



# Hazard Mitigation Plan

Washburn County, Wisconsin

Updated July, 2020

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## Acronyms

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### Acronyms

ACE	Army Corps of Engineers
ADA	Americans with Disabilities Act
ALS	Advanced Life Support
ARC	American Red Cross
ARES	Amateur Radio Emergency Services
ASCS	Agriculture Stabilization and Conservation Service
ASL	Above Sea Level
ASPR	Assistant Secretary for Preparedness and Response
BIA	Bureau of Indian Affairs
Bq	Becquerel, a unit of radioactivity
CAD	Computer Aided Dispatch
CAR	Communities At Risk
CBRNE	Chemical, Biological, Radiological, Nuclear, or Explosive
CDBG	Community Development Block Grant
CEMP	Comprehensive Emergency Management Plan
CERT	Community Emergency Response Team
CFR	Code of Federal Regulations
Ci	Curie, a unit of radioactivity
CI	City
CO	County
COAD	Community Organizations Active in Disaster
CO HWY	County Highway Department
COOP/COG	Continuity of Operations & Continuation of Government
CTH	County Highway
DFIRM	Digital Flood Insurance Rate Map
DHS	U.S. Department of Homeland Security



DNR	Wisconsin Department of Natural Resources
DOD	U.S. Department of Defense
DOJ	U.S. Department of Justice
DOT	Department of Transportation
DPW	Department of Public Works
DTM	Digital Terrain Maps
EAP	Emergency Assistance Program or Emergency Action Plan
EF	Enhanced Fujita Scale
EHS	Extremely Hazardous Substance
EM	Emergency Management
EMS	Emergency Medical Services
EMT	Emergency Medical Technician
EOC	Emergency Operations Center
EOP	Emergency Operating Procedure
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
F	Fahrenheit or Fujita Scale
FCC	Federal Communications Commission
FCIC	Federal Crop Insurance Corporation
FD	Fire Department
FEMA	Federal Emergency Management Agency
FIRMS	Flood Rate Insurance Maps
FMA	Flood Mitigation Assistance
FOIA	Freedom of Information Act
FOUO	For Official Use Only
FSA	Farm Service Agency
GIS	Geographic Information System
GPS	Global Positioning System

## Acronyms

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HazMat	Hazardous Materials
HazMit	Hazard Mitigation
HAZUS	Hazards United States
HAZUS-MH	Hazards United States Multihazard
HMGP	Hazard Mitigation Grant Program
HUD	U.S. Department of Housing and Urban Development
HVA	Hazard Vulnerability Analysis
HWY	Highway
ICS	Incident Command System
L	Liter
LE	Law Enforcement
LEPC	Local Emergency Planning Committee
LID	Land Information Department
LIDAR	Laser Imaging Detection and Ranging
LPDM	Lagrangian Particle Dispersion
LTPO	Long-Term Power Outage
LWC	Land and Water Conservation Department
MABAS	Mutual Aid Box Alarm System
MAP	FEMA's Risk Mapping, Assessment and Planning
ME	Medical Examiner
MHz	Megahertz
MMI	Modified Mercalli Intensity Scale
MOU	Memorandum of Understanding
MPH	Miles Per Hour
MSDS	Material Safety Data Sheet
NFIA	National Flood Insurance Act
NFIF	National Flood Insurance Fund

NFIP	National Flood Insurance Program
NFPA	National Fire Protection Association
NIDIS	National Integrated Drought Information System
NIMS	National Incident Management System
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NRP	National Response Plan
NWS	National Weather Service
OJA	Office of Justice Assistance
PA	Public Address (System)
PDM	Pre-Disaster Mitigation
PGA	Peak Ground Acceleration
PH	Public Health
PSA	Public Service Announcement
POW	Plan of Work
P&Z	Planning and Zoning
RACES	Radio Amateur Civil Emergency Service
RES1	Single Family Dwelling
RES2	Manufactured Housing
RFC	Repetitive Flood Claims
SARA	Superfund Amendments and Reauthorization Act
SBA	Small Business Administration
SMART	Spatial Management, Analysis and Resource Tracking
SPI	Standardized Precipitation Index
SRL	Severe Repetitive Loss
STH	State Highway
SWAT	Special Weapons and Tactics

