[81] completely or partially within Green Lake County.[82] The watersheds in the Upper Fox Water Management Unit (WMU) drain into Lake Michigan and include:

- White River
- Mecan River
- Fox River
- Fox River – Berlin
- Buffalo and Puckaway Lakes
- Lower Grand River
- Big Green Lake
- Upper Grand River
- Swan Lake

The watersheds in the Upper Rock WMU drain into the Mississippi River and include:

- Beaver Dam River
- Upper Rock River

Each of these are described more fully in they Hydrology section of this plan and maps in Appendix A show the watershed boundaries and 100-year flood plains for the entire county.

Floodplain Regulations

Floodplain regulations have been in place in the cities, villages and towns of Green Lake County for many years. The Department of Natural Resources requires that each municipality approve regulations that meet DNR guidelines. These regulations and

[81] https://dnr.wi.gov/water/watershedsearch.aspx
[82] https://dnr.wi.gov/water/watershedsearch.aspx

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, Green Lake County has adopted a zoning ordinance which gives a measure of protection to watersheds. The law protecting flood plains was created to meet the following objectives:

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

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

Frequency of Occurrence

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

Green Lake County does have a history of flooding problems and has been included in four Presidential Disaster Declarations requests; the events are detailed below (note that dollar losses and victim numbers are for the entire disaster, not just Green Lake County unless otherwise noted):

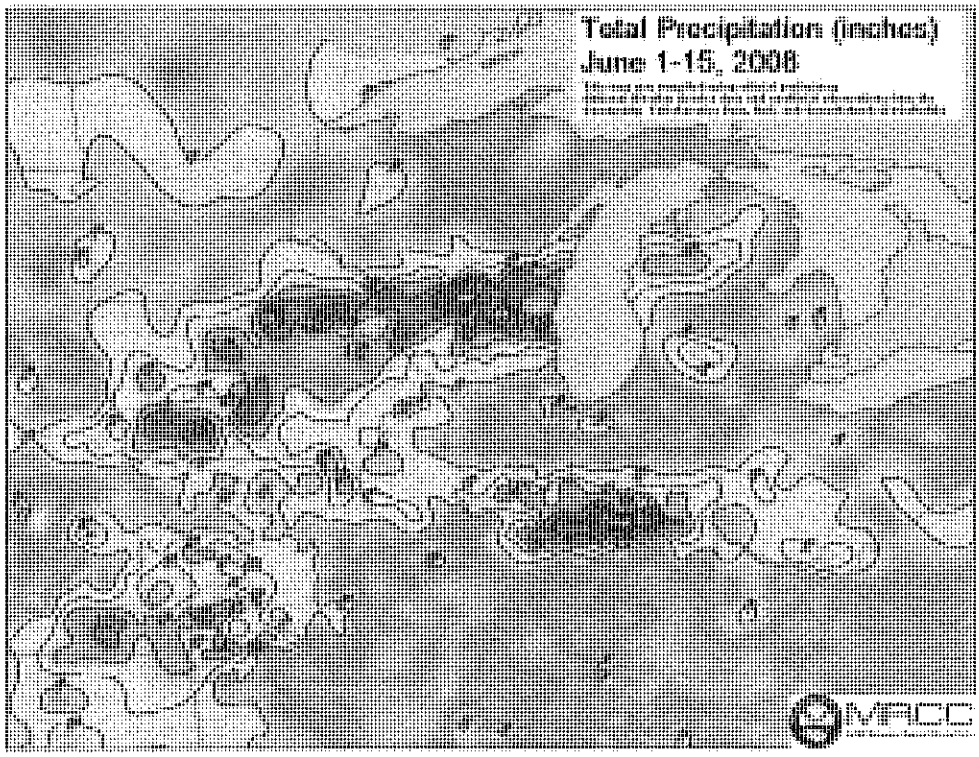
- FEMA-376-DR-WI: The President declared a major disaster as a result of flooding.
- FEMA-994-DR-WI: On July 23, 1993 the President declared a major disaster as a result of flooding that happened between June 7 and August 25.
- FEMA 1526-DR-WI: On June 18, 2004, the President declared a major disaster as a result of severe storms and flooding that began on May 19th. Green Lake County was

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

- FEMA 1768-DR-WI: On June 14, 2008, the President declared a major disaster as a result of severe storms, tornadoes and flooding. The county was eligible for assistance from the Public and Individual Assistance Programs as well as the Hazard Mitigation Program.

The flooding of FEMA-1768-DR-WI was some of the most severe flooding experienced by the State of Wisconsin and Green Lake County recently.

The graphic below[83] shows the amount of rain that fell from June 1-15, 2008 showing that Green Lake County received between eight inches in the northern portion of the county to 14 inches in the southern portion.



The bulk of the rain fell during the period of June 5 – 13, 2008. Flooding on Green Lake, the deepest natural lake in the state, has eroded miles of shoreline and damaged homes and businesses,

[83] Flood of June 2008 in Southern Wisconsin, Scientific Investigations Report 2008-5235; U.S. Department of the Interior and U.S. Geological Survey; Reston, VA; 2008.

public infrastructure such as roads and bridges and the environment. Photographs of the damages to public and private property can be seen at http://www.co.green-lake.wi.us/photos.iml.

Tables showing the flood and flash flood events recorded by the National Weather Service can be found in Appendix B.[84]

Green Lake County NFIP Loss Claims				
Jurisdiction	Total Loss	Closed Loss	Closed Without Payment	Total Payments
City of Berlin	39	34	5	$297,551.96
City of Green Lake	2	1	0	$7,142.39
City of Markesan	5	4	1	$20,201.91
City of Princeton	4	4	0	$6,691.59
Green Lake County	8	7	1	$99,055.66

The following table summarizes repetitive loss damages attributed to flooding in Green Lake County through 30 June 2018. Note that each line of the table is one property, for a total of seven RLPs in Green Lake County.

Location	No. of Losses	Type of Losses	Total Paid	Average Paid
City of Berlin	6	Non-Residential	$53,662.80	$8,943.80
City of Berlin	3	Other Residential	$35,128.48	$11,709.49
City of Berlin	2	Single Family	$16,783.93	$8,391.97
City of Berlin	2	Non-Residential	$82,238.84	$41,119.42
City of Berlin	2	Other Residential	$48,779.21	$24,389.61
City of Berlin	2	Single Family	$5,512.78	$2,756.39
City of Princeton	2	Other Non-Residential	$4,215.63	$2,107.82

A careful review of the geography and history of flooding in Green Lake County leads to the conclusion that there is a medium probability of flash flooding and a high probability of river flooding in the future as well as a high probability of damage and losses due to

[84] http://bsa.nfipstat.fema.gov/reports/1040.htm

flash flooding and a medium probability of damage and losses due to river flooding. There is a low probability of a dam failure in the county due to the fact that many dams have been upgraded but if there is a dam failure, the probability of damages and losses is high particularly in the City of Green Lake and downstream of the Montello dam (in Marquette County) in the Cities of Princeton and Berlin.

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 emergency response and recovery activities. The public media communications utilized by emergency managers to provide timely and adequate emergency public information can also be impacted.

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

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

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

Appendix A contains maps depicting the floodplain and a map highlighting the critical facilities in Green Lake County. Appendix F contains excerpts from the Green Lake County HAZUS report. HAZUS-MH uses state-of-the-art geographic information system (GIS) software to map and display hazard data and the results of damage and economic loss estimates for buildings and infrastructure. FEMA HAZUS-MH data were used to estimate the number of structures located within the one-percent chance, or 100-year floodplain, based upon Flood Insurance Rate Maps (FIRMs) published by the Federal Emergency Management Agency (FEMA), the results of which are outlined in the report.

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 Green Lake 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 continue encouraging all Green Lake County communities' participation 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.

Green Lake County and its municipalities are committed to remaining compliant with the requirements of the National Flood Insurance Program (NFIP) and all other state and federal laws.

According to the NFIP, the following communities participate in the program:

- Green Lake County
- Cities of Berlin (Listed under Waushara County in the NFIP Community Register), Green Lake, Markesan and Princeton
- Villages of Kingston and Marquette

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

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:

- Update Mapping to include:
    - Update GIS data collection and incorporate it on schedule with the "Green Lake Land Information Plan" (v. 2016-2018),[85] which describes the data available and the updating schedule.
    - Apply to FEMA for a Letter of Map Amendment (LOMA) to incorporate FEMA-compliant, 1 foot Light Detection and Ranging (LIDAR) information. The county currently has 2' LIDAR mapping and plans to upgrade to 1' in the next flight, scheduled for 2020, for an estimated $100,000 cost. This will require new panels to be printed.

[85] http://www.co.green-lake.wi.us/uploads/forms/landinfoplan20162018.pdf

- Contract with aerial photography company for "fly-overs" during 1% chance flood events (oblique) because this data provides a useful tool in determining level of damage and mitigating areas of concern.

- Conduct a floodplain study at the confluence of the Fox River, White River, Puchyan River and Sucker Creek. Approximate floodplain area on FEMA maps. With study safe development of the area could be accomplished.

- Continue floodplain ordinance outreach within the community and ensure that homeowners and builders follow floodplain regulations. As new residents come into the community/county, outreach is necessary.

- Advise the public of available governmental programs and information, including the NFIP, as it relates to flood issues

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

- Looking for acceptable (environmentally, socially, cost-benefit, politically, etc.), permanent solutions for removing water from flood-prone areas. Seek out funding sources (grants) to execute solutions. Some of the potential solutions may include acquisitions, demolitions, floodproofing or moving water to surface streams.

- Pre-identifying infrastructure (roads, bridges, culverts, shoulders) prone to flooding and directing current and future budgetary dollars towards making the infrastructure disaster-resistant as it is scheduled for routine maintenance. Also performing preventative maintenance in areas of concern. Areas of concern include:

    - City of Berlin

        - Riverbank Improvements – Downtown area from the Franklin St. Bridge north to the Pedestrian Bridge.

- Stormwater Retention Ponds – North Business Park. Do a stormwater regional detention basis survey for North Business Park and Implement the development of it.

- Southwest Drainage District. Create an area-wide drainage system to prevent flooding of private property. An initial study was made to determine the affect storm water/run-off has on this area and a means to correct the problem. A potential solution is to create waterways and ditches to channel water to prevent sheeting across many properties.

- Shorewall improvements – Riverside Park

- Berlin Foundry Shorewall – riverbank improvements. Privately owned, this foundry is set right on the banks of the river and has flooding through their buildings during times of high water. Measures to limit run-off into the river is important.

- Explore feasibility of purchasing properties along Dock Street. The structures are storage facilities which may receive some damage in times of flooding however could be acquired and removed.

- Northeast Drainage District. Create an area-wide drainage system to prevent flooding of private property. An ongoing project for 10 years, some steps have been taken for implementation however full completion of the project has not taken place yet. A potential solution is to create waterways and ditches to channel water to prevent sheeting across many properties.

- Address flooding and roadway repairs associated with West & East Marquette St. Preliminary solution is to increase storm sewer size. Rain events greater than a 10 yr. storm event result in street flooding.

- Explore flooding problem on Water Street between Cumberland Street to E Noyes Street to stop flooding into homes. The goal would be to prevent loss of personal property and business loss from flooding.

- Install Screen before the Cumberland lift station to prevent rags from clogging pumps in high flow events. The goal would be to prevent rags from getting into the wet well and clogging up pumps during floods or wet weather events, thus allowing employees to do other essential work.

- Install new sanitary sewer main on East and West Marquette St. from Center to Water St. (about 4500 ft. plus the intersections). The goal is to stop inflow and infiltration during flooding and heavy rain events. This sewer is a converted storm sewer and has many problems. This should be done in conjunction with a storm sewer program on the same street.

o City of Green Lake

- Continue to monitor lake level readings at Green Lake Upper Dam. Currently readings are taken daily Monday through Friday when ice is not present.

- Street and drainage improvements to South Lawson Drive. City applied for FEMA disaster relief in 2008 and was denied. City is applying for Tiger Funds. Street continually has drainage and repair issues and needs to be re-engineered.

o City of Markesan

- Explore flooding problem at Moorland and John St to stop flooding of Moorland apartments and prevent personal property loss.

- Water retention area for properties on Manchester St. west of Margaret St.

- Buyouts/Elevations:
  - Business located at 450 N Margaret/ Relocation
  - Residence/garage at 95 S. Bridge

- Install shut-offs in sewer lines (laterals) in the City of Markesan to keep water from flooding 20-30 properties.

- With the assistance of the Village of Kingston & Towns of Kingston and Manchester - Work with County and State DOT to Upgrade culvert at State Hwy 44 and E. Vista and re-ditch Hwy 44 west of Margaret St.

- With the assistance of the Village of Kingston & Towns of Kingston & Manchester - Work with County and State DOT to clean trees and debris out of Grand River west side of the village.

o City of Princeton

- Explore options for erosion mitigation projects.

- Riverbank Stabilization – Water Street

o Village of Kingston

- Continue working on shoreline restoration and lake clearing projects.

o Village of Marquette

- Explore hazard mitigation opportunities (i.e., buyout or elevation) in the Village of Marquette. Several homes were completely surrounded by flood waters in June of 2008.

o Town of Marquette

- Work with the Town of Marquette and Drager Rd. property owners to elevate Drager Rd. above RFE. With contiguous dry land access the property owners can elevate their homes and remove them from floodplain.

- Work with the Town of Marquette and Marine Dr. property owners to elevate Marine Dr. above RFE. With contiguous dry land access the property owners can elevate their homes and remove them from floodplain.

- Town of Princeton

  - Work with the Town of Princeton and property owners along Kuharski Rd. to elevate Kuharski road above RFE. With contiguous dry land access the property owners can elevate their homes and remove them from floodplain.

  - Explore hazard mitigation opportunities (i.e., buyout or elevation) on Fox River Lane as well as Birch Lane. Several homes were completely surrounded by flood waters in June of 2008.

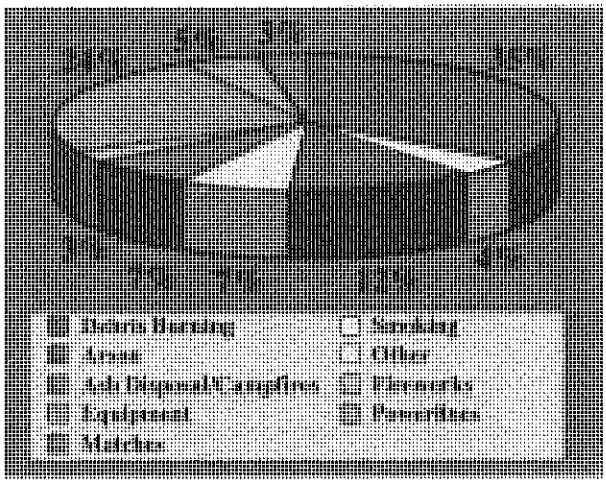
Forest and Wildfires

Wildfire (fires in forested, open, and/or agricultural land) season in Green Lake 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

According to the DNR, there are approximately 1,500 fires annually that burn over 5,000 acres of the land that they protect; 98% 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.[86]



[86] https://dnr.wi.gov/topic/ForestFire/causes/index.html

Berlin Fen State Natural Area, Fountain Creek Wet Prairie State Natural Area, Grand River March State Public Hunting Grounds, Princeton Prairie State Natural Area, Puchyan Prairie State Natural Area, Rogers Memorial State Habitat Preserve, Snake Creek Fen State Natural Area, White River Marsh State Natural Area, White River Prairie – Tamaracks State Natural Area, and White River Sedge Meadow State Natural Area are the natural areas in Green Lake County. Local fire departments are responsible for fire protection in these open acreage areas.

Frequency of Occurrence

While the total number of open fires in Wisconsin has decreased over the years, the potential danger to lives and property remains due to the increased encroachment of development into previously open lands. Overall, the probability for a forest fire is low and the probability of wildfire is medium in Green Lake County. The probability of damage or losses from forest is also low and for wildfire is medium. The areas at highest risk for wildfire in the county are the less improved parts (e.g., marshes) where the damages are more to the environment than to improved property.

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.

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.[87]

As can be seen on the map in Appendix A, in Green Lake County, two communities were identified as Communities at Risk – High:

- Town of Brooklyn
- Town of Princeton

Additionally, these communities were identified as Communities of Concern:

- Town of Berlin
- Town and Village of Kingston
- Town of and Village of Marquette
- Town of Seneca

Hazard Mitigation Strategies

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

The Wisconsin Department of Natural Resources (DNR) provides annual training for firefighters in the spring. The DNR does not have a forestry office in Green Lake County and also does not pre-stage resources (e.g., rangers, equipment, supplies) there. If there was a large wildfire for which local firefighters would request state

[87] Wisconsin State Hazard Mitigation Plan

assistance, the DNR may be able to provide limited assistance based upon their deployment level at that time; the closest DNR office is in Montello (Marquette County).

The emergency management office also partners with the local fire departments to provide information about fire safety and other mitigation strategies (e.g., protecting structures from wildfires, obtaining burn permits), especially during Fire Safety Week in October of each year.

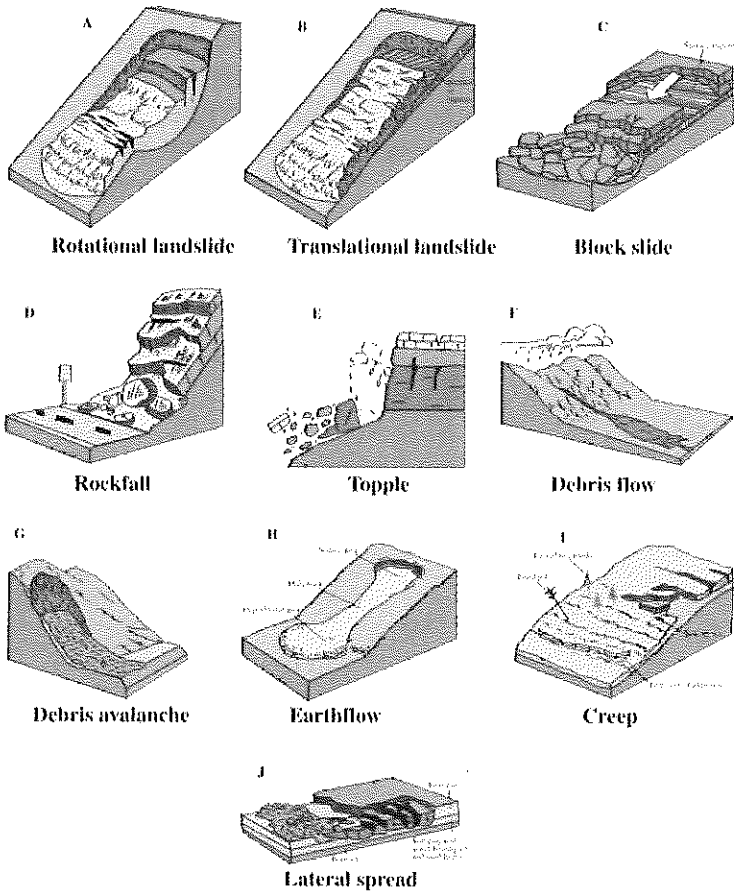
The Village of Kingston Fire Department would like to explore the possibility of creating dry hydrants for filling trucks for fires.

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

Landslide

The term landslide includes a wide range of ground movement such as rock falls, deep failure of slopes and shallow debris flows. Although gravity acting on an over-steepened slope is the primary reason for a landslide, there may be other contributing factors. Factors likely to be seen in Green Lake County include:

- erosion by rivers or lakes creating over-steepened slopes
- rock and soil slopes being weakened through saturation by snowmelt or heavy rains
- excess weight from the accumulation of rain or snow, stockpiles of rock or ore, waste piles or from man-made structures stressing weak slopes to failure[88]



[88] http://landslides.usgs.gov/html_files/nlic/page5.html and https://editors.eol.org/eoearth/wiki/Landslide

Physical Characteristics

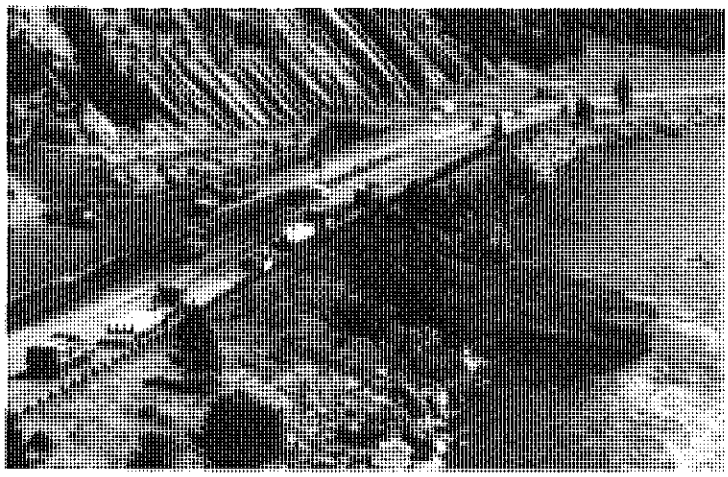
Landslides may include any combination of natural rock, soil or artificial fill and are classified by the type of movement and the type of material. The types of movement are slides, flows, lateral spreads and falls and topples; a combination of two or more landslide movements is a complex movement:

- Slides: straight or rotating downward displacements along one or more failure surfaces of soil or rock as a single intact mass or a number of pieces
- Flows: a rapid, downhill mass movement of a "slurry" comprised of loose soil, rocks, organic matter, air and water
- Lateral spreads: large movements of rock, fine-grained soils or granular soils distributed laterally
- Falls and Topples: masses of rocks or material that rapidly detach from a steep slope or cliff that free-fall, roll or bounce.

Almost any steep or rugged terrain is susceptible to landslides under the right conditions. The most hazardous areas are steep slopes on ridges, hills and mountains; incised stream channels and slopes excavated for buildings and roads. Slide potentials are enhanced where slopes are destabilized by construction, heavy rainfall, floods or river erosion. Debris flows generally occur during intense rainfall on water saturated soil. Surface runoff channels along roadways and below culverts are common sites of debris flows.

Landslides often occur together with other major natural disasters thereby exacerbating relief and reconstruction efforts:

- Floods and landslides are closely related and both involve precipitation, runoff and ground saturation that may be the result of severe thunderstorms.
- Landslides into a reservoir may indirectly compromise dam safety or a landslide may even affect the dam itself.
- Wildfires may remove vegetation from hillsides, significantly increasing runoff and landslide potential.



Landslide from fire damage in CO[89]

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

Enlarged fracture in Brown County, WI[90]

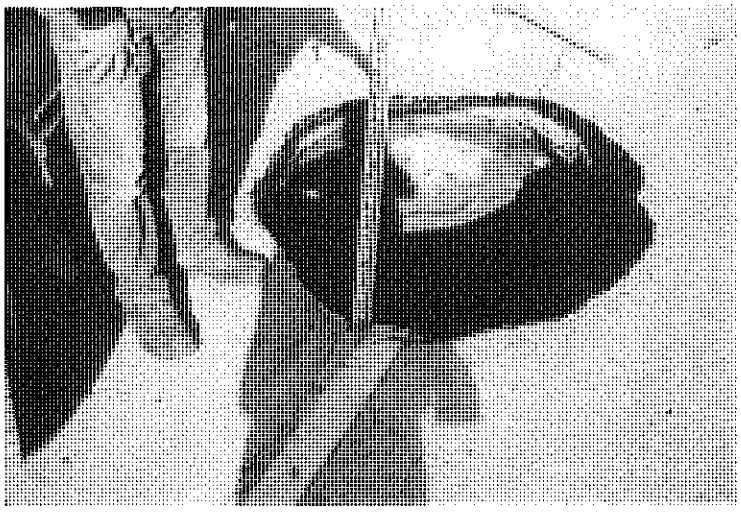
[89] http://landslides.usgs.gov/html_files/landslides/slides/slide15.htm
[90] http://www.uwex.edu/wgnhs/enlargedjoint.htm

Frequency of Occurrence

According to the U.S. Geological Survey, landslides are a widespread geologic hazard, occurring in all 50 states where they cause on average $1 to $2 billion in damages and more than 25 fatalities annually. Landslides pose serious threats to highways; railroads and structures that support fisheries, tourism, timber harvesting, mining and energy production. Expanding urban development and other land uses have increased the incidence of landslide disasters in the United States.

Even though there have been no recent reports of landslide in Green Lake County, Wisconsin Emergency Management has determined that Green Lake County has a low likelihood of occurrence and a low probability of damage if it does occur. If there was an incident, the damages would likely be environmental and not to improved property. (See the map in Appendix A.)

The karst potential map in Appendix A shows that Green Lake County has a mixture of deep and shallow karst features throughout the southeast portion county. The presence of this geologic feature supports the low probability of incidents (e.g., sinkholes, fissures to groundwater) to residents in that portion of the county and a very low probability in the rest of the county. The good news is that the complications due to karst geology have a low probability of causing significant damage, injury or death.



Sinkhole in Monroe County, WI[91]

[91] http://www.uwex.edu/wgnhs/cavesink.htm

Vulnerability

The most likely consequences of landslides in Green Lake County would be damage due to underlying karst geology, which has been identified in Green Lake County. This feature can lead to sinkholes under structures such as homes, businesses, roadways and railroads causing economic losses and possible injury to residents and the community. Fissures and/or holes that form as a result of karst geology can also open a direct channel to the aquifer. Water may then enter the aquifer that has not had the benefit of filtering through the soil, allowing contaminants into wells.

Hazard Mitigation Strategies

The goal of landslide mitigation activities is to reduce, in a cost effective manner, the loss of lives and property due to these events. Although the physical cause of many landslides cannot be removed, geologic investigations, good engineering practices and effective enforcement of land-use management regulations can reduce landslide hazards. Karst features should be considered in land use planning, stormwater management and hazardous materials planning to avoid possible damage to structures due to sinkholes or contamination of groundwater. Green Lake County will continue to work with its municipal partners to ensure that areas at risk of landslide and karst-related complications are identified and mitigation strategies are employed as appropriate. This will include evaluating areas with known karst geological features for new fissures and ensuring that direct access to the water table (i.e., without filtering through the soil) is not opened in a fissure.

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

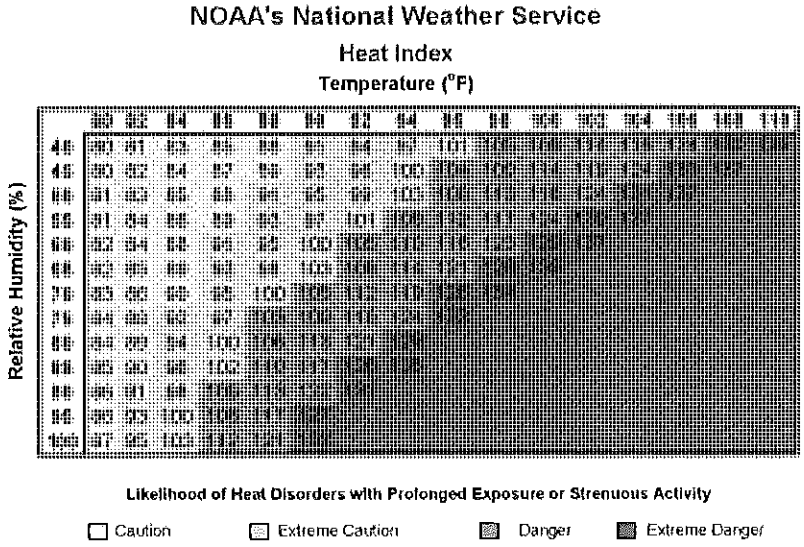
Severe Temperatures

Characteristics

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

Physical Characteristics: Heat

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



The Heat Index estimates the relationship between these two conditions and reports them as a danger category, as can be seen in the following table[92]:

[92] 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.

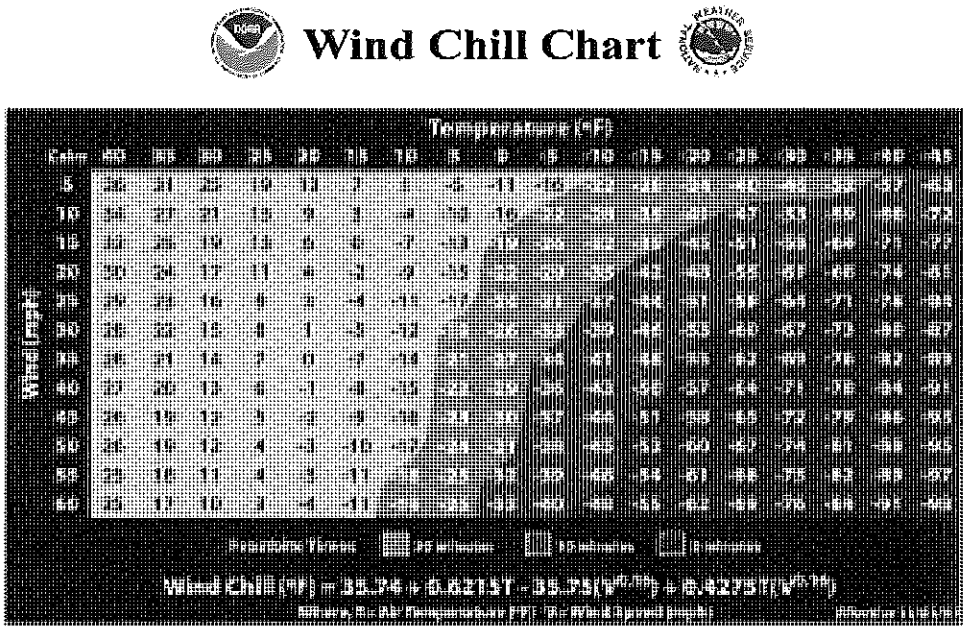
- Heat Cramps – muscular cramping brought on by exercising in warmer weather than one is accustomed to, no lasting effect.

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.[93]



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.

[93] National Weather Service: https://www.weather.gov/safety/cold-wind-chill-chart

  - 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 Green Lake County [94] 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 felt that there was a low likelihood of occurrence in any given year and the severity of damages also has a low likelihood of probability.

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 Green Lake County[95] can be found in Appendix B.

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

[94] http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=55%2CWISCONSIN
[49 & 95] http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=55%2CWISCONSIN

properties (homes, businesses, barns) are insulated for this climate, the severity of effects is also moderate.

Vulnerability

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

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

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

It should be noted that the propane shortage experience in, primarily, northern Wisconsin in the winter of 2012-13 highlighted issues with utility reliability. The workgroup recognized that utility failures will exacerbate both the likelihood of occurrence and the severity of effects of extreme temperature incidents.

Green Lake 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.

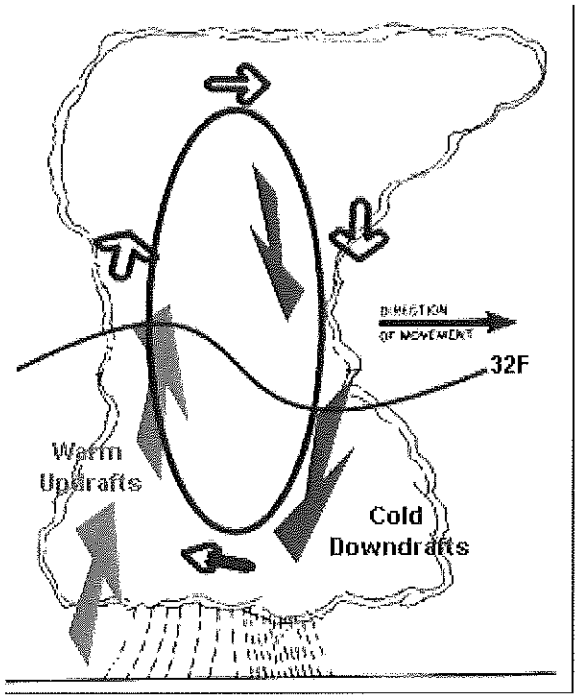
Hazard Mitigation Strategies

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 and the county and its municipalities will continued to monitor the impact of climate change to communities.

The Green Lake County Emergency Management Office 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. The county and its municipalities also will continue to prepare so that they can provide sheltering services to citizens in need during severe temperature incidents.

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: [96]



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

[96] NWS, January 10, 2003

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.

Hail Size Estimates[97]	
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. Green Lake County, as can be seen in the map in Appendix A, has a medium probability of hail occurrence in Wisconsin and the likelihood of damage due to hail is considered low in general but high for crops, roofs, and vehicles.

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.

[97] NWS, January 10, 2003

A table showing the hail events recorded by the National Weather Service in Green Lake County[98] can be found in Appendix B.

Vulnerability

NWS loss tables show that property damage has ranged from $2,000 (2004) to $1.5 million (2000). Hail, typically occurring in conjunction with thunderstorms and lightning, can damage many types of infrastructure. Public and private vehicles (e.g., campers, boats, cars, trucks) are liable to have their windshields cracked, bodies dented and paint damaged as a result of hail. This damage can occur, depending on the size of the hail, whether the vehicle is moving through the storm or is stationary. Hail on the roadway can also cause vehicles to slide off the road. Vehicle damage and iced roadways are of particular concern when you consider the need for emergency vehicles such as police cars, fire trucks and ambulances to quickly move to assist victims in a disaster.

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

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

Hail can be particularly damaging to agricultural concerns, including farm buildings, standing crops and livestock. As described previously, the agricultural sector is an important economic driver in Green Lake County. Hail is a localized phenomenon and it would be difficult to estimate losses but there have been four events ranging from $300 (2000) to $10,000 (1997) in crop loss and the potential is much greater with over 75,000 acres in harvested cropland with an average value of $203.53 per acre.

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

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.

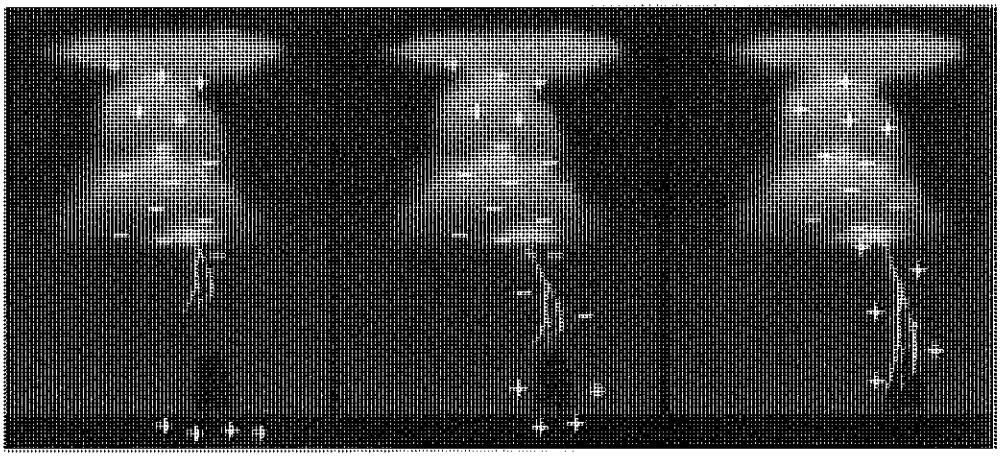
Green Lake County Emergency Management provides hail information to the public as part of the spring severe weather awareness week. The office also provides information about hail in displays in the courthouse and on the website. Federal emergency assistance is available in the form of low-interest loans 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 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.[99]

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.

[99] 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. Green Lake County has a very 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 Green Lake County generally have several severe thunderstorms per summer. The likelihood of damage due to lightning is considered low.

A table showing the lightning events recorded by the National Weather Service (NWS) in Green Lake County[100] 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.

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.,

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

computers, televisions) that has 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.

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

Hazard Mitigation Strategies

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

The Green Lake County Emergency Management Office has awareness and educational materials in a display rack and online 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.

The City of Princeton is concerned about the effects of a lighting strike on its utility control (SCADA) system. This system is very old and can no longer be serviced because of its advanced age; its upgrade is on the capital improvement projects list. There may be other municipalities with similar concerns (e.g., the City of Berlin).

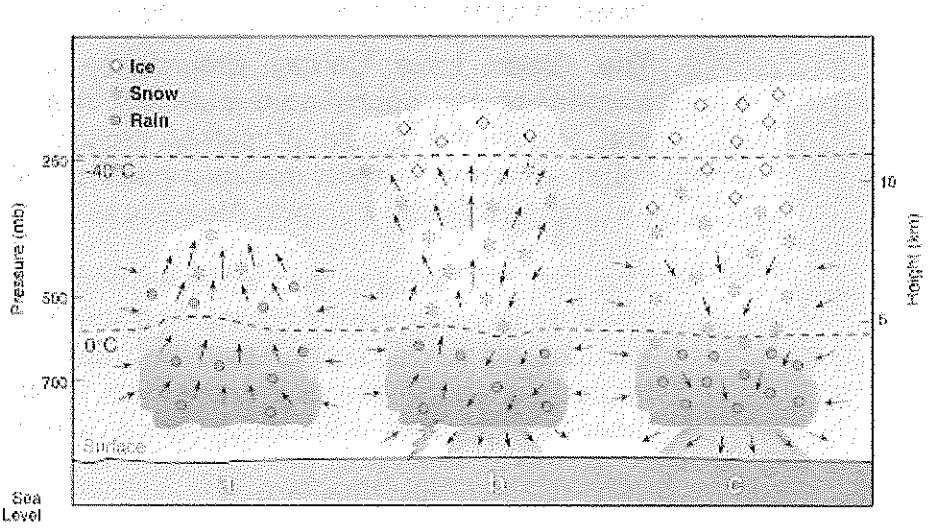
Storms: Thunderstorms

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.[101]



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

[101] National Weather Service - Flagstaff

individual thunderstorm cells. These fronts can often be tracked across the state from west to east with a constant cycle of birth, growth, maturity and death of individual thunderstorm cells.

Frequency of Occurrence

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

The probability of severe thunderstorms occurring in Green Lake County is moderate as these storms usually occur one or more times annually during the summer in Green Lake County. The severity of effects in thunderstorms is considered low. Damage from thunderstorms usually is a result of the hail, lightning, winds and/or flash flooding that can occur as part of the storm. The likelihood of damage from these causes is also discussed in the appropriate chapters.

Tables showing the thunderstorm events that have been recorded in Green Lake County by the National Weather Service in Green Lake County[102] 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. Green Lake County's thunderstorm vulnerabilities due to associated hail, lightning, winds and flood waters are discussed in the other hazard chapters of this plan.

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

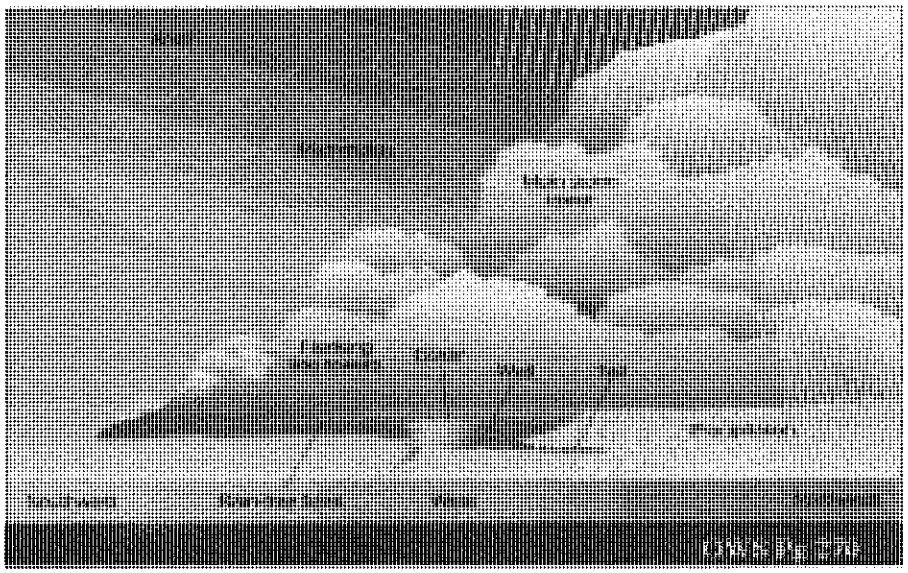
Hazard Mitigation Strategies

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 Green Lake County Emergency Management Office has developed severe weather safety information that it disseminates to the public. During Tornado Awareness Week, there is extensive media coverage of safety tips. Additionally, the department assists the National Weather Service (NWS) in conducting tornado spotter training programs and in organizing local tornado spotter networks. The communities would also like to work with their special events fair/festival boards, as requested, to create emergency plans in case of bad weather.

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

Storms: Tornadoes and High Winds

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



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

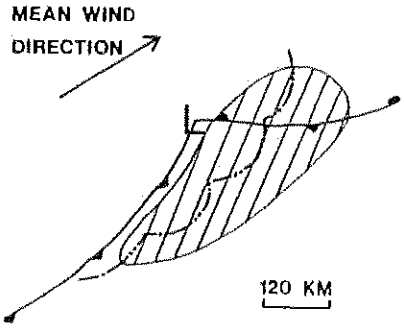
The traditional criteria that distinguish a derecho from a severe thunderstorm are *sustained* winds of 58 mph during the storm as opposed to gusts, high and/or rapidly increasing forward speed and geographic extent (typically 250 nautical miles in length). In addition, they have a distinctive appearance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

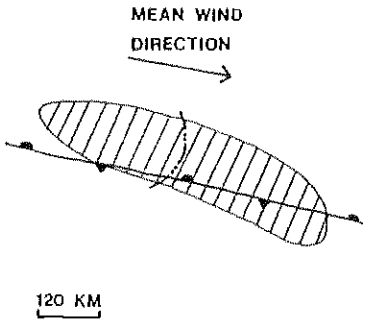
- Progressive: A small line of thunderstorms take the bow-shape and can travel for hundreds of miles.

- 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.

- Low dewpoint derecho: A derecho that occurs in an environment of comparatively limited low-level moisture, with appreciable moisture confined to the mid-levels of the atmosphere. Such derechos most often occur between late fall and early spring in association with strong low pressure systems. Low dewpoint derechos are essentially organized bands of successive, dry downbursts.[103]



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

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

damage in most cases. Because tornadoes are associated with storm systems, they usually are accompanied by hail, torrential rain and intense lightning.

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

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

The Fujita Tornado Scale[104]

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

[104] FEMA, 1997

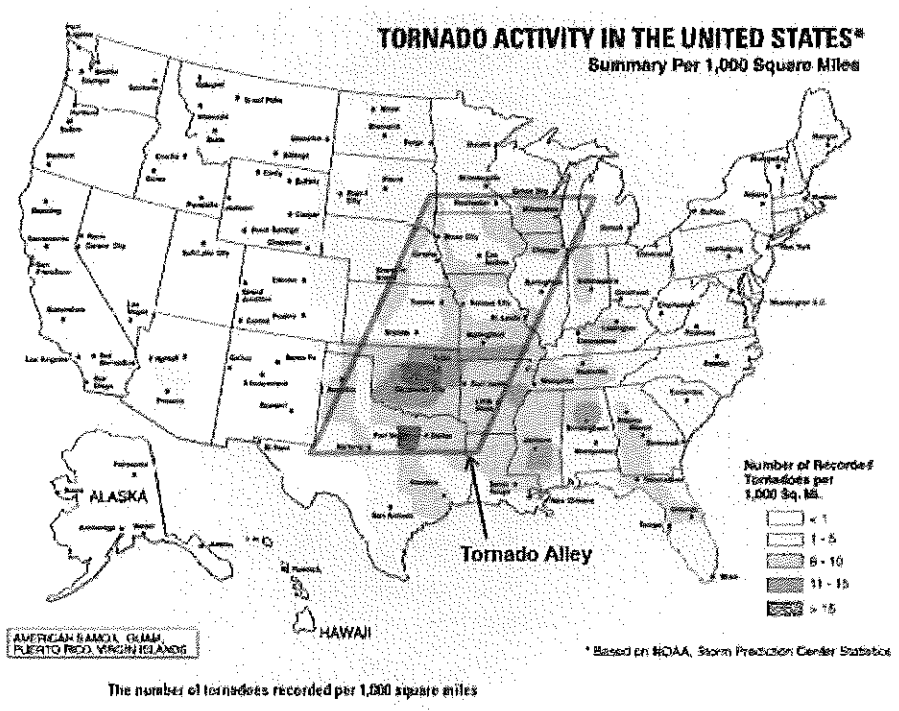
Downburst Characteristics

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

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

Frequency of Occurrence

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



Wisconsin's tornado season runs from the beginning of April through September with the most severe tornadoes typically occurring in April, May and June. Tornadoes have, however, occurred in Wisconsin during every month 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.

Tables showing the frequency of high winds, funnel clouds and tornadoes as reported by the National Weather Service can be found in Appendix B.[105] The probability of Green Lake County being struck by a tornado in the future is high and the likelihood of damage from future tornadoes is also high. All parts of Green Lake County are equally susceptible to tornadoes.

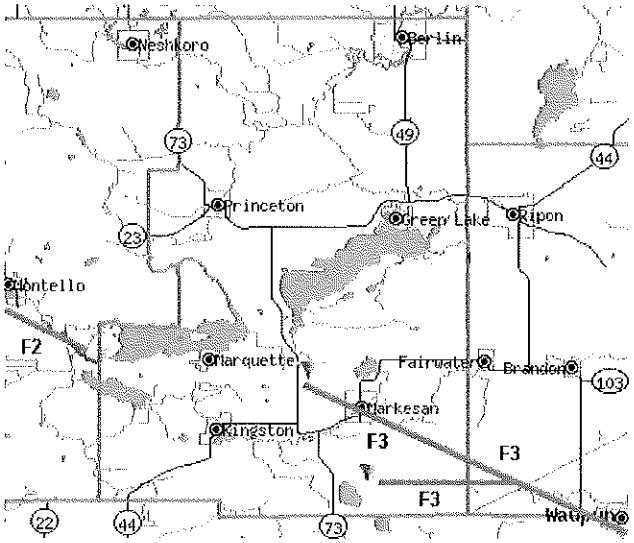
Two of the State of Wisconsin's most notable tornadoes occurred in Green Lake County[106]:

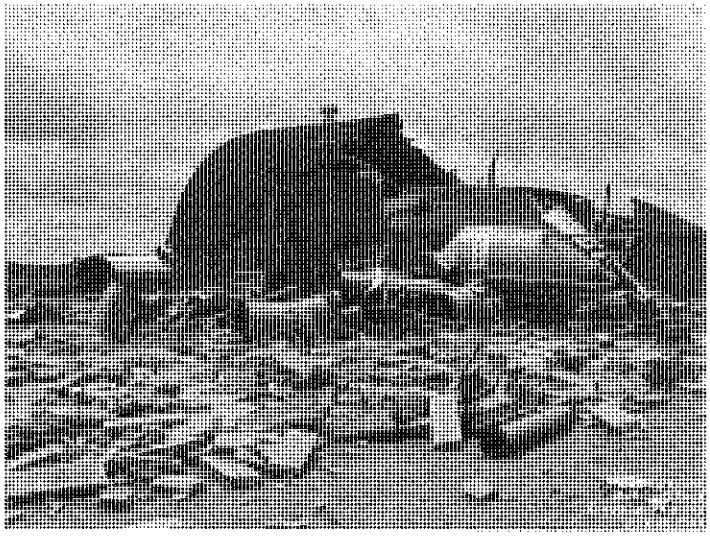
- "On April 3, 1956 a tornado struck the southeast sector of the City of Berlin, Green Lake County, at approximately 1:40 p.m. after damaging at least three farms south and west of the city. It came within a few yards of the high school where 400 students were in class. The terrified students watched the tornado churn

[105] http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=55%2CWISCONSIN
[106] Wisconsin State Hazard Mitigation Plan, v 2008, pp 4-50 through 4-52

towards the high school, but the twister veered to the right, barely missing the school. Witnesses saw cars and buildings lifted and carried through the air. The tornado killed 7 people and injured 50. Damage was estimated at more than $1 million."