## Acronyms

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TN	Township
UASI	Urban Area Security Initiative
UC	Unified Command
USDA	U.S. Department of Agriculture
USFS	U.S. Forestry Service
USGS	U.S. Geological Survey
USH	U.S. Highway
UW	University of Wisconsin
UW Ext	University of Wisconsin – Extension Office
VHF	Very High Frequency
VI	Village
VOAD	Voluntary Organizations Active in Disaster
WEM	Wisconsin Emergency Management
WISP	Wisconsin Irrigation Scheduling Program

## Introduction and Background

The Washburn County Hazard Mitigation Plan is intended to provide strategies for reducing susceptibility to future damage to public and private infrastructure in the county. The Washburn County Emergency Management Office completed the original hazard mitigation plan in 2006 and applied for and received a hazard mitigation update planning grant in 2010 and 2019. This grant program is sponsored by the U.S. Department of Homeland Security - Federal Emergency Management Agency (FEMA) and is administered by the Wisconsin Department of Military Affairs - Wisconsin Emergency Management (WEM). The procedures utilized in preparing this plan are based on guidance provided by FEMA and WEM and should therefore be considered consistent with the requirements and procedures in the Disaster Mitigation Act of 2000.

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

Section 409 states that the county is obligated to try to reduce damage susceptibility to any hazard that has received relief funding in the past. Developing a hazard mitigation plan provides an opportunity for communities to meet this requirement by developing strategies for reduction of potential losses from future natural disasters. Hazard mitigation planning is the process of developing a set of actions designed to reduce or eliminate long-term risk to people and property from hazards and their effects. Completion of this plan should put Washburn 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 Washburn 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 Washburn County Hazard Mitigation Plan provides background information on Washburn 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 Washburn County Emergency Management Office has completed and regularly updates a hazard vulnerability analysis (HVA). The 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.

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

**Washburn County**<sup>1</sup>

Chapter 14	Buildings and Building Regulations
Chapter 38	Land Development Code
Chapter 38 Article II	Shoreland-Wetland
Chapter 38 Article III	Flood Damage Prevention
Chapter 38 Article IV	Zoning Regulations
Chapter 62	Subdivisions

**City of Shell Lake**<sup>2</sup>

8-13-2012	Floodplain Ordinance
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**City of Spooner**<sup>3</sup>

Chapter 14	Buildings and Building Regulations
Chapter 30	Floodplain Zoning
Chapter 54	Shoreland-Wetland Zoning
Chapter 66	Subdivisions
Chapter 86	Zoning

**Town of Casey**<sup>4</sup>

2009-03	Uniform Building Code Ordinance
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**Town of Gull Lake**<sup>5</sup>

Ordinance 109	Adopting the Comprehensive Plan
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<sup>1</sup> [https://library.municode.com/wi/washburn\\_county/codes/code\\_of\\_ordinances](https://library.municode.com/wi/washburn_county/codes/code_of_ordinances)

<sup>2</sup> <http://www.shelllake.org/local-government/departments/zoning/>

<sup>3</sup> [https://library.municode.com/wi/spooner/codes/code\\_of\\_ordinances](https://library.municode.com/wi/spooner/codes/code_of_ordinances)

<sup>4</sup> <https://townofcaseygov.net/ordinances/>

<sup>5</sup> <https://www.townofgulllake.us/ordinances/>

**Town of Long Lake** <sup>6</sup>

2017-1	Nonmetallic Mining
2004-2012	Uniform Dwelling Code
2005-3	Adopt Comprehensive Plan
2005-1	Temporary Moratorium on Land Rezonings

**Town of Madge** <sup>7</sup>

2013-04-01	Amendment to Adoption of Uniform Dwelling Code (UDC)
2010-04-02	Adoption of Uniform Dwelling Code (UDC)

The Towns Barronett, Bashaw, Bass Lake, Beaver Brook, Brooklyn, Crystal, Evergreen, Frog Creek, Sarona, and Springbook have no online ordinances.

The Towns of Birchwood,<sup>8</sup> Chicog,<sup>9</sup> Minong,<sup>10</sup> Spooner,<sup>11</sup> Stinnett,<sup>12</sup> Stone Lake,<sup>13</sup> and Trego <sup>14</sup> have no relevant ordinances available online.

**Village of Birchwood** <sup>15</sup>

Chapter 6	Buildings and Building Regulations
Chapter 22	Subdivisions
Chapter 28	Zoning

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<sup>6</sup> <https://www.townoflonglake.com/ordinances-resolutions/>

<sup>7</sup> <http://www.townofmadge.com/ordinances/>

<sup>8</sup> <https://www.townofbirchwood.net/ordinances/>

<sup>9</sup> <http://townofchicog.com/index.html>

<sup>10</sup> <http://www.townofminong.us/>

<sup>11</sup> <https://www.townofspooner.com/>

<sup>12</sup> <http://www.townofstinnett.com/artman2/publish/ordinance/index.shtml>

<sup>13</sup> <http://stonelakewi.com/>

<sup>14</sup> <https://townoftregowi.com/ordinances-resolutions/>

<sup>15</sup> [https://library.municode.com/wi/birchwood/codes/code\\_of\\_ordinances](https://library.municode.com/wi/birchwood/codes/code_of_ordinances)



**Village of Minong** <sup>16</sup>

Chapter 8	Buildings and Building Regulations
Appendix A	Zoning
Appendix B	Subdivision Regulations

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 storm water management plan), 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., storm water management) serving as core members of the workgroup committee. The selected mitigation strategies are recorded and detailed in each chapter as well as in the table in Appendix E.

Mitigation strategies are reviewed over the five years of the plan's life by the leadership staff from the applicable departments (e.g., Emergency Management, Sheriff's Office/Communications, Highway, Land and Water Conservation, 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

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<sup>16</sup> [https://library.municode.com/wi/minong/codes/code\\_of\\_ordinances](https://library.municode.com/wi/minong/codes/code_of_ordinances)

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 Washburn 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:

- Carol Buck, Washburn County Emergency Management
- Ben Garrett, Wisconsin DNR
- Jacob Druffner, Wisconsin DNR
- Bill Groat, Town of Stinnett
- Don Plante, Town of Stinnett
- Dave Wilson, City of Shell Lake
- Dennis Stuart, Washburn County Sheriff's Department
- Michelle Boutwell, Washburn County Zoning Department
- Cheri Nickell, Washburn County Health Department
- Paul Deneen, Washburn County Land Information Office
- Nils Odgren, Washburn County Land Information Office
- Bill Marx, City of Spooner Administrator
- Frank Scalzo, Washburn County Highway Department
- Rick Coquilllette, Washburn County LEPC
- Lolita Olson, Washburn County Administrator
- Nathan Nelson, Washburn County GIS
- Keith Dahlstrom, Washburn County Fire Association
- Randy Books, Wisconsin Emergency Management
- Anita Smith, Wisconsin Emergency Management
- Dave Vold, Washburn County Lakes and Rivers Association
- Phil Sylla, Washburn County Lakes and Rivers Association

- Madeline Roberts, UW-Extension
- Danielle Danford, Washburn County Register News
- John Geiger, Trego Lake District
- Rich Nonihoober
- Lenora Borchardt, EPTEC, Inc. (Contractor)

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

The committee met 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 Douglas, Bayfield, Sawyer, Rusk, Barron and Burnett 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 Washburn 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 E

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

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

A resolution was passed by the Washburn County Board of Supervisors and all of the cities, villages and towns in the county. 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.

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 Washburn County Hazard Mitigation Plan Workgroup will provide leadership and guidance throughout the plan's life cycle (i.e., monitoring, evaluating and

updating). Updates will allow municipal leaders and the public to provide input into the process. The public will be notified of this opportunity via legal public notices.

The process for integrating hazard mitigation actions into other planning mechanisms will be led by the county Emergency Management Director. As she receives information between the five-year update periods (e.g., comprehensive or capital improvement plans) that might be included, it will be added to Appendix G: Inter-Revision Updates. Washburn County Emergency Management maintains responsibility and is the point of contact for all issues (e.g., monitoring, updating and evaluating the effectiveness) regarding this plan. Municipalities can contact the county Emergency Management Director to add updated local information to Appendix G at any time. The communications will query if there are new elements for the mitigation plan as well as asking if there are any plans (new or updates) in which the mitigation plan can and/or will be used as a source plan. 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 C as they annually prioritize "regular" maintenance projects, as they set their annual budgets, after a disaster period and as grants become available that might help off-set the costs of some of the strategies listed within the plan. The latter will be instigated by notice of these opportunities by the county Emergency Management Director. The Director will keep and compile the inter-revision data for inclusion in the five-year update, which will be coordinated through county Emergency Management beginning at least 18 months prior to expiration and at which time they will report on their progress towards meeting the hazard mitigation goals. The update will bring together many of the same workgroup members as well as any new stakeholders (e.g., elected officials, businesses, academia, members of the public) who respond to the invitation to participate and have an interest in mitigation planning.