- On June 23, 2004 two F3 tornadoes merged and struck Green Lake, Fond du Lac and Dodge Counties causing $20 million in damages and killing one person. A map of the tornado paths in Green Lake County and a photograph of sample damage follows:[107]





[107] http://www.crh.noaa.gov/mkx/document/tor/062304.php

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; Green Lake County has several of each type of property. Both have high concentrations of people in a small area, generally have structures that provide less protection than standard construction homes and 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 [108]

Park Name	Location
Markesan Mobile Home Park	Markesan
Grand Fox Mobile Home Court	Markesan
Lamplighter	Green Lake
Coachlite Mobile Home Park	Green Lake
Pine View Estates	Princeton
Welks Landing	Markesan
Rivers End Resort	Markesan
Sadie Hawk Mobile Home Court	Green Lake
Shady Oaks Trailer & Lock LLC	Markesan

Campgrounds [109] [110] [111]

Campground Name	Location

108 https://www.mobilehome.net/mobile-home-park-directory/wisconsin/county/green-lake-county
https://dsps.wi.gov/Credentialing/ManufacturedHomes/Park%20Table%2001232018.pdf
109 http://www.glcountry.com/lodging/campgrounds/
110 https://www.visitgreenlake.com/lodging/campgrounds/
111 http://www.wisconline.com/cgi-bin/aaw_campgroundsearch.pl

Shady Oaks Campground	Markesan
Riverside Park	Berlin
Grand Valley Campground	Kingston
Green Lake Campground	Green Lake
Lake Arrowhead Campground	Montello
Hattie Sherwood Campground	Green Lake
Green Lake Conference Center	Green Lake
Cahoon's Resort	Marquette

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

An effective warning system is the single most important resource for alerting the public to a tornado hazard, which is critical to the main goal of saving lives and reducing property losses. Forecasting of tornadoes is difficult, however, because of the suddenness of their onset, their relatively short duration, the extreme variability of a tornado striking area, limited knowledge of tornado dynamics and the limitations of the weather observation system. Tornado sirens are municipally owned and maintained in Green Lake County although some are activated by the county. The Emergency Management Office promotes the use of NOAA weather radios for public alert and notification. The office also continues to evaluate various technologies to determine if they can be effectively integrated into the county's alert and notification systems.

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

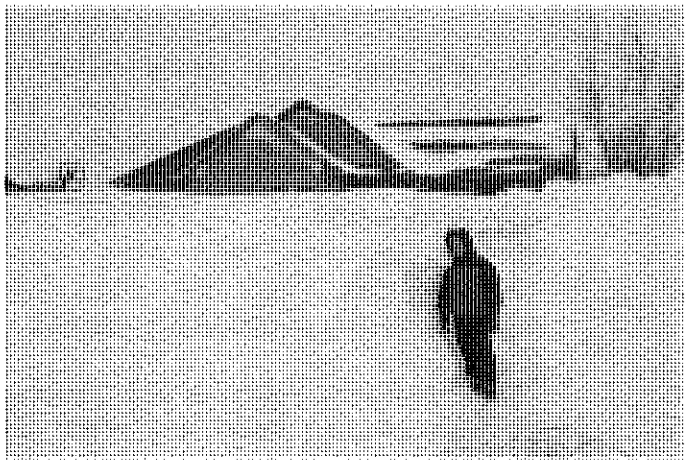
The mitigation planning workgroup recognizes that mobile home parks and campgrounds are particularly vulnerable locations for people and property during a tornado. To help mitigate the danger, communities are considering projects that include:

- Green Lake County: Exploring the feasibility of increasing wind resistance of the roofs of community storm shelters.

- Green Lake County and the City of Markesan: Exploring the feasibility of constructing tornado shelters in areas where deficient, especially in mobile home parks and/or campgrounds. The U. S. Department of Commerce Community Development Block Grants may be an avenue to achieve the necessary funding.

Storms: Winter

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



Picture of snow drifts after the "Groundhog Day Blizzard" in 2011.[112]

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.
- Freezing drizzle/freezing rain - Effect of drizzle or rain freezing upon impact on objects with a temperature of 32 degrees Fahrenheit or below.

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

- 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.

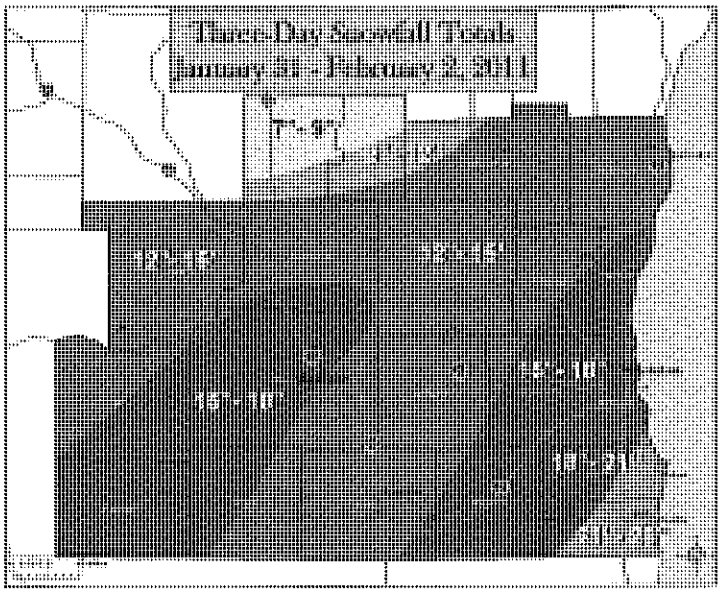
Damage from ice storms can occur when more than half an inch of rain freezes on trees and utility wires, especially if the rain is accompanied by high winds. Another danger comes from accumulation of frozen rain pellets on the ground during a sleet storm, which can make driving hazardous.

Frequency of Occurrence

Annual snowfall in Wisconsin varies between thirty inches in southern counties to one hundred inches in the north. Green Lake County averages approximately 42 inches of snow annually. Storm tracks originating in the southern Rockies or Plains states that move northeastward produce the heaviest precipitation, usually six to twelve inches. Low pressure systems originating in the northwest (Alberta) tend to produce only light snowfalls of two to four inches. Snowfalls associated with Alberta lows occur more frequently with colder weather.

Although massive blizzards are rare in Wisconsin, blizzard-like conditions often exist during heavy snowstorms when gusty winds cause blowing and drifting of snow. For example, 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. Green Lake County received from seven up to fifteen inches associated over this three-day storm. It should be noted that there

were two additional large snow storms that occurred in late February and late March of 2011.[113]



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. 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 Green Lake County is high and the likelihood that those storms will cause significant damage is also high. The tables of snow and ice events in Appendix B[114] show that there is little property damage but this does not take into account the public costs of managing the snow and ice as well as the costs of managing utility repair to power, telephone and water lines.

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

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

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.

Hazard Mitigation Strategies

The goal of winter storm mitigation activities is to reduce, in a cost effective manner, the loss of lives and property due to these events. Communities prepare for severe winter weather by ensuring that plowing and sanding equipment is operational and available to handle potential emergencies. Funding is budgeted for the overtime hours of extra personnel but in a large emergency this may not be adequate. Redundant communication modes (e.g., radio, telephone) exist between government, police, fire, EMS, hospitals and highway departments. The Green Lake 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 Green Lake County Emergency Management Office and some of its municipal partners during Winter Awareness Week in November. Preparedness information is also available from display racks in the courthouse and the website. During a storm, the public is advised to monitor local radio, television and NOAA weather alert radios for up-to-date forecasts.

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

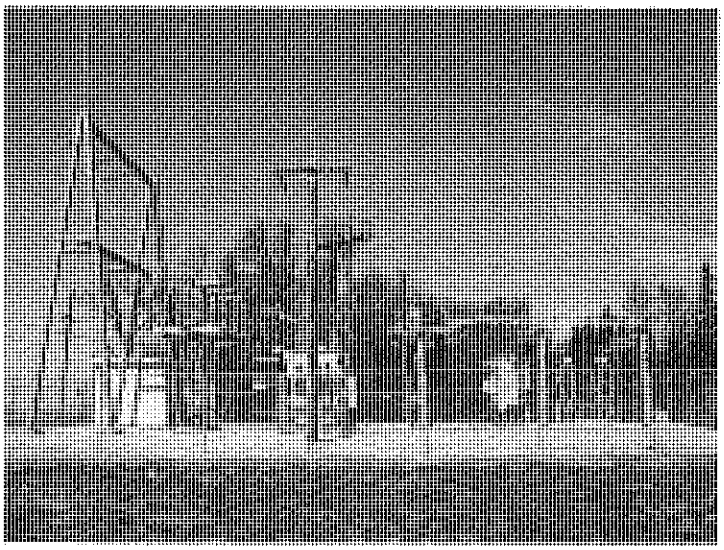
snow and ice and repairing downed utility lines, there are few measures that can be employed to reduce damages to existing or future buildings and infrastructure.

Utility Failure

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

Physical Characteristics

Modern society is very dependent on electrical power for normal living and is therefore quite disrupted by loss of power. Most power outages last about fifteen minutes to one hour. If longer, the utilities will inform the local news media of the anticipated duration of the outage. Most of Green Lake County is serviced by Alliant Energy.



Electrical substation

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

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

Green Lake 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.

In general, Green Lake County has a medium likelihood of utility failures with a low risk of death or injury due to a loss but a high risk of damage to infrastructure. Obviously, power outages are more likely to occur and the severity is greater in areas of higher human population (i.e., urban areas) but the loss of power to rural customers, while affecting fewer people, generally lasts longer and can be as life-threatening, especially if a person with functional or access needs (e.g., the elderly, the young, those on special medical equipment) is involved.

Vulnerability

The failure of a utility to function can have wide-ranging impact in Green Lake County. People, especially special needs populations, in residential properties may not be able to safely live in their homes because of inadequate heat, the inability to cook, the inability to manage waste, etc. Businesses, including the utilities themselves, may lose money due to the inability to produce goods and services for which they can bill and they may be non-operational due to damaged infrastructure, which can be very expensive to replace and/or repair. Critical infrastructure such as hospitals, schools and governmental facilities may not be able to operate or may have to operate at a reduced capacity due to the

loss of utility services. EPCRA facilities may not be able to adequately control and contain their chemicals and there may be a release of hazardous materials that can impact people or the environment.

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

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

Hazard Mitigation Strategies

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

In the event of a prolonged power outage, Green Lake County has generators available to provide power for radio communication and EOC operation. Evacuation and shelter arrangements have been prepared in case of a severe power outage. It should be noted that schools are often top choices as community disaster shelters but few of the county's schools have back-up generators. They have some emergency power to run minimal lighting (e.g., "EXIT" lights) in the pre-identified shelters but this would not be adequate for long-term operations. The Green Lake County Emergency Management Office would like to complete a feasibility study (including a cost-benefit analysis) to selectively upgrade shelter facilities and/or facilities that would host mass clinics and other emergency centers for electricity needs.

Other projects that are being considered:

- City Markesan

- There are 3 lift-station locations, none of which have generator back up. The city would like to install three permanent generators.

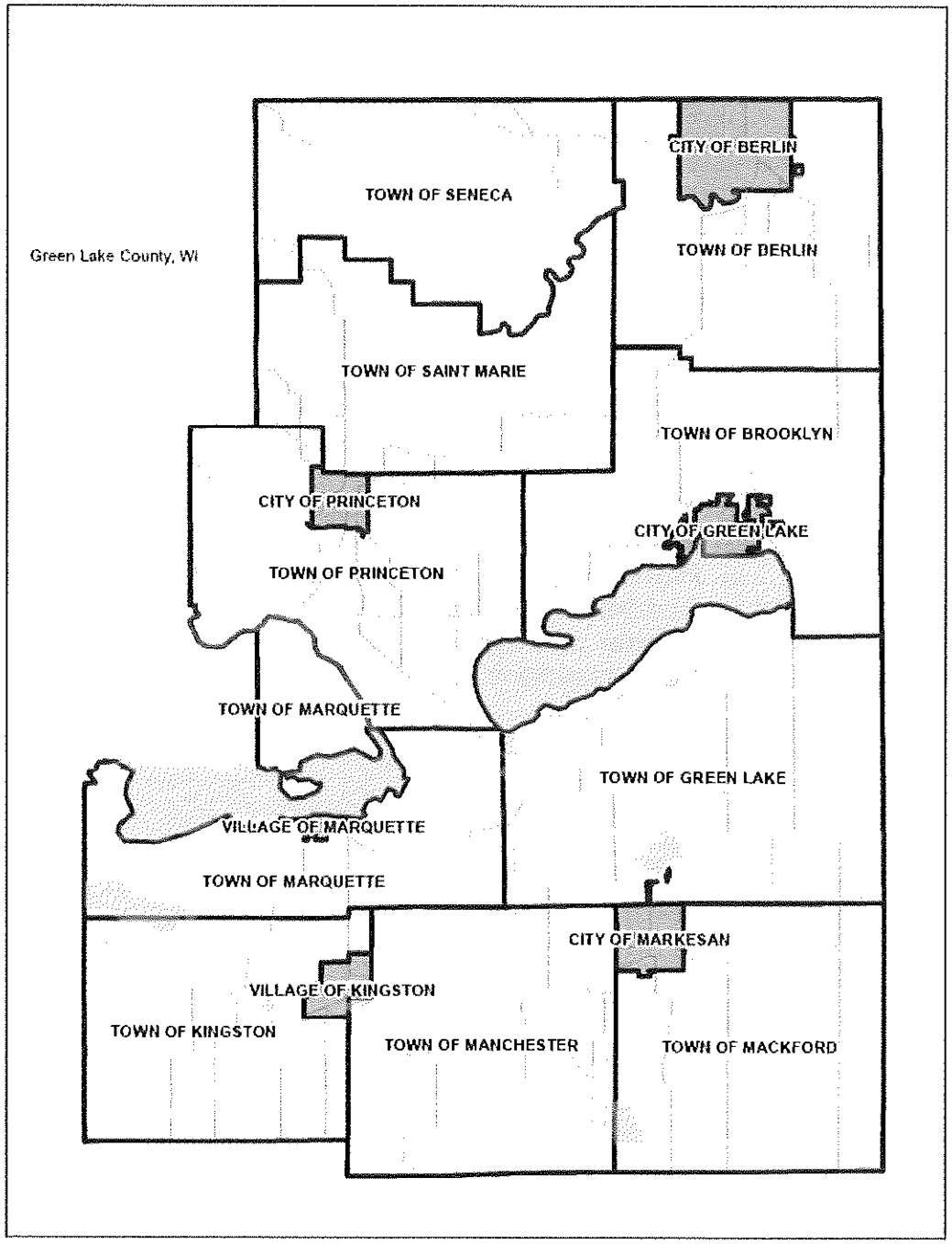
- Install back up power at wells to have backup power to well in the city for fire suppression.

- Install back up power at water tower to have backup power to the towers. The towers control the pumps under emergency conditions and also our SCADA system for the water and sewer systems.

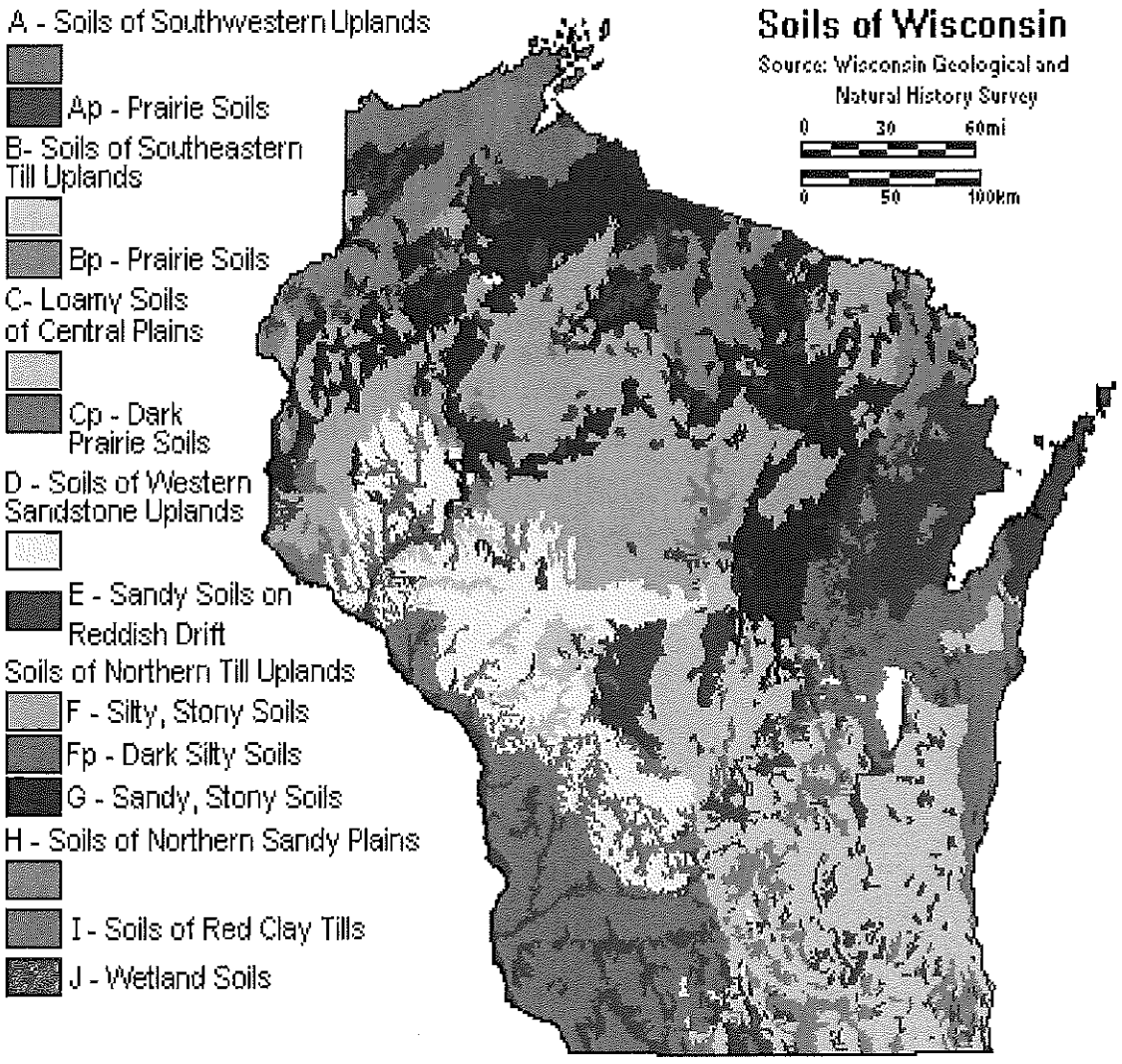
- City of Berlin
  - Install back up power at Well # 5 to have backup power to more than one well in the City (Berlin has three wells).
  - Install back up power at water towers to have backup power to the towers. The towers control the pumps under emergency conditions and also our supervisory control and data acquisition (SCADA) system for the water and sewer systems.
  - Provide and install portable back-up generators at Webster Street.
  - Provide and install a permanent back-up generator at Cumberland Street.
  - Provide and install portable back-up generators for three lift stations.

Appendix A: Maps

Green Lake County Base Map

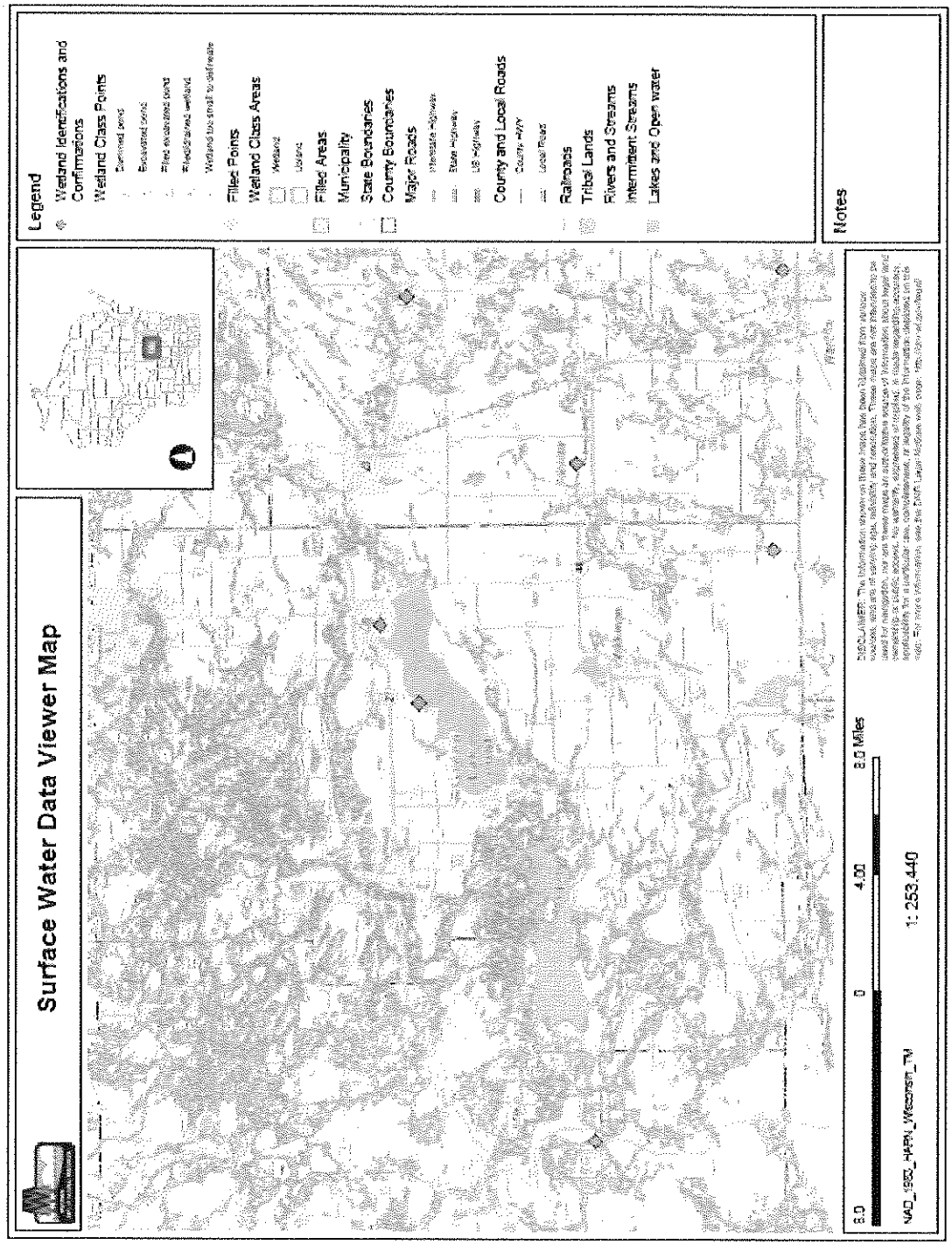


Soils Types[115]



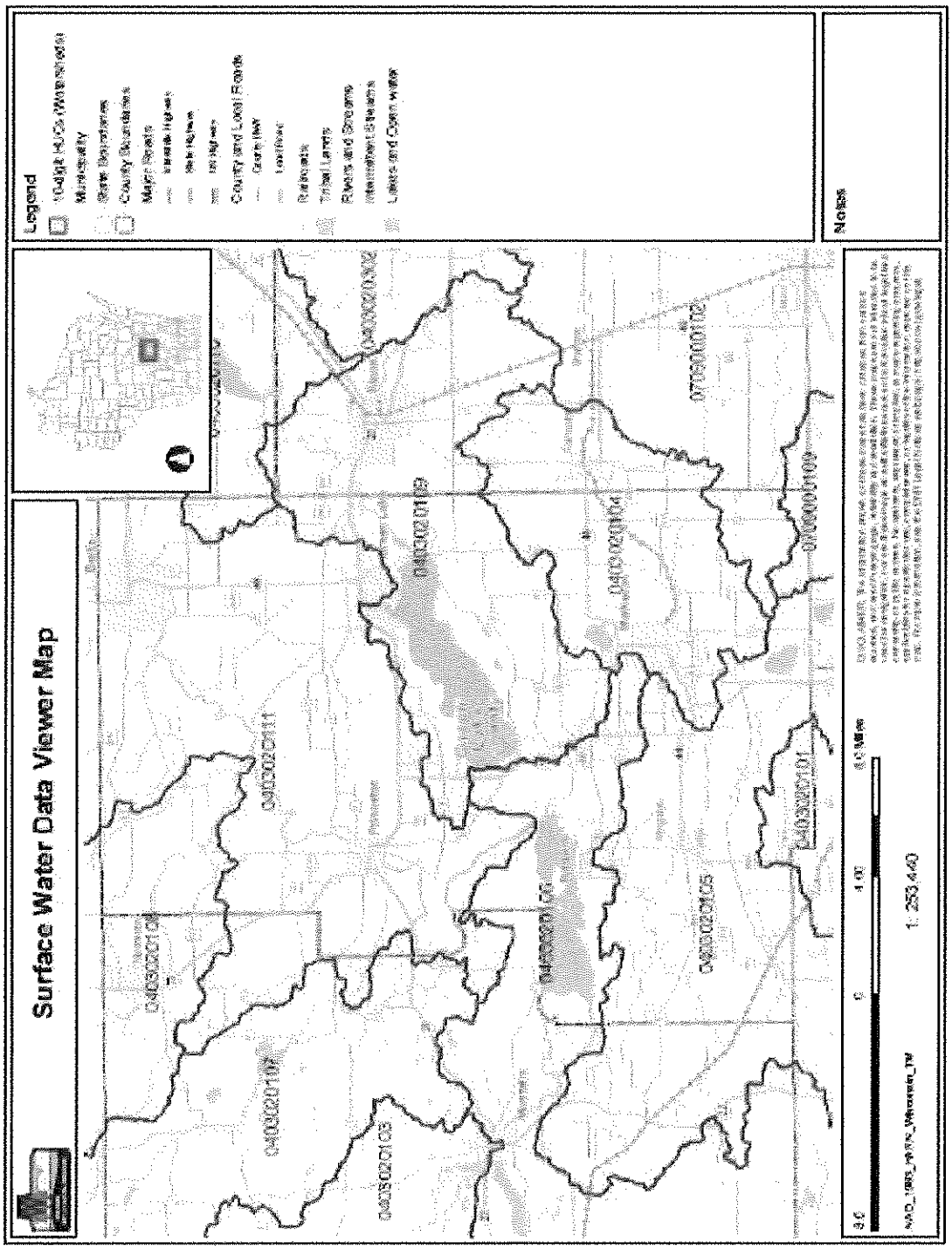
[115] Source: *Soils of Wisconsin* compiled by F. D. Hole, 1973; Wisconsin Geological and Natural History Survey Map, scale (approx.) 1: 3,150,000.

Green Lake County Surface Water[116]



[116] https://dnr.wi.gov/maps/applist.html

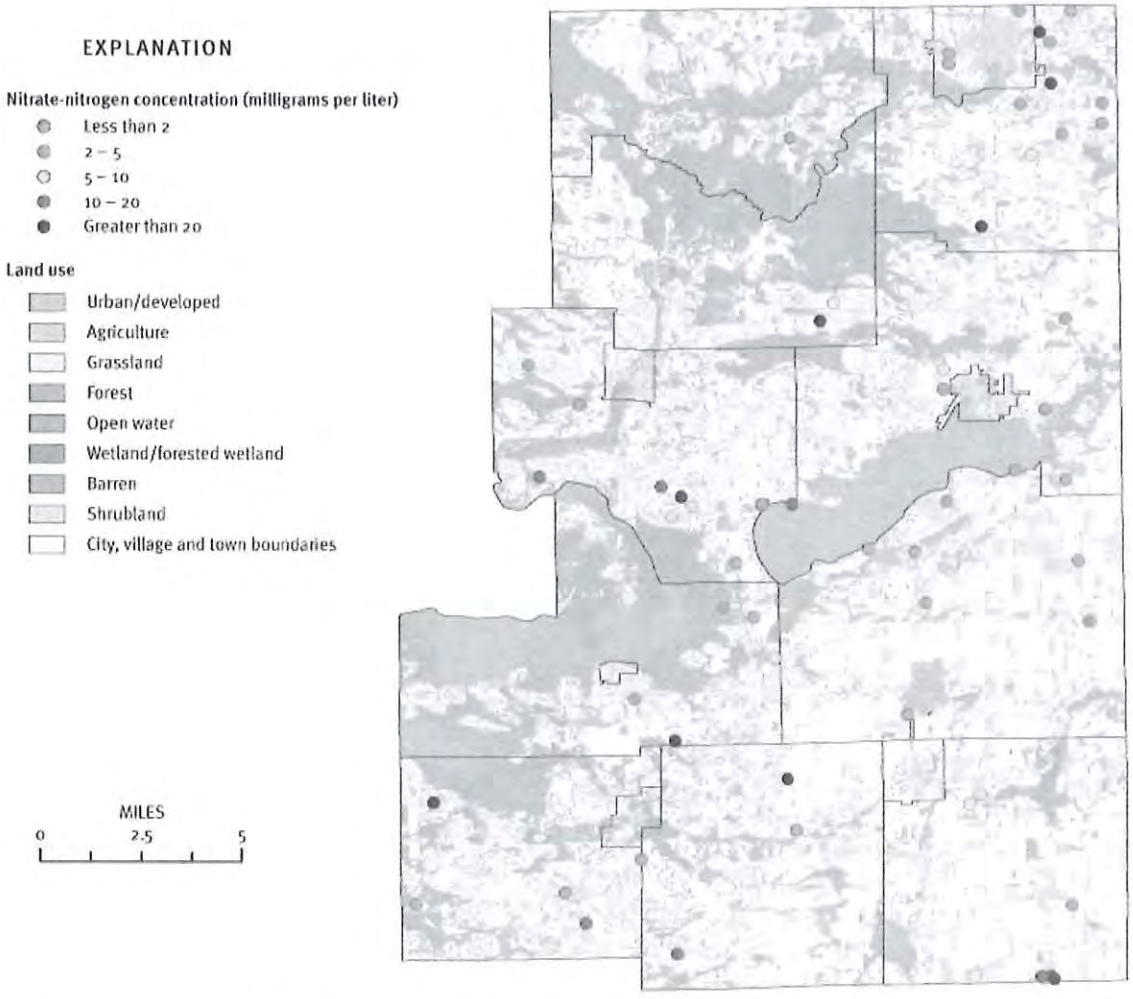
Green Lake County Watersheds[117]



[117] https://dnr.wi.gov/maps/applist.html

Green Lake County – Nitrate-Nitrogen Concentrations

Green Lake County – Nitrate-Nitrogen Concentrations

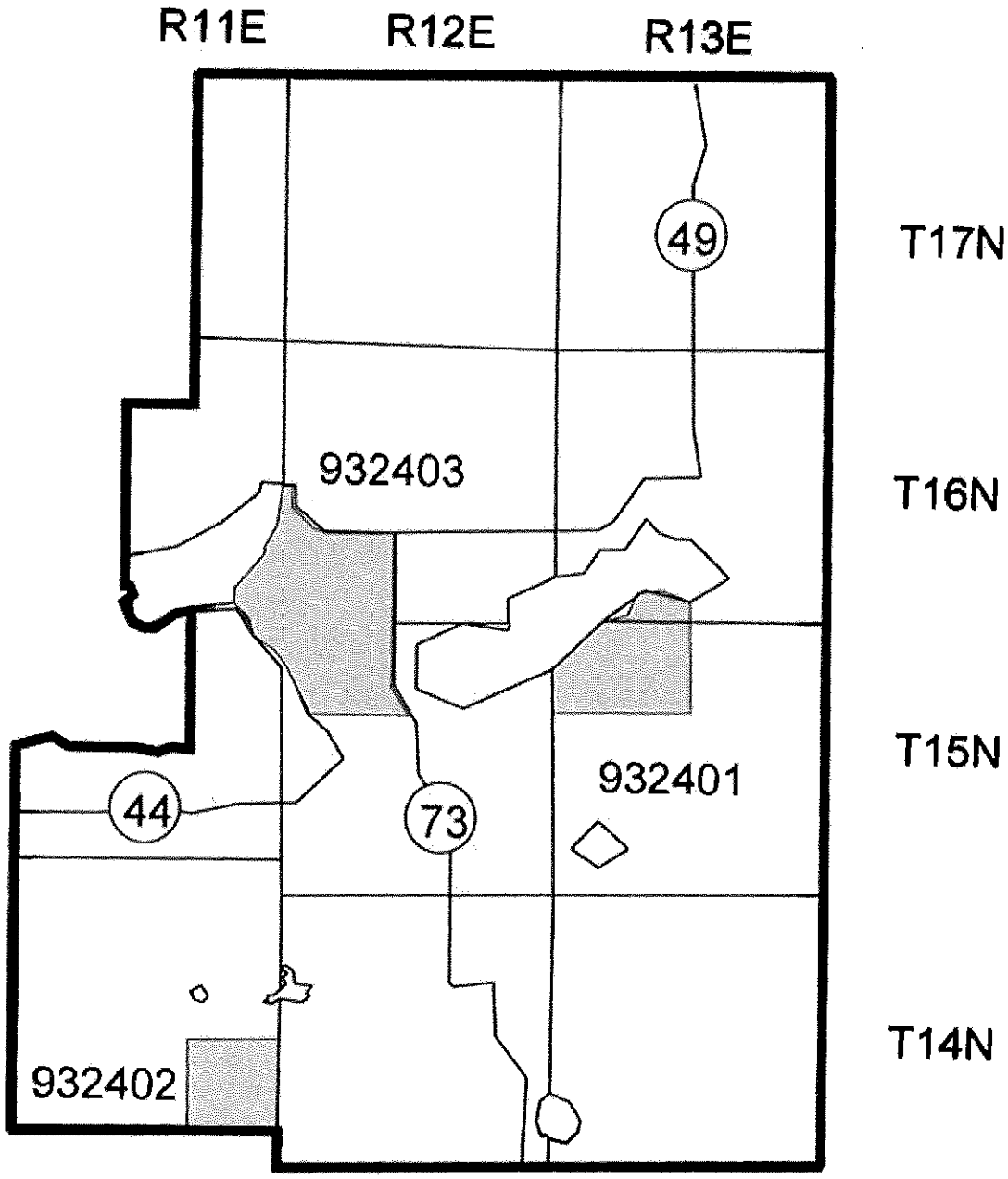


Private well nitrate-nitrogen data presented on this map should not be considered comprehensive. Data are from sampling conducted during 1985-2004 as reported by the Wisconsin Department of Natural Resources, the Wisconsin Department of Agriculture, Trade and Consumer Protection, and the Central Wisconsin Groundwater Center. Data collected at other times or by other sources are not included.

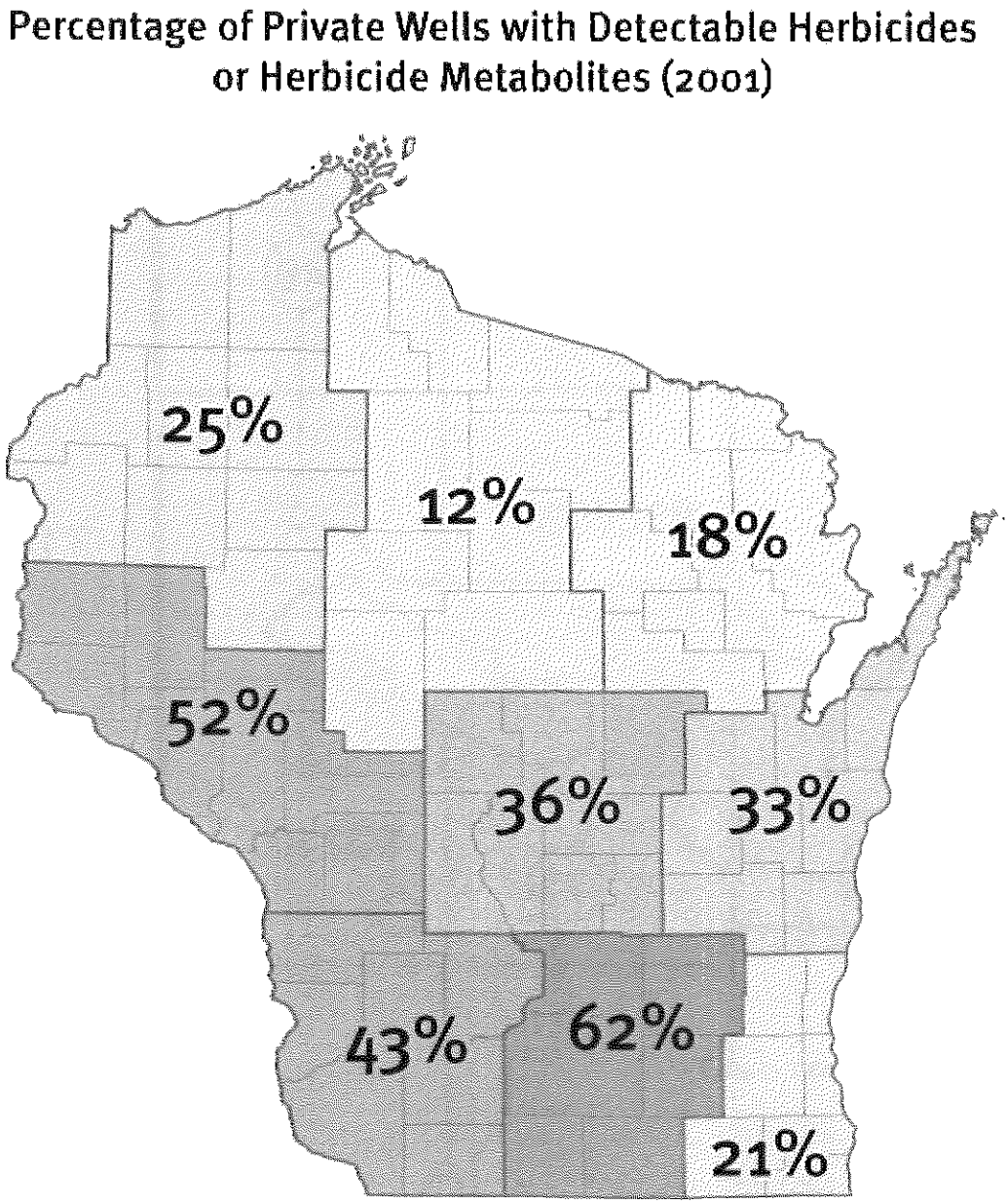
Land cover data: Wisconsin Department of Natural Resources, 1998, WISCLAND land cover (WLCGW930) 1991-1993, available at *http://www.dnr.state.wi.us/maps/gis/datalandcover.html*

Figure created by Raquel Miskowski, University of Wisconsin-Stevens Point, Center for Land Use Education, for the 'Protecting Wisconsin's Groundwater Through Comprehensive Planning' web site, 2007, *http://wi.water.usgs.gov/gwcomp/*

Green Lake County – Areas of Atrazine Concentrations



Green Lake County – Herbicides in Private Wells



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

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

Green Lake County – Sites of Contaminated Soil/Groundwater

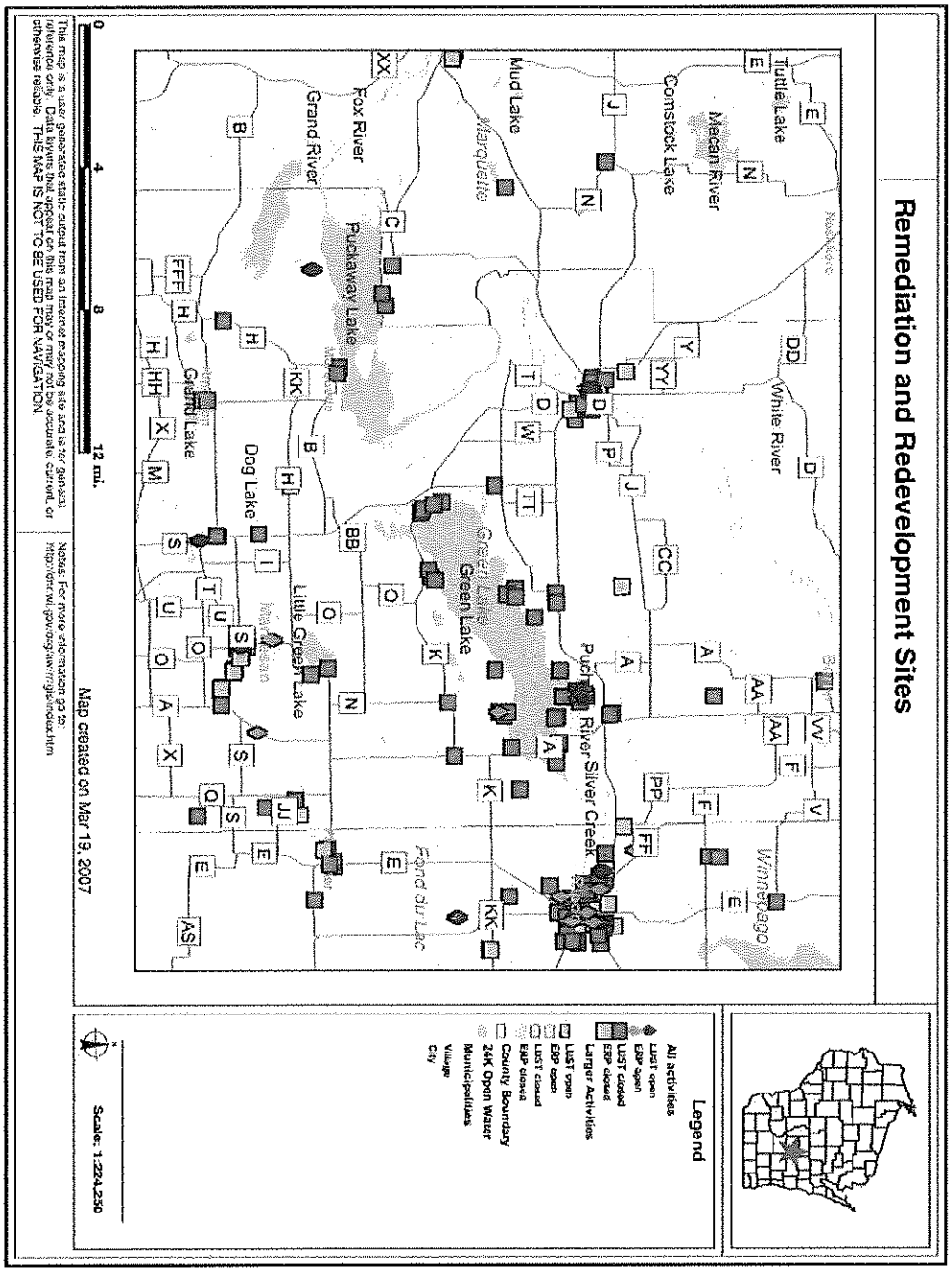
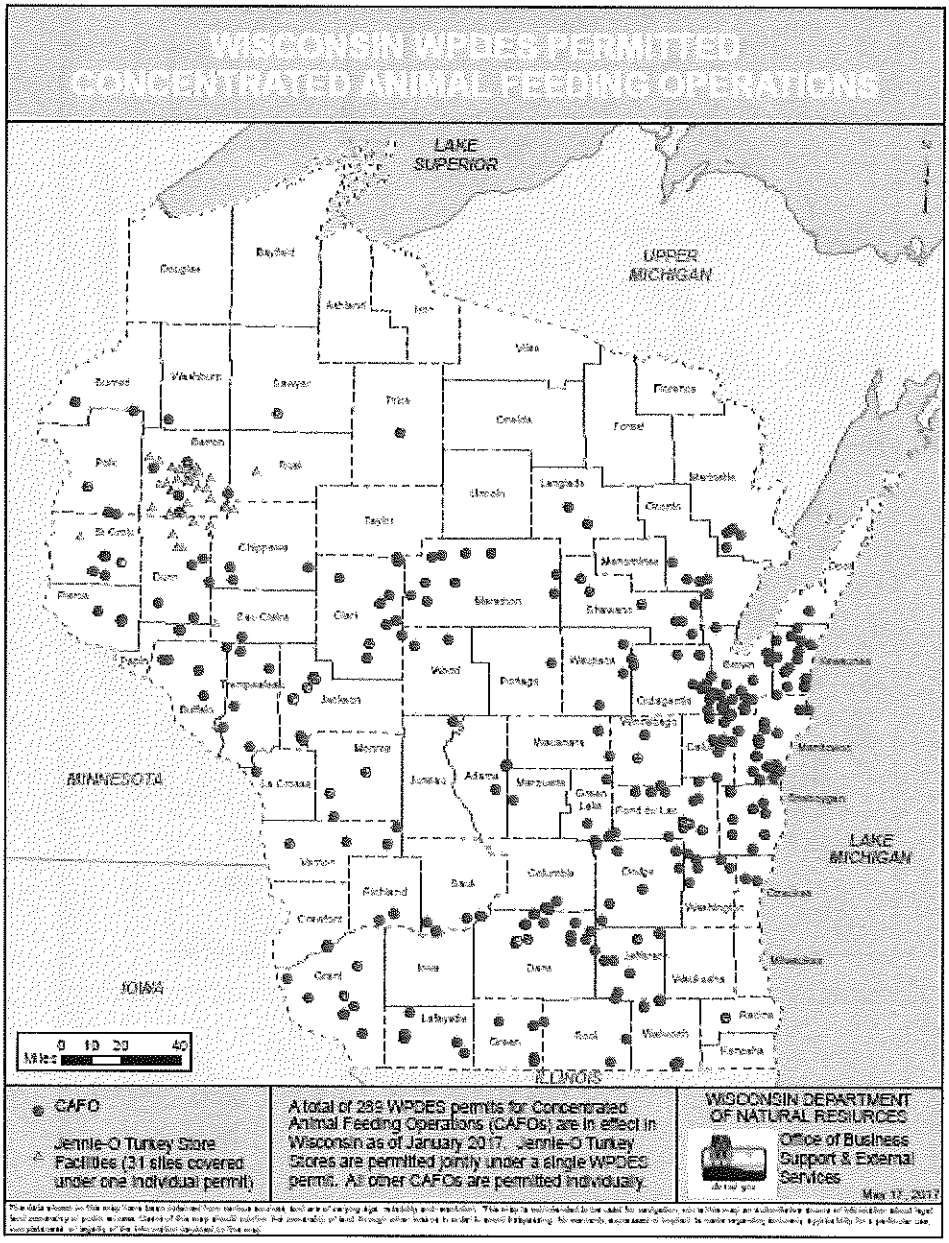