The plan participants also recognize this document as an important planning tool within the community and will use this plan as a reference as they complete other related planning. The county Emergency Management Director, the Washburn County Land and Water Conservation and Zoning Departments will use this plan as they update applicable community planning documents as well as community ordinances such as zoning, shoreland, floodplain, wetland, etc. and in other stand-alone plans such as those for park and recreation, sustainability and farmland preservation and will refer to it as they are involved in the planning and other preparedness activities of their municipalities. Many of these plans are on a regular updating cycle and as they come up for renewal, emergency management will be notified and provide any relevant planning materials (from the hazard mitigation plan and any additional information received since the plan's approval). Municipalities with planning departments have also committed to referring to the mitigation plan in their zoning updates, flood and shoreland planning. After this plan has passed its reviews from Wisconsin Emergency Management (WEM) and the Federal Emergency Management Agency (FEMA) and is approved, the county Zoning Department and the municipalities will receive a copy. They have committed to using and referring to the mitigation plan as they complete their regularly scheduled reviews and updates of the aforementioned plans. Washburn County Emergency Management will also refer to this plan in their emergency preparedness activities.

# Physical Characteristics of Washburn County

## General Community Introduction

The first white visitors to present day Washburn County arrived in about 1660. These visitors were missionaries and fur traders traveling the east-west route provided by the Namekagon River. In 1754, the Ojibwa (Chippewa) Indians migrated south from Lake Superior to occupy the region.

Fur trading was the dominant local industry until 1875, when a dam was constructed along the Namekagon River near Stinnett. Following this period, the logging industry became the principal economic activity in the county and large tracts of virgin white pine were harvested and floated to mills in Saint Croix Falls, Wisconsin and as far south as St. Louis, Missouri. The introduction of rail transportation into Washburn County in the year 1879 further expanded the logging industry by providing easier access to lumber in areas farther removed from the traditional river routes.

Early logging practices were not aimed at sustainability but rather a quick economic return. Impacts to the county's natural resource base were severe and dramatic. The cutover left in the wake of early logging resembled a barren northern desert. Timber waste became fuel for the subsequent slash fires that burned across the county in the late 1800's.

Washburn County received its name from former Wisconsin governor, businessman and Civil War veteran Cadwallader C. Washburn, an entrepreneur and speculator involved in business ventures in northern Wisconsin. Prior to 1883, present day Washburn County was part of Burnett County. The county became official on April 7, 1883, following action by the Wisconsin state legislature.

In the wake of the logging boom, agriculture became prevalent in the county. Former forestlands were converted to agricultural use and by 1935, there were 1,754 farms and 215,000 acres in production. Agricultural productivity was greatly limited by the land and much of

## Physical Characteristics of Washburn County

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these agricultural lands were eventually returned to forest cover and commercial timber production.

Present day Washburn County is economically diverse and modern. The primary industry within the county is tourism, evident by the number of motels, restaurants, museums, shops and recreational facilities now present in the county.<sup>17</sup>

Following is an edited excerpt from the book, Fifty Years in the Northwest<sup>18</sup> which describes some of the early conditions and communities in Washburn County:<sup>19</sup>

*Washburn County was organized in 1883, and embraces townships 37 to 42, inclusive, and ranges 10 to 13, inclusive, a total of 24 townships. It is drained by St. Croix waters with the exception of the southeast corner, which is drained by a branch of the Chippewa River. It has been a rich timbered region and large forests of pine still remain. The greater part of the county is adapted to agriculture and is settling rapidly. Two lines of railway traverse the county, one from the south to north and the other from southwest to northeast, giving the county excellent facilities for transportation and marketing of products. The county is divided into two towns, Bashaw in the south and Veasie in the north. These towns were organized in 1877 while Washburn was a part of Burnett County. The town of Bashaw was the first settled. John McMullen settled in township 38, range 13, in 1872, in Bashaw Valley. L. E. Thomas was the second settler in Bashaw and in Washburn County and ...built the first house. Nellie Raberge taught the first school in Bashaw, in 1881. The first post office was established in 1880, Mrs. Malcolm Dobie, postmistress. The first sermon was preached by Rev. Ellingwood. G. P. Pearly was the first physician; A. L. Bugbee, the first lawyer. Messrs. Hart, Baker, Gardner and others have large farms in Bashaw Valley.*