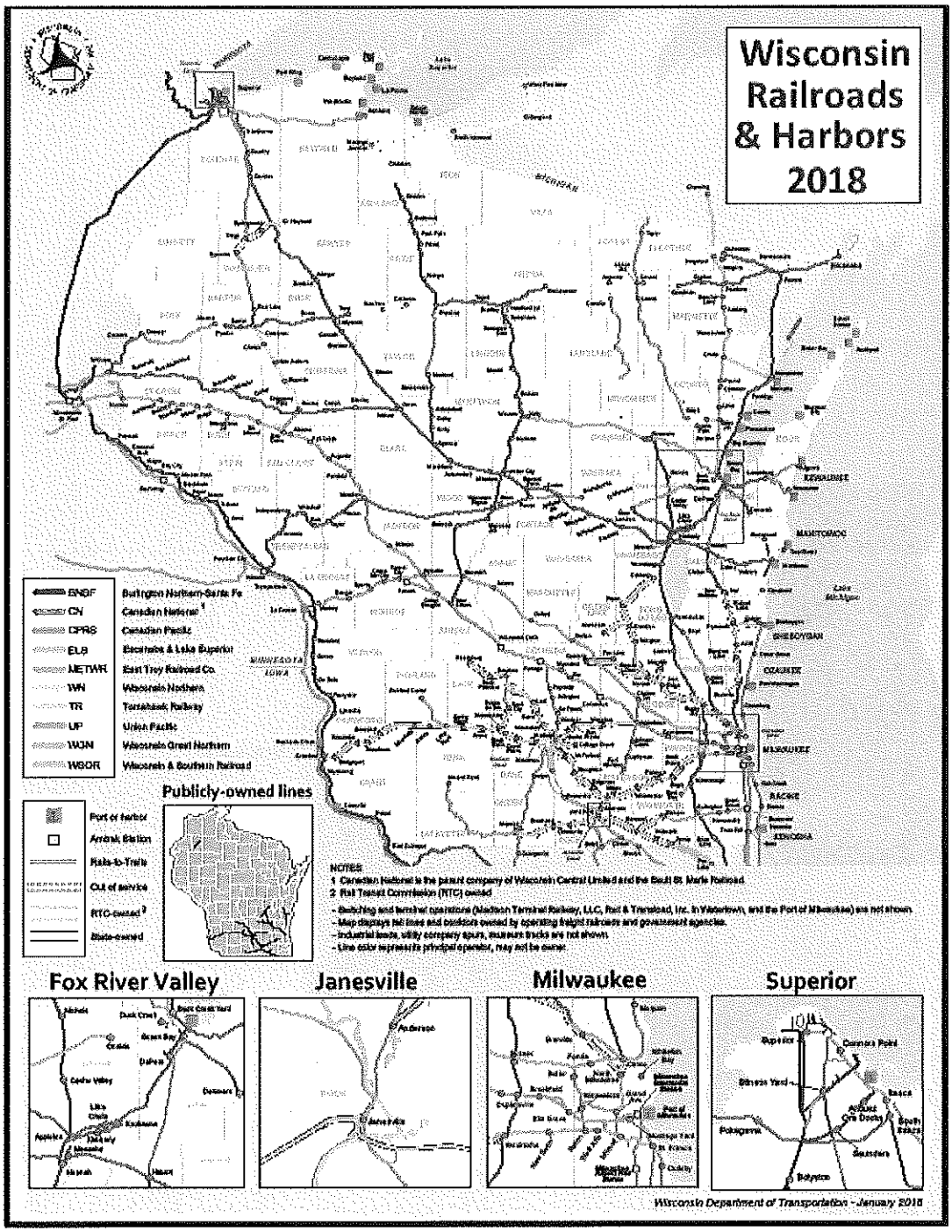
Figure created for the "Protecting Wisconsin's Groundwater Through Comprehensive Planning" web site, 2007, *http://wi.water.usgs.gov/gwcomp/*

Wisconsin Permitted Concentrated Animal Feeding Operations (CAFOs)[118]



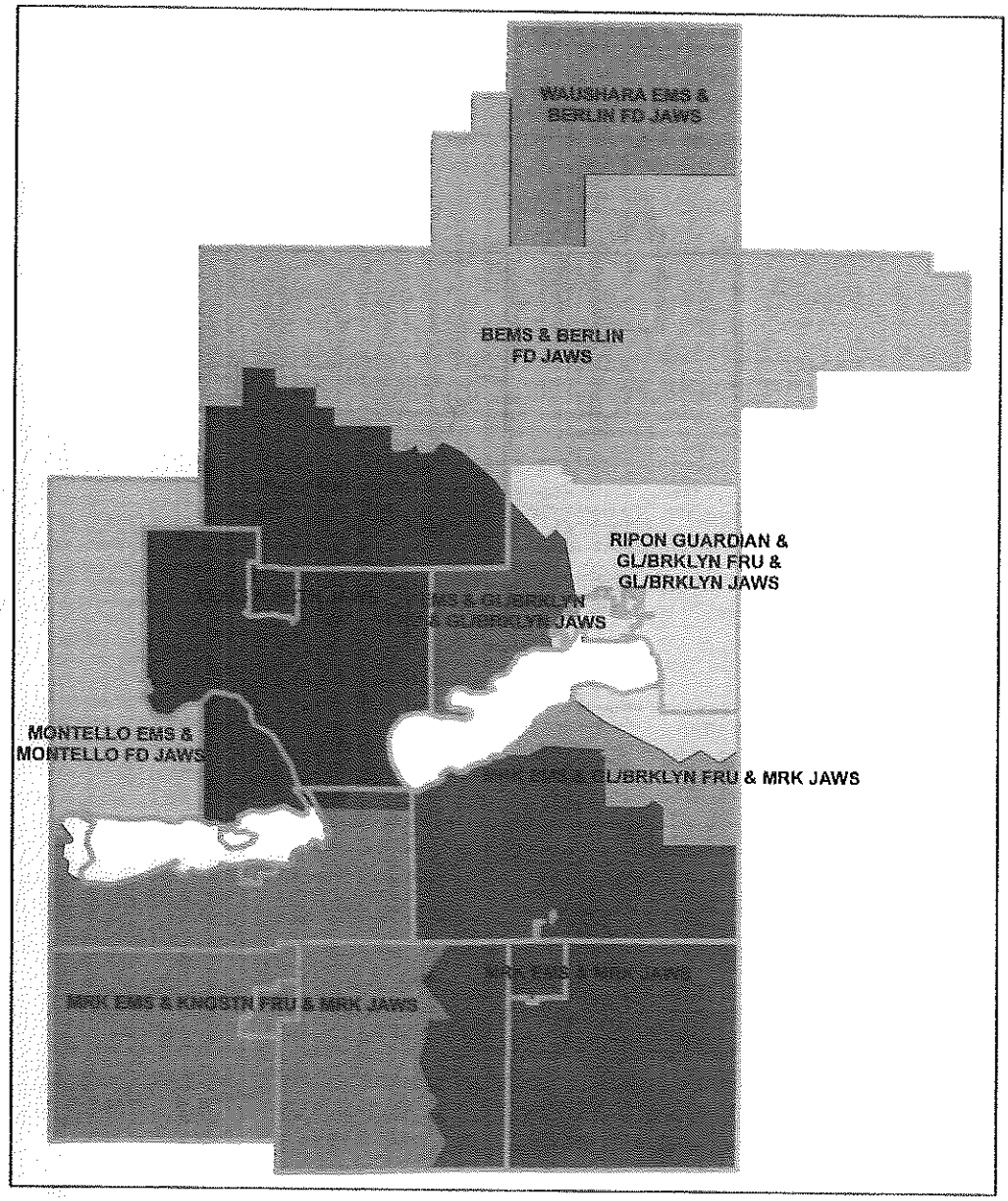
[118] https://dnr.wi.gov/topic/AgBusiness/documents/cafo_statewide_map.pdf

Wisconsin Railroads & Harbors[119]

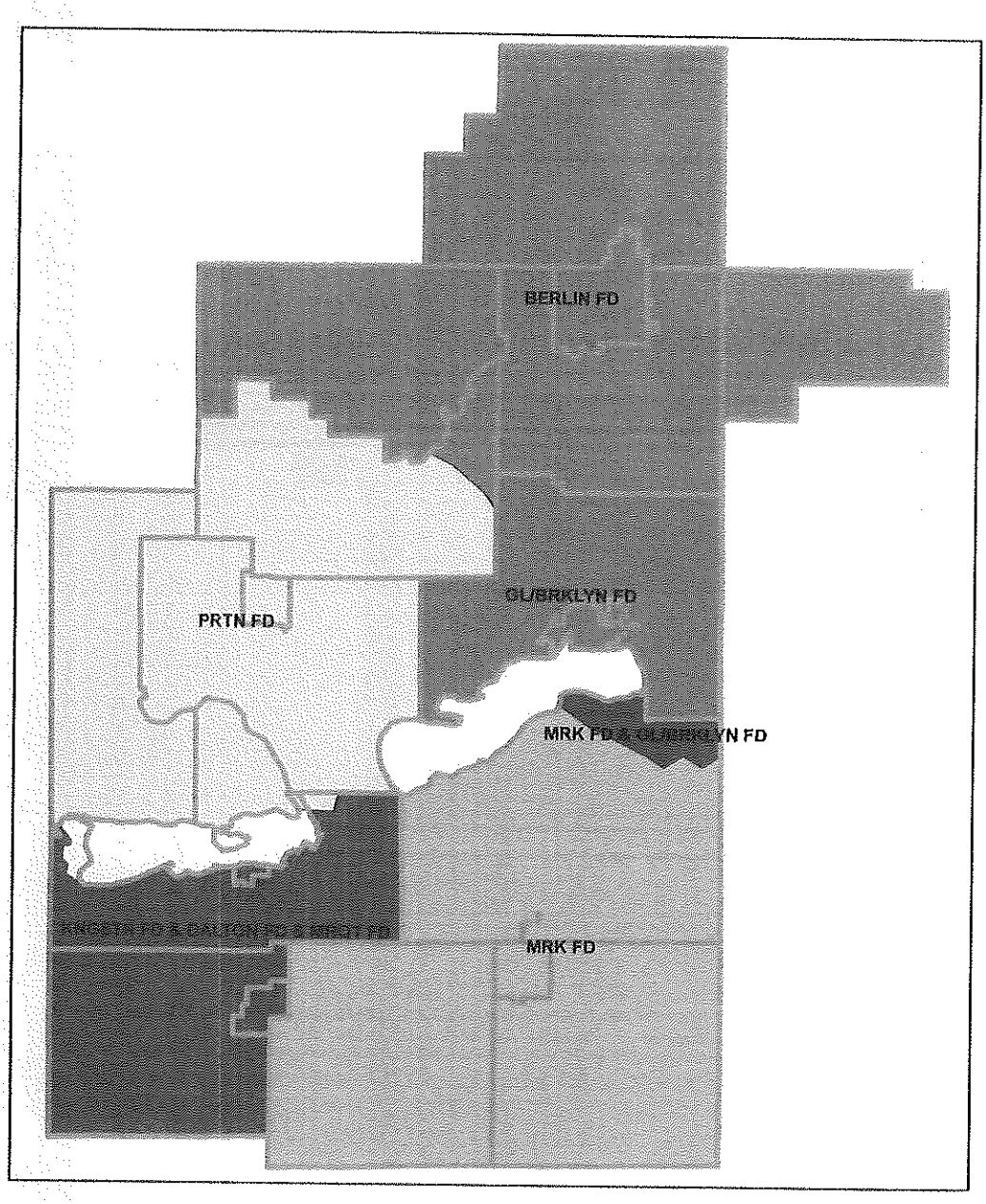


[119] http://wisconsindot.gov/Documents/travel/rail/railmap.pdf

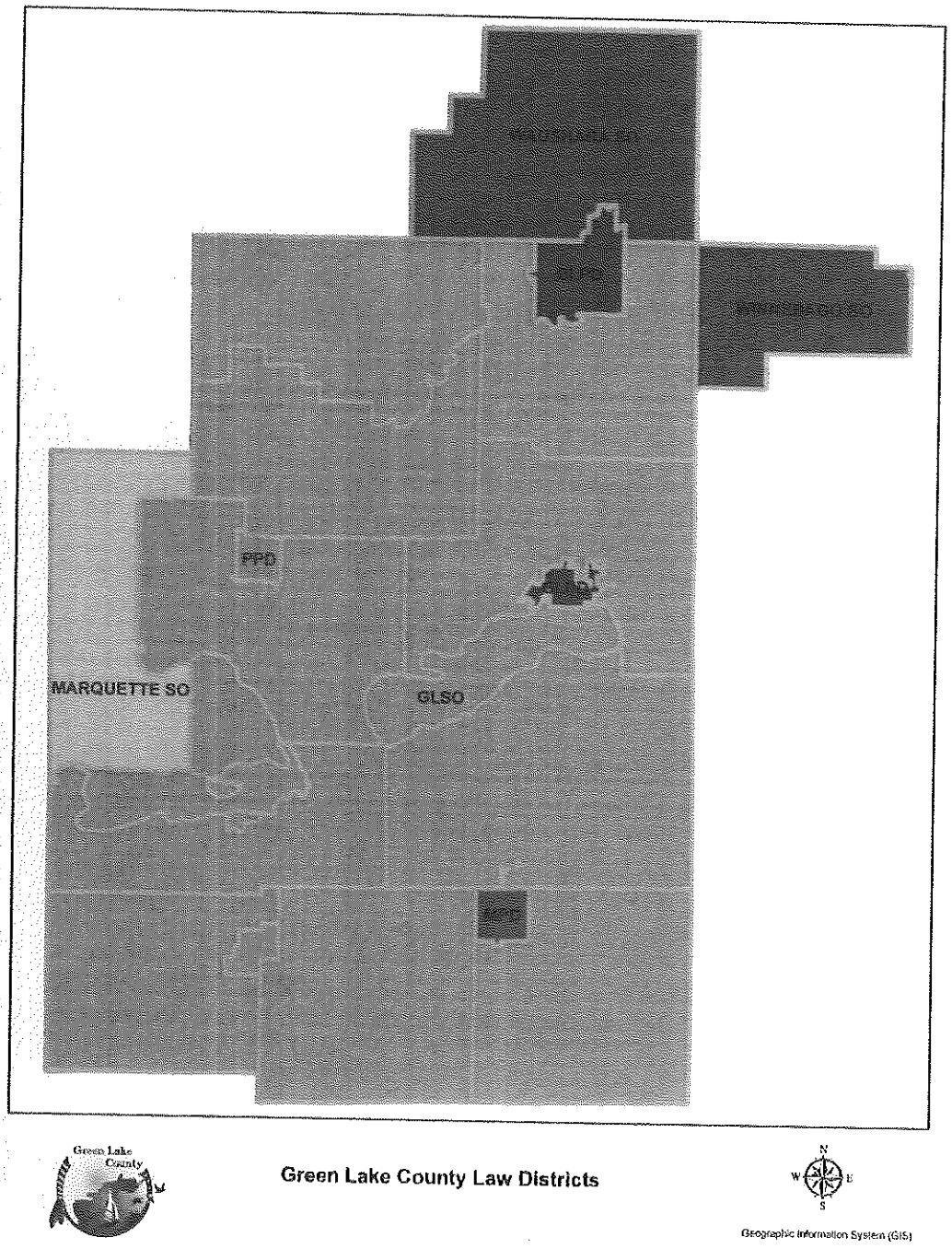
Green Lake County Ambulance Districts



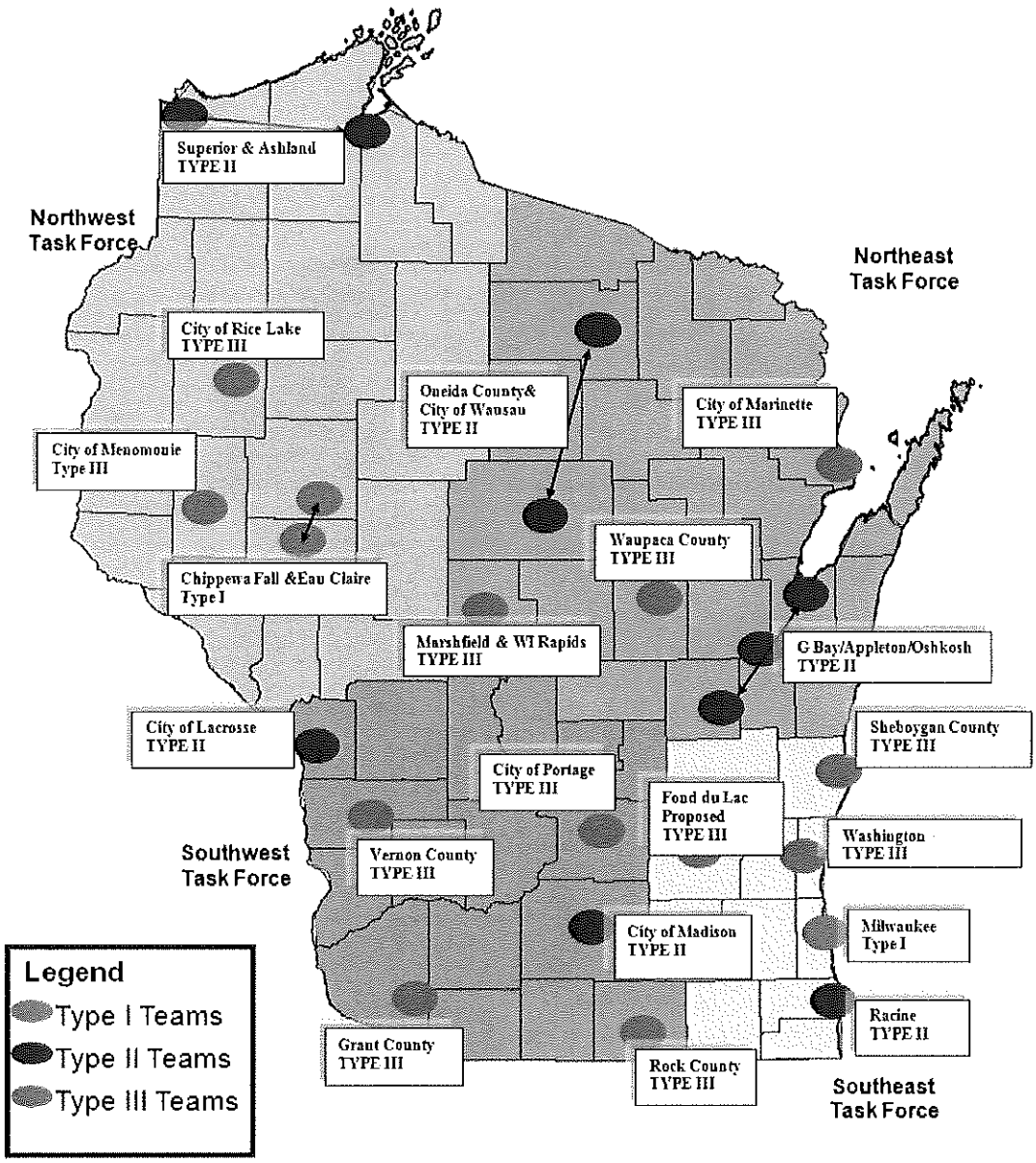
Green Lake County Fire Districts



Green Lake County Law Enforcement Districts



Wisconsin Hazardous Materials Response System[120]

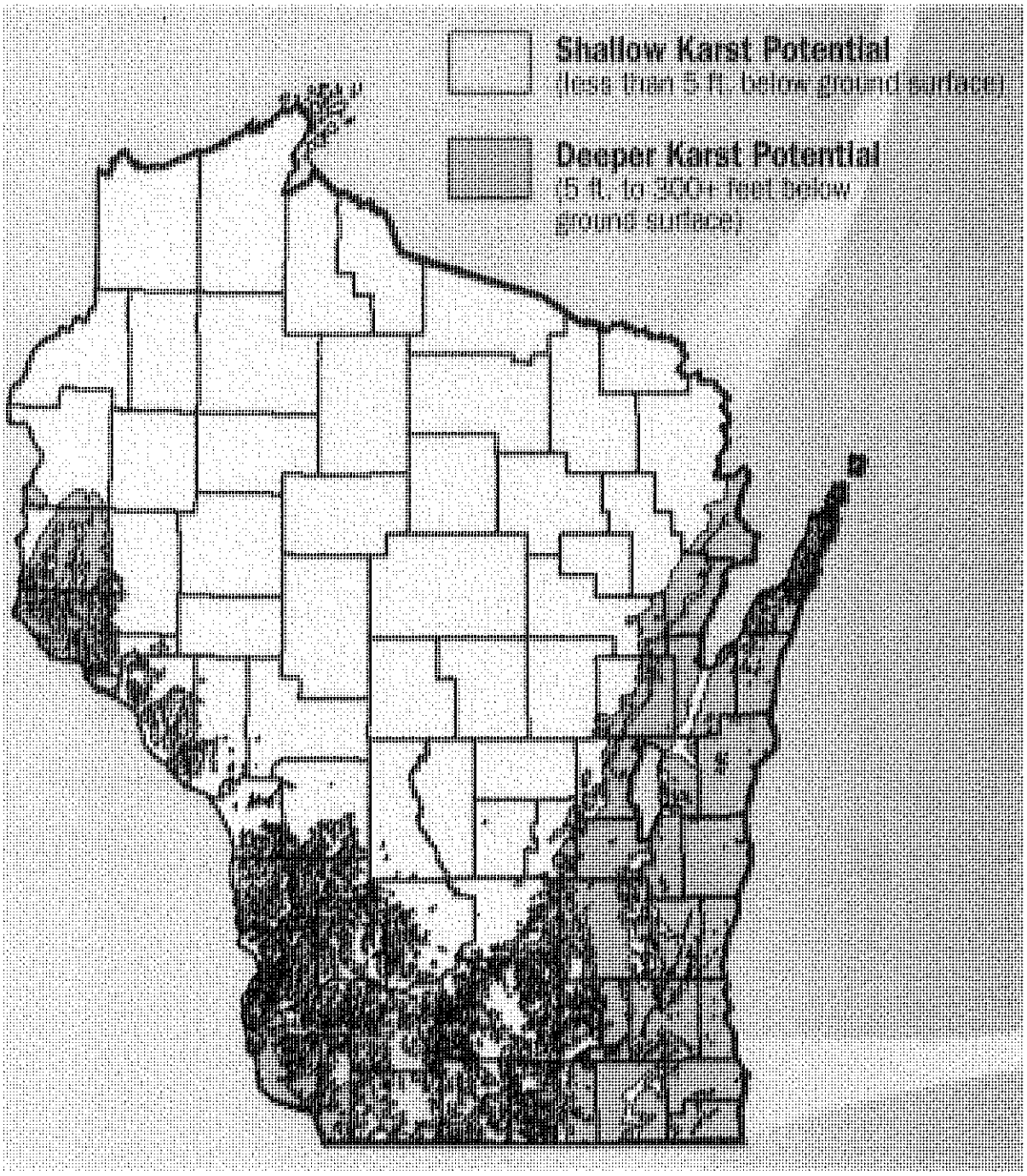


[120] http://www.emergencymanagement.wi.gov/training/docs/Regional_Hazardous_Materials_Resp_Teams_Map.pdf

Wisconsin Hazardous Materials Response Teams[121]

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

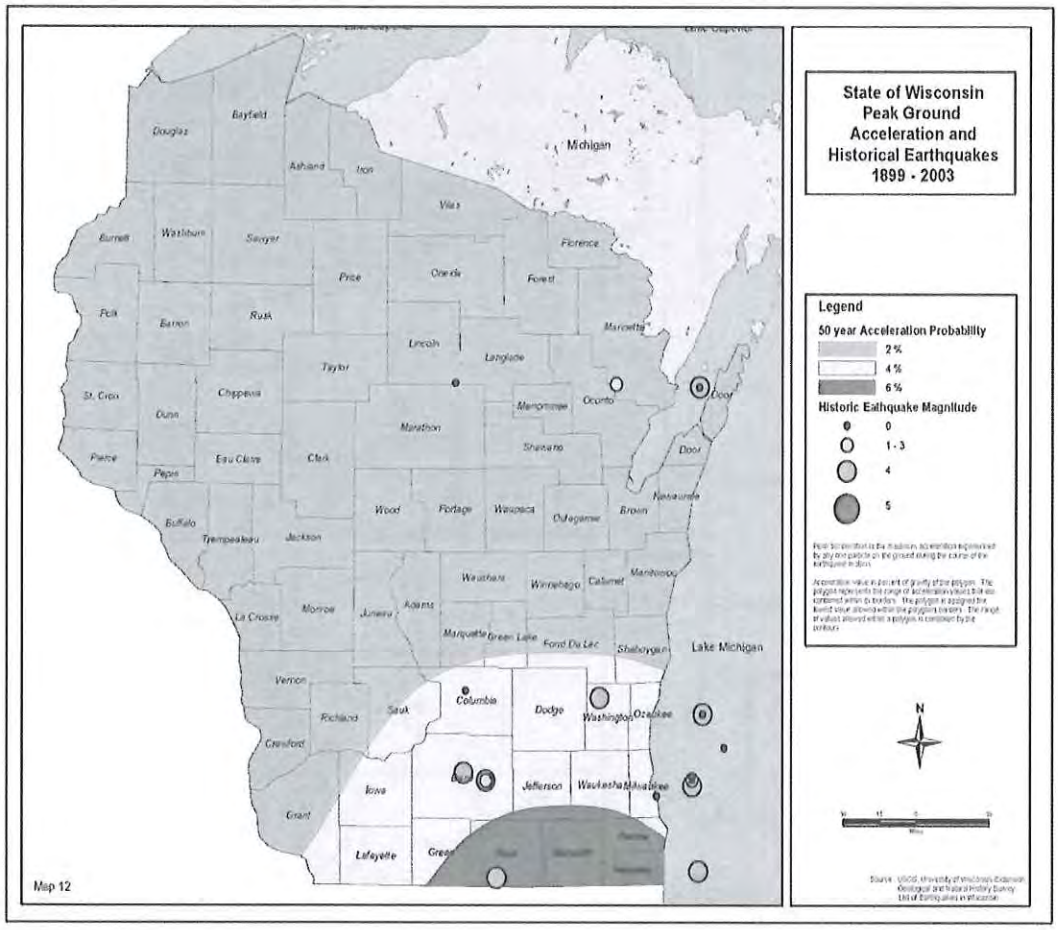
Karst Potential [122]



[122] Wisconsin State Hazard Mitigation Plan

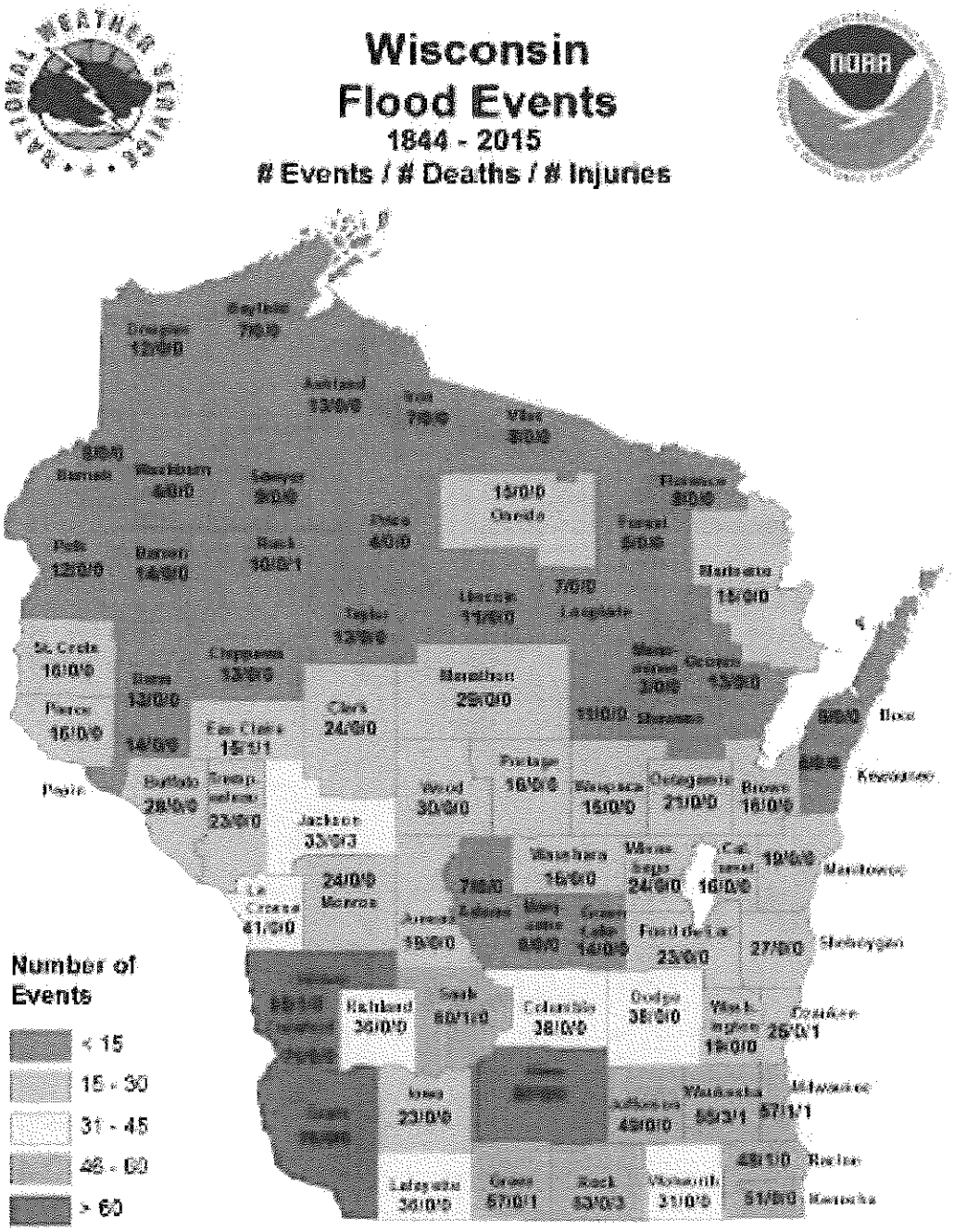
Earthquakes in Wisconsin

Peak Ground Acceleration Contours and Historical Earthquakes in Wisconsin[123]

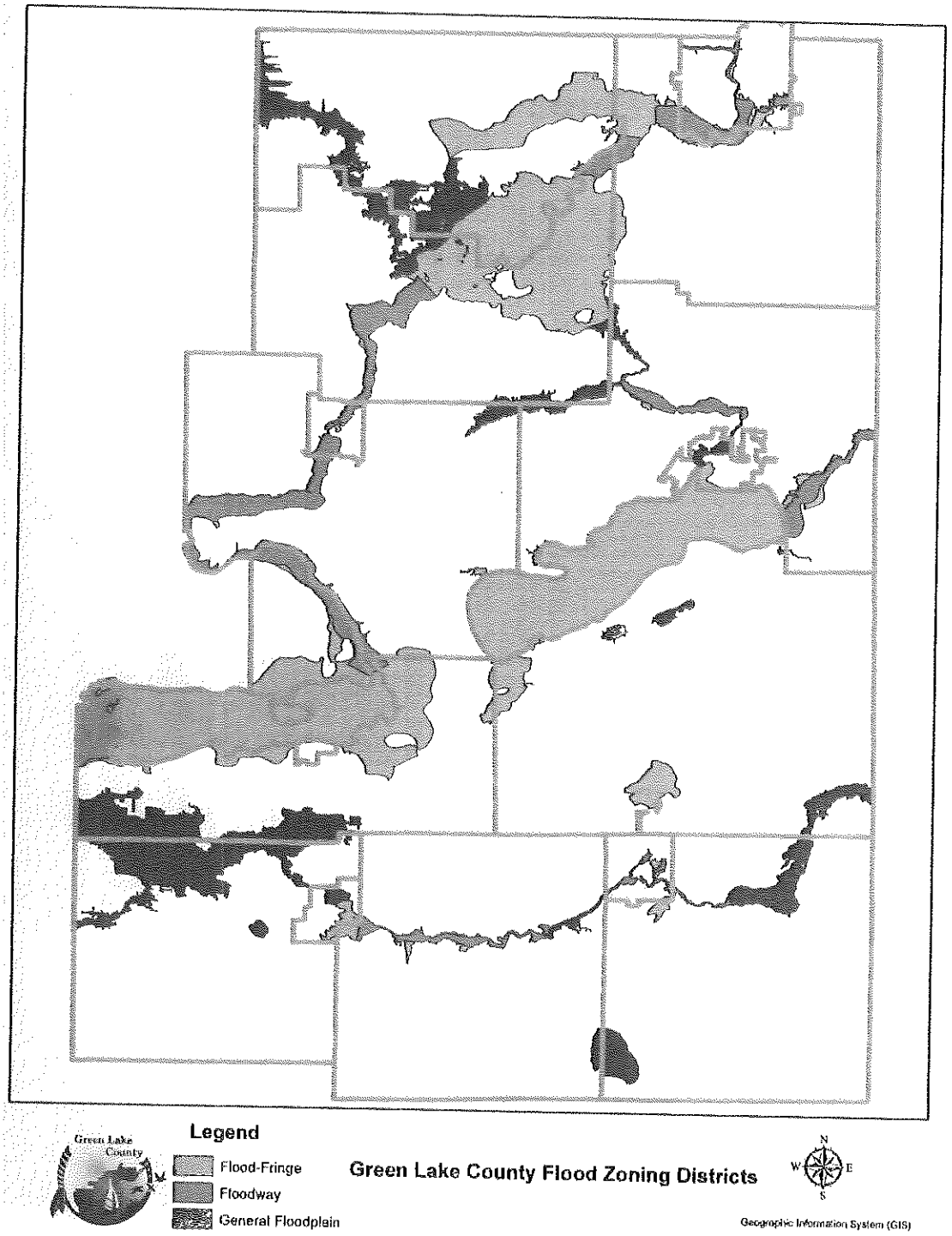


[123] Wisconsin State Hazard Mitigation Plan, 2008, page 4-105

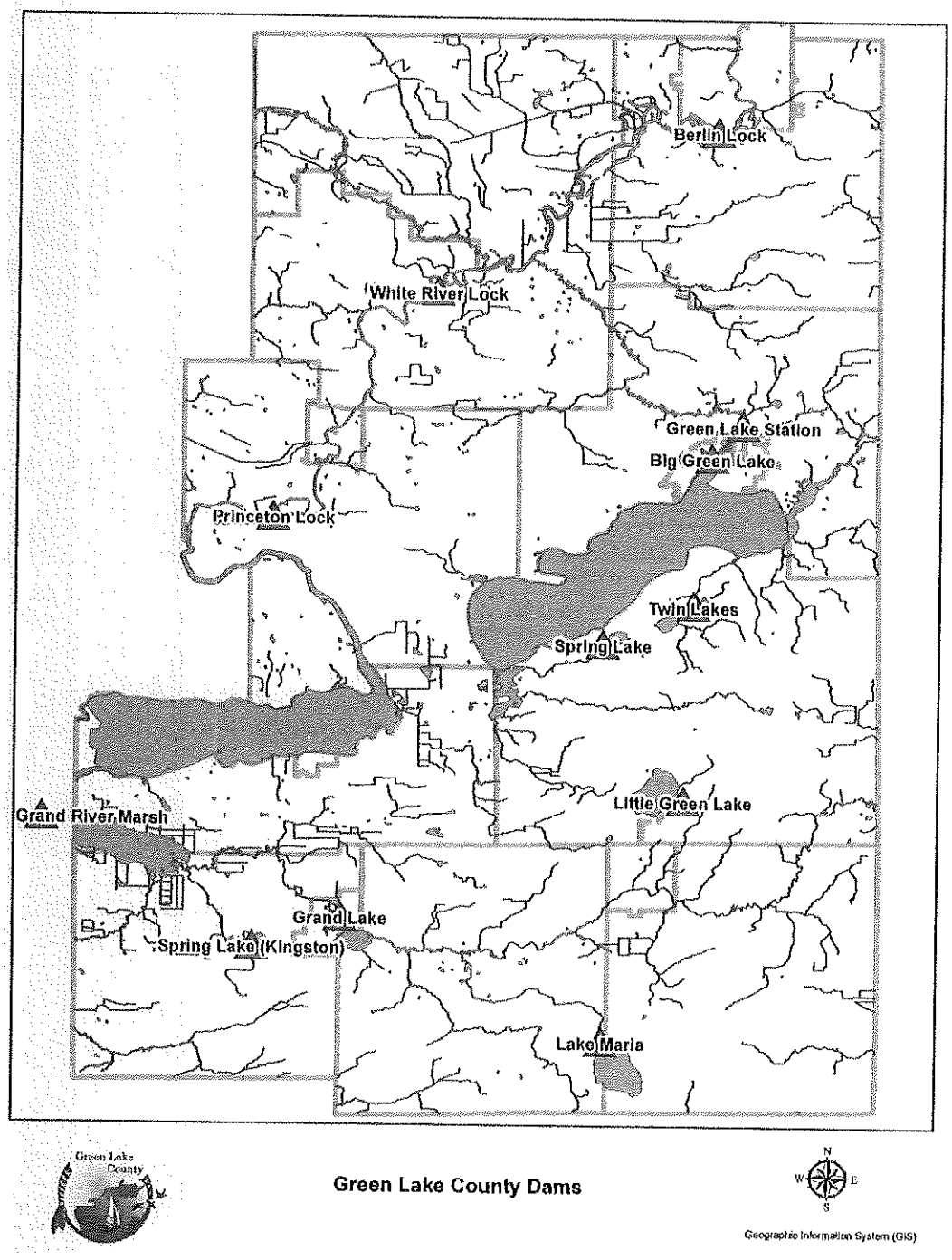
Wisconsin Total Flood Events



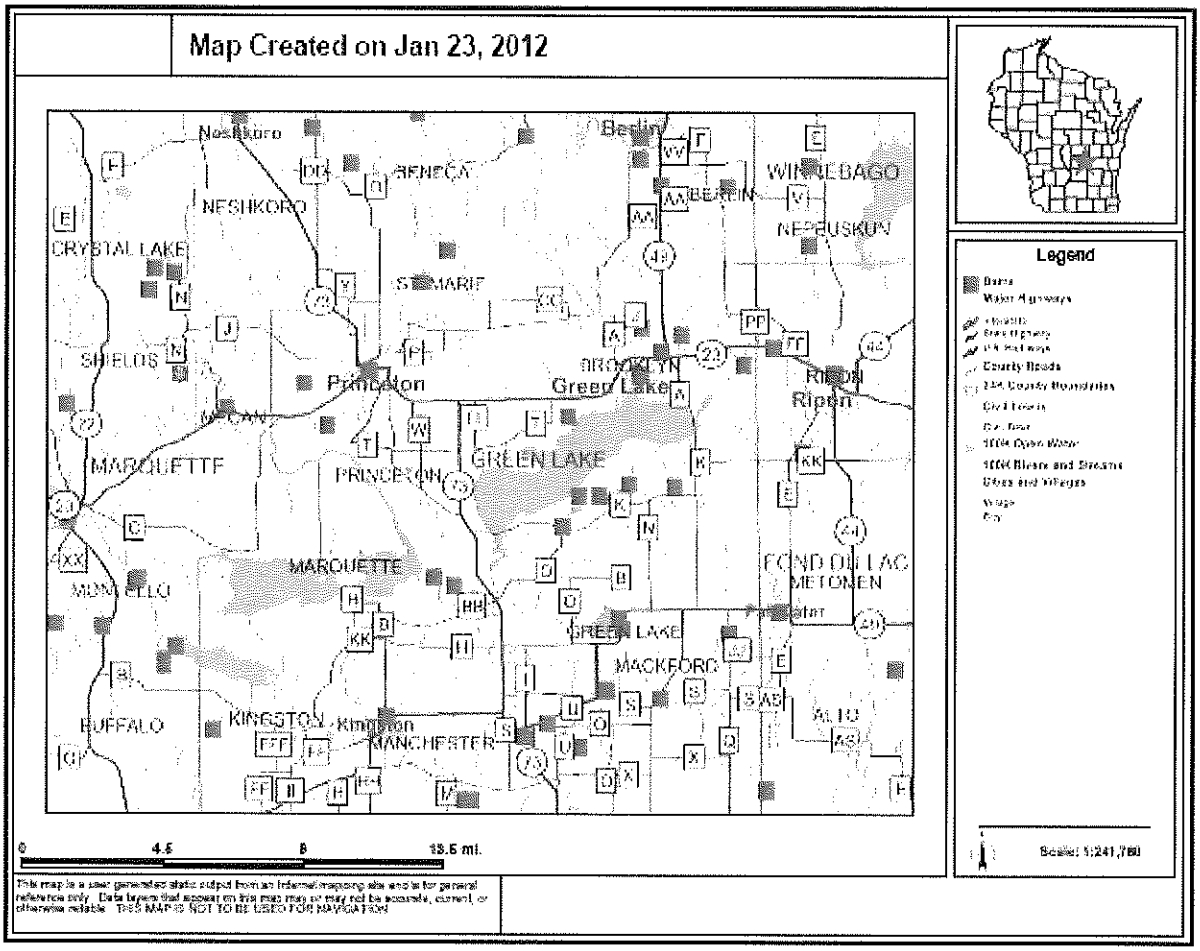
Green Lake County Floodplain



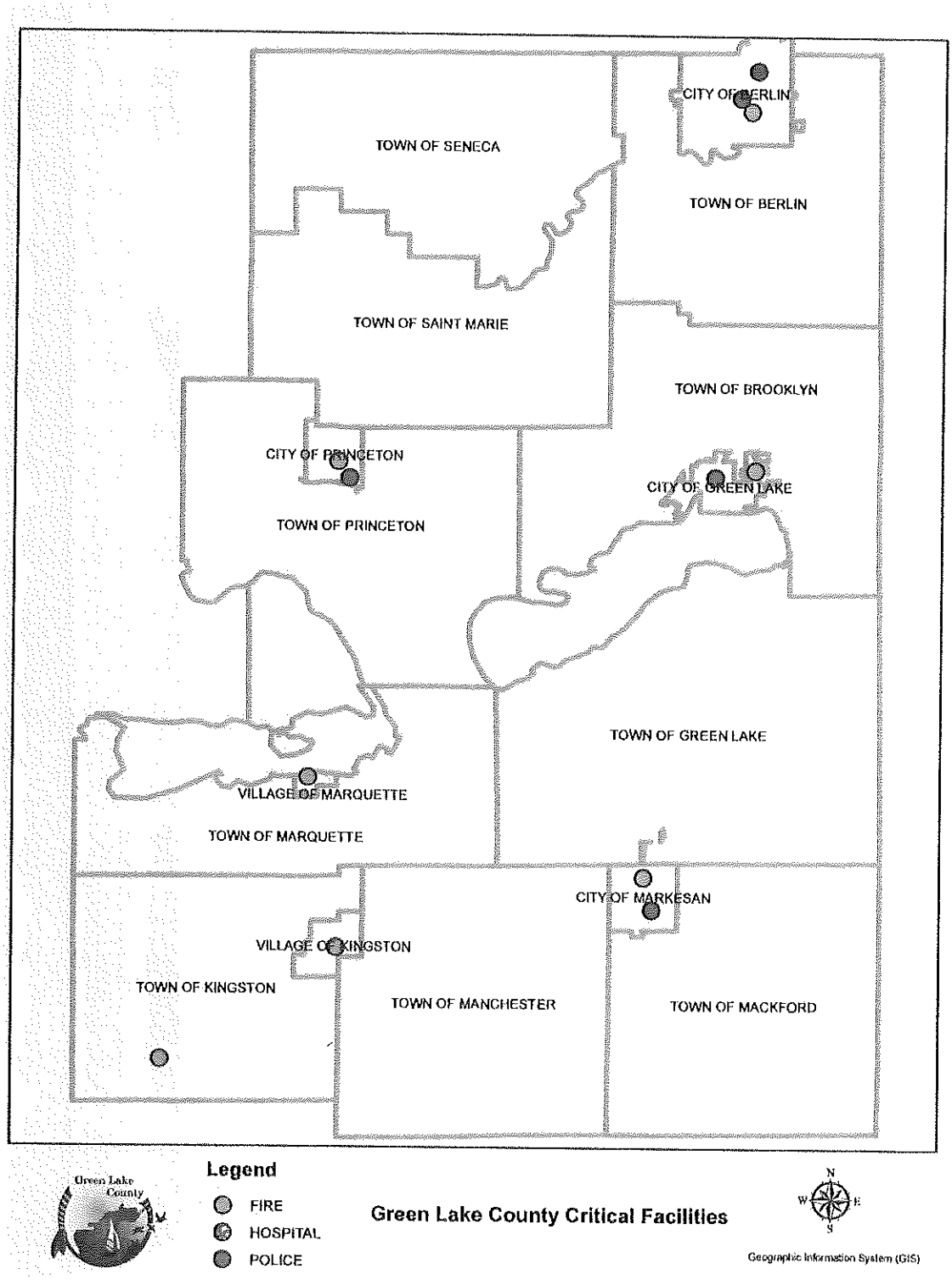
Green Lake County Dams – County Data



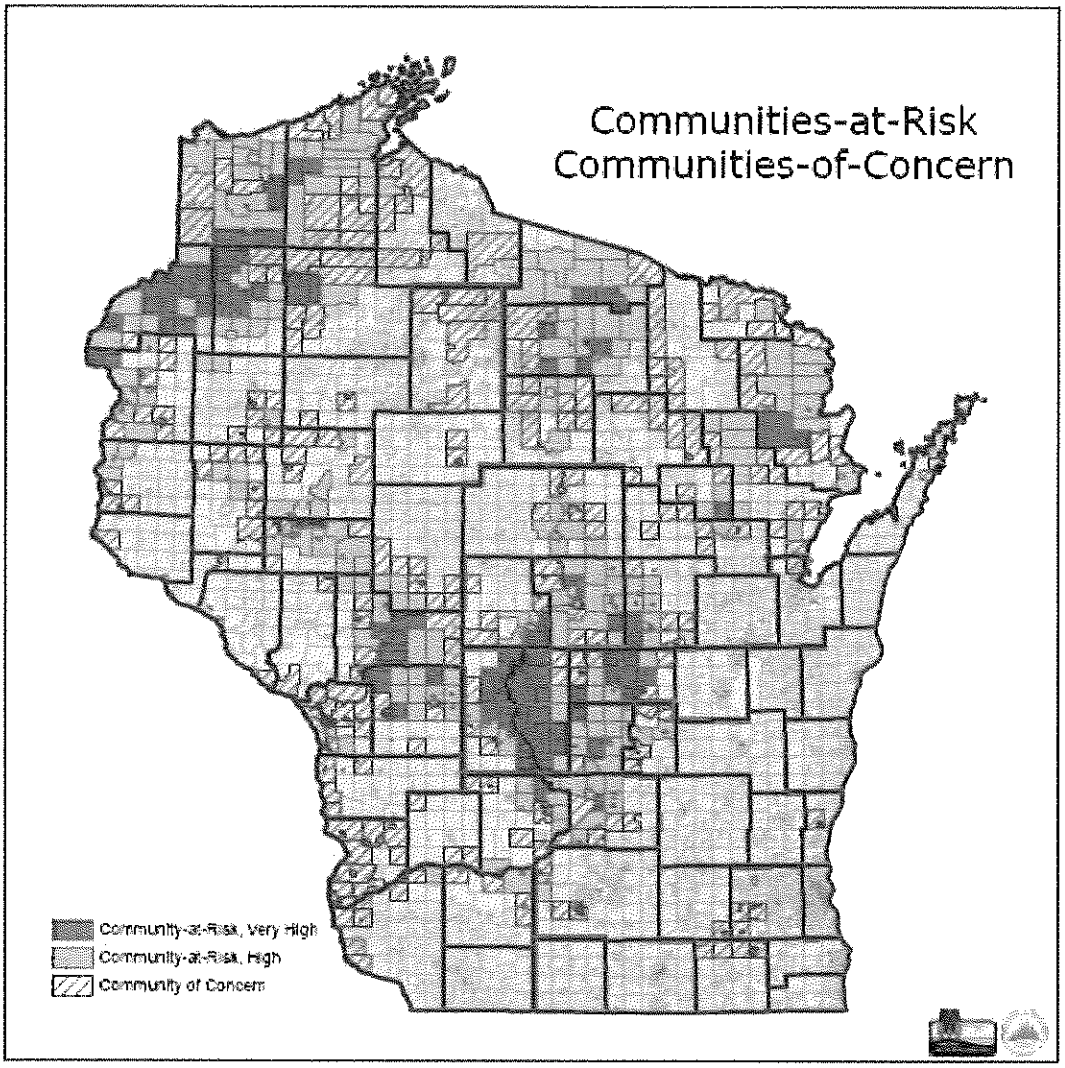
Green Lake County Dams – WI DNR Data



Green Lake County Critical Facilities



Wildfire Communities at Risk



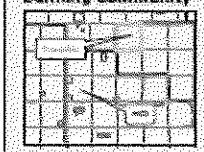
Introduction to Communities-at-Risk

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

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

1) Very High
2) High
3) Community of Concern*

Defining Community



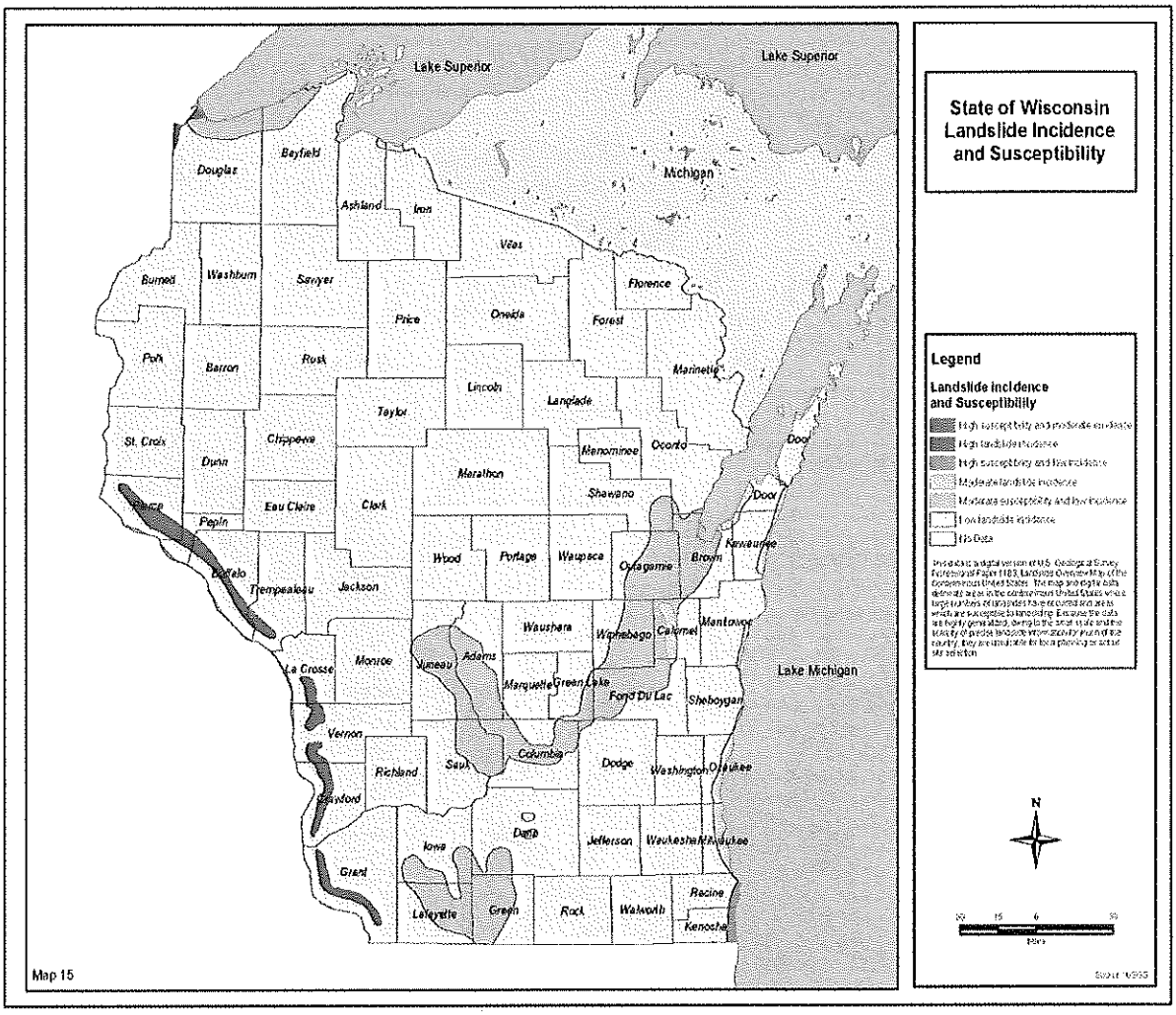
For Wisconsin, Communities at Risk are reported at the MCD (municipal civil division) level*. MCD was chosen due to its identifiable legal boundaries, ease in reporting, and usage in the development of Community Wildfire Protection Plans.