*By the act of organizing the county, Shell Lake was made the county seat. It is beautifully located on the shores of Summit Lake. It has a*

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<sup>17</sup> Washburn County Comprehensive Plan 2025 (draft) <https://www.co.washburn.wi.us/county-information/comprehensive-planning>

<sup>18</sup> Fifty Years in the Northwest, W. H. C. Folsom, Pioneer Press Company, 1888

<sup>19</sup> <http://washburn.wigenweb.org/histories/communities/50northwest/index.htm>



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*court house, built at a cost of \$11,000, in 1885, one of the most tasteful buildings of the kind in the St. Croix Valley. The town is built on railroad lands, purchased by the Shell Lake Lumber Company and by them surveyed into lots. The streets are from sixty-six to eighty feet wide. A restriction in the deeds to the lots and lands against the sale of alcoholic drinks has been continuously violated. In 1883 the town board fixed license at five hundred dollars, a plain violation of the original agreement.*

*A fine school building with four apartments was built in 1885 at a cost of \$5,000. Prof. Halphyde is principal of the schools. The Episcopalians and Catholics have church buildings. The Baptists, Methodists, Lutherans and Presbyterians have church organizations. The Masons, Good Templars and Knights of Labor have organizations.*

*Summit Lake, on the west bank of which the town is situated, is about two and a half miles broad by three and a half long. It has bold, gravelly shores. The water is deep, clear and pure. The slopes surrounding it are covered with evergreen and hardwood timber. One small steamer floats upon its waters.*

*The Shell Lake Lumber Company was organized in 1880 under Iowa laws. Their mills are located on the northwest side of Summit Lake. They have a capacity of 50,000,000 feet per year. The capital stock amounts to \$500,000. Employment is furnished to 250 men. In 1880 the hour system of labor was adopted. A narrow gauge railroad, twelve miles long, supplied with two locomotives and fifty cars, is used for bringing logs to mill. This road has a steel track and 3,000 feet of piling. The refuse burner of the mill is 20 feet in diameter and 102 in height. There are 63 tenement houses to accommodate the laborers.*

*Sawyer Creek obtained its name from Seth M. Sawyer, of Stillwater. This stream flows into Yellow River, five miles from Summit Lake. It rises from springs three hundred feet from the lake, and one hundred feet lower down, and may be considered its subterranean outlet, as visible outlet there is none. The lake, literally a summit lake, the receding and descending slopes, the springs uniting to form a larger*

## Physical Characteristics of Washburn County

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*stream, form a peculiar landscape, quite park-like in some of its features, and worthy of being converted into a park.*

*Spoooner, in the township of Veazie, on the north branch of the Yellow river, township 39, range 12, is a dinner station on the North Wisconsin railroad. The railroad company has fitted up an elegant eating house, and a few neat buildings, the nucleus of a much larger village, cluster around it.*

*Veazie Village is in township 41, range 10, and has a post office. The town of Veazie, occupying the northern part of the county, was organized in 1877. Millions of feet of pine timber have been gathered and marketed from this town, and it is estimated that 150,000,600 feet still remain. Ames and Sinnot station are in the township of Veazie.*

## Plan Area

Washburn County covers approximately 853 square miles or 545,945 acres with rivers, streams and lakes (surface waters) accounting for about 32,439 square miles of the total.<sup>20</sup> Washburn County is home to approximately 15,758 people.<sup>21</sup>

Washburn County lies within the Central Plain geographical province to the south; and the Northern Highland geographical province to the north.<sup>22</sup> 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 over a small area. The surface elevation ranges from 1,242 feet in the western part of the crescent, to 785 feet in the central part of the plain and 685 feet near the eastern end of the lowland. The general slope is very gradual.

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<sup>20</sup> Washburn County Comprehensive Plan 2025 (draft) <https://www.co.washburn.wi.us/county-information/comprehensive-planning>

<sup>21</sup> <https://www.census.gov/quickfacts/fact/table/washburncountywisconsin,US/PST045217>

<sup>22</sup> <http://www.wisconline.com/counties/washburn/index.html>

All the characteristics of the sandstone plain are normal to an inner lowland of a belted plain. The name inner lowland is used in connection with slightly dissected coastal plains. Where uplift takes place in a coastal plain, made up of alternate layers of weak and resistant rock which dip gently toward the ocean, it will be carved by streams and the weather.<sup>23</sup>

The Northern Highland belongs to a great upland area that stretches northward in Canada to Labrador and Hudson Bay. It has a strong southward slope and, as the highland is shield- shaped and gently arches, it also has east and west components of slope. The slant of a medial line from the northern to the southern border is less than six feet to the mile.