** Menominee County is an exception due to its lack of MCD's (civil townships). Therefore, Menominee county is reported by legal township.*

** A Community of Concern is a Wisconsin DNR concept whereby it is demonstrated that a significant portion of the community (more than 3 adjoining square miles) are at high or very high risk, but where the community as a whole falls below the Community-at-Risk threshold.*

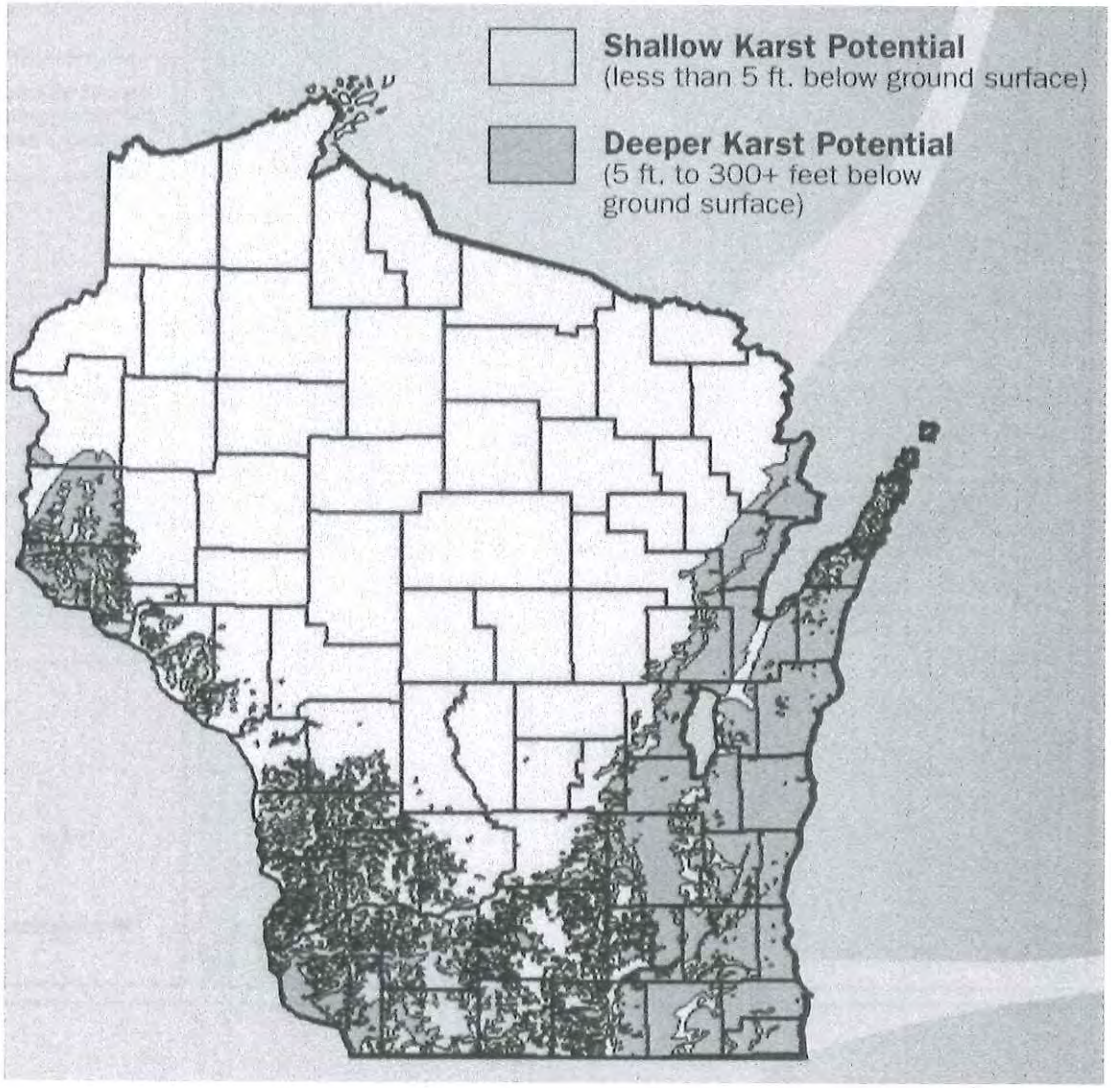
10/5/07

Landslide Incidence and Susceptibility[124]



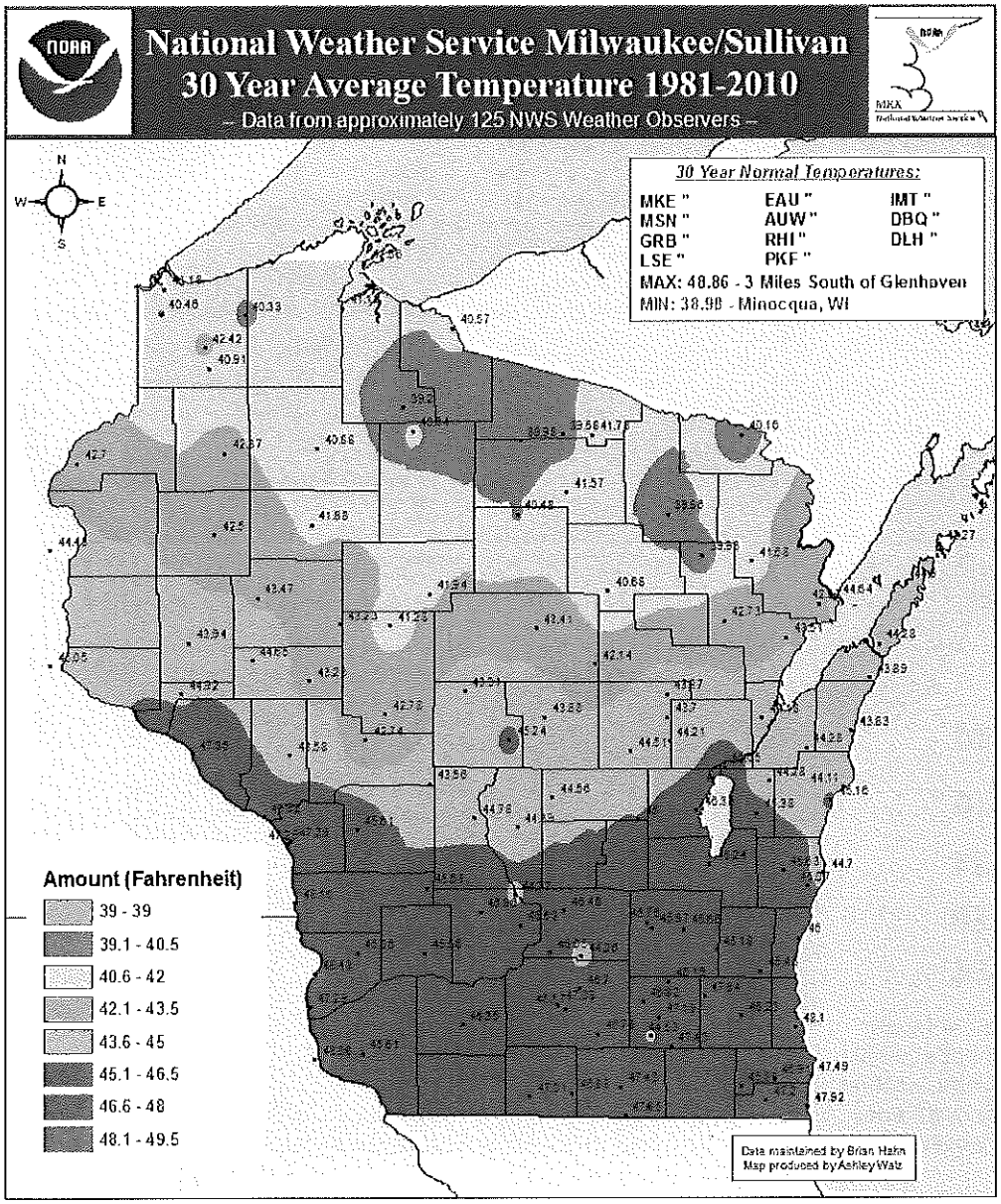
[124] Wisconsin State Hazard Mitigation Plan, 2008, page 4-131

Karst Potential[125]



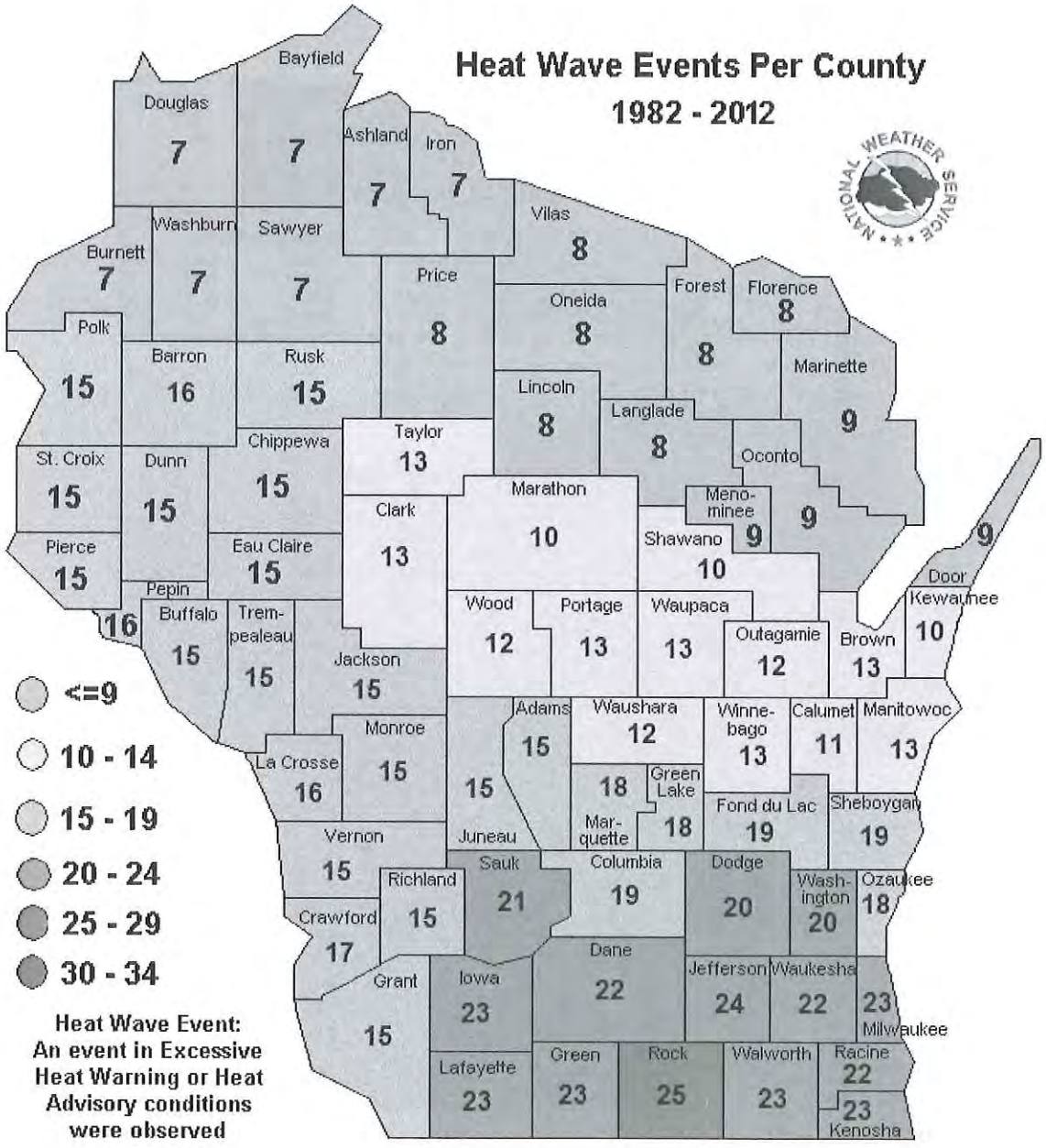
[125] Wisconsin State Hazard Mitigation Plan, 2008, page 4-132

Wisconsin 30 Year Average Temperature [126]



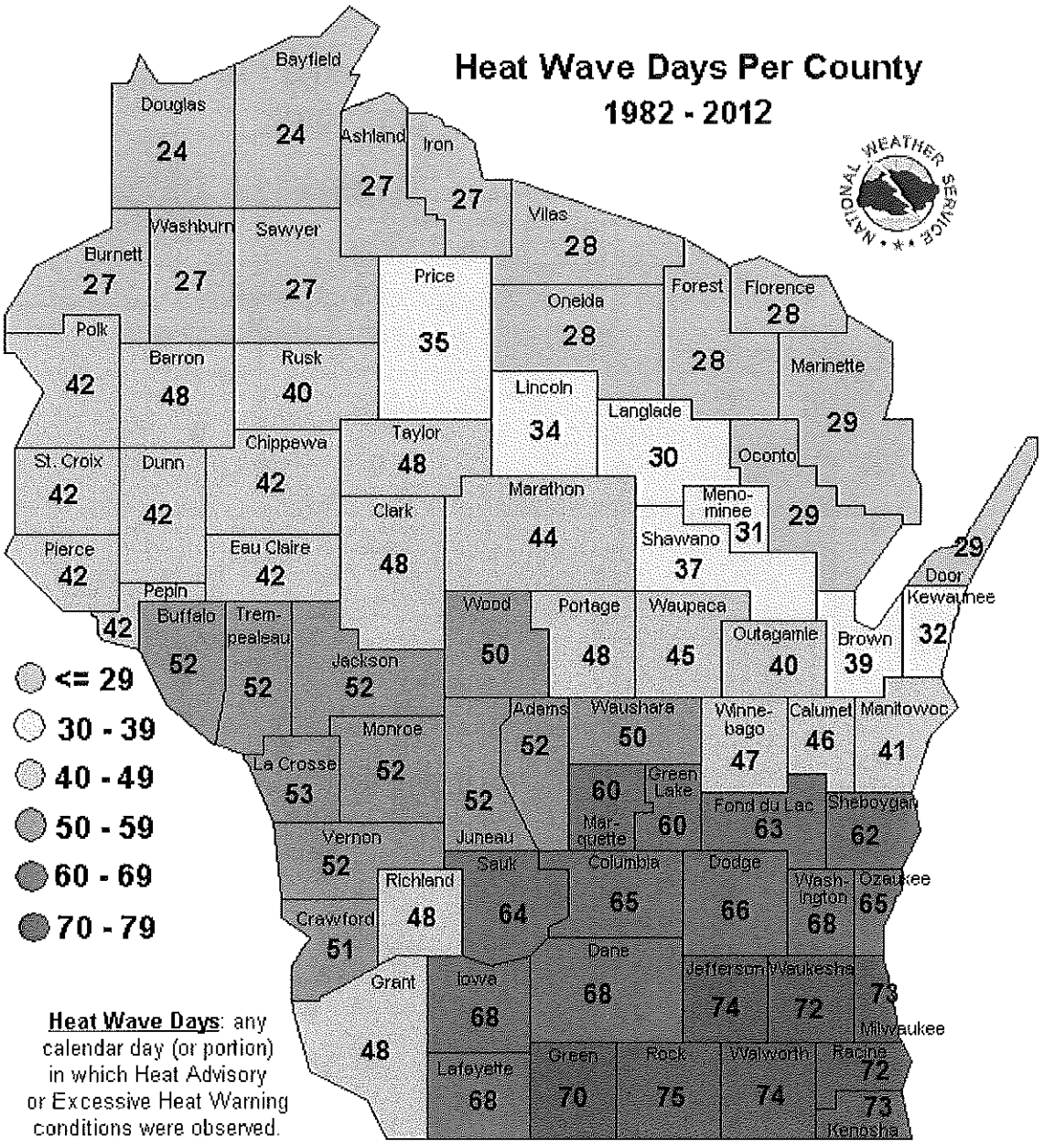
[126] http://www.crh.noaa.gov/images/mkx/climate/avg_30_year_temp.png

Wisconsin Heat Wave Events[127]



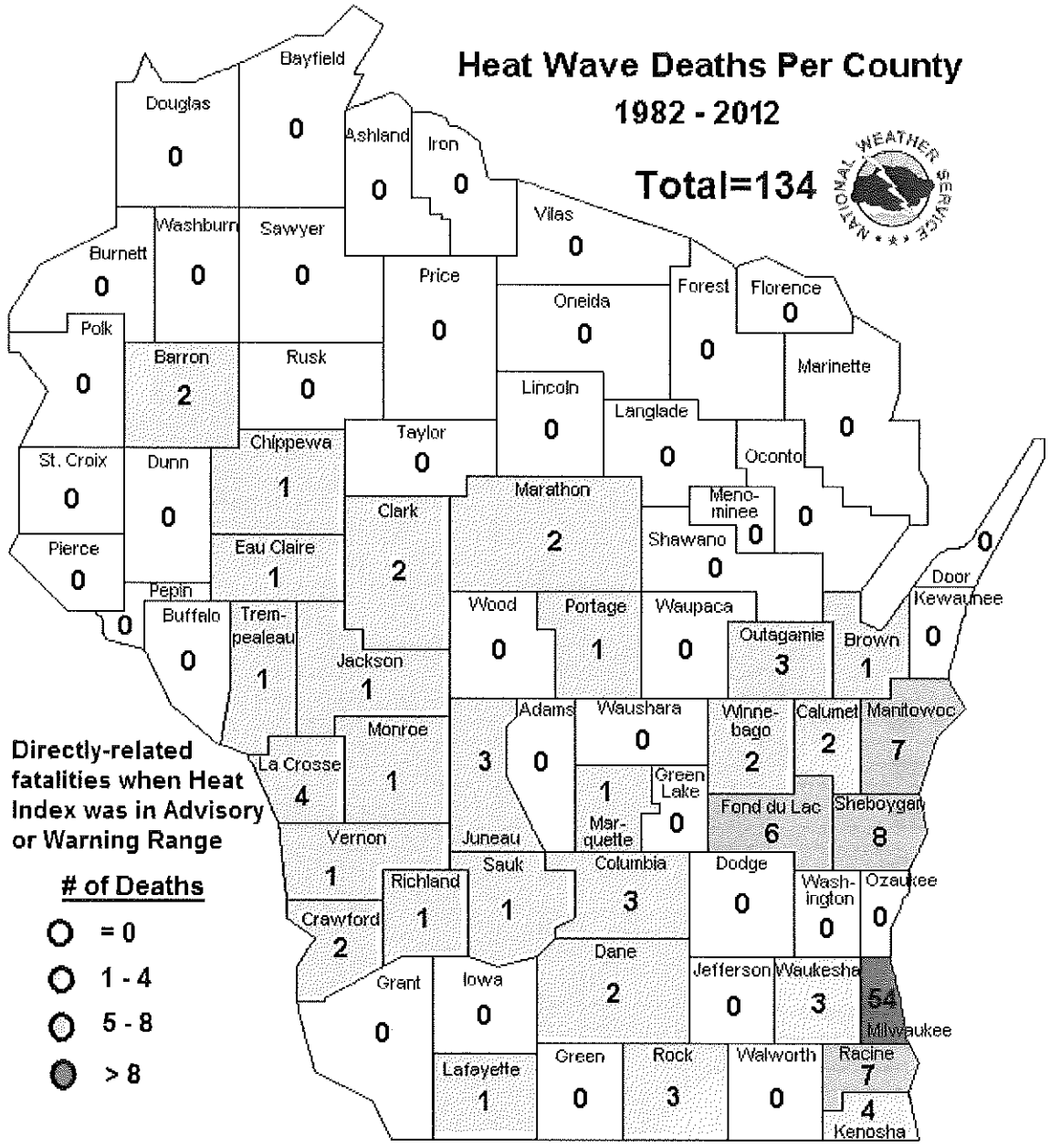
[127] http://www.crh.noaa.gov/images/mkx/severe/htwaveevents.gif

Wisconsin Heat Wave Days[128]



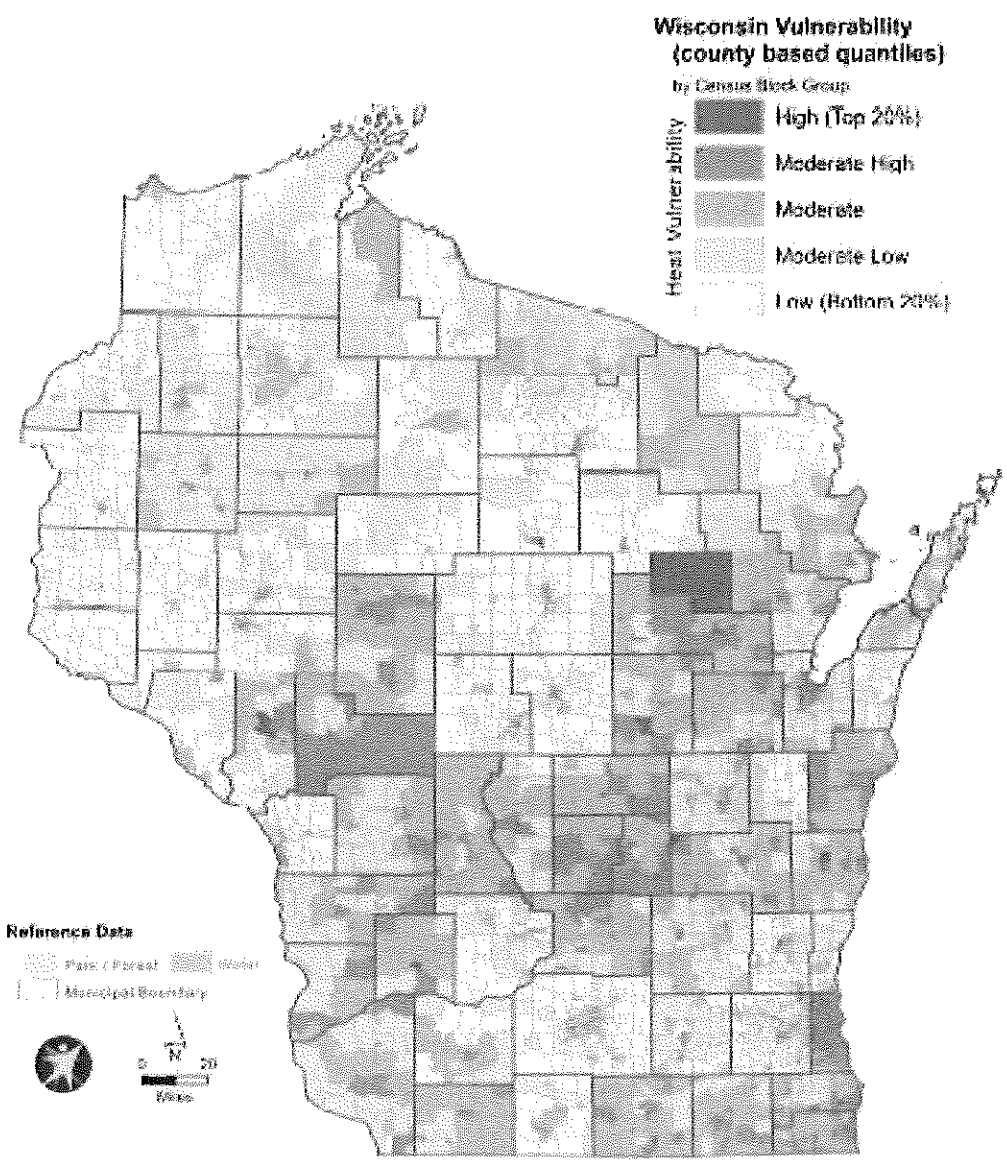
[128] http://www.crh.noaa.gov/images/mkx/severe/htwavedays.gif

Wisconsin Heat Wave Deaths[129]



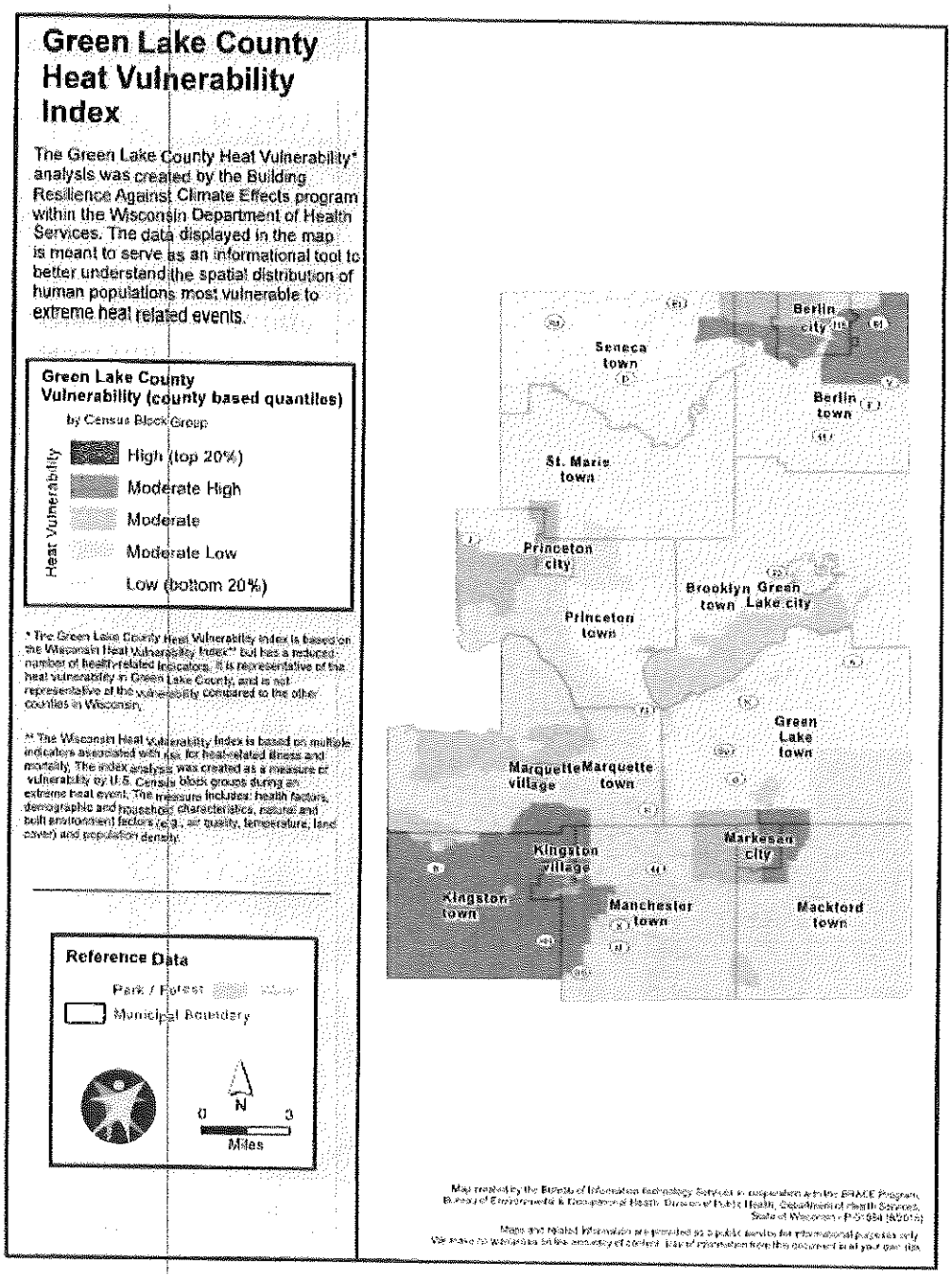
[129] http://www.crh.noaa.gov/images/mkx/severe/htwavedeaths.gif

Wisconsin Heat Vulnerability Index[130]



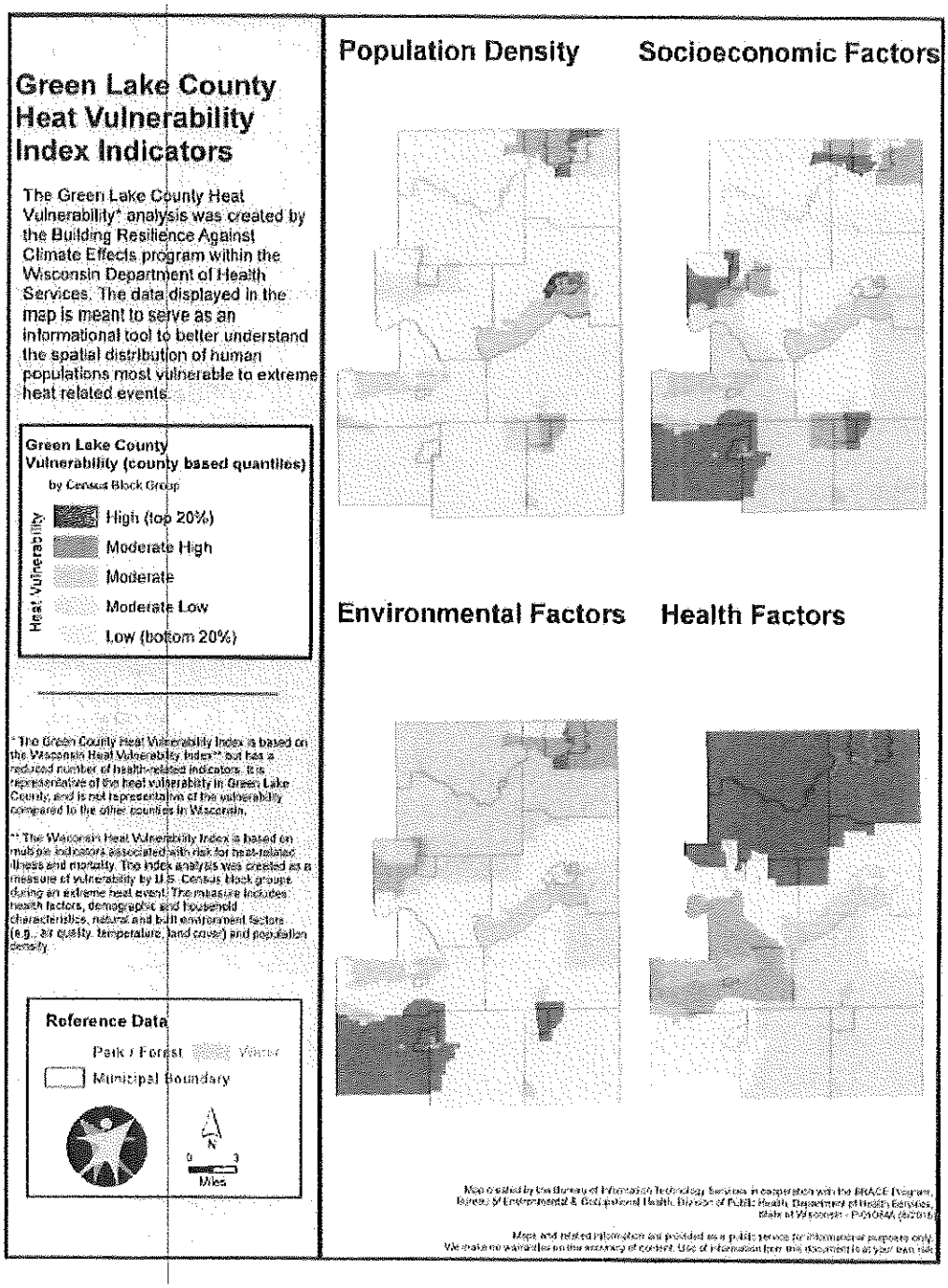
[130] https://www.dhs.wisconsin.gov/images/map-hvi-wi.jpg

Green Lake County Heat Vulnerability Index[131]



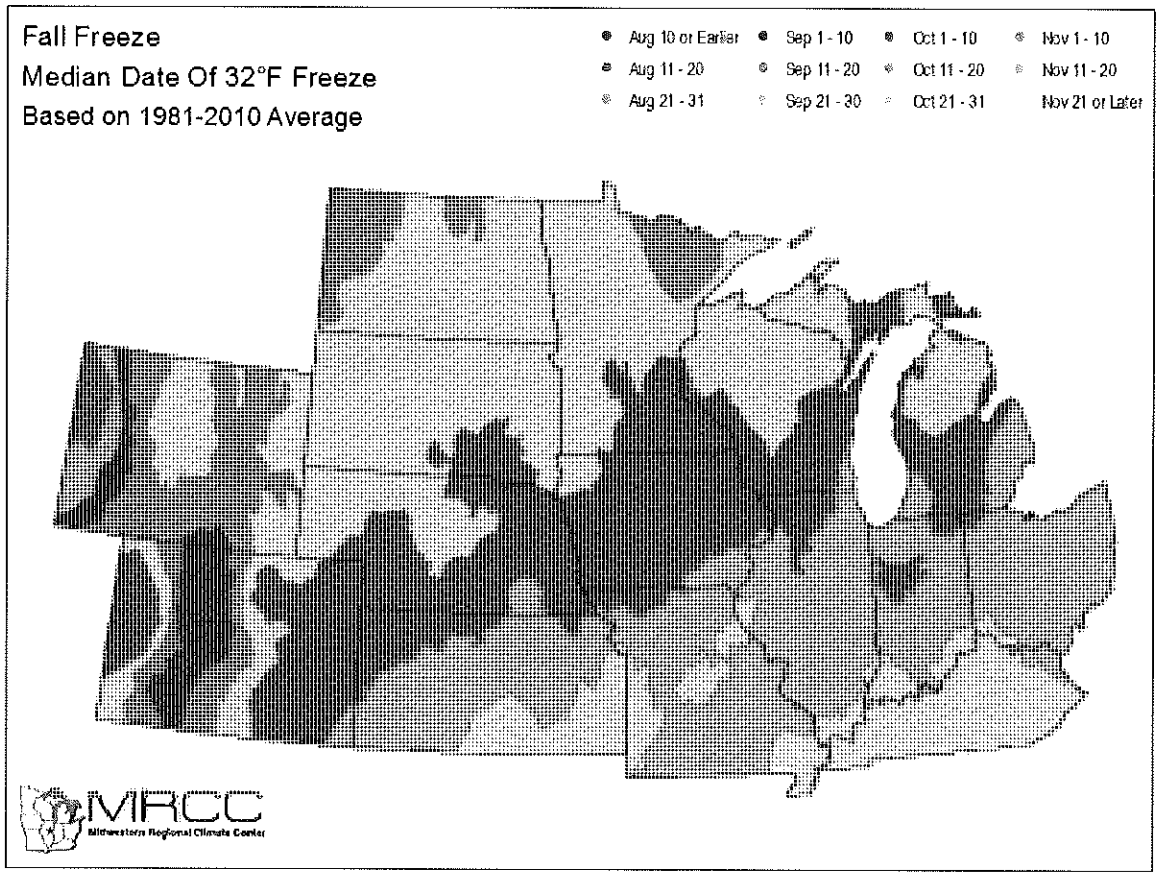
[131] https://www.dhs.wisconsin.gov/publications/p01084-greenlake.pdf

Green Lake County Heat Vulnerability Index Indicators[132]



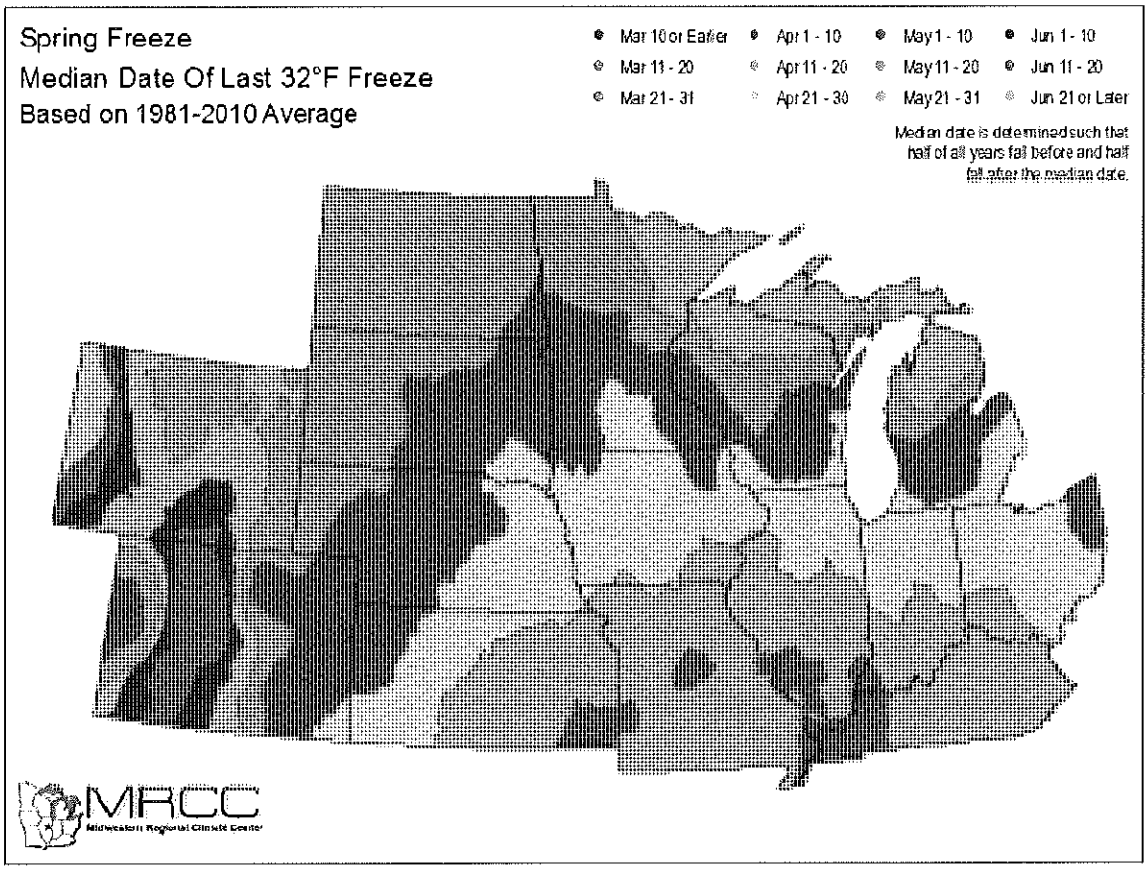
[132] https://www.dhs.wisconsin.gov/publications/p01084a-greenlake.pdf

Median Date of First Freeze[133]



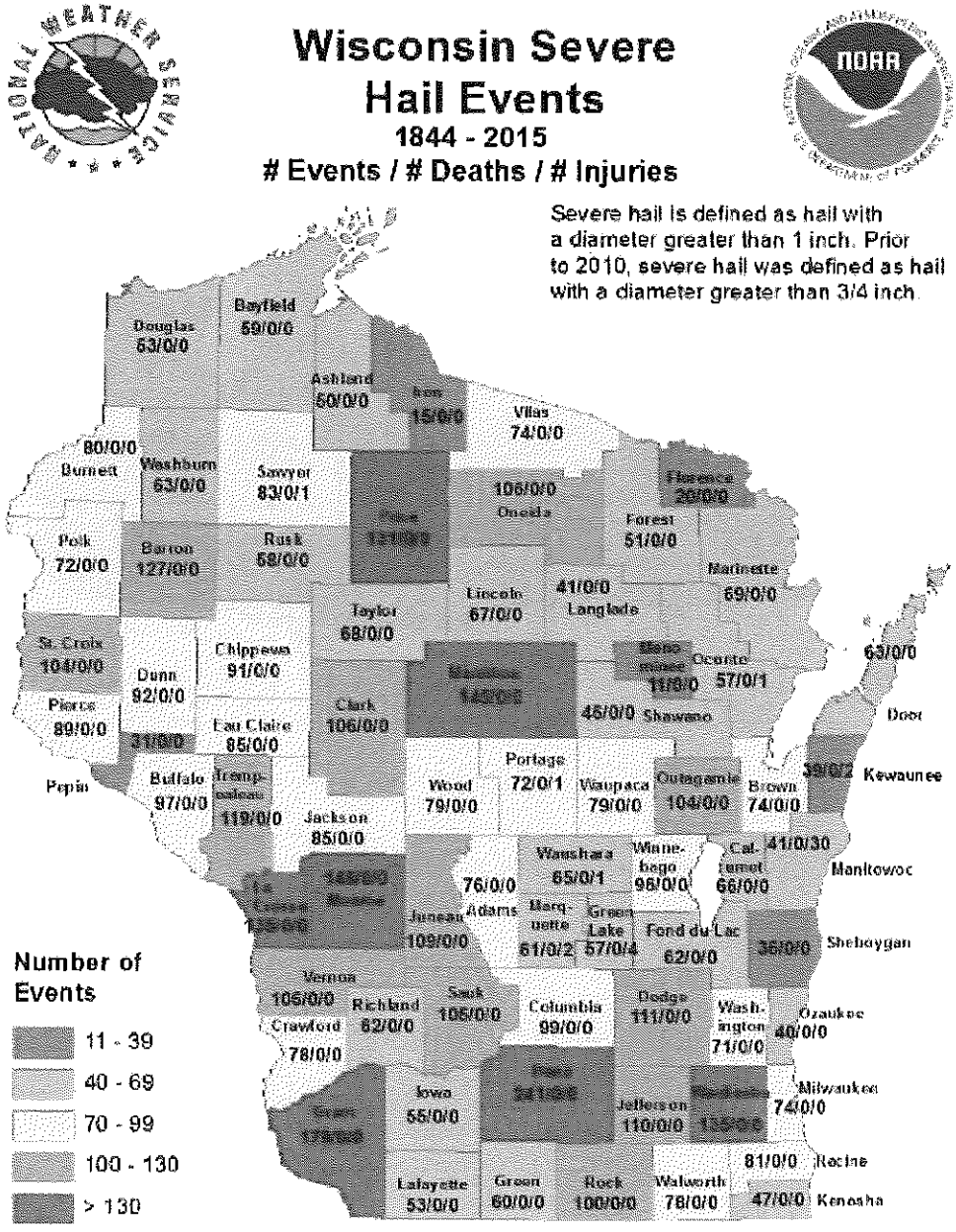
[133] http://www.crh.noaa.gov/images/mkx/climate/FallFirstFreeze.png

Median Date of Last Freeze[134]



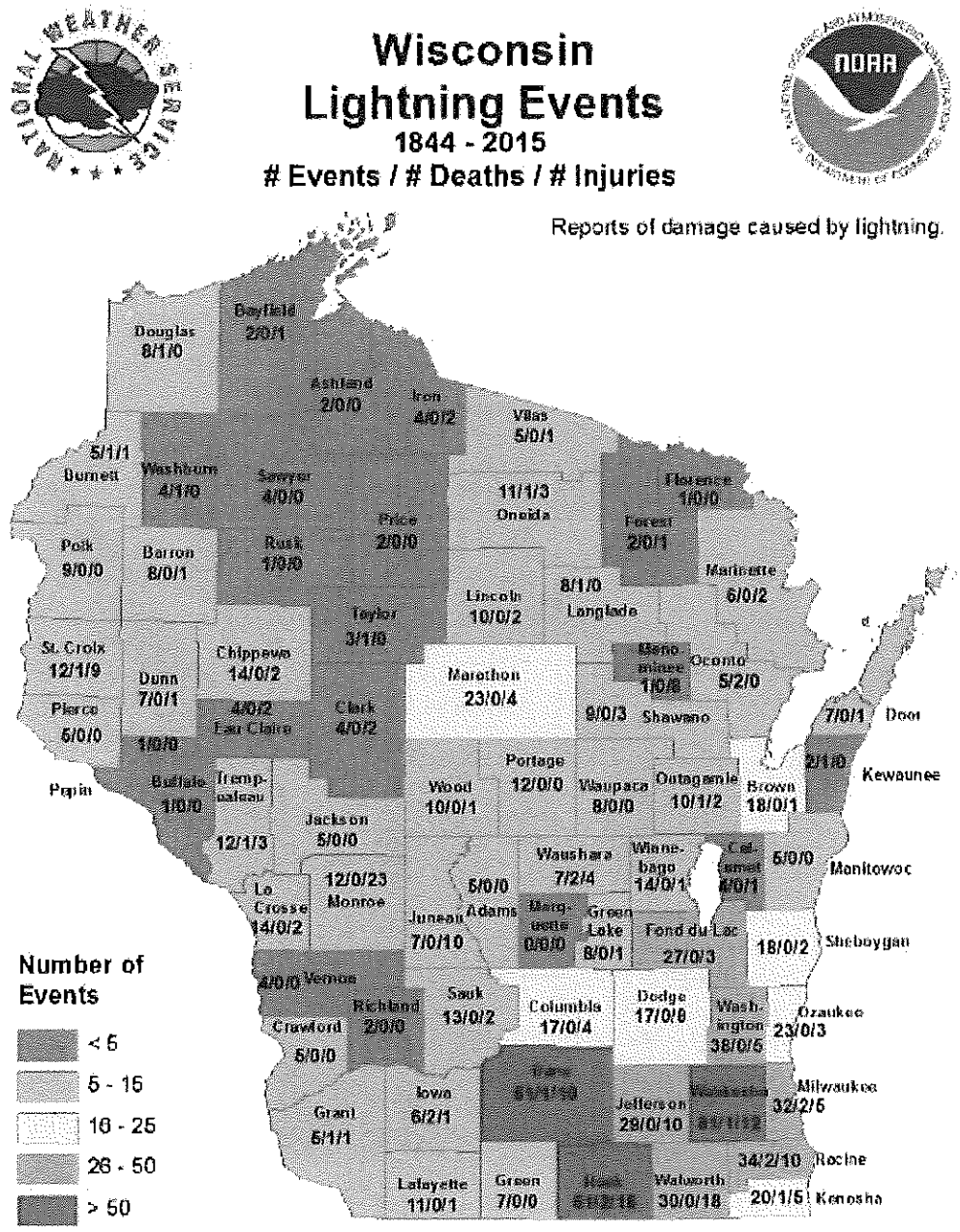
[134] http://www.crh.noaa.gov/images/mkx/climate/springlastfreeze.png

Wisconsin Hail[135]



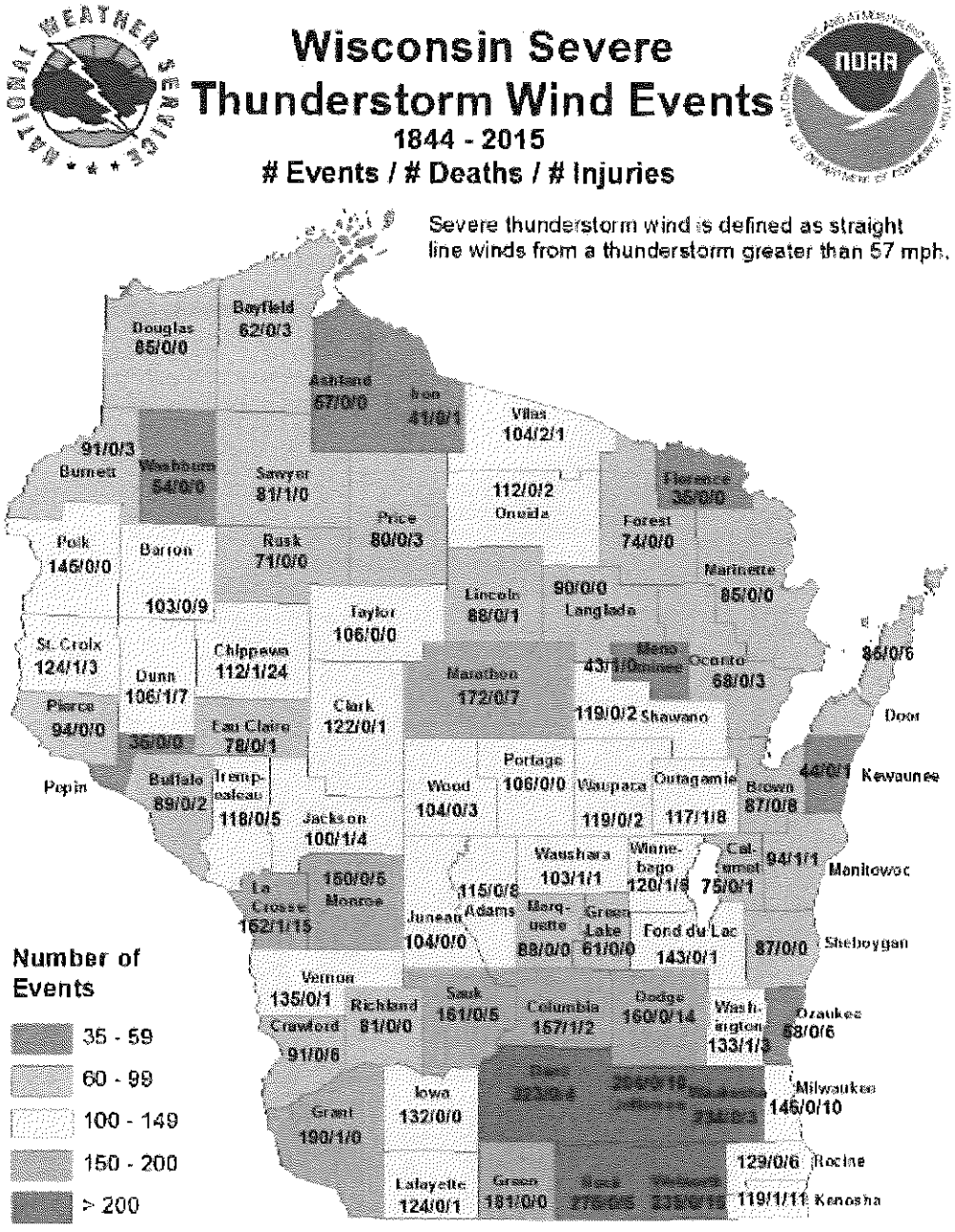
[135] http://www.crh.noaa.gov/images/mkx/severe/hail.gif

Wisconsin Lightning[136]



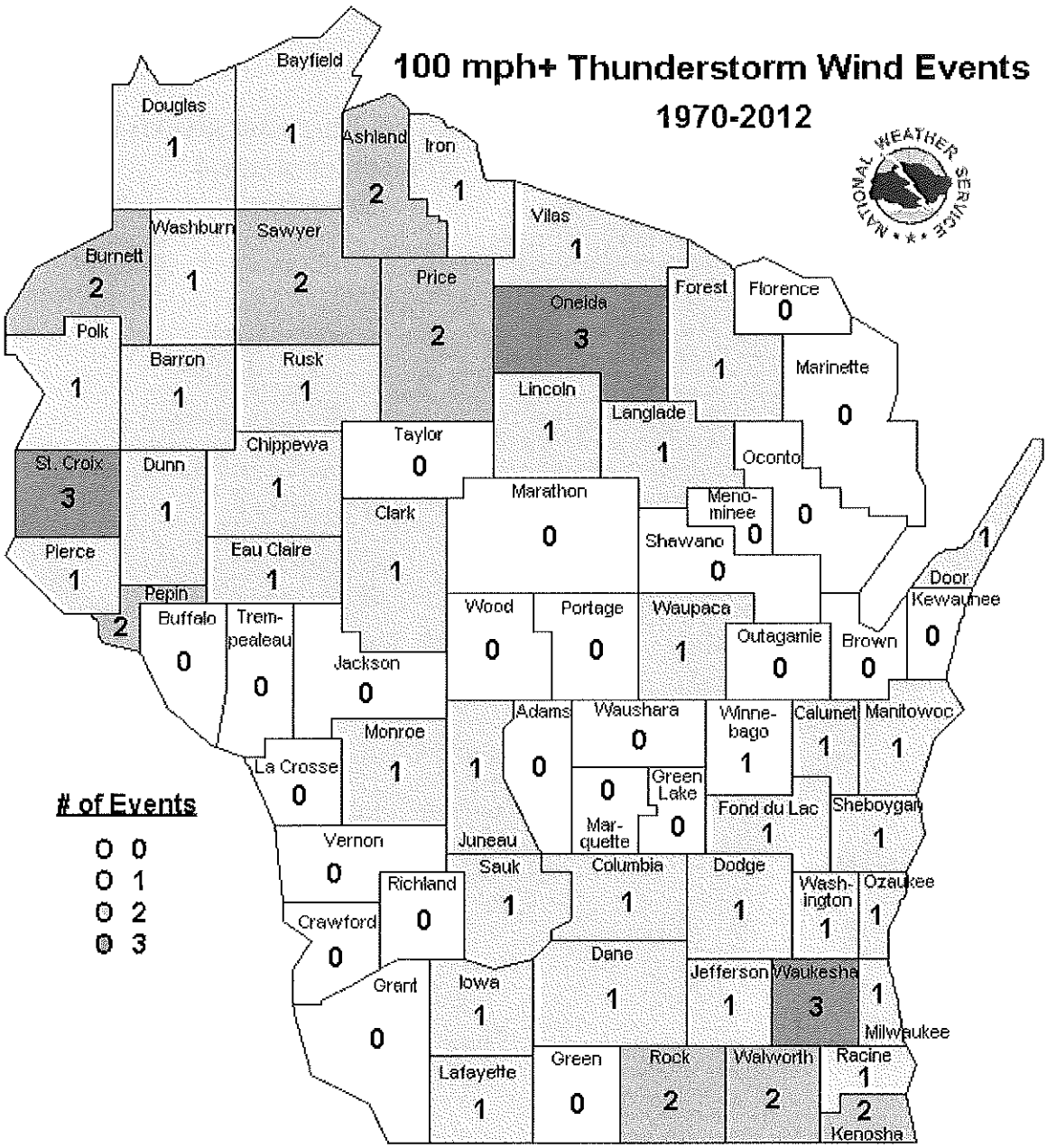
[136] http://www.crh.noaa.gov/images/mkx/severe/lightning.gif

Wisconsin Severe Thunderstorm Winds[137]



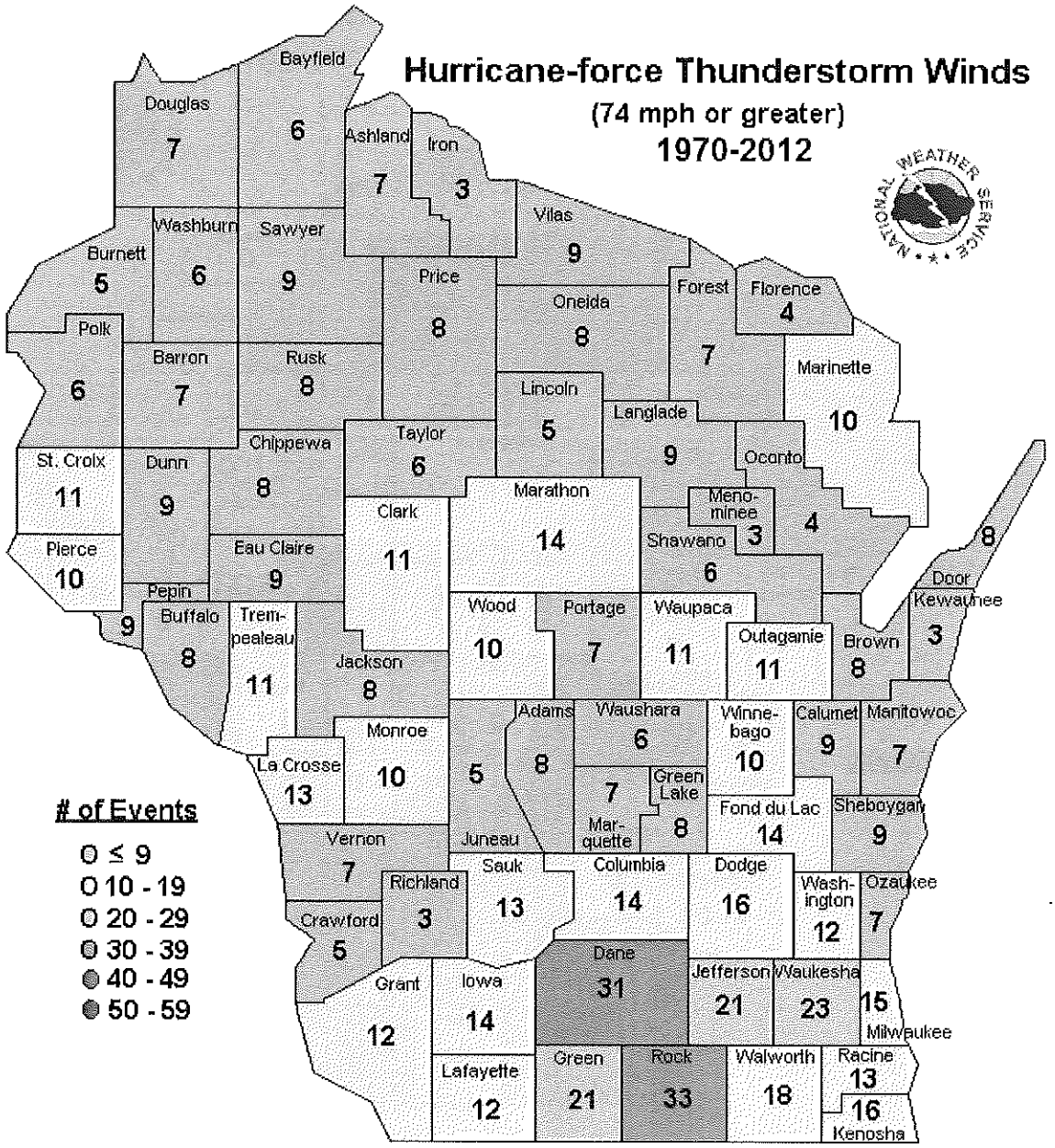
[137] http://www.crh.noaa.gov/images/mkx/severe/tstormwind.gif

Wisconsin 100+ mph Thunderstorm Wind Events[138]



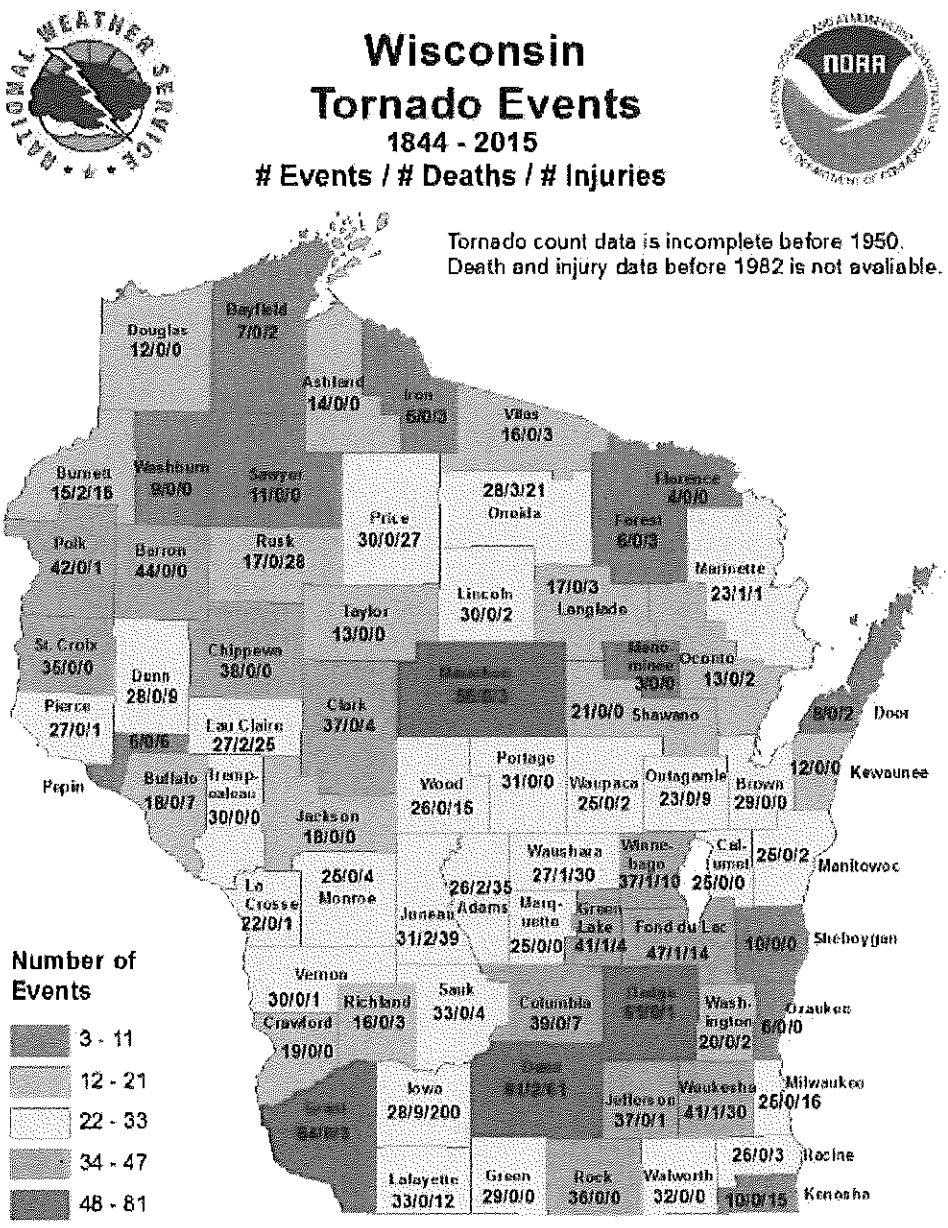
[138] http://www.crh.noaa.gov/images/mkx/severe/hurricwinds100mph.gif

Wisconsin Hurricane-force (74+ mph) Thunderstorm Winds[139]



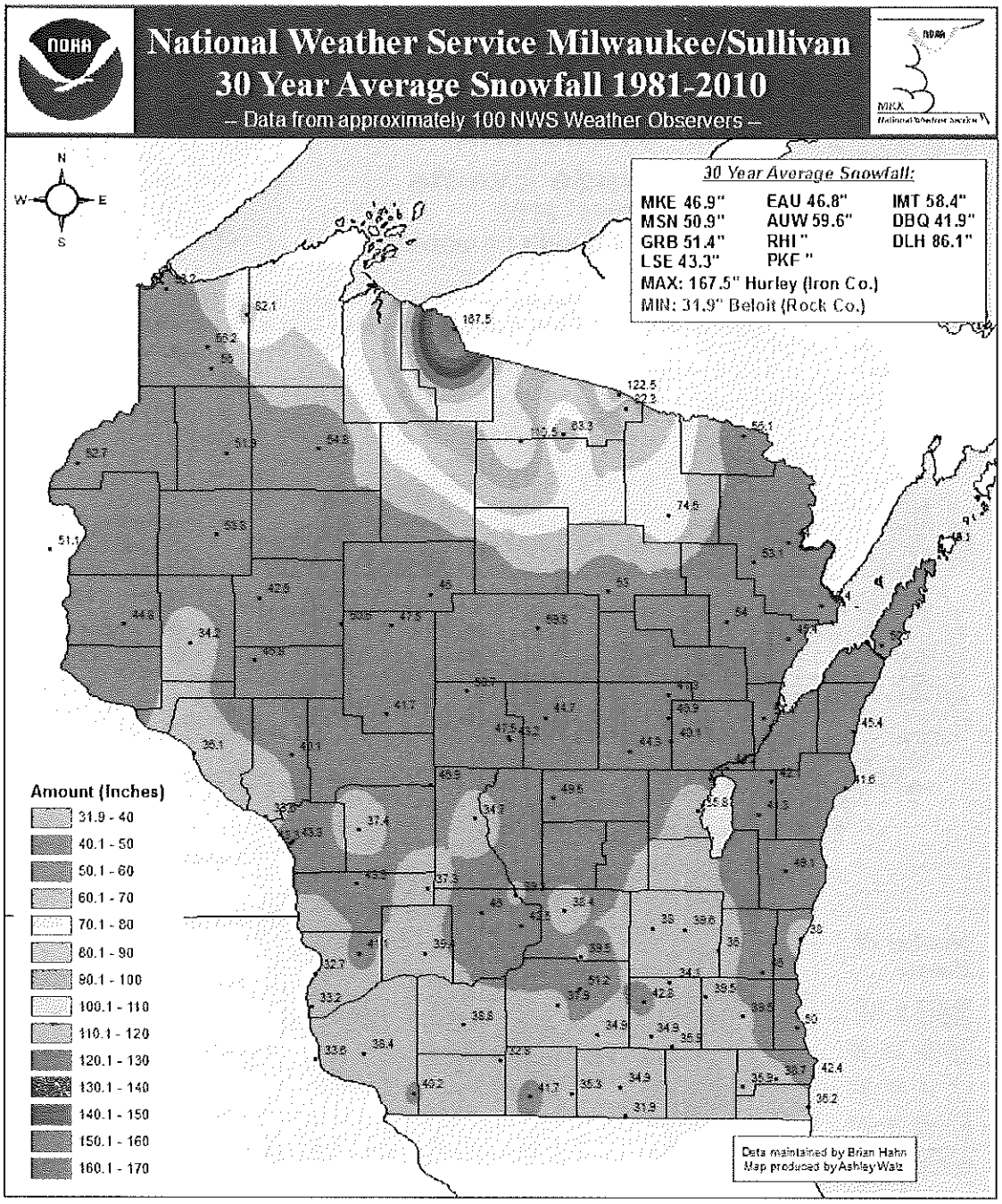
[139] http://www.crh.noaa.gov/images/mkx/severe/hurricwinds75mph.gif

Wisconsin Tornadoes[140]



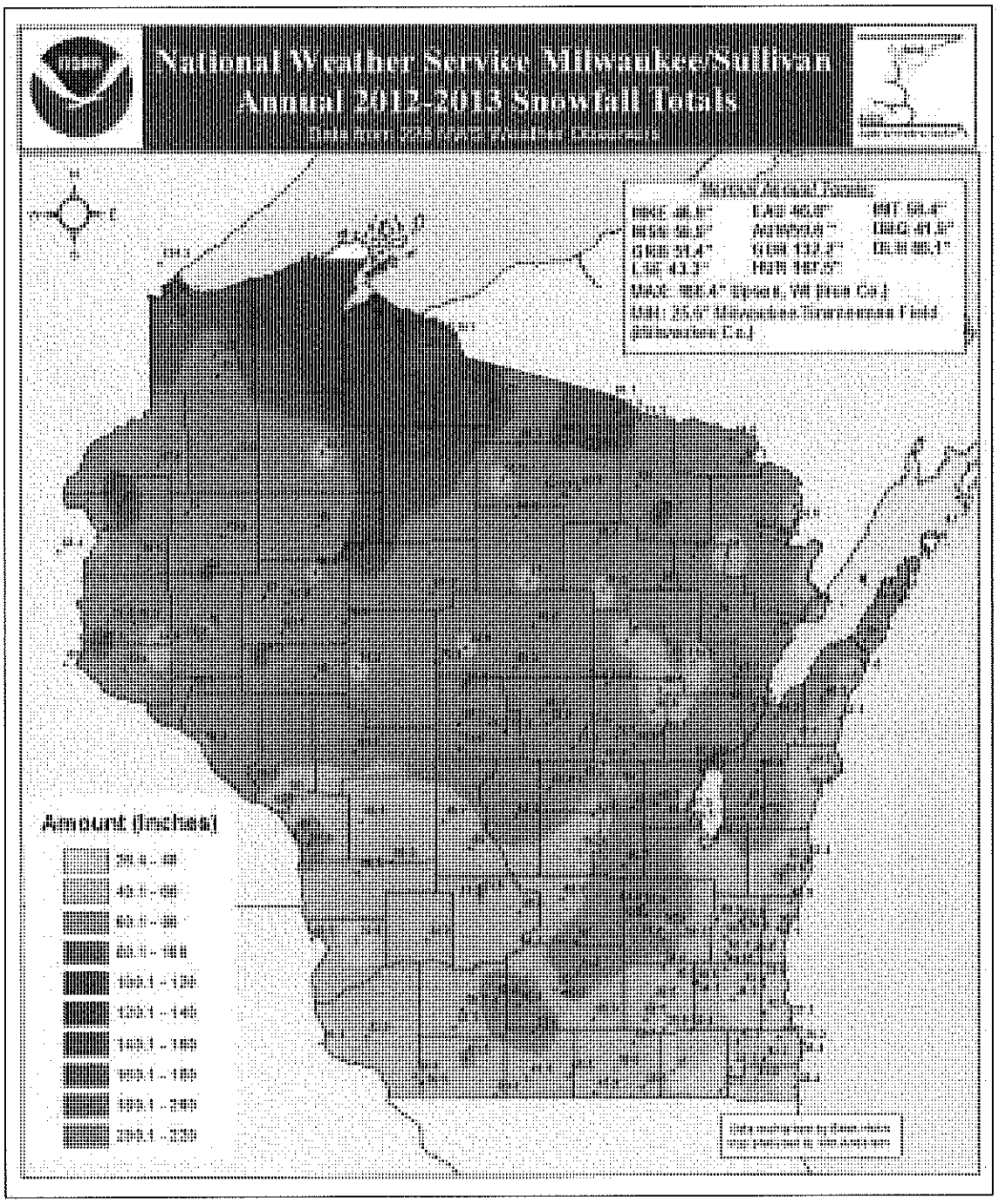
[140] http://www.crh.noaa.gov/images/mkx/severe/tor-event-death-injury.gif

Wisconsin 30-Year Average Snowfall [141]



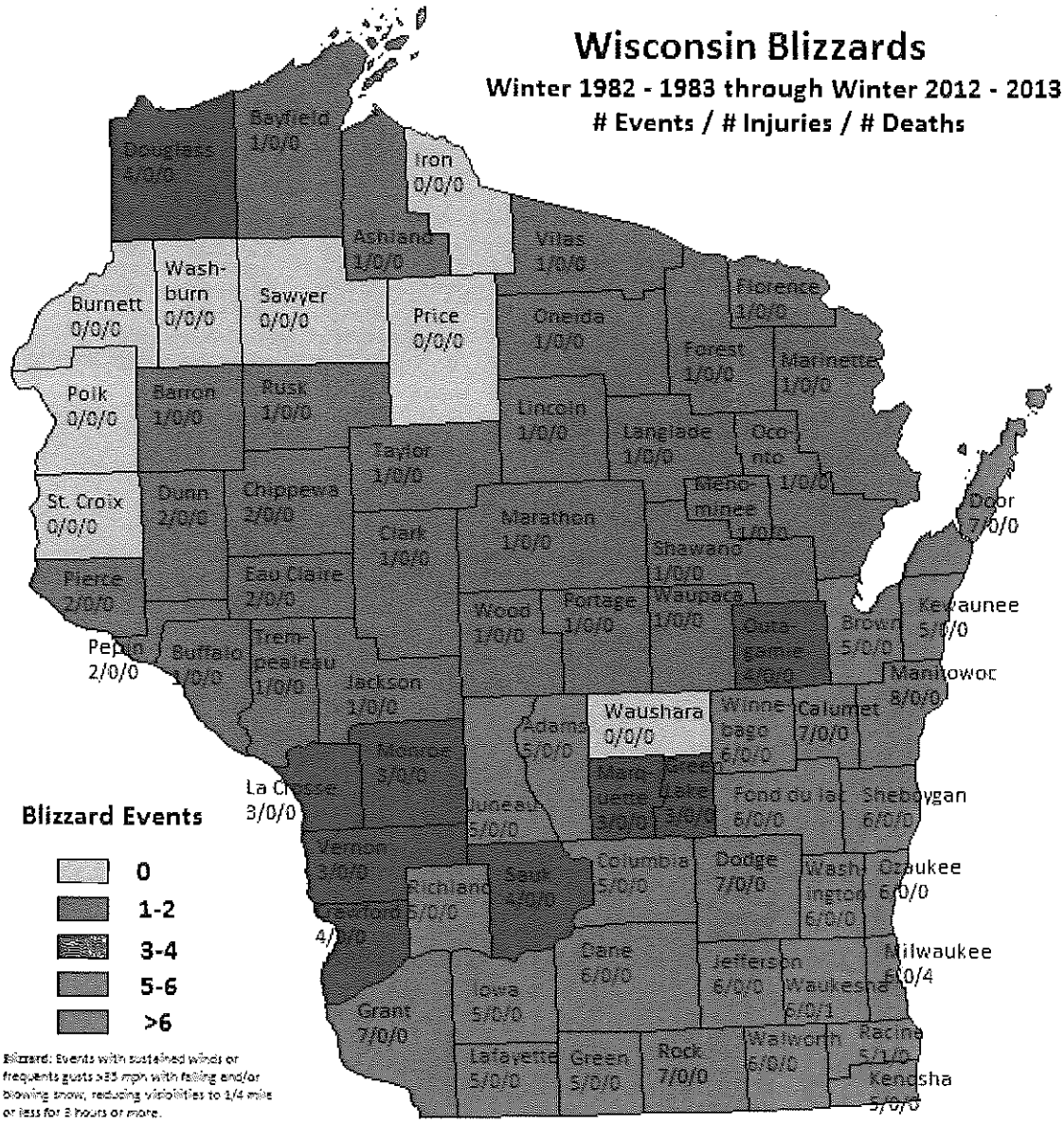
[141] http://www.crh.noaa.gov/images/mkx/climate/avg_30_year_snowfall.png

Wisconsin Annual 2012-2013 Snowfall[142]



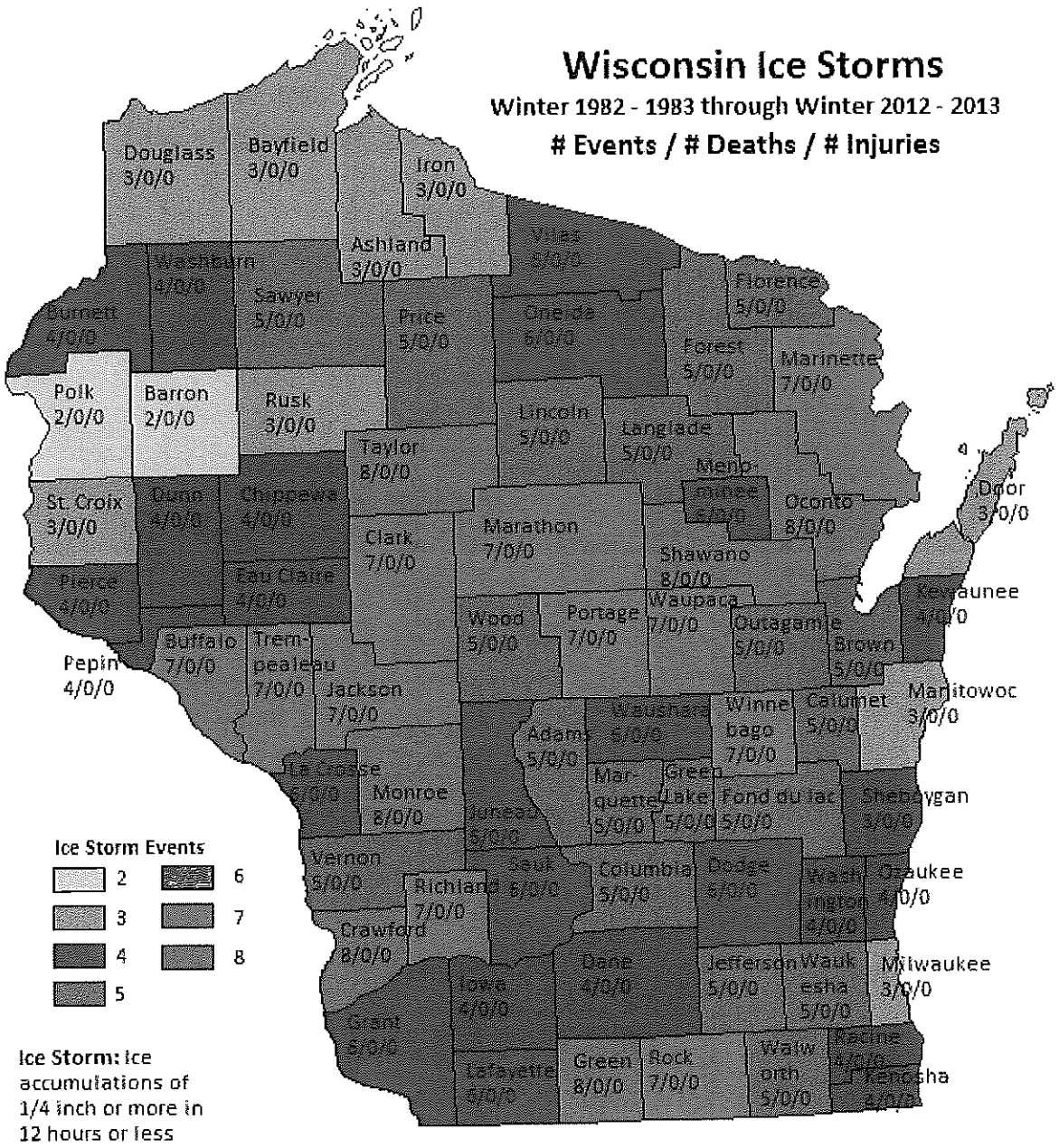
[142] http://www.crh.noaa.gov/images/mkx/pcpn/2013/1213snow.gif

Wisconsin Blizzards (1982-2013)[143]



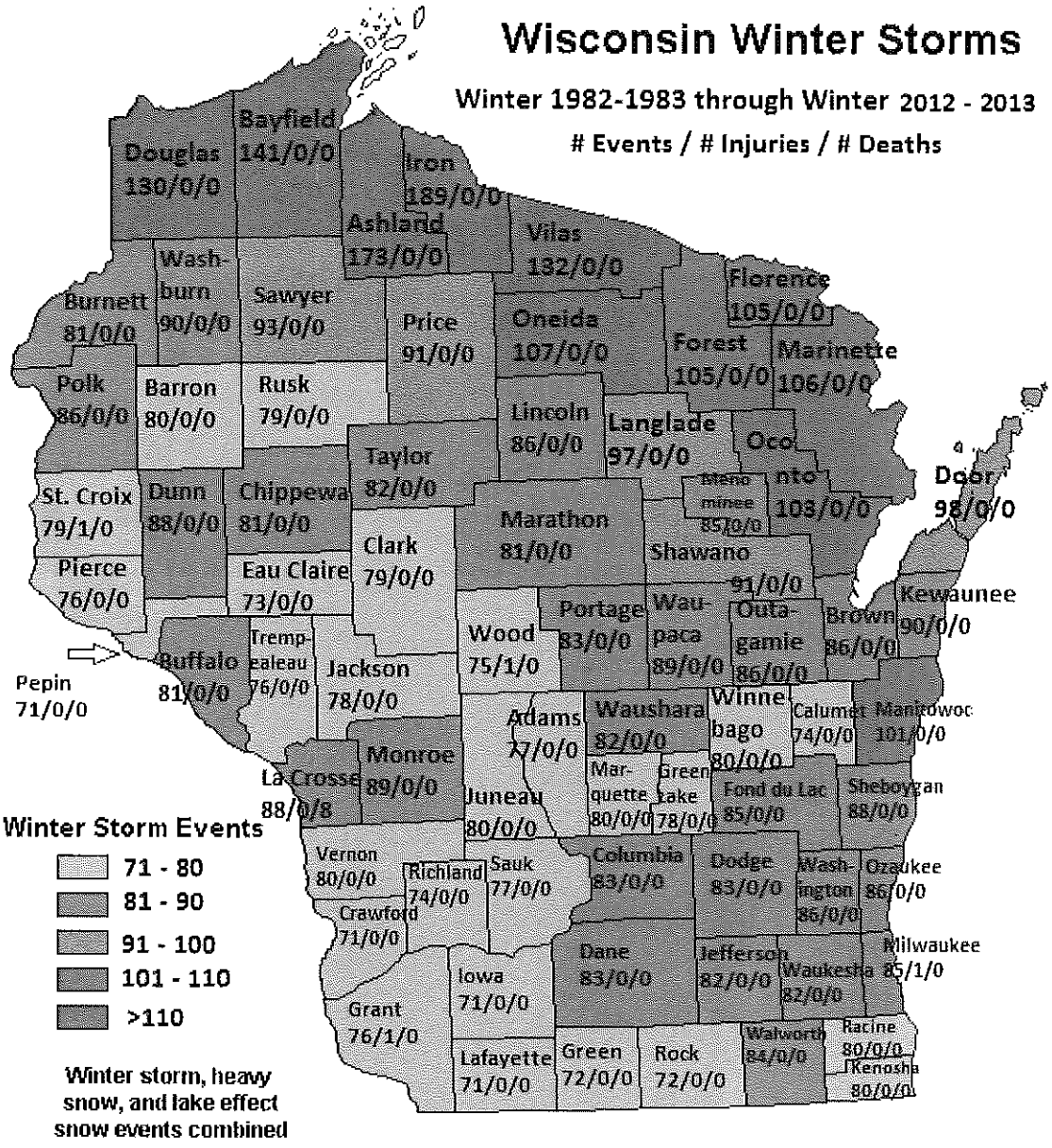
[143] http://www.crh.noaa.gov/images/mkx/severe/blizzards.gif

Wisconsin Ice Storms (1982-2013)[144]



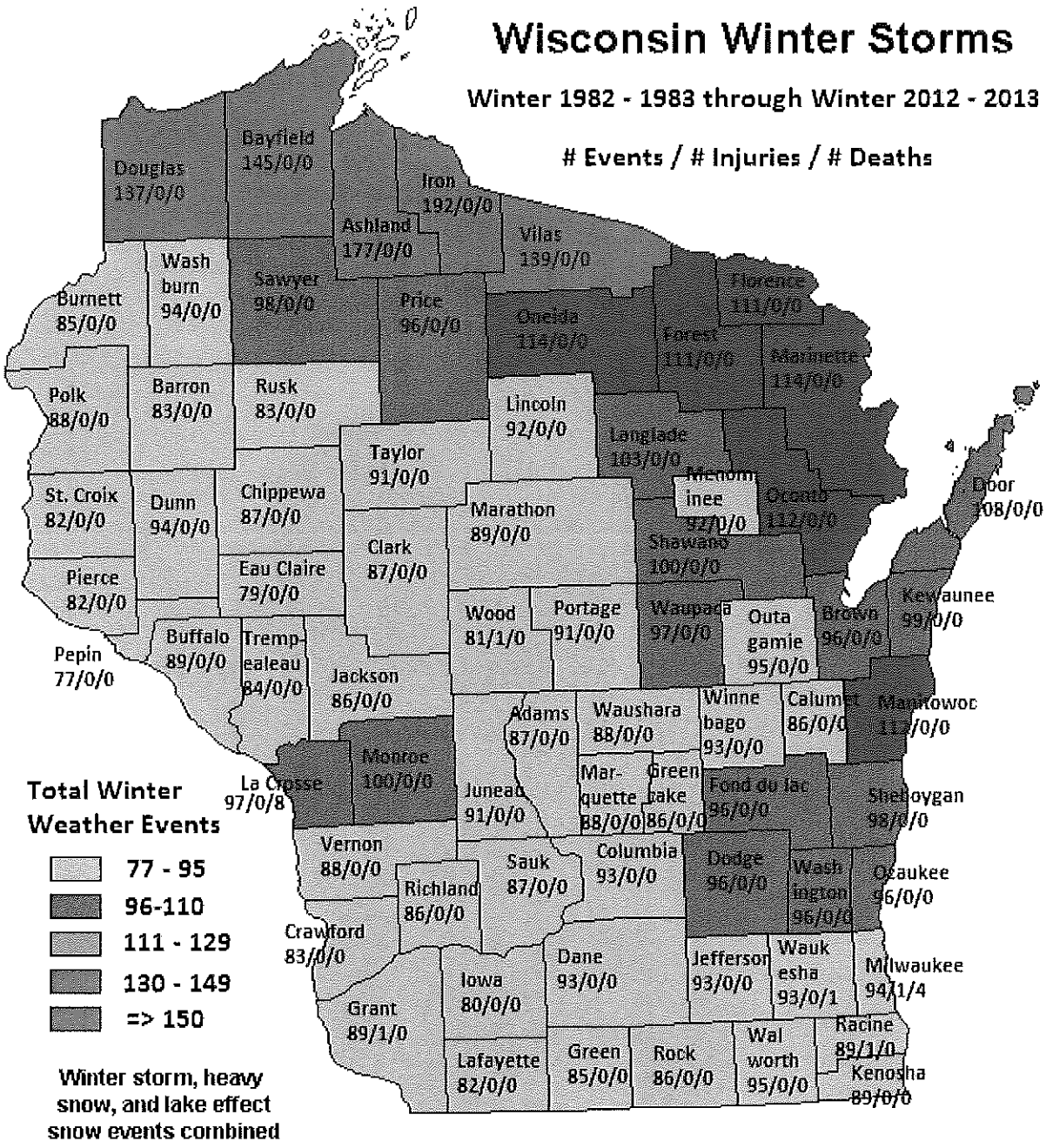
[144] http://www.crh.noaa.gov/images/mkx/severe/icestorms.gif

Wisconsin Winter Storm Events (1982-2013)[145]



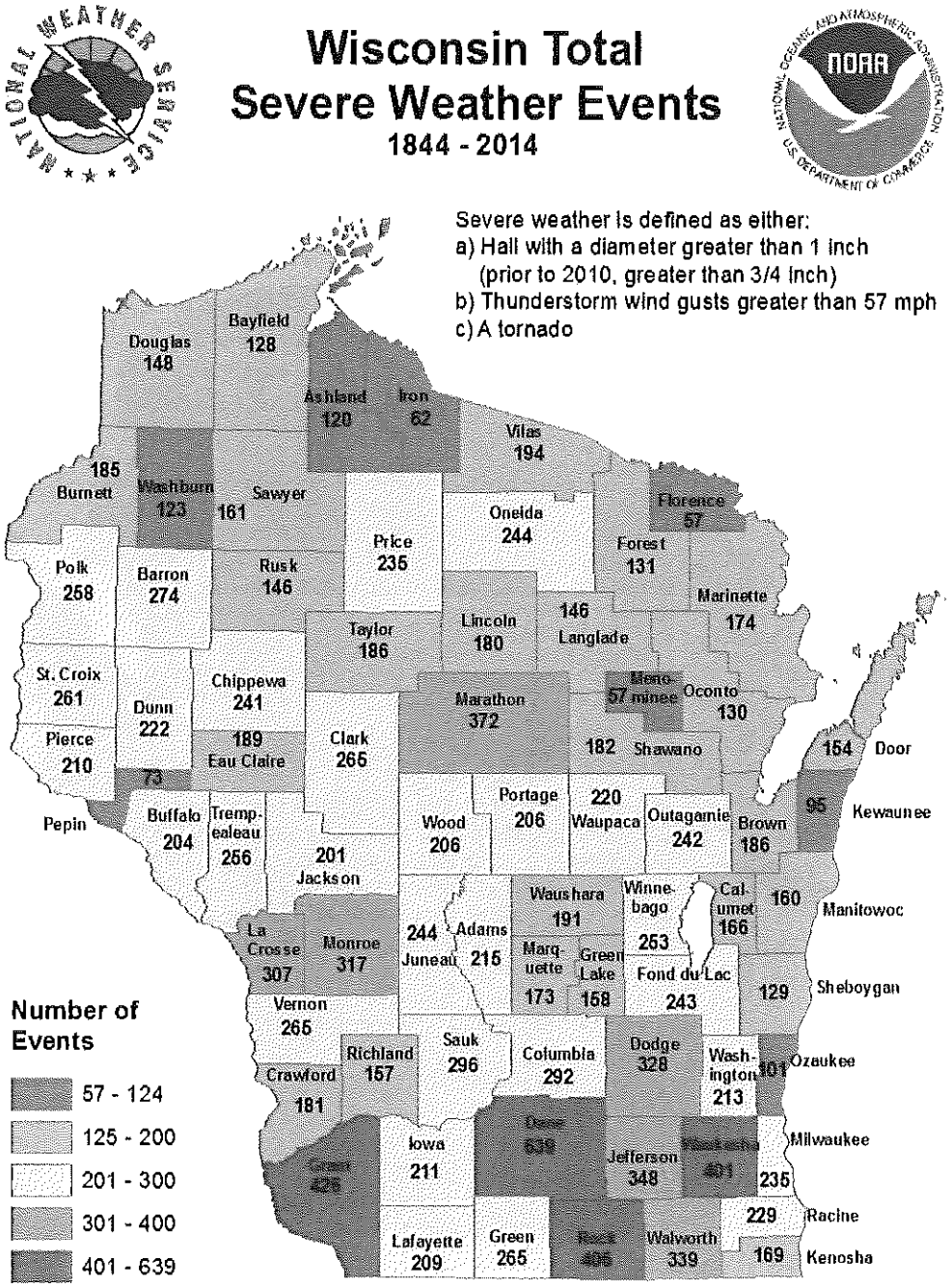
[145] http://www.crh.noaa.gov/images/mkx/severe/winterstorms.gif

Wisconsin Total Winter Weather Events (1982-2013)[146]