This is a moderately hilly region, the tops of the hills reaching a general elevation of 1,300 to 1,400 feet above sea level. The deepest valleys are cut down to 1,100 or 1,200 feet, so that the local relief is only about 200 feet. The hills are so moderate in slope that practically all roads are laid out in the rectangular system of the township and section lines. The valleys branch in dendritic or tree- like fashion. There are no lakes and practically no swamps [near Marathon]. A view from a hilltop shows an even skyline in every direction.<sup>24</sup>

The portion of the Northern Highland in the area of Wisconsin glaciation forms a striking contrast with the Driftless Area. There is no residual soil. Instead, there is a transported, glacial soil. Rapids and waterfalls are abundant in the streams. There are large undrained inter- stream areas. Lakes and swamps are found everywhere. The drainage pattern is most irregular, resembling nothing systematic, as is perfectly normal for so youthful a drainage system.

Washburn County is bordered on the east by Sawyer County, on the south by Barron County, on the west by Burnett County, on the north by Douglas County, on the northeast by Bayfield County and on the southeast by Rusk County.

In Wisconsin, there are three types of sub-county, full-service local government units: towns, which are unincorporated, and villages and

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<sup>23</sup> <http://www.wisconline.com/wisconsin/geoprovinces/centralplain.html>

<sup>24</sup> <http://www.wisconline.com/wisconsin/geoprovinces/northernhighland.html>

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cities, which are incorporated. Washburn County contains the Cities of Spooner and Shell Lake; the Villages of Birchwood and Minong; and the Towns of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake, and Trego. (See Appendix A for a map of Washburn County). The county and all of its municipalities have adopted the plan. Copies of the adoptions can be found in Appendix C.

## Geology

Glacial deposits, consisting of glacial till, loess and alluvial sands and gravels, cover much of Washburn County with thicknesses up to 106' thick. Much of the county is covered by glacial deposits greater than 100 feet. The underlying bedrock in the northern portion of the county is Keweenawan sandstone and basaltic lava. Sandstone underlies much of the southern portion of the county with small areas of quartzite.<sup>25</sup>

## Topography

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

The Northern Highlands, a plateau extending across northern Wisconsin, is an area of about 15,000 square miles with elevations from 1,000 to 1,800 feet. This area has many lakes and is the origin

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<sup>25</sup> Martin, 1932

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.<sup>26</sup>

The topography of Washburn County is gently rolling and is characterized by belts of drift hills and by numerous lakes. The highest elevations are east of Shell Lake, where the altitude is between 1,200 and 1,400 feet above sea level. Farther north, in the Yellow, Namekagon and Totagatic River Watersheds, the altitude is generally between 1,000 and 1,200 feet. The highest point in Washburn County is 1,500 feet in the Town of Birchwood near County Line Lake. The lowest point is the Namekagon River outlet to the St. Croix River at about 930 feet above sea level. Topographic maps are on file in the Spooner NRCS Field Office.<sup>27</sup>

## 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.

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<sup>26</sup> <http://www.uwex.edu/sco/state.html>

<sup>27</sup> Washburn County Comprehensive Plan 2025 (draft) <https://www.co.washburn.wi.us/county-information/comprehensive-planning>

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

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

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

The average seasonal snowfall varies from about 30 inches at Beloit to well over 100 inches in northern Iron County along the steep western slope of the Gogebic Range. Greater average snowfall is

## Physical Characteristics of Washburn County

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. <sup>28</sup>

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. Washburn County's growing season averages 117 days with a range of 88 to 144 days. Washburn County's median date of last frost in the spring is May 27 and the median date of the first frost in the fall is September 23. <sup>29</sup>