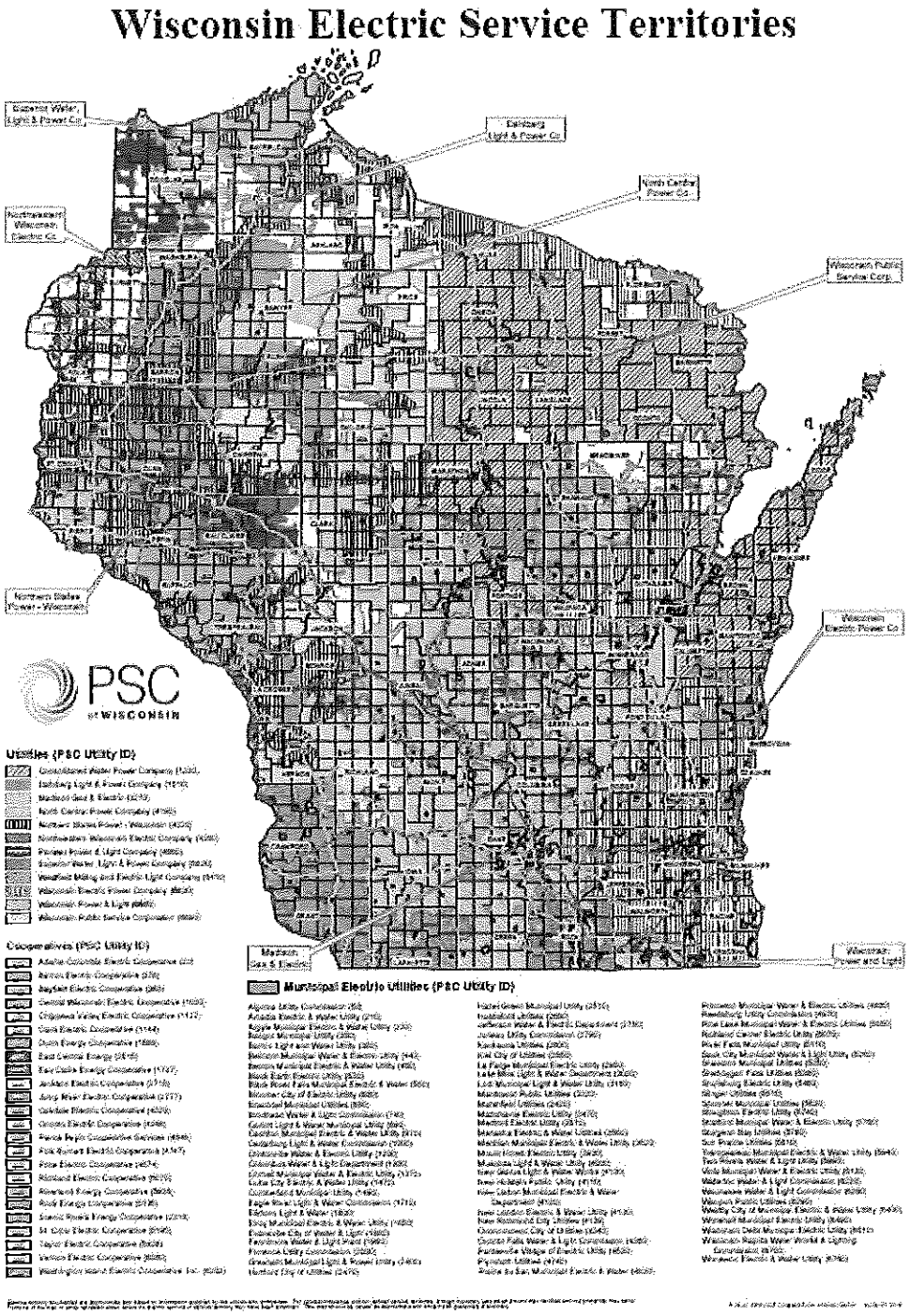
[146] http://www.crh.noaa.gov/images/mkx/severe/totalevents.gif

Wisconsin Total Severe Weather Events [147]



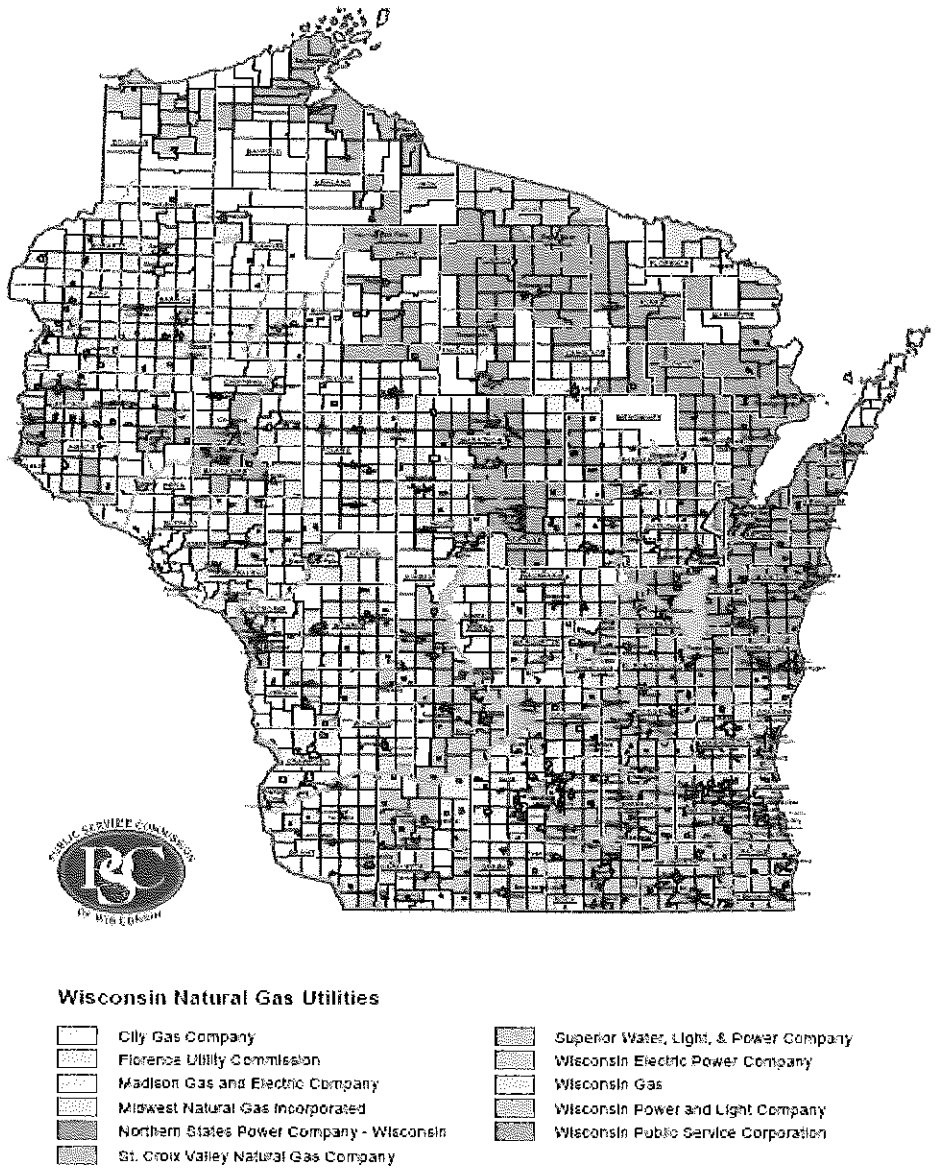
[147] http://www.ready.wi.gov/tornado/images/Sever-weather-statistics/TotalSevere.jpg

Wisconsin 2018 Electric Service Territories[148]



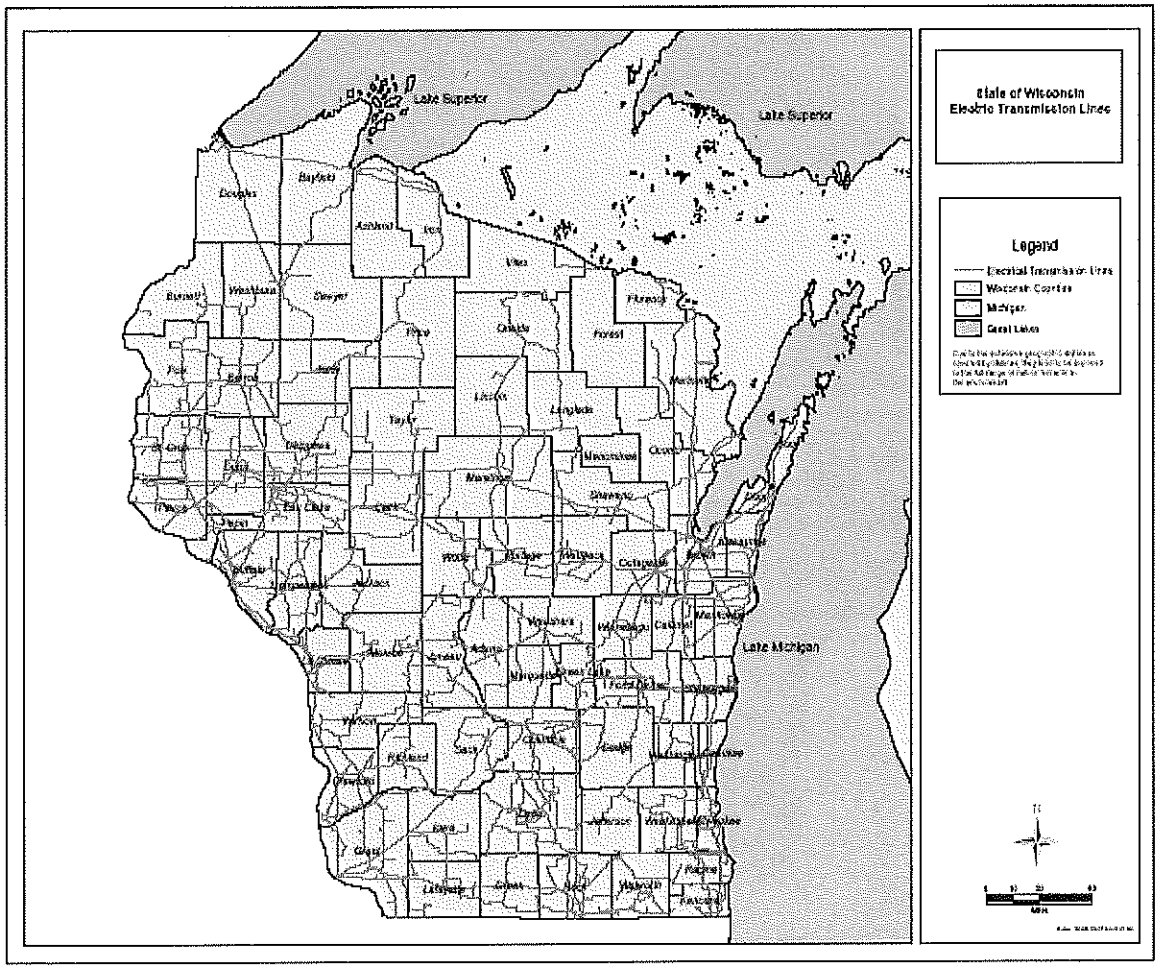
[148] http://www.psc.wi.gov/utilityinfo/maps/documents/largeElectricMap.pdf

Wisconsin 2016 Natural Gas Service Territories[149]



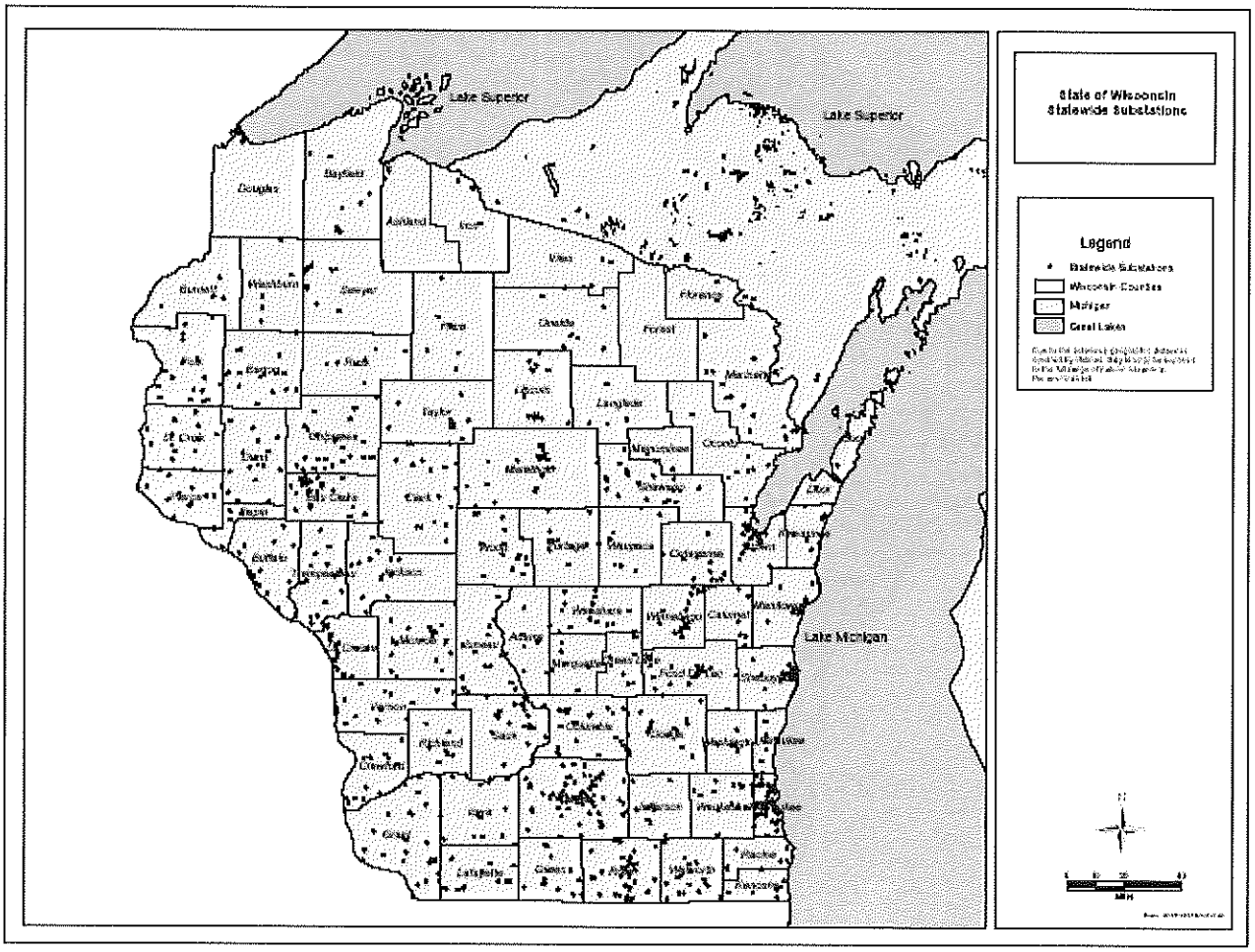
[149] https://psc.wi.gov/utilityInfo/maps/documents/medGasMap.pdf

Electric Transmission Lines[150]



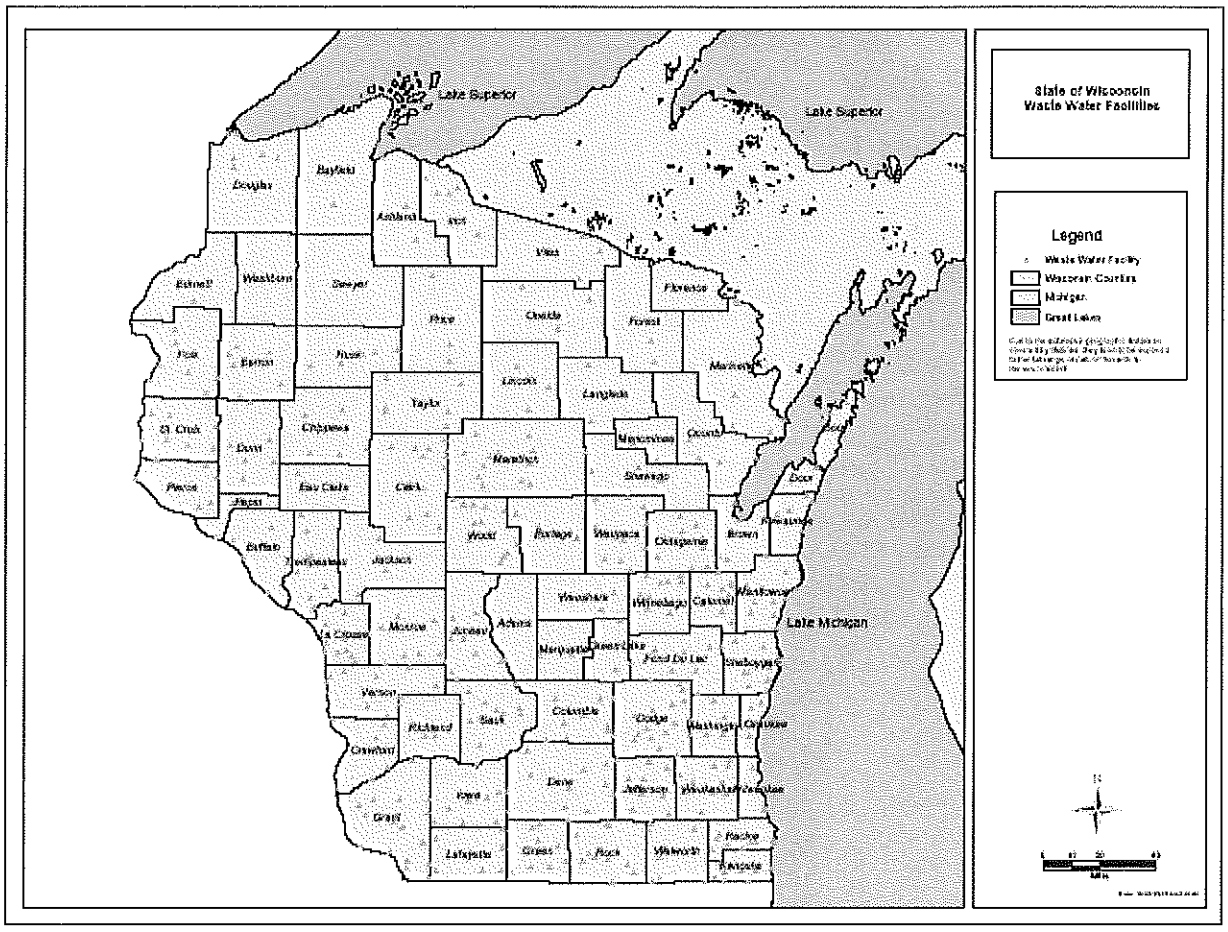
[150] Wisconsin State Hazard Mitigation Plan, v 2008, page 4-215

Electrical Substations[151]



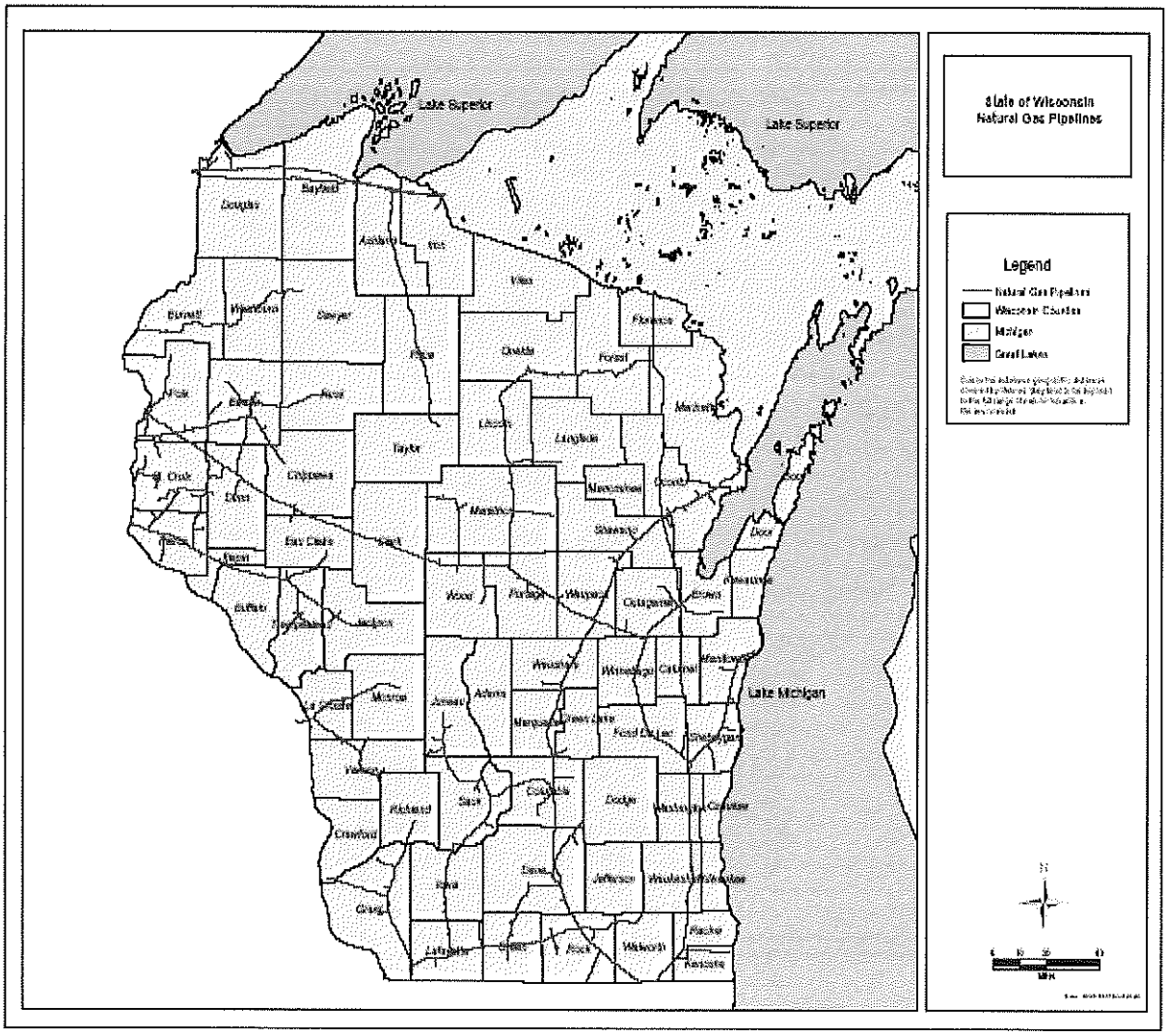
[151] Wisconsin State Hazard Mitigation Plan, v 2008, page 4-216

Wastewater Facilities[152]



[152] Wisconsin State Hazard Mitigation Plan, v 2008, page 4-211

Natural Gas Pipelines



Appendix B: Frequency of Occurrence

BLIZZARD

Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
GREEN LAKE COUNTY	01/29/96	0	0	0	0
GREEN LAKE COUNTY	02/24/07	0	0	0	0
GREEN LAKE COUNTY	12/11/10	0	0	0	0
GREEN LAKE COUNTY	12/20/12	0	0	0	0

COLD/WIND CHILL

Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
GREEN LAKE COUNTY	1/30/1996	0	0	0	0
GREEN LAKE COUNTY	1/31/1996	0	0	0	0
GREEN LAKE COUNTY	2/1/1996	0	0	0	0
GREEN LAKE COUNTY	1/17/1997	0	0	0	0
GREEN LAKE COUNTY	1/5/1999	0	0	0	0
GREEN LAKE COUNTY	12/18/2005	0	0	0	0
GREEN LAKE COUNTY	2/17/2006	0	0	0	0
GREEN LAKE COUNTY	2/18/2006	0	0	0	0
GREEN LAKE COUNTY	2/3/2007	0	0	$1,000.00	0
GREEN LAKE COUNTY	1/19/2008	0	0	0	0
GREEN LAKE COUNTY	12/15/2008	0	0	0	0
GREEN LAKE COUNTY	12/21/2008	1	0	0	0
GREEN LAKE COUNTY	1/13/2009	0	0	0	0
GREEN LAKE COUNTY	1/14/2009	0	0	0	0
GREEN LAKE COUNTY	1/24/2009	0	0	0	0
GREEN LAKE COUNTY	1/21/2011	0	0	0	0
GREEN LAKE COUNTY	1/21/2013	0	0	0	0
GREEN LAKE COUNTY	01/27/14	0	0	0	0
GREEN LAKE COUNTY	01/07/15	0	0	0	0
GREEN LAKE COUNTY	1/9/2015	0	0	0	0
GREEN LAKE COUNTY	12/14/16	0	0	0	0
GREEN LAKE COUNTY	12/18/16	0	0	0	0
GREEN LAKE COUNTY	12/25/17	0	0	0	0
GREEN LAKE COUNTY	01/01/18	0	0	0	0

DROUGHT

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
GREEN LAKE COUNTY	8/1/2002	0	0	0	$100,000.00
GREEN LAKE COUNTY	9/1/2003	0	0	0	0
GREEN LAKE COUNTY	10/1/2003	0	0	0	0
GREEN LAKE COUNTY	11/1/2003	0	0	0	0
GREEN LAKE COUNTY	12/1/2003	0	0	0	0
GREEN LAKE COUNTY	7/1/2005	0	0	0	0
GREEN LAKE COUNTY	8/1/2005	0	0	0	0
GREEN LAKE COUNTY	9/1/2005	0	0	0	0
GREEN LAKE COUNTY	10/1/2005	0	0	0	0
GREEN LAKE COUNTY	11/1/2005	0	0	0	0
GREEN LAKE COUNTY	6/26/2012	0	0	0	0
GREEN LAKE COUNTY	07/01/07	0	0	0	$75,000.00
GREEN LAKE COUNTY	08/01/07	0	0	0	0
GREEN LAKE COUNTY	06/26/12	0	0	0	0
GREEN LAKE COUNTY	07/01/12	0	0	0	0
GREEN LAKE COUNTY	8/1/2012	0	0	0	0
GREEN LAKE COUNTY	9/1/2012	0	0	0	0
GREEN LAKE COUNTY	10/1/2012	0	0	0	0

EXCESSIVE HEAT

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
GREEN LAKE COUNTY	7/17/2011	0	0	0	0
GREEN LAKE COUNTY	7/2/2012	0	0	0	0

EXTREME COLD/WIND

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
GREEN LAKE COUNTY	01/30/08	0	0	0	0
GREEN LAKE COUNTY	02/10/08	0	0	0	0
GREEN LAKE COUNTY	01/15/09	0	0	0	0
GREEN LAKE COUNTY	01/08/14	0	0	0	0

FLASH FLOOD

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
GREEN LAKE COUNTY	06/22/02	0	0	$10,000.00	0
GREEN LAKE COUNTY	05/08/04	0	0	$25,000.00	0
GREEN LAKE COUNTY	06/07/08	0	0	0	

FLOOD

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
GREEN LAKE COUNTY	08/18/01	0	0	0	0
GREEN LAKE COUNTY	05/25/04	0	0	$300,000.00	$200,000.00
GREEN LAKE COUNTY	06/01/04	0	0	$2.72M	$15.0M
GREEN LAKE COUNTY	07/01/04	0	0	$100,000.00	$15.2M

FUNNEL CLOUD

Location	Date	Deaths	Injuries	Property Damage	Crop Damage
BERLIN	07/18/96	0	0	0	0
PRINCETON	05/30/03	0	0	0	0
MARKESAN	06/08/03	0	0	0	0
KINGSTON	06/08/03	0	0	0	0
KINGSTON	06/23/04	0	0	0	0
BERLIN	07/01/06	0	0	0	0
BERLIN	06/21/11	0	0	0	0

HAIL

Location	Date	Diameter (Inches)	Deaths	Injuries	Property Damage	Crop Damage
GREEN LAKE COUNTY	09/09/90	0.75	0	0	0	0
GREEN LAKE COUNTY	10/17/90	0.75	0	0	0	0
GREEN LAKE COUNTY	05/31/91	1	0	0	0	0
BERLIN	05/13/91	0.75	0	0	0	0
BERLIN	08/14/95	0.88	0	0	0	0
GREEN LAKE	07/18/96	0.75	0	0	0	0
BERLIN	04/05/97	0.75	0	0	0	0
PRINCETON	07/16/97	1.75	0	0	0	0
PRINCETON	07/16/97	1	0	0	0	0
GREEN LAKE	08/03/97	3	0	0	0	$10,000.00

MANCHESTER	05/12/98	0.88	0	0	0	0
PRINCETON	02/11/99	0.75	0	0	0	0
MARKESAN	06/08/99	0.75	0	0	0	0
MARKESAN	07/23/99	1	0	0	0	0
PRINCETON	03/08/00	0.75	0	0	0	0
MARQUETTE	05/12/00	2.75	0	4	$1.5M	$300,000.00
BERLIN	06/11/00	0.75	0	0	0	0
KINGSTON	09/11/00	1	0	0	0	0
PRINCETON	04/23/01	1	0	0	0	0
PRINCETON	04/23/01	0.75	0	0	0	0
GREEN LAKE	05/10/01	0.75	0	0	0	0
PRINCETON	05/14/01	0.75	0	0	0	0
MARKESAN	05/14/01	0.75	0	0	0	0
BERLIN	04/18/02	0.75	0	0	0	0
GREEN LAKE	04/18/02	0.75	0	0	0	0
PRINCETON	05/10/03	1	0	0	0	0
BERLIN	05/12/04	0.75	0	0	0	0
MARKESAN	06/23/04	1.75	0	0	0	0
BERLIN	10/23/04	0.88	0	0	0	0
KINGSTON	07/25/05	1	0	0	0	0
MARQUETTE	06/06/06	0.88	0	0	0	0
MARQUETTE	07/01/06	1.75	0	0	0	0
MARQUETTE	07/01/06	1.75	0	0	0	0
GREEN LAKE	07/01/06	1	0	0	0	0
BERLIN	07/17/06	0.88	0	0	0	0
KINGSTON	10/02/06	0.75	0	0	0	0
DALTON	10/02/06	1.5	0	0	0	0
KINGSTON	10/02/06	0.75	0	0	0	0
PRINCETON	04/25/08	0.88	0	0	0	0
DALTON	04/25/08	0.88	0	0	0	0
KINGSTON	04/25/08	1	0	0	0	0
GREEN LAKE	04/25/08	1	0	0	0	0
DALTON	07/27/09	1.5	0	0	0	$5,000.000
GREEN LAKE	04/30/10	1	0	0	0	0
PRINCETON	05/22/11	1.75	0	0	0	0
PRINCETON	05/22/11	1.75	0	0	0	0
BERLIN	06/08/11	1	0	0	0	0
MARQUETTE	06/08/11	1	0	0	0	0
MARQUETTE	05/28/12	1	0	0	0	0
BERLIN	08/02/15	0.88	0	0	0	0

FAIRBURN	05/17/17	0.75	0	0	0	0
BERLIN	07/15/17	0.88	0	0	0	0

HEAT

Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
GREEN LAKE ZONE	11/28/98	0	0	0	0
GREEN LAKE ZONE	12/01/98	0	0	0	0
GREEN LAKE ZONE	17/4/99	0	0	0	0
GREEN LAKE ZONE	07/29/99	0	0	0	0
GREEN LAKE ZONE	11/08/99	0	0	0	0
GREEN LAKE ZONE	11/13/99	0	0	0	0
GREEN LAKE ZONE	07/31/01	0	0	0	0
GREEN LAKE ZONE	08/08/01	0	0	0	0
GREEN LAKE ZONE	04/15/02	0	0	0	0
GREEN LAKE ZONE	06/30/02	0	0	0	0
GREEN LAKE ZONE	07/01/02	0	0	0	0
GREEN LAKE ZONE	06/23/09	0	0	0	0
GREEN LAKE ZONE	07/01/11	0	0	0	0
GREEN LAKE ZONE	06/28/12	0	0	0	0
GREEN LAKE ZONE	07/16/12	0	0	0	0
GREEN LAKE ZONE	07/23/12	0	0	0	0
GREEN LAKE ZONE	07/25/12	0	0	0	0
GREEN LAKE ZONE	07/16/13	0	0	0	0
GREEN LAKE ZONE	07/22/14	0	0	0	0
GREEN LAKE ZONE	07/21/16	0	0	0	

HEAVY RAIN

Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
GREEN LAKE COUNTY	11/01/03	0	0	0	0

HEAVY SNOW

Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
GREEN LAKE ZONE	01/25/96	0	0	0	0
GREEN LAKE ZONE	01/26/96	0	0	0	0
GREEN LAKE ZONE	12/23/96	0	0	0	0
GREEN LAKE ZONE	02/04/97	0	0	0	0

GREEN LAKE ZONE	02/21/97	0	0	0	0
GREEN LAKE ZONE	02/27/97	0	0	0	0
GREEN LAKE ZONE	03/12/97	0	0	0	0
GREEN LAKE ZONE	03/13/97	0	0	0	0
GREEN LAKE ZONE	12/18/00	0	0	0	0
GREEN LAKE ZONE	03/02/02	0	0	0	0
GREEN LAKE ZONE	02/05/04	0	0	0	0
GREEN LAKE ZONE	02/14/08	0	0	0	0

HIGH WIND

Location	*Date*	*KTS*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
GREEN LAKE COUNTY	11/10/98	50	0	0	$100,000.00	$25,000.00
GREEN LAKE COUNTY	04/07/01	52	0	0	0	0
GREEN LAKE COUNTY	04/12/01	54	0	0	0	0
GREEN LAKE COUNTY	10/26/10		0	0	$15,000.00	0

ICE STORM

Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
GREEN LAKE COUNTY	01/04/98	0	0	0	0
GREEN LAKE COUNTY	04/04/03	0	0	0	0

LIGHTNING

Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
MANCHESTER	07/18/96	0	0	$1,000	0
GREEN LAKE	04/18/04	0	0	$20,000.00	0
MARQUETTE	74/18/04	0	0	$50,000.00	0

STRONG WIND

Location	*Date*	*KTS*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
GREEN LAKE COUNTY	5/24/2000		0	0	0	0
GREEN LAKE COUNTY	10/24/2001		0	0	0	0
GREEN LAKE COUNTY	12/5/2001		0	0	$5,000.00	0
GREEN LAKE COUNTY	11/12/2003	39	0	0	$2,000.00	0
GREEN LAKE COUNTY	3/14/2004	39	0	0	$2,000.00	0

GREEN LAKE COUNTY	4/18/2004	46	0	0	$10,000.00	0
GREEN LAKE COUNTY	12/12/2004	39	0	0	$1,000.00	0
GREEN LAKE COUNTY	1/24/2006	40	0	0	$5,000.00	0
GREEN LAKE COUNTY	05/11/06	36	0	0	$1,000.00	0
GREEN LAKE COUNTY	02/22/07	39	0	0	$2,000.00	0
GREEN LAKE COUNTY	05/24/07	39	0	0	$2,000.00	0
GREEN LAKE COUNTY	11/5/2007	39	0	0	$3,000.00	0
GREEN LAKE COUNTY	5/5/2010	39	0	0	$30,000.00	0
GREEN LAKE COUNTY	2/18/2011	26	0	0	$2,000.00	0
GREEN LAKE COUNTY	4/15/2011	39	0	0	$3,000.00	0
GREEN LAKE COUNTY	09/29/11	39	0	0	$2,000.00	0
GREEN LAKE COUNTY	1/1/2012	45	0	0	$1,000.00	0
GREEN LAKE COUNTY	01/19/13	43	0	0	$5,000.00	0
GREEN LAKE COUNTY	03/16/16	43	0	0	$1,000.00	0
GREEN LAKE COUNTY	03/18/17	43	0	0	$5,000.00	0
GREEN LAKE COUNTY	12/04/17	41	0	0	$4,000.00	0

THUNDER STORM

Location	*Date*	*KTS*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
GREEN LAKE COUNTY	08/18/90	54	0	0	0	0
GREEN LAKE COUNTY	08/25/92	52	0	0	0	0
MARKESAN	07/22/95	0	0	0	0	0
PRINCETON	07/22/95	0	0	0	0	0
BERLIN	08/09/95	0	0	0	$20,000.00	0
BERLIN	08/28/95	65	0	0	$160,000.00	0
MARQUETTE	06/29/96		0	0	0$7,000	0
BERLIN	08/05/96		0	0	0$5,000	0
GREEN LAKE	08/05/97		0	0	0$4,000	0
MARQUETTE	04/05/97	52	0	0	$7,000.00	0
GREEN LAKE	06/15/97		0	0	0$3,000	0
GREEN LAKE	07/16/97		0	0	$200.00	0
PRINCETON	07/16/97		0	0	$1,000.00	0
MARKESAN	08/03/97	51	0	0	$4,000.00	0
BERLIN	08/03/97		0	0	$1.0M	$5.0M
PRINCETON	09/16/97		0	0	$1,000.00	0
GREEN LAKE	05/15/98		0	0	$2,000.00	0
COUNTYWIDE	05/31/98		0	0	$5,000.00	0
GREEN LAKE	06/27/98		0	0	$6,000.00	0

MARKESAN	06/01/00		0	0	$2,000.00	0
DALTON	06/11/01	55	0	0	$100,000.00	0
MARQUETTE	06/16/01	52	0	0	$10,000.00	0
PRINCETON	09/07/01	52	0	0	0	0
KINGSTON	09/07/01	56	0	0	0	0
BERLIN	07/20/03	52	0	0	0	0
MARQUETTE	08/20/03	56	0	0	0	0
MARKESAN	04/17/04	65	0	0	$100,000.00	0
COUNTYWIDE	07/23/05	56	0	0	$50,000.00	0
BERLIN	09/07/05	52	0	0	0	0
GREEN LAKE	09/13/05	62	0	0	0	0
BERLIN	07/30/06	52	0	0	0	0
MARKESAN	04/22/07	45	0	0	$30,000.00	0
BERLIN	05/24/07	56	0	0	$20,000.00	0
GREEN LAKE	07/03/07	52	0	0	0	0
KINGSTON	08/11/07	52	0	0	$10,000.00	0
DALTON	06/07/08	61	0	0	$25,000.00	0
DALTON	06/07/08	52	0	0	0	0
GREEN LAKE	06/07/08	56	0	0	$10,000.00	0
PRINCETON	07/07/08	65	0	0	$20,000.00	0
MARKESAN	07/10/08	56	0	0	0	0
DALTON	07/12/08	56	0	0	$10,000.00	0
PRINCETON	07/16/08	50	0	0	0	0
DALTON	07/27/09	65	0	0	$100,000.00	$2,000.00
BERLIN	08/20/10	50	0	0	0	0
DALTON	08/20/10	56	0	0	0	0
GREEN LAKE	08/20/10	87	0	0	0	0
DALTON	06/08/11	65	0	0	0	0
MARKESAN	06/21/18	50	0	0	0	0
BERLIN	07/11/11	55	0	0	0	0
PRINCETON	07/19/11	52	0	0	0	0
MARQUETTE	05/28/12	56	0	0	$5,000.00	0
GREEN LAKE	08/18/14	50	0	0	0$1,000	0
MARQUETTE	05/26/15	50	0	0	$500.00	0
PRINCETON	06/29/15	50	0	0	$2,000.00	0
PRINCETON	07/13/15	65	0	0	$10,000.00	0
GREEN LAKE	05/25/16	50	0	0	$2,000.00	0
GREEN LAKE	05/25/16	50	0	0	$1,000.00	0
DALTON	07/21/16	56	0	0	$10,000.00	0
PRINCETON	07/21/16	56	0	0	$5,000.00	0

GREEN LAKE	07/21/16	56	0	0	$5,000.00	0
PRINCETON	06/12/17	61	0	0	$5,000.00	0
PRINCETON	06/14/17	50	0	0	$2,000.00	0
MARKESAN	06/14/17	65	0	0	$20,000.00	0

TORNADO

Location	*Date*	*Strength*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
GREEN LAKE COUNTY	09/07/92	F2	0	40	$2.5M	0
GREEN LAKE COUNTY	09/26/92	F0	0	0	$250,000	0
PRINCETON	07/06/94	F0	0	0	$25,000	$500.00
BERLIN	07/06/94	F0	0	0	$250,000	$500.00
BERLIN	07/06/94	F1	0	0	$250,000	$5,000.00
PRINCETON	07/07/94	F0	0	0	0	0
GREEN LAKE	07/18/96	F1	0	5	$250,000	0
MARQUETTE	06/11/01	F0	0	0	$2,500	0
MANCHESTER	06/23/04	F3	0	0	$2,500	$500,000.00
MARKESN	06/23/04	F3	1	0	0	$300,000.00
MANCHESTER	04/25/08	EF0	0	0	0	0
MANCHESTER	06/12/08	EF0	0	0	0	$0.00
MANCHESTER	07/07/08	EF1	0	0	$30,000.00	$10,000.00
DALTON	07/10/08	EF1	0	0	$150,000.00	0
DALTON	07/27/09	EF0	0	0	$0.00	$2,000.00
BERLIN	04/30/10	EF1	0	0	$130,000.00	0
DALTON	04/30/10	EF0	0	0	$0.00	0
KINGSTON	04/30/10	EF0	0	0	0	0
BERLIN	04/10/11	EF0	0	0	$300.00	0
DALTON	05/22/11	EF0	0	0	$1,000.00	0
MARKESAN	05/22/11	EF0	0	0	$5,000.00	0
MARKESAN	06/21/11	EF1	0	0	$5,000.00	0
GREEN LAKE	06/21/11	EF1	0	0	$2,000.00	

WINTER STORM

Location	*Date*	*Deaths*	*Injuries*	*Property Damage*	*Crop Damage*
GREEN LAKE ZONE	3/8/1998	0	0	0	0
GREEN LAKE ZONE	1/2/1999	0	0	0	0
GREEN LAKE ZONE	3/8/1999	0	0	0	0
GREEN LAKE ZONE	1/3/2000	0	0	0	0
GREEN LAKE ZONE	4/7/2000	0	0	0	0

GREEN LAKE ZONE	1/6/2005	0	0	0	0
GREEN LAKE ZONE	1/22/2005	0	0	0	0
GREEN LAKE ZONE	02/20/05	0	0	0	0
GREEN LAKE ZONE	03/19/05	0	0	0	0
GREEN LAKE ZONE	02/16/06	0	0	0	0
GREEN LAKE ZONE	02/23/07	0	0	0	0
GREEN LAKE ZONE	02/25/07	0	0	0	0
GREEN LAKE ZONE	4/11/2007	0	0	$10,000	0
GREEN LAKE ZONE	12/1/2007	0	0	0	0
GREEN LAKE ZONE	1/29/2008	0	0	0	0
GREEN LAKE ZONE	2/5/2008	0	0	0	0
GREEN LAKE ZONE	2/17/2008	0	0	0	0
GREEN LAKE ZONE	3/21/2008	0	0	0	0
GREEN LAKE ZONE	12/1/2008	0	0	0	0
GREEN LAKE ZONE	12/8/2008	0	0	0	0
GREEN LAKE ZONE	12/18/2008	0	0	0	0
GREEN LAKE ZONE	12/20/2008	0	0	0	0
GREEN LAKE ZONE	03/08/09	0	0	0	0
GREEN LAKE ZONE	12/8/2009	0	0	0	0
GREEN LAKE ZONE	02/01/11	0	0	0	0
GREEN LAKE ZONE	02/20/11	0	0	0	0
GREEN LAKE ZONE	04/19/11	0	0	0	0
GREEN LAKE ZONE	03/02/12	0	0	0	0
GREEN LAKE ZONE	01/30/13	0	0	0	0
GREEN LAKE ZONE	12/22/2013	0	0	0	0
GREEN LAKE ZONE	01/14/14	0	0	0	0
GREEN LAKE ZONE	12/28/15	0	0	0	0
GREEN LAKE ZONE	02/02/16	0	0	0	0
GREEN LAKE ZONE	03/23/16	0	0	0	0
GREEN LAKE ZONE	12/16/16	0	0	0	0
GREEN LAKE ZONE	04/14/18	0	0	0	0

Appendix C: Plan Adoption

This plan has been adopted by Green Lake County and the following municipal bodies including Cities of Berlin, Green Lake, Markesan and Princeton; the Villages of Kingston and Marquette and the Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca, and St. Marie. The Towns of XXX have not individually adopted the plan but, as towns, are considered under the county's adoption. Scanned copies of those municipalities that adopted this plan follow.

Appendix D: Report on Previous Mitigation Strategies

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Notes and *Report on Activities***
All Hazards	Smart Growth Plan Implementation	~$2,000	City of Berlin Zoning Office;	Ongoing	High	City of Berlin	Zoning Ordinances, Zoning Department Staff using municipal budget dollars	*County plan was updated in 2016 but needs to be continually reviewed and consulted as development continues*
			City of Green Lake Plan Commission and City Council		Medium	City of Green Lake		*Plan has been adopted. It needs to be* reviewed every 10 years.
	Continue to promote the increased use of National Oceanic and Atmospheric Administration (NOAA) weather radios	~$1,000	EM Dept. and City of Markesan EM Dept.	As grants available	High	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Emergency Management Staff using department budget	*County EM has provided information at promotional events and as part of awareness weeks.* *City of Markesan received a disabled/hearing impaired external antenna at cost. They do radio and public relations shows to sell weather radios through the fire stations*

Appendix D: Report on Previous Mitigation Strategies

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Notes and *Report on Activities***
	Continue to add/update Emergency Management Department links on the existing city web site (e.g., ARC, FEMA, WEM) especially focusing on preparedness bulletins.	~$500	EM Dept.; City of Markesan EM Dept.; City of Green Lake Clerk's Office and IT Consultant	Ongoing	Low	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	County and city EM, Clerk and IT staff using county budget dollars	The county website also currently includes GIS information for the county. *The county and municipalities continue to incorporate new information into their online presences and publicize it at community events. This will expand and continue going forward.*
	Create a website for people to receive the most current information regarding an ongoing disaster.	~$500		Ongoing	Low			
	Publicize the website to let citizens know about its capabilities (including those described above.)	~$500		Ongoing	Low			

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Notes and *Report on Activities***
	Purchase and install three more weather data collection stations	~$500	City of Markesan EM Dept.	On-going	Low	City of Markesan	EM Staff. As grants available.	The goals would be to purchase web-enabled devices that could share information with the National Weather Service as well as provide current information to citizens on city web site. *Funding was not available for this and it will be brought forward into the plan update.*

Appendix D: Report on Previous Mitigation Strategies

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Notes and *Report on Activities***
	Upgrade area early warning sirens: • Markesan has 4 and 2 need replacing.	$15K/ea-$30K total	City of Markesan EM Dept.	2015	Medium – High	City of Markesan	As funding available	*Funding was not available for these projects and they will continue forward into the next plan.*
	• Siren for the Soldiers & Sailors City Park	$15k	City of Markesan/ Town of Green Lake	2015	Medium – High	City of Markesan, Town of Green Lake	As funding available	
	• Determine disposition of courthouse siren.	Unknown	City of Green Lake	Ongoing	High	City of Green Lake	City staff using current budget	Continue maintaining the civil defense siren on the downtown courthouse or move to a new location if the courthouse is sold to a private developer.
	Bring Markesan School District & school bus companies from UHF to VHF band.	Unknown	City of Markesan EM Dept., School Dists, Bus Companies	2012	Medium	City of Markesan	EM staff, as funding allows	*Funding was not available for this; it will be carried forward.* For interoperability during school uses and during disaster, when resource may be used by communities.

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Notes and *Report on Activities***
	Comprehensive plan update/ implementation	~$10k	City of Princeton	5 years	Medium	City of Princeton	Planning Staff using current budget	*The plan was reviewed and updated for a ten-year period. It will continue to be tended during this PDM update period.*
	Emergency Operations Manual	~$5k	City of Princeton	1 year	High	City of Princeton	City staff using current annual budget	Framework in place. Plan needs review and update. *This was completed in 2015 at a cost of approximately $500. The manual will be put on a review/update cycle and this will be carried forward.*
	Hire Emergency Government Co-Director	unknown	City of Princeton	6 months	High	City of Princeton	City ordinances using annual budget	To assist EGD *This was completed and the new staff person is on-staff as of 2016. This will be removed from the update.*

Appendix D: Report on Previous Mitigation Strategies

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Notes and *Report on Activities***
	Green Lake County and the City of Markesan would like to improve their communications systems to include: o VHF – UHF Cross band repeater to county Emergency Management. o Buy additional portable radios for law enforcement and fire	$25K City of Markesan	City of Markesan EM Dept. and Green Lake County	2011	High	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	City staff using annual budget dollars	This system supports fire, law enforcement and county dispatch. The VHF system will have 5 sites in the county, one of which will be in the City of Markesan *This was completed and will be removed from the plan update going forward.*
	8 new hand-held radios and one base station with new required frequency	$15,000	Berlin Utility	2 years	Medium/ High	City of Berlin	Utility staff as funding is available	The goal is to have radios for all utility employees in an emergency situation *Funding was not available for this project and it will be carried forward.*

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Notes and *Report on Activities***
Drought and Dust Storms	County should be prepared to provide information to farmers (e.g., crop irrigation, crop insurance) during times of drought	~$200	UW-Ext./FSA	As needed	Low	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Covered by annual budget and UW-Ex/FSA staff	*This was done as needed during the plan period and will be carried forward.*
	Prepare/publicize water usage information for non-farm areas during drought	~$500	Municipal Water Utilities	As needed	Low	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Covered by annual budget and water utility staff	*This was done as needed during the plan period and will be carried forward.*

Appendix D: Report on Previous Mitigation Strategies

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Notes and *Report on Activities***
Flooding and Dam Failure	*Continue floodplain ordinance outreach within the community and ensure that homeowners and builders follow floodplain regulations	~$250	County and Municipal Zoning Offices	Continual	Medium	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Covered by Annual Budget and zoning staff	As new residents come into the community/county, outreach is necessary With new floodplain maps effective, consult parcel boundaries on all projects Adopted February 2010 City of Berlin: Floodplain ordinance was adopted in present DNR/FEMA format

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Notes and *Report on Activities***
	*Incorporate Floodplain information into Smart Growth Comprehensive Plan	unknown	County and City of Berlin Zoning Office	2010 – 2012	On-Going	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Covered by Annual Budget and zoning staff	Presently being undertaken with annual reviews of the Comprehensive Plan *This was completed in the 2016 county comprehensive plan update. It was also done by the Cities of Princeton. It will remain in the plan, which will be updated on schedule and this separate line-item will be dropped going forward.*
	*Mapping: • Keep updated topographic maps for purpose of current information inclusive of updated aerial photography	$75,000	Land Use Planning & Zoning Dept. and County Leaders	As funds are available	Medium	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Annual budget dollars used by zoning staff for projects	*Data was collected in 2009 in a LIDAR flight and data has been updated as able. This will be carried forward with edits.*
	• Update orthophoto (aerial photography)	$40,000		Every 5 years	High			Updated ortho will aide in the identification of areas at risk of flooding.

Appendix D: Report on Previous Mitigation Strategies

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Notes and *Report on Activities***
	*Look for acceptable (environmentally, socially, cost-benefit, politically, etc.), permanent solutions for removing water from flood-prone areas. Seek out funding sources (grants) to execute solutions.	~$500	Elected officials	Ongoing	High	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Covered by annual budget in elected official conferences	Some of the potential solutions may include acquisitions, demolitions, floodproofing or moving water to surface streams *No projects were identified or funded during this plan period. This will be carried forward.*
	*Advise the public of available governmental programs and information, including the NFIP, as it relates to flood issues	~$500	Zoning	Ongoing	Low	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Covered by Annual budget; CDBG EAP funding. Use zoning staff	*This was led by the emergency managers who provided public information during promotional events. It will be carried forward.*

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Notes and *Report on Activities***
	Riverbank improvements Downtown area. Franklin Street Bridge north to Pedestrian Bridge	$1.7 million	City of Berlin	2010 – 2020	Medium	City of Berlin	As funds become available or Special assessment policy	*Funding was not available; this project will be carried forward.* Implement the Waterfront Improvement project as adopted by Council in 2009
	*Stormwater Retention Ponds – North Business Park	$350,000	City Council	2 years	High	City of Berlin	As funds become available or Special assessment policy	*Funding was not available; this project will be carried forward.* Do a stormwater regional detention basis survey for North Business Park and Implement the development of it.

Appendix D: Report on Previous Mitigation Strategies

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Notes and *Report on Activities***
	*Southwest Drainage District. Create an area Wide drainage system to prevent flooding of private property	~$500,000 ($215,913 plus property acquisition)	City of Berlin	When funding is available	Medium	City of Berlin	As grants or funding become available or Special assessment policy	*Funding was not available; this project will be carried forward.* An initial study was made to determine the affect storm water/run-off has on this area and means to correct the problem A potential solution is to create waterways and ditches to channel water to prevent sheeting across many properties.
	Shorewall improvements – Riverside park	$500,000	City of Berlin	When funding is available	Medium	City of Berlin	As grants or funding become available – DNR funding sources	*Funding was not available; this project will be carried forward.*

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Notes and *Report on Activities***
	Berlin Foundry Shorewall – riverbank improvements	$750,000	Private	When funding is available	Medium	City of Berlin	As public facilities or economic development grants become available – CDBG PF for Economic Development	*Funding was not available; this project will be carried forward.* Privately owned, this foundry is set right on the banks of the river and has flooding through their buildings during times of high water. Measures to limit run-off into the river is important
	*Explore feasibility of purchasing properties along Dock Street	$175,000	City of Berlin	When funding is available	Medium	City of Berlin	As grant funds become available or Special assessment policy	*Funding was not available; this project will be carried forward.* The structures are storage facilities which may receive some damage in times of flooding however could be acquired and removed

Appendix D: Report on Previous Mitigation Strategies

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Notes and *Report on Activities***
	*Northeast Drainage District. Create an area-wide drainage system to prevent flooding of private property	$495,900	City of Berlin	When funding is available	Medium	City of Berlin	As grant funds become available or Special assessment policy	*Funding was not available to complete this project; it will be carried forward.* An ongoing project for 10 years, some steps have been taken for implementation however full completion of the project has not taken place yet A potential solution is to create waterways and ditches to channel water to prevent sheeting across many properties.
	Address flooding and roadway Repairs associated with West & East Marquette St. Preliminary solution is to increase storm sewer size.	$1,184,105	City of Berlin	When funding is available	medium	City of Berlin	As grant funds become available or Special assessment policy	*Funding was not available; this project will be carried forward.* Rain events greater than a 10 yr. storm event result in street flooding.

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Notes and *Report on Activities***
	Address flooding and roadway Repairs associated with Leffert St. Preliminary solution is to increase Storm sewer size	$528,390	City of Berlin	When funding is available	Medium	City of Berlin	As grant funds become available or Special assessment policy	*Funding was secured for this project and it was completed and will be dropped going forward.* Rain Events greater than a 10 yr. storm event result in street flooding
	Explore flooding problem on Water Street between Cumberland Street to E Noyes Street to stop flooding into homes.	Cost to be determined	City of Berlin	When funding is available	High	City of Berlin	As grant funds become available or Special assessment policy	*Funding was not available; this project will be carried forward.* The goal would be to prevent loss of personal property and business loss from flooding.
	Explore flooding problem in to properties on Junction Street between S. State Street and Church Street	Cost to be determined	City of Berlin	When funding is available	Medium	City of Berlin	As grant funds become available or Special assessment policy	*Funding was secured for this project and it was completed and will be dropped going forward.* The goal would be to prevent loss of personal property and business loss from flooding.

Appendix D: Report on Previous Mitigation Strategies

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Notes and *Report on Activities***
	Install Screen before Cumberland lift Station to prevent rags from clogging pumps in high flow events	$250,000	Berlin Utility	When funding is available	Medium	City of Berlin	As grant funds become available or Special assessment policy	*Funding was not available; this project will be carried forward.* The goal would be to prevent rags from getting into the wet well and clogging up pumps during floods or wet weather events, thus allowing employees to do other essential work
	Install new sanitary sewer main on East and West Marquette St from Center to Water St this is about 4500 ft. plus the intersections	$600,000	Berlin Utility	When funding is available	Medium	City of Berlin	As grant funds become available or Special assessment policy	*Funding was not available; this project will be carried forward.* The goal is to stop inflow and infiltration during flooding and heavy rain events. This sewer is a converted storm sewer and has many problems. This should be done in conjunction with a storm sewer program on the same street.

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	Continue to monitor lake level readings at Green Lake Upper Dam	~$500	City of Green Lake Public Works Dept.	Ongoing	High	City of Green Lake	Covered by annual budget and current staff	*Funding was not available; this project will be carried forward.* Currently readings are taken daily Monday through Friday when ice is not present.
	Street and drainage improvements to South Lawson Drive	$600,000	City of Green Lake Public Works Director and City Council	When funding is available	High	City of Green Lake	As grant funds become available or Special assessment policy	*Funding was not available; this project will be carried forward.* City applied for FEMA disaster relief in 2008 and was denied. City is applying for Tiger Funds. Street continually has drainage and repair issues and needs to be re-engineered.
	Explore flooding problem at Moorland and John St to stop flooding of Moorland apartments	Cost to be determined	City of Markesan	When funding is available	High	City of Markesan & Property owners	As grant funds become available or Special assessment policy	*Funding was not available; this project will be carried forward.* Prevent personal property loss

Appendix D: Report on Previous Mitigation Strategies

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	*Water retention area for properties on Manchester St. west of Margaret St.	Cost to be determined	City of Markesan	When funding is available	High	City of Markesan & Property owners	As grant funds become available or Special assessment policy	*Funding was not available; this project will be carried forward.* Prevent personal property loss
	*Buyouts/ Elevations: ▪ Business located at 450 N Margaret/Relocation ▪ Residence/garage at 95 S. Bridge	Cost to be determined	Zoning and City of Markesan	2015	Medium	City of Markesan & Property owners	As grant funds become available or Special assessment policy	*Funding was not secured for this project; it will be carried forward.* Prevent personal property loss Prevent personal property loss FEMA's PDM & FMA grants are potential funding sources for buyout.
	Install shut-offs in sewer lines (laterals) in the City of Markesan to keep water from flooding 20-30 properties.	~$1,000 per unit (1 valve/bldg.)	City of Markesan Wastewater Treatment	When funding is available	Med-High	City of Markesan	As grant funds become available or Special assessment policy	*Funding was not available; this project will be carried forward.* Installing these valves would affect ~100 structures, many of which house senior citizens and small, local businesses

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	Work with County & State DOT to Upgrade culvert at State HWY 44 and E. Vista and re-ditch 44 west of Margaret St	Covered by Dept. Annual budget	City of Markesan Green Lake County DOT	When funding is available	High	City of Markesan; Village of Kingston & Towns of Kingston & Manchester	As grant funds become available or Special assessment policy	*Funding was not available; this project will be carried forward.*
	Work with County & State DOT to clean trees and debris out of Grand River west side of City	Cost to be determined	City of Markesan Green Lake County DOT	When funding is available	Med-High	City of Markesan; Village of Kingston & Towns of Kingston & Manchester	As grant funds become available or Special assessment policy	*Funding was not available; this project will be carried forward.*
	*Create Flood Mitigation Plan and seek out additional floodplain mitigation grants	Covered by annual budget	City of Princeton	1 year	Very High	City of Princeton	Annual budget dollars used by zoning staff for projects	*Funding was secured for this project and it was completed and will be dropped going forward.* Document and provide details for existing procedures. The Hazard Preparedness Questionnaire lists this as a high priority. Currently have a BEBR Grant for a parcel located within the floodplain that we can use for improvements

Appendix D: Report on Previous Mitigation Strategies

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	Riptide mitigation grant	As grants available ($5,000)	City of Princeton	5 years	Low-Medium	City of Princeton	As grant funds become available	*Funding was not available; this project will be carried forward.*
	*Adopt 2010 FEMA map panels and revise Floodplain Zoning Ordinance.	P&Z Dept. annual budget	Land Use Planning & Zoning Dept.	Complete	High	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Annual budget dollars used by zoning staff for projects	*Funding was secured for this project and it was completed and will be dropped going forward.* Maps effective February 3, 2010
	*Acquire 2 foot LIDAR information and add layer to GIS site.	$132,910	Land Use Planning & Zoning Dept.	Complete	Med	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Annual budget dollars used by zoning staff for projects	*A 2' LIDAR flight was conducted and that data is currently in use. This project will be rolled into the overall mapping line item for the next plan.* Currently in use on GIS site as of January 2010

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	~~*Apply to FEMA for a LOMA to incorporate FEMA compliant 2 foot LIDAR information~~	P&Z Dept. Annual budget	Land Use Planning & Zoning Dept.	5 years	Med	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Annual budget dollars used by zoning staff for projects	*Funding was secured for this project and it was completed and will be dropped going forward.* Will require new panels to be printed.

Appendix D: Report on Previous Mitigation Strategies

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	*Complete Parcel Mapping	P&Z Dept. annual budget	Land Use Planning & Zoning Dept.	5 years	High	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Annual budget dollars used by zoning staff for projects	*Funding was secured for this project and it was completed and will be dropped going forward.* At completion, layer will be useful tool in identifying areas at risk and assessing damaging events. New GIS parcel maps will include current floodplain boundary information City of Berlin: the parcel mapping project is about 50% done. Budgetary constraints halted the local project from continuing at this time City of Green Lake is working with GL County to complete.

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	*Contract with aerial photography company "fly-overs" during 1% chance flood events (oblique).	To be determined	Land Use Planning & Zoning Dept.	Every 10 years	Low	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Annual budget dollars used by zoning staff for projects	*Funding was not available; this project will be carried forward and rolled into mapping line item.* Useful tool in determining level of damage and mitigating areas of concern.
	*Conduct a floodplain study at the confluence of the Fox River, White River, Puchyan River and Sucker Creek.	To be determined	Land Use Planning & Zoning Dept.	5 year	Low	Towns of Seneca and St. Marie	Annual budget dollars used by zoning staff for projects	*Funding was not available; this project will be carried forward.* Approximate floodplain area on FEMA maps. With study, safe development of the area could be accomplished.
	*Work with Robin's Nest Resort to acquire uplands (Ebert) to facilitate the removal of sites from flood fringe.	To be determined	Land Use Planning & Zoning Dept.	5 years	Low	Town of Marquette	Annual budget dollars used by zoning staff for projects	*Funding was secured for this project and it was completed and will be dropped going forward.* The Ebert property sites can be relocated out of the flood fringe and minimize access & damage concerns.

Appendix D: Report on Previous Mitigation Strategies

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	*Work with the Town of Marquette and Drager Road property owners to elevate Drager Rd. above RFE.	To be determined	Land Use Planning & Zoning Dept.	5 years	Low	Town of Marquette	Annual budget dollars used by zoning staff for projects	*Funding was not available; this project will be carried forward.* With contiguous dry land access the POs can elevate their homes and remove them from floodplain.
	*Work with the Town of Marquette and Marine Drive property owners to elevate Marine Dr. above RFE.	To be determined	Land Use Planning & Zoning Dept.	5 years	Low	Town of Marquette	Annual budget dollars used by zoning staff for projects	*Funding was not available; this project will be carried forward.* With contiguous dry land access the POs can elevate their homes and remove them from floodplain.
	*Work with the Town of Princeton and POs along Kuharski Rd to elevate Kuharski road above RFE.	To be determined	Land Use Planning & Zoning Dept.	5 years	Low	Town of Princeton	Annual budget dollars used by zoning staff for projects	*Funding was not available; this project will be carried forward.* With contiguous dry land access the POs can elevate their homes and remove them from Floodplain.

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	*Explore hazard mitigation opportunities (i.e., buyout or elevation) on Fox River Lane as well as Birch Lane.	To be determined	Land Use Planning & Zoning Dept.	5 years	Low	Town of Princeton	Annual budget dollars used by zoning staff for projects	*Funding was not available; this project will be carried forward.* Several homes were completely surrounded by flood waters in June of 2008.
	Continue working on shoreline restoration and lake clearing projects	Covered by annual budget	Village of Kingston	Ongoing	Medium	Village of Kingston	Annual budget dollars used by zoning staff for projects	*Minor projects were done as funding available; project will carry forward.*
	*Explore hazard mitigation opportunities (i.e., buyout or elevation) in the Village of Marquette.	To be determined	Land Use Planning & Zoning Dept. and Village Leaders	Ongoing	Medium	Village of Marquette	Annual budget dollars used by zoning staff for projects	*Funding was not available; this project will be carried forward.* Several homes were completely surrounded by flood waters in June of 2008.
Fog	Provide public information via website links and/or brochures regarding safe driving procedures in the fog	Covered by ~$500	EM Dept., Sheriff's Office and Muni PDs	Ongoing	Low	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake,	Annual budget dollars used by EM staff for projects	*This project was completed and, due to the low risk of fog in the area and limited availability of hazard mitigation options for it, Fog will be de-listed.*

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						Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie		
Forest Fires and Wildfires	Continue to provide outreach efforts to homeowners on protecting homes and structures from wildfires and on obtaining the proper burn permits	~$1,000	Local Fire Departments	Ongoing	Low	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Annual budget dollars used by fire department staff for projects	*This is an ongoing project that was done at public relations events and in conjunction with fire weeks. It will continue in the next plan period.*
	Explore the possibility of creating dry hydrants for filling trucks for fires	To be determined	Kingston Fire Dept.	2013	Medium	Village of Kingston	As grant funds become available or Special assessment policy	*Funding was not available; this project will be carried forward.*

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	Provide ample training for volunteer fire fighters for larger wildfires	Costs vary	Local Fire Departments, EM Dept.	Ongoing	Medium	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Annual budget dollars used by fire department staff for projects. DNR statewide training grants for firefighters.	*This is an ongoing project that was done annually (spring) by local fire departments and the WI DNR. It will continue in the next plan period.* Annual training is provided in spring by the WI DNR for county firefighters. Closest DNR office is Montello (Marquette Co.)
Landslide	Evaluate areas with known karst geological features for new fissures. Ensure that direct access to the water table (i.e., without filtering through the soil) is not opened in a fissure.	To be determined	Land Conservation	Ongoing	Medium	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Annual budget dollars used by LCD staff for projects	*This is an ongoing project that was done as needed. It will continue in the next plan period.*

Appendix D: Report on Previous Mitigation Strategies

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Severe Temper-atures	Continue public informational campaigns about severe weather on the website and during Winter and Heat Awareness Weeks.	~$250	EM Dept.	Ongoing	Medium	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Annual budget dollars used by EM staff for projects	*This was done in annual campaigns in Fall and Spring and will continue in the next plan period.* Continue public informational campaigns about severe weather on the website and during Winter and Heat Awareness Weeks.
	Continue to provide sheltering services to citizens in need during severe temperatures.	Costs vary	Human Services with EM assistance	As needed	High	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Annual budget dollars used by EM and HHS staff for projects	*This was done as needed and will continue in the next plan period.* A protocol exists and is used during severe temperature outbreaks to open community shelters.

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Storms: Hail	Place hail storm safety materials in county display rack, on the website and during severe weather week.	~$250	EM Dept.	Ongoing	Medium	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Annual budget dollars used by EM staff for projects	*This was done in the Spring Severe Weather Awareness Week annual campaign and will continue in the next plan period.*
	Provide information regarding the purchase of crop insurance	~$250	UW Ext	Ongoing	Low	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Annual budget dollars used by UW-Ext staff for projects	*This is an ongoing project that was done as needed. It will continue in the next plan period.*
Storms: Lightning	Place lightning safety materials in county display rack, on the website and during severe weather week.	~$250	EM Dept. and City of Markesan EM	Ongoing	Medium	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Annual budget dollars used by EM staff for projects	*This was done in the Spring Severe Weather Awareness Week annual campaign and will continue in the next plan period.*

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	Provide information regarding the use of fire-resistant materials and surge protectors.	~$250	EM Dept.	Ongoing	Low	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Annual budget dollars used by EM staff for projects	*This was done in the Spring Severe Weather Awareness Week annual campaign and will continue in the next plan period.*
Storms: Thunderstorm	Place thunderstorm safety materials in county display rack, on the website and during severe weather week.	~$250	EM Dept. ~~and City of Markesan EM~~	Ongoing	Medium	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Annual budget dollars used by EM staff for projects	*This was done in the Spring Severe Weather Awareness Week annual campaign and will continue in the next plan period.*
	Work with local fair/festival boards, as requested, to create emergency plans in case of bad weather.	~$2500	EM Dept.	Ongoing	Medium	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Annual budget dollars used by EM staff for projects	*This is an ongoing project that was done as requested. It will continue in the next plan period.* EM regularly works with the county fair board and other large events. The EM office also completed an emergency plan for the fairgrounds.

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Storms: Tornadoes and High Winds	Explore the feasibility of constructing tornado shelters in areas where deficient especially in mobile home parks.	Costs vary	City of Markesan, Markesan EM	Ongoing	Medium	City of Markesan Town of Green Lake	As grant funds become available or Special assessment policy. Grant options include CDBGs and WEM HazMit, when available.	*Funding was not available; this project will be carried forward.*
	Explore the feasibility of increasing the wind resistance of the roofs of community storm shelters.	~$500	EM Dept.	As grants available	Medium	City Of Markesan Town of Green Lake	Annual budget dollars used by EM staff for projects	*Funding was not available; this project will be carried forward.*
	Promote tornado awareness, including safety measures.	~$250	EM Dept.	Ongoing	Medium	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Annual budget dollars used by EM staff for projects	*This was done in the Spring Severe Weather Awareness Week annual campaign and will continue in the next plan period.* Done during tornado awareness week in April. Information will be included on the website for homes, schools and business safety measures.

Appendix D: Report on Previous Mitigation Strategies

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Storms: Winter	Promote winter hazards awareness, including home and travel safety measures (including website.)	~$250	EM Dept.	Ongoing	Medium	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Annual budget dollars used by EM staff for projects	*This was done in the Fall Winter Weather Awareness Week annual campaign and will continue in the next plan period.* Done during winter weather awareness week in November.
Utility Failure	There are 3 lift-station locations, none of which have generator back up. The city would like to install three permanent generators.	$35-40K/unit for permanent generators	City of Markesan Wastewater Treatment	2014	High	City Markesan	As grant funds become available.	*Funding was not available; this project will be carried forward.*
	Install back up power at Well # 5	$300,000	Berlin Utility	When funding is available	Medium	City of Berlin	As grant funds become available or Special assessment policy.	*Funding was not available; this project will be carried forward.* The goal is to have backup power to more than one Well in the City Berlin has 3 Wells

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	Install back up power at water towers	$100,000 for both	Berlin Utility	When funding is available	Medium/ High	City of Berlin	As grant funds become available or Special assessment policy.	*Funding was not available; this project will be carried forward.* The goal is to have backup power to the Towers. The towers control the pumps under emergency conditions, and also our SCADA system for the Water & Sewer Systems
	Install circulation pumps in 2 water towers	$50,000 Ea	Berlin Utility	When funds are available	Medium	City of Berlin	As grant funds become available or Special assessment policy.	*Funding was secured for this project and it was completed and will be dropped going forward.* The goal would be to stop the towers from freezing during the low flow in winter months
	Install back up power at wells	$200,000	City of Markesan Utility	When funding is available	Medium	City of Markesan	As grant funds become available or Special assessment policy.	*Funding was not available; this project will be carried forward.* To have backup power to well in the city for fire suppression

Appendix D: Report on Previous Mitigation Strategies

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	Install back up power at water tower	$100,000	City of Markesan Utility	When funding is available	Medium/ High	City of Markesan	As grant funds become available or Special assessment policy.	*Funding was not available; this project will be carried forward.* The goal is to have backup power to the Towers. The towers control the pumps under emergency conditions, and also our SCADA system for the Water & Sewer Systems

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	Consider back-up power needs. The county is purchasing a large, portable generator (100-150 KW, trailer-mounted with delivery in '10) with the major goal of providing power at any mass clinic site but can be used at shelters if not needed for a clinic. May need to evaluate if this is sufficient for sheltering operations.	Costs vary $135,000 UASI grant for purchased generator	EM Dept. and Health and Human Services Dept.	Ongoing	High	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	As grant funds become available or Special assessment policy.	*Funding was not available; this project will be carried forward.* Currently emergency shelters only have emergency back-up power (e.g., to exit lights), which is not adequate to fulfill the needs of evacuees.

EM Dept = Green Lake County Emergency Management Department
UW Ext = University of Wisconsin – Green Lake County Extension Office
* Designates an element that supports the NFIP.

Appendix E: Summary of Mitigation Strategies

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All Hazards	Comprehensive Plan Implementation	~$2,000	City of Berlin Zoning Office; City of Princeton Plan Commission City of Green Lake Plan Commission and City Council	Ongoing	High Medium Medium	City of Berlin City of Princeton City of Green Lake	Zoning Ordinances, Zoning Department Staff using municipal budget dollars	Plans are current and will be continually reviewed and consulted as development continues over its 10-year life cycle.
	Continue to promote the increased use of National Oceanic and Atmospheric Administration (NOAA) weather radios	~$1,000 per entity	EM Dept. and Cities of Berlin, Green Lake, Markesan and Princeton EM Depts.	As grants available	High	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Emergency Management Staff using department budget	

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	Continue to add/update preparedness links on governmental websites (e.g., ARC, FEMA, WEM) and publicize them to let citizens know about the information.	~$1,000 per entity	EM Depts. (County and Cities of Green Lake and Markesan) with the assistance of the Clerks and IT.	Ongoing	Low	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Governmental staff using county budget dollars	
	Purchase and install three more weather data collection stations	~$500	City of Markesan EM Dept.	On-going	Low	City of Markesan	EM Staff. As grants available.	The goals would be to purchase web-enabled devices that could share information with the National Weather Service as well as provide current information to citizens on city web site.

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	Upgrade area early warning sirens: • Markesan has 4 and 2 need replacing.	$15K/ea-$30K total	City of Markesan EM Dept.	2015	Medium – High	City of Markesan	As funding available	
	• Siren for the Soldiers & Sailors City Park	$15k	City of Markesan/ Town of Green Lake	2015	Medium – High	City of Markesan, Town of Green Lake	As funding available	
	• Determine disposition of courthouse siren.	Unknown	City of Green Lake	Ongoing	High	City of Green Lake	City staff using current budget	Continue maintaining the civil defense siren on the downtown courthouse or move to a new location if the courthouse is sold to a private developer.
	• Municipal Emergency Siren	$30,000	City of Princeton	2018	High	City of Princeton and immediate surrounding areas	City Annual budget	Siren is very old and new one will be able to be set off from a remote location
	Bring Markesan School District & school bus companies from UHF to VHF band.	unknown	City of Markesan EM Dept., School Dists, Bus Companies	2012	Medium	City of Markesan	EM staff, as funding allows	For interoperability during school uses and during disaster, when resource may be used by communities.
	Emergency Operations Manual	~$500	City of Princeton	Ongoing	Low	City of Princeton	City staff using current annual budget	Annually review and update.

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Comments**
	8 new hand-held radios and one base station with new required frequency	$15,000	Berlin Utility	2 years	Medium/ High	City of Berlin	Utility staff as funding is available	The goal is to have radios for all utility employees in an emergency situation
	Explore the purchase of emergency lighting equipment	$80,000	Princeton EG	3 years	Medium	City of Princeton or surrounding communities for mutual aid	Municipal Budget	As Princeton owns the Electric Utility, emergency lighting is needed when outages take place
Drought and Dust Storms	County should be prepared to provide information to farmers (e.g., crop irrigation, crop insurance) during times of drought	~$200	UW-Ext./FSA	As needed	Low	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Covered by annual budget and UW-Ex/FSA staff	
	Prepare/publicize water usage information for non-farm areas during drought	~$500	Municipal Water Utilities	As needed	Low	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Covered by annual budget and water utility staff	

Appendix E: Summary of Mitigation Strategies

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Comments**
Flooding and Dam Failure	*Continue floodplain ordinance outreach within the community and ensure that homeowners and builders follow floodplain regulations	~$250	County and Municipal Zoning Offices	Continual	Medium	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Covered by Annual Budget and zoning staff	As new residents come into the community/county, outreach is necessary With new floodplain maps effective, consult parcel boundaries on all projects Adopted February 2010 City of Berlin: Floodplain ordinance was adopted in present DNR/FEMA format

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Comments**
	*Mapping: *Update GIS data collection and incorporation on schedule with the "Green Lake Land Information Plan" *Apply to FEMA for a LOMA to incorporate FEMA compliant 1 foot LIDAR information *Contract with aerial photography company "fly-overs" during 1% chance flood events (oblique).	Unknown	Land Use Planning & Zoning Dept. and County Leaders	As funds are available	High	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Annual budget dollars used by zoning staff for projects	The Green Lake Land Information Plan 2016-2018[153] describes the data available and the updating schedule. The county currently has 2' LIDAR mapping and plans to upgrade to 1' in the next flight, scheduled for 2020 for an estimated $100,000 cost. Will require new panels to be printed. Useful tool in determining level of damage and mitigating areas of concern.

[153] http://www.co.green-lake.wi.us/uploads/forms/landinfoplan20162018.pdf

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Comments**
	*Look for acceptable (environmentally, socially, cost-benefit, politically, etc.), permanent solutions for removing water from flood-prone areas. Seek out funding sources (grants) to execute solutions.	~$500	Elected officials	Ongoing	High	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Covered by annual budget in elected official conferences	Some of the potential solutions may include acquisitions, demolitions, floodproofing or moving water to surface streams
	*Advise the public of available governmental programs and information, including the NFIP, as it relates to flood issues	~$500	Zoning	Ongoing	Low	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Covered by Annual budget; CDBG EAP funding. Use zoning staff	
	Riverbank improvements Downtown area. Franklin Street Bridge north to Pedestrian Bridge	$1.7 million	City of Berlin	2010 – 2020	Medium	City of Berlin	As funds become available or Special assessment policy	Implement the Waterfront Improvement project as adopted by Council in 2009

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Comments**
	*Stormwater Retention Ponds – North Business Park	$350,000	City Council	2 years	High	City of Berlin	As funds become available or Special assessment policy	Do a stormwater regional detention basis survey for North Business Park and Implement the development of it.
	*Southwest Drainage District. Create an area Wide drainage system to prevent flooding of private property	~$500,000 ($215,913 plus property acquisition)	City of Berlin	When funding is available	Medium	City of Berlin	As grants or funding become available or Special assessment policy	An initial study was made to determine the affect storm water/run-off has on this area and means to correct the problem A potential solution is to create waterways and ditches to channel water to prevent sheeting across many properties.
	Shorewall improvements – Riverside park	$500,000	City of Berlin	When funding is available	Medium	City of Berlin	As grants or funding become available – DNR funding sources	
	Berlin Foundry Shorewall – riverbank improvements	$750,000	Private	When funding is available	Medium	City of Berlin	As public facilities or economic development grants become available – CDBG PF for Economic Development	Privately owned, this foundry is set right on the banks of the river and has flooding through their buildings during times of high water. Measures to limit run-off into the river is important

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Comments**
	*Explore feasibility of purchasing properties along Dock Street	$175,000	City of Berlin	When funding is available	Medium	City of Berlin	As grant funds become available or Special assessment policy	The structures are storage facilities which may receive some damage in times of flooding however could be acquired and removed
	*Northeast Drainage District. Create an area-wide drainage system to prevent flooding of private property	$495,900	City of Berlin	When funding is available	Medium	City of Berlin	As grant funds become available or Special assessment policy	An ongoing project for 10 years, some steps have been taken for implementation however full completion of the project has not taken place yet A potential solution is to create waterways and ditches to channel water to prevent sheeting across many properties.
	Address flooding and roadway Repairs associated with West & East Marquette St. Preliminary solution is to increase storm sewer size.	$1,184,105	City of Berlin	When funding is available	Medium	City of Berlin	As grant funds become available or Special assessment policy	Rain events greater than a 10 yr. storm event result in street flooding.

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Comments**
	Explore flooding problem on Water Street between Cumberland Street to E Noyes Street to stop flooding into homes.	Cost to be determined	City of Berlin	When funding is available	High	City of Berlin	As grant funds become available or Special assessment policy	The goal would be to prevent loss of personal property and business loss from flooding.
	Install Screen before Cumberland lift Station to prevent rags from clogging pumps in high flow events	$250,000	Berlin Utility	When funding is available	Medium	City of Berlin	As grant funds become available or Special assessment policy	The goal would be to prevent rags from getting into the wet well and clogging up pumps during floods or wet weather events, thus allowing employees to do other essential work
	Install new sanitary sewer main on East and West Marquette St from Center to Water St this is about 4500 ft. plus the intersections	$600,000	Berlin Utility	When funding is available	Medium	City of Berlin	As grant funds become available or Special assessment policy	The goal is to stop inflow and infiltration during flooding and heavy rain events. This sewer is a converted storm sewer and has many problems. This should be done in conjunction with a storm sewer program on the same street.
	Continue to monitor lake level readings at Green Lake Upper Dam	~$500	City of Green Lake Public Works Dept.	Ongoing	High	City of Green Lake	Covered by annual budget and current staff	Currently readings are taken daily Monday through Friday when ice is not present.

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Comments**
	Complete any remaining street and drainage improvements to South Lawson Drive	$600,000	City of Green Lake Public Works Director and City Council	When funding is available	High	City of Green Lake	As grant funds become available or Special assessment policy	City applied for FEMA disaster relief in 2008 and was denied. City is applying for Tiger Funds. Street continually has drainage and repair issues and needs to be re-engineered.
	Explore flooding problem at Moorland and John St to stop flooding of Moorland apartments	Cost to be determined	City of Markesan	When funding is available	High	City of Markesan & Property owners	As grant funds become available or Special assessment policy	Prevent personal property loss
	*Water retention area for properties on Manchester St. west of Margaret St.	Cost to be determined	City of Markesan	When funding is available	High	City of Markesan & Property owners	As grant funds become available or Special assessment policy	Prevent personal property loss
	*Buyouts/ Elevations: ▪ Business located at 450 N Margaret/Relocation ▪ Residence/garage at 95 S. Bridge	Cost to be determined	Zoning and City of Markesan	2015	Medium	City of Markesan & Property owners	As grant funds become available or Special assessment policy	Prevent personal property loss Prevent personal property loss FEMA's PDM & FMA grants are potential funding sources for buyout.

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Comments**
	Install shut-offs in sewer lines (laterals) in the City of Markesan to keep water from flooding 20-30 properties.	~$1,000 per unit (1 valve/bldg.)	City of Markesan Wastewater Treatment	When funding is available	Med-High	City of Markesan	As grant funds become available or Special assessment policy	Installing these valves would affect ~100 structures, many of which house senior citizens and small, local businesses
	Work with County & State DOT to Upgrade culvert at State HWY 44 and E. Vista and re-ditch 44 west of Margaret St	Covered by Dept. Annual budget	City of Markesan Green Lake County DOT	When funding is available	High	City of Markesan; Village of Kingston & Towns of Kingston & Manchester	As grant funds become available or Special assessment policy	
	Work with County & State DOT to clean trees and debris out of Grand River west side of City	Cost to be determined	City of Markesan Green Lake County DOT	When funding is available	Med-High	City of Markesan; Village of Kingston & Towns of Kingston & Manchester	As grant funds become available or Special assessment policy	
	Explore options for erosion mitigation projects	As grants available ($5,000)	City of Princeton	5 years	Low-Medium	City of Princeton	As grant funds become available	
	Riverbank Stabilization – Water Street	$600,000	City of Princeton	2020 or when funds become available	Medium	City of Princeton	Annual budgets or as grant funding becomes available	Elimination of flooding and property damage

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Comments**
	*Conduct a floodplain study at the confluence of the Fox River, White River, Puchyan River and Sucker Creek.	To be determined	Land Use Planning & Zoning Dept.	5 year	Low	Towns of Seneca and St. Marie	Annual budget dollars used by zoning staff for projects	Approximate floodplain area on FEMA maps. With study safe development of the area could be accomplished.
	*Work with the Town of Marquette and Drager Road property owners to elevate Drager Rd. above RFE.	To be determined	Land Use Planning & Zoning Dept.	5 years	Low	Town of Marquette	Annual budget dollars used by zoning staff for projects	With contiguous dry land access the POs can elevate their homes and remove them from floodplain.
	*Work with the Town of Marquette and Marine Drive property owners to elevate Marine Dr. above RFE.	To be determined	Land Use Planning & Zoning Dept.	5 years	Low	Town of Marquette	Annual budget dollars used by zoning staff for projects	With contiguous dry land access the POs can elevate their homes and remove them from floodplain.
	*Work with the Town of Princeton and POs along Kuharski Rd to elevate Kuharski road above RFE.	To be determined	Land Use Planning & Zoning Dept.	5 years	Low	Town of Princeton	Annual budget dollars used by zoning staff for projects	With contiguous dry land access the POs can elevate their homes and remove them from Floodplain. This area flooded in the Sept. 2018 flooding. The road is the only access to approximately 8 homes.

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Comments**
	*Explore hazard mitigation opportunities (i.e., buyout or elevation) on Fox River Lane as well as Birch Lane.	To be determined	Land Use Planning & Zoning Dept.	5 years	Low	Town of Princeton	Annual budget dollars used by zoning staff for projects	Several homes were completely surrounded by flood waters in June of 2008.
	Continue working on shoreline restoration and lake clearing projects	Covered by annual budget	Village of Kingston	Ongoing	Medium	Village of Kingston	Annual budget dollars used by zoning staff for projects	
	*Explore hazard mitigation opportunities (i.e., buyout or elevation) in the Village of Marquette.	To be determined	Land Use Planning & Zoning Dept. and Village Leaders	Ongoing	Medium	Village of Marquette	Annual budget dollars used by zoning staff for projects	Several homes were completely surrounded by flood waters in June of 2008.
Forest and Wildfires	Continue to provide outreach efforts to homeowners on protecting homes and structures from wildfires and on obtaining the proper burn permits	~$1,000	Local Fire Departments	Ongoing	Low	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Annual budget dollars used by fire department staff for projects	

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Comments**
	Explore the possibility of creating dry hydrants for filling trucks for fires	To be determined	Kingston Fire Dept.	2013	Medium	Village of Kingston	As grant funds become available or Special assessment policy	
	Provide ample training for volunteer fire fighters for larger wildfires	Costs vary	Local Fire Departments, EM Dept.	Ongoing	Medium	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Annual budget dollars used by fire department staff for projects. DNR statewide training grants for firefighters.	Annual training is provided in spring by the WI DNR for county firefighters. Closest DNR office is Montello (Marquette Co.)
Landslide	Evaluate areas with known karst geological features for new fissures. Ensure that direct access to the water table (i.e., without filtering through the soil) is not opened in a fissure.	To be determined	Land Conservation	Ongoing	Medium	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Annual budget dollars used by LCD staff for projects	

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Comments**
Severe Temper-atures	Continue public informational campaigns about severe weather on the website and during Winter and Heat Awareness Weeks.	~$250	EM Dept	Ongoing	Medium	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Annual budget dollars used by EM staff for projects	Done in annual campaigns in Fall and Spring. Continue public informational campaigns about severe weather on the website and during Winter and Heat Awareness Weeks.
	Continue to provide sheltering services to citizens in need during severe temperatures.	Costs vary	Human Services with EM assistance	As needed	High	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Annual budget dollars used by EM and HHS staff for projects	A protocol exists and is used during severe temperature outbreaks to open community shelters.
Storms: Hail	Place hail storm safety materials in county display rack, on the website and during severe weather week.	~$250	EM Dept	Ongoing	Medium	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Annual budget dollars used by EM staff for projects	

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Comments**
	Provide information regarding the purchase of crop insurance	~$250	UW Ext	Ongoing	Low	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Annual budget dollars used by UW-Ext staff for projects	
Storms: Lightning	Place lightning safety materials in county display rack, on the website and during severe weather week.	~$250	EM Dept	Ongoing	Medium	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Annual budget dollars used by EM staff for projects	
	Provide information regarding the use of fire-resistant materials and surge protectors.	~$250	EM Dept	Ongoing	Low	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Annual budget dollars used by EM staff for projects	

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Comments**
	Update the utility control system (SCADA), which could be made inoperable by a lightning strike or excessive rainfall.	Unknown	Princeton Utilities	5 years	High	City of Princeton	Capital improvements budget	The system is very old and cannot be serviced due to advanced age. Failed in 2016 but were able to get back-ups for critical buildings.
Storms: Thunder-storm	Place thunderstorm safety materials in county display rack, on the website and during severe weather week.	~$250	EM Dept	Ongoing	Medium	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Annual budget dollars used by EM staff for projects	
	Work with local fair/festival boards, as requested, to create emergency plans in case of bad weather.	~$2500	EM Dept	Ongoing	Medium	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Annual budget dollars used by EM staff for projects	EM regularly works with the county fair board and other large events. The EM office also completed an emergency plan for the fairgrounds.

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Comments**
Storms: Tornadoes and High Winds	Explore the feasibility of constructing tornado shelters in areas where deficient especially in mobile home parks.	Costs vary	EM Dept. and City of Markesan EM	Ongoing	Medium	City of Markesan Town of Green Lake	As grant funds become available or Special assessment policy. Grant options include CDBGs and WEM HazMit, when available.	
	Explore the feasibility of increasing the wind resistance of the roofs of community storm shelters.	~$500	EM Dept	As grants available	Medium	City of Markesan Town of Green Lake	Annual budget dollars used by EM staff for projects	
	Promote tornado awareness, including safety measures.	~$250	EM Dept	Ongoing	Medium	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Annual budget dollars used by EM staff for projects	Done during tornado awareness week in April. Information will be included on the website for homes, schools and business safety measures.

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Comments**
Storms: Winter	Promote winter hazards awareness, including home and travel safety measures (including website.)	~$250	EM Dept	Ongoing	Medium	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	Annual budget dollars used by EM staff for projects	Done during winter weather awareness week in November.
Utility Failure	There are 3 lift-station locations, none of which have generator back up. The city would like to install three permanent generators.	$35-40K/unit for permanent generators	City of Markesan Wastewater Treatment	2014	High	City Markesan	As grant funds become available.	
	Install back up power at Well # 5	$300,000	Berlin Utility	When funding is available	Medium	City of Berlin	As grant funds become available or Special assessment policy.	The goal is to have backup power to more than one Well in the City Berlin has 3 Wells
	Install back up power at water towers	$100,000 for both	Berlin Utility	When funding is available	Medium/ High	City of Berlin	As grant funds become available or Special assessment policy.	The goal is to have backup power to the Towers. The towers control the pumps under emergency conditions, and also our SCADA system for the Water & Sewer Systems

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Comments**
	Install back up power at wells	$200,000	City of Markesan Utility	When funding is available	Medium	City of Markesan	As grant funds become available or Special assessment policy.	To have backup power to well in the city for fire suppression
	Install back up power at water tower	$100,000	City of Markesan Utility	When funding is available	Medium/ High	City of Markesan	As grant funds become available or Special assessment policy.	The goal is to have backup power to the Towers. The towers control the pumps under emergency conditions, and also our SCADA system for the Water & Sewer Systems
	Provide and Install portable Back-up Generator Webster Street	$50,000	City of Berlin Utility	When funding is available	Medium/ High	City of Berlin	As grant funds become available or special assessment policy	The goal is to have back-up power for remote locations
	Provide and Install permanent Back-up Generator Cumberland Street	$80,000	City of Berlin Utility	When funding is available	Medium/ High	City of Berlin	As grant funds become available or special assessment policy	The goal is to have back-up power for remote locations
	Provide and install portable back-up Generators for three lift stations	$75,000 each or $225,000 total	City of Princeton Utility	When funding is available	Medium/ High	City of Princeton	As grant funding becomes available or through utility revenue	The goal is to have back-up power for all remote locations

Summary of Mitigation Strategies								
Hazard Type	**Mitigation Measures**	**Costs of Project**	**Responsible Management**	**Project Timetable**	**Project Priority**	**Community(ies) Benefitting**	**Authorities, Policies, Programs or Resources**	**Comments**
	Consider back-up power needs.	Costs vary $135,000 UASI grant for purchased generator	EM Dept and Health and Human Services Dept	Ongoing	High	Green Lake County; Cities of Berlin, Green Lake, Markesan & Princeton; Villages of Kingston & Marquette; Towns of Berlin, Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Seneca & St. Marie	As grant funds become available or Special assessment policy.	Currently emergency shelters only have emergency back-up power (e.g., to exit lights), which is not adequate to fulfill evacuee needs.

EM Dept = Green Lake County Emergency Management Department
UW Ext = University of Wisconsin – Green Lake County Extension Office
*** Designates an element that supports the NFIP.**

Appendix F: HAZUS Vulnerability Assessment

Requests HAZUS from WEM & will insert when received.

Appendix G: Community Input

Green Lake 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 for the all-hazards pre-disaster mitigation plan.

DATE	SUMMARY OF OPPORTUNITY
July, 2017	Initial press release sent to local media outlets (i.e., Berlin Journal, Green Lake Reporter, Markesan Herald, Princeton Times) notifying the public of the planning grant and requesting interested parties for participation. See copy of the release and scan of article (follows). It was also put on the "News" section of the county website.
August, 2017	Green Lake Community Survey was sent with a cover letter to all municipal officials. Copy of cover memo and compilation of comments received follows.
August, 2017	Mitigation brochures were printed and distributed around public locations in Green Lake County. A copy is attached.
4 August 2017	Pre-Disaster Mitigation plan meeting with core workgroup.
5 October 2017	Pre-Disaster Mitigation plan meeting with core workgroup.
Over Several Quarters	Green Lake County EM, contractor and PDM workgroup met via remote technologies (phone, email, etc.) to review the plan draft and hazard mitigation strategies.
	Press release was sent to local media outlets to notify the public that the plan was completed and available for review.
	Notice of plan availability for public review and comment was placed in the Public Notice section of the newspaper.
	Copies of the plan were sent to the municipal leaders of the cities, villages and towns in Green Lake County. Additionally county board officials were given the plan for

	review and comment. Comments were received and the few, minor edits were incorporated into the plan.
	Copies of the plan were sent to the Emergency Management Directors of the contiguous counties for review and comment. No comments were received.

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. 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.

30 June 2017

For More Information, Contact Gary Podoll (920-361-5416)
For Immediate Release

Green Lake County Received Pre-Disaster Hazard Mitigation Planning Grant

(Green Lake, WI) Green Lake County, like the rest of the State of Wisconsin, is vulnerable to a variety of disasters. Wisconsin has incurred disaster-related damages totaling nearly $3 billion in the last three decades, with almost half of that occurring in the 1990s alone. These losses can be reduced through mitigation activities. It is estimated that for every dollar spent on mitigation, $2 to $3 in future damages can be avoided. Hazard mitigation breaks the cycle of damage and repair.

Mitigation actions reduce or eliminate the long-term risk to human life and property from hazards. These preventative actions can be simple such as elevating a furnace in a basement that sometimes has water on the floor. Mitigation can also have a comprehensive approach such as relocating buildings out of the floodplain or strengthening critical facilities to prevent wind damage and provide stronger shelter.

In an effort to better prepare Green Lake County to manage its vulnerability to disaster, Gary Podoll, Green Lake County Emergency Management Director, applied for and received a Pre-Disaster Mitigation (PDM) planning grant. This goal of this grant is to complete an approvable plan, which will serve as a roadmap that outlines potential cost-effective hazard mitigation activities, some of which might be available for future grant funding.

The plan is designed to look at the risks and vulnerabilities that the county faces from natural disaster and to highlight mitigation strategies that might reduce future losses. As part of this planning process, Podoll is assembling a workgroup to review and guide the planning activities. The workgroup is reviewing initial background information about Green Lake County and has begun identifying strategies that might help.

Podoll stated, "I am very excited about this part of the planning process. The input from the workgroup can have long-lasting impacts, making Green Lake County safer and more disaster resistant."

FEMA has recognized the importance of having members of the community involved in the process and Podoll would like to ensure that all interested members of the community have an opportunity to provide input into the plan. If you are interested in more information about the plan or would like to provide input into the plan, please contact Gary Podoll at 920-361-5416.

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nday event is the 4-H

ous year-round sponsors of the 4-H program.

Diamond Sponsors: Alliance Laundry Systems, American Family Insurance/Tabitha Pierce, Avalon/Precision Metalsmiths, Ballweg Implement, Beck's Meat Processing, Cliff's Tire & Battery, Fox River Family Dentistry, Kelly L. White DDS, Markesan State Bank, Green Lake County Farm Bureau, Holliday Food & Sport, Jaster's Ag-Supply, Napralla Tire, Norton's Dry Dock, Redeker Dairy Equipment, Shepard's Drive-In, Sondalle Motors, Superheat & Cooling, United Cooperative, VandeCastle Chiropractic, Veterinary Clinics Berlin - Ripon, Waupun Equipment, Wautharn Dental Associates.

All County Pap

Green Lake County receives grant for Pre-Disaster Mitigation planning

August 3, 2005

Green Lake County, like the rest of the State of Wisconsin, is vulnerable to a variety of disasters. In the last thirty years, Wisconsin has incurred disaster-related damages totaling nearly $3 billion, with almost half of that occurring in the 1990s alone. These losses can be reduced through mitigation activities. It is estimated that for every dollar spent on mitigation, two to three dollars in future damages can be avoided. Hazard mitigation breaks the cycle of damage and repair.

Mitigation actions reduce or eliminate the long-term risk to human life and property. Preventative actions can be simple, such as elevating a furnace in a basement that sometimes has water on the floor. Mitigation can also involve a comprehensive approach such as moving buildings out of a flood plain, or strengthening them against wind damage.

In an effort to better guard Green Lake County against disaster, Green Lake County Emergency Management Director Gary Podoll applied for and received a Pre-Disaster Mitigation (PDM) planning grant. This grant funds the creation of a so-called "approvable plan", which will serve as a road map outlining potential cost-effective hazard mitigation activities, some of which might be available for future grant funding.

The plan is designed to look at the risks and vulnerabilities that the county may face from natural disaster, and to highlight mitigation strategies that might reduce future losses. As part of this planning process, Podoll is assembling a work group to review and guide the planning activities. The work group is reviewing initial background information about Green Lake County and has begun identifying strategies.

Said Podoll, "I am very excited about this part of the planning process. The input from the work group can have long-lasting impacts, making Green Lake County safer and more disaster-resistant."

FEMA has recognized the importance of having members of the community involved in the process, and Podoll would like to ensure that all interested members of the community have an opportunity to contribute. For more information or to offer input, contact Gary Podoll at (920) 361-5416.

News

Pre-Disaster Hazard Mitigation Planning Grant.

For More Information, Contact Gary Podoll (920-361-5416)
For Immediate Release

Green Lake County Received Pre-Disaster Hazard Mitigation Planning Grant (Green Lake, WI)

Green Lake County, like the rest of the State of Wisconsin, is vulnerable to a variety of disasters. Wisconsin has incurred disaster-related damages totaling nearly $3 billion in the last three decades, with almost half of that occurring in the 1990s alone. These losses can be reduced through mitigation activities. It is estimated that for every dollar spent on mitigation, $2 to $3 in future damages can be avoided. Hazard mitigation breaks the cycle of damage and repair.

Mitigation actions reduce or eliminate the long-term risk to human life and property from hazards. These preventative actions can be simple such as elevating a furnace in a basement that sometimes has water on the floor. Mitigation can also have a comprehensive approach such as relocating buildings out of the floodplain or strengthening critical facilities to prevent wind damage and provide stronger shelter.

In an effort to better prepare Green Lake County to manage its vulnerability to disaster, Gary Podoll, Green Lake County Emergency Management Director, applied for and received a Pre-Disaster Mitigation (PDM) planning grant. This goal of this grant is to complete an approvable plan, which will serve as a roadmap that outlines potential cost-effective hazard mitigation activities, some of which might be available for future grant funding.

The plan is designed to look at the risks and vulnerabilities that the county faces from natural disaster and to highlight mitigation strategies that might reduce future losses. As part of this planning process, Podoll is assembling a workgroup to review and guide the planning activities. The workgroup is reviewing initial background information about Green Lake County and has begun identifying strategies that might help.

Podoll stated, "I am very excited about this part of the planning process. The input from the workgroup can have long-lasting impacts, making Green Lake County safer and more disaster resistant."

FEMA has recognized the importance of having members of the community involved in the process and Podoll would like to ensure that all interested members of the community have an opportunity to provide input into the plan. If you are interested in more information about the plan or would like to provide input into the plan, please contact Gary Podoll at 920-361-6416.

Documents

2017-mitigation[illegible].pdf

View Archives »

Green Lake County

HEADLINE NEWS

Pre-Disaster Hazard Mitigation Planning Grant
CTH O PAVING - June 29, 2017
CTH I CLOSURE - July 5th - August 29th
July 4th Holiday Hours
CTH A CLOSURE - June 14 & 15

Date: 30 June 2017
To: Town, Village or City Leader
County Department Manager
From: Gary Podoll, EM Director
Re: Pre-Disaster Mitigation (PDM) Plan

Green Lake County, like the rest of the State of Wisconsin, is vulnerable to a variety of disasters. Wisconsin has incurred disaster-related damages totaling nearly $3 billion in the last three decades, with almost half of that occurring in the 1990s alone. These losses can be reduced through mitigation activities. It is estimated that for every dollar spent on mitigation, $2 to $3 in future damages can be avoided. Hazard mitigation breaks the cycle of damage and repair.

Mitigation actions reduce or eliminate the long-term risk to human life and property from hazards. These preventative actions can be simple such as elevating a furnace in a basement that sometimes has water on the floor. Mitigation can also have a comprehensive approach such as relocating buildings out of the floodplain or strengthening critical facilities to prevent wind damage and provide stronger shelter.

In an effort to better prepare Green Lake County to manage its vulnerability to disaster Green Lake County Emergency Management applied for and received a PDM planning grant. This goal of this grant is to complete an approvable plan, which will serve as a roadmap that outlines potential cost-effective hazard mitigation activities, some of which might be available for future grant funding.

The plan is designed to look at the risks and vulnerabilities that the county faces from natural disaster and to highlight mitigation strategies that might reduce future losses to life and property. As part of this planning process, I need your help.

The first step is asking that you please place an item on your **next** municipal meeting agenda to complete the attached survey. This very short survey will help us to identify the concerns that you have in your municipality and to capture ideas that you have for making your community safer and more disaster resistant. Please return your completed surveys to me at the address listed above **by September 30th**.

After receiving your surveys, the information will be incorporated into the draft plan, which is being guided by a workgroup of interested agencies and public members. I would like to extend an offer for anyone from your leadership council, your municipal staff or your general community to contact me if they would like to join the workgroup.

Finally, after the workgroup has a final draft, we will be sending copies of the plan to each of you for final review and adoption. It is important to note two things:

- 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 can be accomplished should the funding and will to complete them become available.
- If you do not adopt this plan, your community will not be eligible to apply for and receive mitigation project funding in the future.

Let me thank you in advance for the assistance that you are providing. This small investment of your time will help make our community a safer, healthier and more disaster-resistant community for years to come.

If you are interested in more information about the plan or would like to provide input into the plan, please feel free to contact me at 920-361-5416.

GREEN LAKE COUNTY, WISCONSIN
NATURAL HAZARDS PREPAREDNESS & MITIGATION QUESTIONNAIRE

1. In the past five years, has your community experienced a natural disaster such as a severe windstorm, flood, wildfire, earthquake, etc.?

Event	When event last occurred:				
	Within past year	1-5 years ago	5-15 years ago	More than 15 years ago	Never
Drought	VI – Marquette: 2017	GL Co. P&Z: 2012	GL Co. P&Z TN – Princeton TN – Marquette	CI – Markesan TN – St. Marie	CI – Green Lake
Dust Storm					CI – Green Lake CI – Markesan VI – Marquette TN – St. Marie
Earthquake					CI – Green Lake CI – Markesan VI - Marquette TN – St. Marie
Flood	GL Co. P&Z TN – Marquette	GL Co. P&Z TN – Princeton	GL Co. P&Z CI – Berlin CI – Green Lake CI – Markesan CI – Princeton VI – Marquette: 2008 TN – Berlin: 2004 TN – Manchester: 2008 TN – Marquette TN – St. Marie		
Lakeshore Erosion		TN - Princeton	GL Co. P&Z CI – Green Lake VI – Marquette: 2008 landings		CI – Markesan TN – St. Marie
Landslide/ Debris Flow			GL Co. P&Z CI – Green Lake CI – Markesan VI – Marquette: 2008 Lyons St Washout		TN – St. Marie
Wildfire				CI – Green Lake TN – St. Marie	CI – Markesan VI - Marquette
Windstorm/ Tornado	GL Co. P&Z CI – Markesan TN – Brooklyn TN – Marquette TN – Princeton	GL Co. P&Z TN – Princeton	GL Co. P&Z VI – Marquette: damaged public pier TN – Marquette TN – St. Marie	CI – Green Lake	
Severe Winter Storm	GL Co. P&Z VI – Marquette: 2016/2017 ice storm TN – Brooklyn	GL Co. P&Z TN – Princeton	GL Co. P&Z CI – Green Lake CI – Markesan TN – Marquette TN – St. Marie		

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

Event	Extremely Concerned	Very Concerned	Concerned	Somewhat Concerned	Not Concerned
Drought		VI – Marquette: Lake levels go down TN – Green Lake TN – Marquette TN – Princeton	TN - Seneca	GL Co. P&Z CI – Markesan TN – Mackford	CI – Green Lake VI- Kingston TN – Berlin TN – Brooklyn TN – Manchester TN – St. Marie
Dust Storm			TN - Princeton	CI – Markesan TN – Green Lake	GL Co. P&Z CI – Green Lake VI- Kingston VI – Marquette TN – Berlin TN – Brooklyn TN – Mackford TN – Manchester TN – Seneca TN – St. Marie
Earthquake				CI - Markesan	GL Co. P&Z CI – Green Lake VI- Kingston VI – Marquette TN – Brooklyn TN – Green Lake TN – Mackford TN – Manchester TN – Princeton TN - Seneca TN – St. Marie
Flood	GL Co. P&Z CI - Berlin CI – Markesan VI – Marquette	CI – Green Lake TN – Marquette TN - Princeton	TN – Berlin TN – Brooklyn TN – Green Lake TN – Manchester TN – St. Marie	CI – Princeton VI- Kingston TN - Mackford	
Erosion	VI – Marquette TN - Princeton	TN - Marquette	GL Co. P&Z CI – Princeton CI – Green Lake CI – Markesan TN – Berlin TN – Brooklyn TN – Green Lake TN – Seneca	TN - Mackford	VI- Kingston TN – Manchester TN – St. Marie
Landslide/ Debris Flow	VI - Marquette		GL Co. P&Z CI – Green Lake CI – Markesan TN – Green Lake	CI – Princeton TN – Berlin TN - Princeton	VI- Kingston TN – Brooklyn TN – Mackford TN – Manchester TN – Seneca TN – St. Marie
Wildfire	TN - Princeton TN – Seneca		CI – Green Lake CI – Markesan TN - Marquette	TN – Berlin TN - Mackford	GL Co. P&Z CI – Princeton VI- Kingston VI – Marquette TN – Brooklyn TN – Manchester TN – St. Marie

Windstorm/ Tornado	GL Co. P&Z VI – Marquette TN – Princeton	CI – Green Lake CI – Markesan TN – Marquette TN – Seneca	CI – Berlin TN – Berlin TN – Brooklyn TN – Green Lake TN – Manchester	CI – Princeton VI- Kingston TN – Mackford	TN – St. Marie
Severe Winter Storm/ Ice Storm	VI – Marquette TN - Princeton	GL Co. P&Z CI – Green Lake CI – Markesan TN – Green Lake TN – Marquette TN – Seneca	CI – Berlin CI – Princeton TN – Berlin TN – Brooklyn TN – Manchester	VI- Kingston TN – Mackford TN – St. Marie	
Other:			CI – Princeton (Floods)		

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

GL Co. P&Z – Damage from flooding to roads mainly

CI – Berlin – Yes
CI – Green Lake – Yes. Streets, shoreline, flooded building.
CI – Markesan – North St. wash out, Hwy. 44 damage, Lift station flooding
CI – Princeton – Just downed electric service lines

VI – Marquette – The village is located in a hill – with Lake Puckaway as a North border, heavy Rains Storms result in culverts and ditches being washed away.
In June 2017 – the water heater in the village hall exploded. The damage was to the hall and the pavilion next door.
This year (2017) the many windstorms has presented a lot of treed being damaged, branches broken off, or trees blown over.

TN – Berlin – 2004 – a few roads
TN – Brooklyn – Yes Roads: Wash out: on the shoulder mostly
TN – Green Lake – No
TN – Mackford – Shoulder of a road washed away.
TN – Manchester – We experienced a bridge washout during the flood of 2008. The bridge was replaced along with numerous road repairs.
TN – Marquette – roads private buildings utilities
TN – Princeton – Culverts and roads and shoulders washed out.
TN – Seneca – Mostly Roads
TN – St. Marie - culverts from flood

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

GL Co. P&Z – Roads

CI – Berlin – Roads
CI – Green Lake – Electric Power, Fire Protection, Flooded storm & sanitary sewers
CI – Markesan – Sewer system damage, sewer treatment plant damage. Hwy 44 damage due to culvert size at Vista Blvd
CI – Princeton – Water tower – tornado, main lift station – flood power lines – tornado

VI – Marquette – Shorelines – private and village owned; road; trees; municipal buildings, fire dept., and private properties;
Records for the village are in the village hall,
Historical society info is at the museum, fire dept. needs to be available for emergencies

TN – Brooklyn – Dam on N. Lawson – Bridges on Spaulding Hill Rd.; Berlin Rd; Dead end Rd
TN – Green Lake – Roads & Private homes/buildings
TN – Mackford – Bridge
TN – Manchester – The town experienced a tornado many years ago and I imagine he buildings and roads were damaged within the path of that disaster.
The group of homes that create the town of Manchester would be vulnerable to any disaster.
Our roads are especially vulnerable to any kind of storm be it ice or water.
TN – Marquette – roads private buildings utilities
TN – Princeton – roads/culverts with water buildings with wind
TN – Seneca – All facilities
TN – St. Marie - None

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

Project	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important
Protecting private property	CI – Green Lake CI – Markesan CI – Berlin VI – Marquette TN – Brooklyn TN – Manchester TN – Marquette TN – Princeton TN – Seneca	GL Co. P&Z CI – Princeton TN – Green Lake	TN – Berlin	TN - Mackford	TN – St. Marie
Protecting critical facilities (hospitals, fire stations, etc.)	CI – Berlin CI – Green Lake CI – Markesan CI – Princeton VI- Kingston VI – Marquette TN – Brooklyn TN – Green Lake TN – Marquette TN – Seneca	TN - Princeton	GL Co. P&Z TN – Berlin		TN – Mackford TN – Manchester TN – St. Marie
Preventing development in hazard areas	GL Co. P&Z VI - Marquette TN – Brooklyn TN – Green Lake TN – Marquette TN – Princeton TN – Seneca	CI – Green Lake CI – Markesan TN – Manchester	CI – Berlin TN – Berlin	VI- Kingston TN - Mackford	TN – St. Marie
Enhancing the function of natural features (streams, wetlands)	GL Co. P&Z CI – Green Lake VI- Kingston TN – Brooklyn TN – Green Lake TN – Manchester TN – Marquette TN – Seneca	CI – Berlin CI – Princeton VI – Marquette TN - Princeton	CI – Markesan TN – Berlin		TN – Mackford TN – St. Marie

Protecting historical and cultural landmarks	CI – Princeton TN - Brooklyn	CI – Berlin CI – Green Lake VI - Marquette TN – Green Lake TN – Manchester TN – Marquette TN – Seneca	CI – Markesan TN – Berlin TN - Princeton	GL Co. P&Z	VI- Kingston TN – Mackford TN – St. Marie
Promoting cooperation among public agencies, citizens, non-profit organizations and businesses	CI – Green Lake CI – Princeton TN – Brooklyn TN – Green Lake TN – Manchester TN – Princeton TN – Seneca	CI – Berlin CI – Markesan VI- Kingston VI – Marquette TN - Marquette	GL Co. P&Z TN – Berlin	TN - Mackford	TN – St. Marie
Protecting and reducing damage to utilities	CI – Berlin CI – Green Lake CI – Markesan CI – Princeton VI- Kingston VI - Marquette TN – Brooklyn TN – Green Lake TN – Manchester TN – Marquette TN – Princeton TN – Seneca	GL Co. P&Z TN – Mackford	TN – Berlin		TN – St. Marie
Strengthening emergency services	CI – Green Lake CI – Markesan CI – Princeton VI - Marquette TN – Brooklyn TN – Green Lake TN – Marquette TN – Princeton TN – Seneca	GL Co. P&Z CI – Berlin VI- Kingston TN – Manchester	TN – Berlin	TN – Mackford TN – St. Marie	

6. **Do you have any community building projects (e.g., subdivisions, office/industrial parks, roads) slated to be built in the near future? If so, please describe it (e.g., project name, location, type, size)?**

CI – Berlin – No
CI – Green Lake – Industrial Park on HWY 23 – 49.
CI – Markesan – Expansion of industrial park
CI – Princeton – In the next 3 years we plan replacing water & sewer mains and putting in storm sewer on Cty D. & Water St.
VI – Marquette – Rebuilding the village hall after the water heater explosion and the pavilion
TN – Berlin – None
TN – Brooklyn – N/A
TN – Green Lake – No
TN – Mackford – No
TN – Manchester – We have no building projects except our yearly road maintenance.
TN – Marquette – No
TN – Princeton – Not at this time
TN – Seneca – None
TN – St. Marie

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

GL Co. P&Z – 1. Marine court is below flood plain. Owners have to access houses by boat in flood conditions. Ideally raise road up to allow contiguous dry land access.
2. Re: Land slide/erosion to lakes of rivers; subsidize erosion control techniques & practices for owners.
3. Re: Flooding...Eliminate reduction of flood storage capacity (i.e.: wetlands) and subsidize BMP (infiltration) practices where they can be most beneficial.
4. Re: Flooding...Subsidize evacuation planning for campgrounds that are in flood fringe.

CI – Berlin – Riverbank improvements; southwest drainage district, create drainage to prevent flooding; Increase storm sewer size to help reduce flooding on streets; Install back up power to wells and water tower if a utility failure would occur.
CI – Green Lake – Planned tree removal – Old or damaged trees. Joint discussion of all involved parties.
CI – Markesan – Clearing Grand River of debris. Resizing of culvert at Vista Blvd. due to flooding issues in residence and businesses.
CI – Princeton – Trim & cut poor trees by power lines & along streets; Rip rap cities river banks; Work with emergency government for assistance.

VI – Marquette – Improve runoff for ditches & Culverts; Repair & improve public landings, and roads; Encourage future building by the lake to include all FEMA regulations – flood plain, shoreland, wetland, and building codes

TN – Green Lake – Cooperation between the emergency services; More working together rather than against each other.
TN – Princeton – Keep Kuharski Road in plan. Flooding issue and near term road failure.
TN – Manchester – We have an emergency plan that involves the Manchester activity center as a designated shelter in case of an emergency.
TN – St. Marie - None

GL Co. P&Z Additional Notes:

2009	July	Tornado
2012	May	Flood
2012	July	Drought
2012	June/July	Flood watch/Tornado
2014	Aug	High Wind
2015	July	Wide Spread Tree Damage. (Tornado/High Winds)
2016	Feb	Winter Storm
2016	March	Heavy Snow
2016	March	Flooding
2016	May	Trees down (High winds)
2016	Sept	Flooding
2017	March	Heavy Snow (4"-7")
2017	June	Tornado/Hail
2017	July	Flash Flood Watch

GREEN LAKE COUNTY
OFFICE OF EMERGENCY MANAGEMENT

Gary V. Podoll
Director

Office: 920-361-5416
FAX: 920-361-5405

GREEN LAKE COUNTY MITIGATION PLAN UPDATE

WORK GROUP MEETING

DATE: **Friday, August 4, 2017**

TIME: 9:00 A.M.

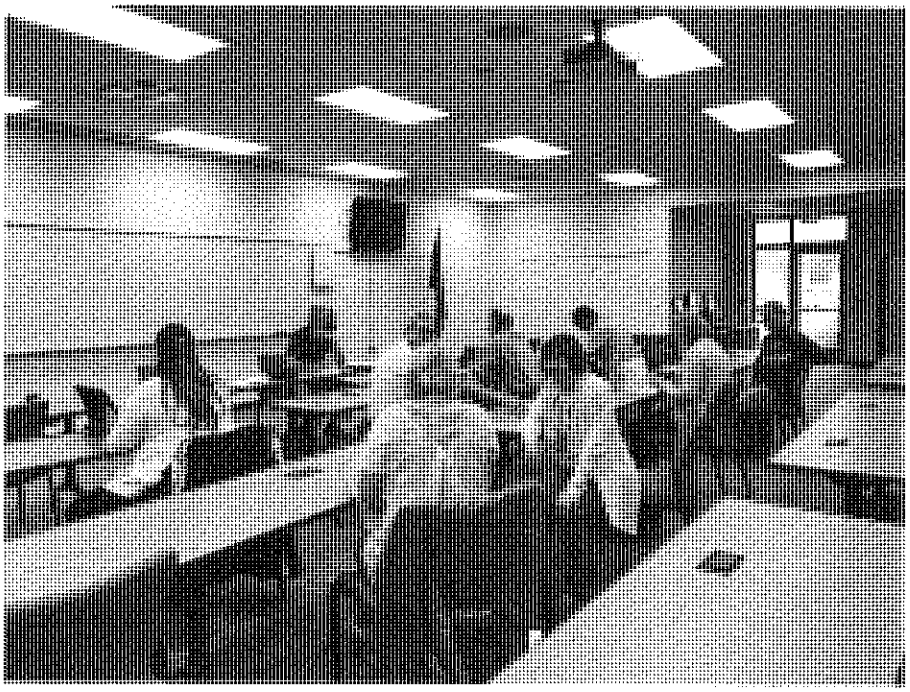
PLACE: Green Lake County Justice Center (EOC) Enter at Main Entrance

Every 5 years FEMA requires Green Lake County Hazard Mitigation Plan to be updated. You or your agency was a part of the workgroup that put the plan together in 2012. Attached is the cover letter and survey that will be sent out to the City, Towns and Villages. If you are unable to attend or have any questions please let me know.

4 AUG 17

GREEN LAKE CO - PDM WORKGROUP MTG

LENORA BORCHARDT	EPTEC
Gary V Podoll	Green Lake Co EM
Gerald Stanuch	P+Z GIS
MIKE ROSS	CITY OF MARYESAN
Julia McCarroll	Green Lake Co. Public Health
Kathy Murray	Green Lake Co. Public Health
Lindsey Kemnitz	City of Berlin
MaryLou Neubauer	C-Princeton
Mark A Podoll	Green Lake City sheriff's Office
Matt Kirkman	Land Use Planning + Zoning



To: Contiguous County Directors
From: Lenora Borchardt, EPTEC, Inc. for
Gary Podoll, Green Lake County Emergency Management Director
Re: Pre-Disaster Mitigation (PDM) Plan

In an effort to better prepare Green Lake County to manage its vulnerability to disaster, Green Lake County applied for and received a PDM planning grant and requested EPTEC, Inc. to assist with its completion. The final draft of the hazard mitigation plan is now complete and is in the review process. If possible, please review the enclosed plan and contact me via email with any comments or questions. If I do not hear from you, I will assume that you have no comments. Thank you for your assistance with this effort.

GOVERNMENTAL & PUBLIC INPUT

Planning creates a way to solicit and consider input from diverse interests. Successful community mitigation begins with a commitment from government officials throughout the county.

Involving stakeholders is essential to building community-wide support for the plan. In addition to emergency managers, the planning process involves other government agencies (e.g., zoning, floodplain management, public works, community and economic development), businesses, civic groups, environmental groups and schools. Vital information provided by these groups helps insure that the plan is workable within the framework of the community's priorities.

ADOPTION OF THE PLAN

Local units of government participating in a multi-jurisdictional planning process must adopt the final plan for the municipality to be eligible for future mitigation funds including grants available through FEMA. Local units (i.e., towns, villages, cities) that do not participate would be ineligible to receive such funds until such time that they meet these requirements and adopt a plan.

HISTORY

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

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.

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

NOTES:_____

_____

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For further information please contact:

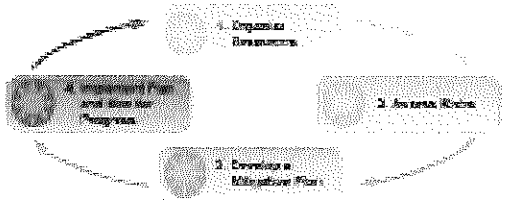
Green Lake County
Emergency Management
P.O. Box 272
Berlin, WI 54923
(920) 361-5416

Pre-Disaster Mitigation Planning

Creating Safe,

Sustainable

Communities



Prepared by:
Green Lake County Emergency Management
108 N. Capron Street
P.O. Box 272
Berlin, WI 54923

What is Hazard Mitigation?

Hazard mitigation is sustained action taken to reduce or eliminate long-term risk to people and their property from hazards.

Floods, ice storms, tornadoes and forest/wild fires – these are all functions of the natural environment and only become hazardous when they threaten our "built" environment with destruction. These hazards will occur one day. When this happens, the results can be appreciably different from past outcomes if our community takes action today.

Risk Reduction

The goal of risk reduction is to reduce the risk to life and property, which includes existing structures and future construction, in the pre- and post-disaster environments. This is achieved through regulations, local ordinances, land use and building practices and mitigation projects that reduce or eliminate long-term risk from hazards and their effects.

Why Develop A Plan?

Mitigation plans form the foundation for a community's long-term strategy to reduce disaster losses and break the cycle of disaster damage, reconstruction and repeated damage. The planning process is as important as the plan itself. It creates a framework for risk-based decision-making to reduce damages to lives, property and the economy from future disasters.

State, tribal and local governments are required to develop a hazard mitigation plan as a condition for receiving certain types of non-emergency disaster assistance. The Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288), as amended by the Disaster Mitigation Act of 2000, provides the legal basis for state, local and tribal governments to undertake a risk-based approach to reducing risks from natural hazards through mitigation planning.

Like many other people, the residents of Minot, Texas didn't think much about flooding. Besides, it had not flooded in Minot for 40 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.

Required Information

- Flood maps
- Identification of potential hazards
- History of occurrences
- Hazard impact projections
- Location of critical facilities
- Identification of high-risk facilities (schools, fire station, nursing homes, etc.)
- Location of repetitive loss structures
- Development & prioritization of mitigation projects
- Other materials as identified

Hazard Mitigation Planning Process

1. Organize Resources- From the start, communities should focus the resources needed for a successful mitigation planning process. Essential steps include identifying and organizing interested members of the community, particularly those with the technical expertise required during the planning process.

2. Assess Risks- Communities next need to identify the characteristics and potential consequences of natural hazards. It is important to understand how much of the community can be affected by specific hazards and what the likely impacts would be for important community assets.

3. Develop a Mitigation Plan- Armed with an understanding of the risks posed by natural hazards, communities need to determine what their priorities should be and then look at possible ways to avoid or minimize the undesired effects. The result is a natural hazard mitigation plan and strategy for implementation.

4. Implement the Plan & Monitor Progress- Communities can bring the plan to life in a variety of ways ranging from implementing specific mitigation projects to changes in the day-to-day operation of the local government. To ensure the success of an on-going program, it is critical that the plan remains effective. Thus, it is important to conduct periodic evaluations and make revisions as needed.

Appendix H: Inter-Revision Updates

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

Green Lake County

Green Lake County Clerk of Circuit Court

571 County Road A, Green Lake, WI 54941 920-294-4142

AMY S. THOMA
Clerk of Circuit Court

February 6, 2019

Judicial/Law Enforcement Committee
571 County Road A
Green Lake, WI 54941

RE: Department Update

Dear Committee Members:

CASES FILED SINCE JANUARY 9, 2019

Case Type	
Criminal Felony	16
Criminal Misdemeanor	13
Criminal Traffic	12
Traffic	70
Forfeiture	9
Juvenile Ordinance	1
Civil	3
Complex Forfeiture	1
Small Claims	24
Family	5
Paternity	1

Other than the day to day activities of this office, there is nothing further to report at this time. If you should have any questions, please do not hesitate to contact me.

Very truly yours,

Amy S. Thoma

Amy S. Thoma
Clerk of Circuit Court

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GREEN LAKE COUNTY
OFFICE OF THE CORONER

Amanda M. Thoma, Coroner *Office: 920-294-4040 ext. 1229*

February 5, 2019

Green Lake County
Judicial/Law Enforcement & Emergency Management Committee
571 County Road A
Green Lake, WI 54941

RE: January 2019

Dear Judicial/Law Enforcement & Emergency Management Committee Members:

Please see the below information regarding deaths reported to the Coroner's Office.

Total Deaths for January 2019	18	
Coroner's Cases	13	
	Of the 18 cases	6 required Coroner's Response
		7 reported hospice requiring a cremation permit
		5 cases-physician certified death

Each Coroner's response to call is a minimum time of 4 hours spent for each call (drive time, scene time, request of information from family, request and review of medical records, and certifying death).

Each reported hospice death is a minimum of an hour and a half spent for each call (drive time for viewing for body, request and review of medical records, certifying death and issuing of cremation permit).

Total Deaths for January 2019	18	
	Of the 18 cases	11 cremation permits 7 burials

Total Deaths for January 2019	23	
	Of the 23 cases	17 Natural deaths
		1 Pending deaths

Total Deaths for January 2019	18	
	Of the 18 cases	4-heart disease
		2-dementia
		2-gastrointestinal
		2-infection
		2-cancer related
		3-lung related
		1-pending
		2-cerebrovascular

To date, the state has indicated Green Lake County has had 18 deaths.

Thank you for your time in this matter. Should you have any questions, please feel free to contact me.

Sincerely,

Amanda M. Thoma
Coroner

Green Lake County

GREEN LAKE COUNTY
OFFICE OF EMERGENCY MANAGEMENT

Gary V. Podoll
Director

Office: 920-361-5416
FAX: 920-361-5405

DATE: February 4, 2019

TO: Green Lake County Judicial/Law Enforcement and Emergency Management Committee

FROM: Gary V. Podoll, Emergency Management Director

SUBJECT: Monthly Report

1. I sent out updated Green Lake County Mitigation plan to the County, Cities, Villages and Towns for their approval in Resolution form, to be completed in February.
2. I am working on updating a number of Hazardous Materials Response Plans within Green Lake County.

Please, if you have any questions you can contact me at 920-290-2275.

Sincerely,

Gary V. Podoll
Emergency Management Director
Green Lake County

Green Lake County
Sheriff
571 County Road A · Green Lake, WI 54941-0586
Ph. 920-294-4000 · Fax. 920-294-3850

February 7, 2019

To Judicial and Law Enforcement Committee Members,

GLSO Events for November

- 01/17/19 – Sth.23 at CTH T, law enforcement conducted an OWI arrest where the subject had a preliminary breath test of .38 (legal limit in Wisconsin is .08)
- 01/23/19 – Area snowfall of 8 inches resulted in very few weather related incidents
- 01/28/19 – Area snowfall of 11 inches followed by -26 degree air temperature resulted in approximately 23 County and City traffic crash and traffic assist incident. No incident resulted in any serious personal injury and about two thirds of the incidents were slide-offs or traffic assists. Several calls were taken advising of concern for domestic animals out in the cold.
- During the recent Government Center closures, essential public servant/law enforcement staffing remained in place with no interruptions.
- 02/06/19 – During a neighbor dispute on South St., Green Lake, a firearm was displayed possibly as a threat or used as intimidation, male party to male party. City of Green Lake Police and Sheriff's Deputies worked to successfully remove the involved from the apartments without violence or injury – this case remains under investigation.
- Continuing in February, annual staff training will take place involving both 24 hour law enforcement/Corrections standards board requirements for licensing and also protective matters such as CPR/AED and Hearing/N95 OSHA Mask Fit testing.

See you at the meeting,

Mark A. Podoll, Sheriff

Sheriff Mark A. Podoll

GREEN LAKE COUNTY
Notice of Budgetary Adjustment

Unanticipated Revenue or Expense Increase or Decrease Not Budgeted

Date: February 1, 2019
Department: Clerk of Circuit Court
Amount: $23,174.61
Budget Year Amended: 2018

Source of Increase / Decrease and affect on Program:
(If needed attached separate brief explanation.)

Due to unforeseen circumstances, Guardian ad Litem expenses and Medical (psychological evals) have increased in 2018. To accommodate the overage, I am requesting to transfer the amount from additional Guardian ad litem reimbursements.

Revenue Budget Lines Amended:

Account #	Account Name	Current Budget	Budget Adjustment	Final Budget
18-100-02-45126-000-000	GAL Reimbursement	$ 25,000.00	$ 23,174.61	$ 48,174.61
				$ -
				$ -
				$ -
Total Adjustment			$ 23,174.61	

Expenditure Budget Lines Amended:

Account #	Account Name	Current Budget	Budget Adjustment	Final Budget
18-100-02-51220-212-000	GAL Expenses	$ 38,000.00	$ 18,514.86	$ 56,514.86
18-100-02-51220-250	Medical	$ 4,500.00	$ 4,659.75	$ 9,159.75
				$ -
				$ -
				$ -
				$ -
Total Adjustment			$ 23,174.61	

Department Head Approval: Amy S. Thoma
Date Approved by Committee of Jurisdiction: _____

Following this approval please forward to the County Clerk's Office.

Date Approved by Finance Committee: _____
Date Approved by County Board: _____

Per WI Stats 65.90(5)(a) must be authorized by a vote of two-thirds of the entire membership of the governing body.

Date of publication of Class 1 notice of budget amendment: _____

Rev 2/17

REQUEST FOR LINE ITEM TRANSFER

Office Use Only

No. _____
Date: _____

Department: Clerk of Circuit Court
Budget Year Amended: 2018

From Account

Account #	Account Name	Current Budget	Transfer Amount	YTD Expenditures	New Budget
18-100-02-51220-194	Bailiffs	$ 1,600.00	$ 159.72	$ 1,378.84	$ 1,440.28
18-100-02-51220-310	Office Supplies	$ 2,400.00	$ 705.49	$ 1,677.25	$ 1,694.51
18-100-02-51220-196	Jury	$ 16,100.00	$ 6,237.04	$ 9,280.99	$ 9,862.96
					$ -
					$ -
					$ -
					$ -
Total Transfer			$ 7,102.25		

To Account

Account #	Account Name	Current Budget	Transfer Amount	YTD Expenditures	New Budget
18-100-02-51220-198	Interpreter	$ 2,900.00	$ 129.72	$ 3,029.72	$ 3,029.72
18-100-02-51220-208	Court Commissioner	$ 70.00	$ 30.00	$ 100.00	$ 100.00
18-100-02-51220-327	Law Books	$ 2,000.00	$ 705.49	$ 2,705.49	$ 2,705.49
18-100-02-51220-204	Court Appointed Attorney	$ 13,000.00	$ 6,237.04	$ 19,238.04	$ 19,238.04
					$ -
					$ -
Total Transfer			$ 7,102.25		

Explanation for Transfer:
To transfer money between line items due to unforeseen overages on Interpreter, Court Commissioner, Law Books and Court Appointed Attorney.

Department Head Approval Amy S Thoma

Governing Committee Approval _____

If < $500:

Send to County Administrator's Office

COUNTY ADMINISTRATOR Approval: _____

If > $500:

Send to County Clerk's Office

FINANCE COMMITTEE Approval given on : _____
Date

Revised 02/2017

GREEN LAKE COUNTY
Notice of Budgetary Adjustment

Unanticipated Revenue or Expense Increase or Decrease Not Budgeted

Date: February 6, 2019
Department: Emergency Management
Amount: $20,533.00
Budget Year Amended: 2019

Source of Increase / Decrease and affect on Program:
(If needed attached separate brief explanation.)

Received new grant

Revenue Budget Lines Amended:

Account #	Account Name	Current Budget	Budget Adjustment	Final Budget
19-100-18-46915-000-000	Hazardous Mitigation Plan	$ -	$ 20,533.00	$ 20,533.00
				$ -
				$ -
				$ -
Total Adjustment			$ 20,533.00	

Expenditure Budget Lines Amended:

Account #	Account Name	Current Budget	Budget Adjustment	Final Budget
19-100-18-52812-206-000	Contract - Hazmat Team	$ 3,600.00	$ 18,375.00	$ 21,975.00
19-100-18-52812-310-000	Office Supplies	$ -	$ 1,294.00	$ 1,294.00
19-100-18-52812-330-000	Travel	$ -	$ 864.00	$ 864.00
				$ -
				$ -
				$ -
Total Adjustment			$ 20,533.00	

Department Head Approval: Dan V Retzlaff

Date Approved by Committee of Jurisdiction: _____

Following this approval please forward to the County Clerk's Office.

Date Approved by Finance Committee: _____

Date Approved by County Board: _____

Per WI Stats 65.90(5)(a) must be authorized by a vote of two-thirds of the entire membership of the governing body.

Date of publication of Class 1 notice of budget amendment: _____

Rev 2/17

GREEN LAKE COUNTY SHERIFF'S OFFICE SQUAD CAR MILEAGE 2019

Officer	Badge No.	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
Putzke	40	54,236											
Hoerig	41	12,780											
Kuklinski	43	117,800											
Colhouer	45	9,525											
Hanson	46	7,548											
Ward	47	24,307											
Young	49	185,492											
Cody	51	18,054											
Holdorf	52	16,556											
Kiener	53	46,960											
Manning	54	17,725											
Schroeder	56	170,981											
Majeskie	57	154,000											
Weiner	58	137,880											
Podoll	60	15,925											
Preuss	61	9,125											
Vande Kolk	62	12,460											
Prachel	64	162,882											
Dodge Trans Van	96	85,651											
CTU Ford Transit		1,589											
Spare Squad		209,628											

Accidents and Complaints for Patrol

2019	Colhouer	Hanson	Hoerig	Kiener	Kuklinski	Majeskie	Manning	Prachel	Preuss	Schroeder	Vande Kolk	Weiner	Young	Total	Avg/Officer
Jan	22	17	24	12	30	9	7	21	13	33	19	11	16	234	18
Feb														0	0
March														0	0
April														0	0
May														0	0
June														0	0
July														0	0
Aug														0	0
Sept														0	0
Oct														0	0
Nov														0	0
Dec														0	0
Total	22	17	24	12	30	9	7	21	13	33	19	11	16	234	18
Avg/Month	22	17	24	12	30	9	7	21	13	33	19	11	16	234	18

Paper Service for Patrol

2019	Colhouer	Hanson	Hoerig	Kiener	Kuklinski	Majeskie	Manning	Prachel	Preuss	Schroeder	Vande Kolk	Weiner	Young	Total	Avg/Officer
Jan	9	7	0	5	8	7	0	12	21	13	11	3	14	110	8
Feb														0	0
March														0	0
April														0	0
May														0	0
June														0	0
July														0	0
Aug														0	0
Sept														0	0
Oct														0	0
Nov														0	0
Dec														0	0
Total	9	7	0	5	8	7	0	12	21	13	11	3	14	110	8
Avg/Month	9	7	0	5	8	7	0	12	21	13	11	3	14	110	8

Citations for Patrol

2019	Colhouer	Hanson	Hoerig	Kiener	Kuklinski	Majeskie	Manning	Prachel	Preuss	Schroeder	Vande Kolk	Weiner	Young	Total	Avg/Officer
Jan	6	2	10	0	9	10	1	7	3	5	5	5	11	74	6
Feb														0	0
March														0	0
April														0	0
May														0	0
June														0	0
July														0	0
Aug														0	0
Sept														0	0
Oct														0	0
Nov														0	0
Dec														0	0
Total	6	2	10	0	9	10	1	7	3	5	5	5	11	74	6
Avg/Month	6	2	10	0	9	10	1	7	3	5	5	5	11	74	6

Warnings for Patrol

2019	Colhouer	Hanson	Hoerig	Kiener	Kuklinski	Majeskie	Manning	Prachel	Preuss	Schroeder	Vande Kolk	Weiner	Young	Total	Avg/Officer
Jan	13	27	9	0	7	25	4	23	6	13	8	5	8	148	11
Feb														0	0
March														0	0
April														0	0
May														0	0
June														0	0
July														0	0
Aug														0	0
Sept														0	0
Oct														0	0
Nov														0	0
Dec														0	0
Total	13	27	9	0	7	25	4	23	6	13	8	5	8	148	11
Avg/Month	13	27	9	0	7	25	4	23	6	13	8	5	8	148	11

Year to Date Totals - Accidents, Complaints, Paper Service, Citations and Warnings for Patrol

2019	Colhouer	Hanson	Hoerig	Kiener	Kuklinski	Majeskie	Manning	Prachel	Preuss	Schroeder	Vande Kolk	Weiner	Young	Total	Avg/Officer
Total Annual Contacts	50	53	43	17	54	51	12	63	43	64	43	24	49	566	44
Avg. per Month	50	53	43	17	54	51	12	63	43	64	43	24	49	566	44

BOAT LAUNCH/MUNICIPAL ORDINANCE CITATIONS

2019	Colhouer	Hanson	Hoerig	Kiener	Kuklinski	Majeskie	Manning	Prachel	Preuss	Schroeder	Vande Kolk	Weiner	Young	Total	Avg/Officer
Jan														0	0
Feb														0	0
March														0	0
April														0	0
May														0	0
June														0	0
July														0	0
Aug														0	0
Sept														0	0
Oct														0	0
Nov														0	0
Dec														0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Avg/Month	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Accidents and Complaints for Detectives

2019	Cody	Holdorf	Ward	Cohl	Roky	Tess
Jan	3	2	2	4	12	0
Feb						
March						
April						
May						
June						
July						
Aug						
Sept						
Oct						
Nov						
Dec						
Total	3	2	2	4	12	0
Average	3	2	2	4	12	0

Arrests for Detectives

2019	Cody	Holdorf	Ward	Cohl	Roky	Tess
Jan	0	0	1	0	5	0
Feb						
March						
April						
May						
June						
July						
Aug						
Sept						
Oct						
Nov						
Dec						
Total	0	0	1	0	5	0
Average	0	0	1	0	5	0

Green Lake County Sheriff
571 County Road A Green Lake, WI 54941-0586
Ph. 920-294-4000 · Fax. 920-294-3850

Sheriff's Office Judicial/Law Enforcement Committee
Report for the Month of January 2019

Deputy contacts for this month	571

Types of Contacts this month	Number of Contacts
Adult Transport	28
Agency Assistance, Mutual Aid	21
Medical Emergency	21
Citizen Assist	20
Traffic Misc.	17
Traffic Accident w/Damage	14
911 Follow up	13
Car/Deer Accident	12
Fire	9
K-9 Assist	9
Animal Problem	8
Lockout	8
Agency Assist Person Charged	5
Controlled Substance Problem	5
K-9 Person Charged	5
Records Check	5
Traffic Violation	5
Fraud	4
Juvenile Problem	4
OWI Alcohol	4
Theft	4
EDI	3
House Check	3
Information Report	3
Suspicious Person/Circumstance	3
Traffic Hazard	3
Vandalism	3

Sheriff Mark A. Podoll

Green Lake County
Sheriff
571 County Road A Green Lake, WI 54941-0586
Ph. 920-294-4000 · Fax. 920-294-3850

Types of Contacts this month continued

Wanted Person	3
Citizen Dispute	2
Computer Agency Assist	2
Computer Forensics	2
CTU	2
Dead Body	2
Drugged Driving	2
K-9 Misc, School Search, Searach and Rescue	2
Traffic Patrol Requested	2
Welfare Check	2
Alarm	1
Bail Jumping	1
Check on Huber Inmate	1
Child Abuse or Neglect	1
Computer Crime	1
Counterfeit	1
Disturbance	1
EMP Check	1
Harassment	1
Missing Person	1
Noise Complaint	1
Trespassing	1
Probation/Parole Violation	1
Traffic Accident w/Injuries	1
Unmanned Aircraft System	1

GREEN LAKE COUNTY JAIL MONTHLY STATISICS

MONTH/ YEAR	ADP	HUBER	HUBER/EMP INCOME	FEMALE	LOCK DOWN	MEALS	EMP	GL INMATES TRANSFERRED	Brown Co. Days SAFEKEEPERS	Billed for Brown Co. Safekeepers	Calumet Co Days Safekeepers	Billed for Calumet Safekeepers
Jan-19	64	11	$5,174.51	13	45	5336	1	3	0	$ -	119	$ 5,117.00
Feb-19												
Mar-19												
Apr-19												
May-19												
Jun-19												
Jul-19												
Aug-19												
Sep-19												
Oct-19												
Nov-19												
Dec-19												
Totals												
Average	64	11	$5,174.51	13	45	5336	1	3	0	$ -	119	$ 5,117.00

ADP- Average daily population
Huber- Sentenced inmate, work release + Sent/Huber from other county
Huber Income- Amount paid by Huber and CAM inmates for the month
Female- Average number of females held that month
Lockdown- Number of inmates held that month that are not working Huber's
Meals- Number of meals + bag lunches served that month
EMP- Number of inmates on electronic monitoring
GL Inmates Transferred- Inmate serving in other county + Sent/Huber serv. out of county
Safekeepers - Holding for another county
Safekeeper days - the number of cumulative days that month for all Safekeepers for that county

Green Lake County
Sheriff
571 County Road A Green Lake, WI 54941-0586
Ph. 920-294-4000 · Fax. 920-294-3850

Sheriff's Office Judicial/Law Enforcement Committee
Report for the Month of January 2019
Correctional Facility

Average Daily Population in the Jail for this month	64

Inmates in custody for (some inmates have more than one charge)

Charge	Number of Charges
Probation/Parole	21
Obstructing	10
Warrants	9
Traffic Offense	7
Assault	6
Drug related	6
DUI	4
Violate Court Order	4
ES Sanction Hold	3
Destruct/Damage/Vandalize	2
Arson	1
Disorderly Conduct	1
Harassment	1
Homicide	1
Resisting/Interfering w/Police	1
Theft	1
Trespass of Real Property	1

Sheriff Mark A. Podoll