Climate Normals	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
<b>Ave Daily High (F°)</b>	20.8	27.4	39.6	56.4	69.4	77.4	82.1	79.0	69.2	58.1	39.8	24.6
<b>Ave Daily Low (F°)</b>	-1.6	3.3	17.5	31.4	42.4	51.5	56.8	54.1	45.9	35.7	22.7	6.1
<b>Growing Degree Days</b>	0	1	18	132	318	468	597	528	321	152	19	1
<b>Heating Degree Days</b>	1717	1389	1128	633	310	92	23	53	231	561	1011	1538
<b>Cooling Degree Days</b>	0	0	0	0	28	74	162	103	9	0	0	0
<b>Ave Precipitation (")</b>	0.76	0.65	1.39	2.16	3.16	3.85	3.76	4.27	3.82	2.53	1.49	0.96
<b>Ave Snowfall (")</b>	12.9	8.0	9.8	2.6	0.0	0.0	0.0	0.0	0.0	0.6	5.8	12.3

Data from the weather station at Spooner Exp Farm, lat. 45°49' N, long. 91°53' W, elevation 1100 ft. <sup>30</sup>

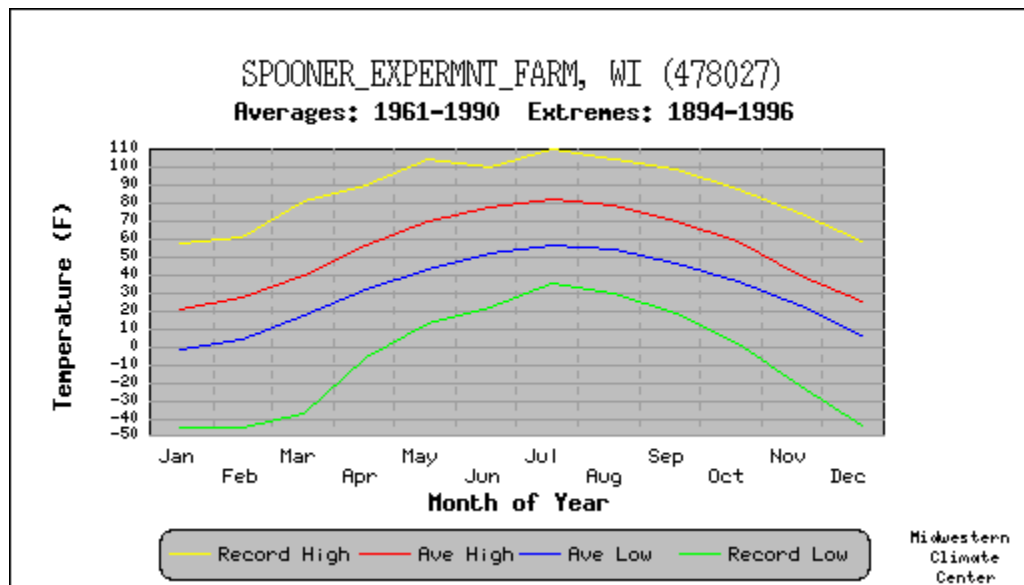
<sup>28</sup> <http://www.aos.wisc.edu/~sco/>

<sup>29</sup> <http://www.wisconline.com/counties/washburn/climate.html>

<sup>30</sup> <http://www.wisconline.com/counties/washburn/climate.html>

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### Climate Normals and Growing Season Summary <sup>31</sup>



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

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

Possible impacts during the four seasons include:

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<sup>31</sup> Data Provided by the Midwestern Regional Climate Center <https://mrcc.illinois.edu>



- Spring - More frequent and intense rain events may lead to more flooding with health impacts such as stress and mental health disorders; foodborne and waterborne illnesses; injuries; drowning; and death.
- Summer - Southern Wisconsin may experience approximately 28 more days exceeding 90 degrees Fahrenheit. Health impacts can include heat stress, respiratory disease, allergic reactions and death.
- Fall - Extended periods of warming could cause more drought with health impacts including water and food insecurity; respiratory distress; allergic reactions; and death.
- Winter - Warmer winters might cause more ice, sleet and rain. Health impacts may include traffic accidents, power outages, injuries and death.<sup>32</sup>

## Hydrology

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

Most of the streams and lakes in the state are ice-covered from late November to late March. Snow covers the ground in practically all the winter months except in extreme southern areas. Flooding is most frequent and most serious in April due to the melting of snow and spring rains. During this period, flood conditions are often aggravated by ice jams which back up the flood waters. Excessive

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<sup>32</sup> *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>

rains of the thunderstorm type sometimes produce tributary flooding or flash flooding along the smaller streams and creeks.<sup>33</sup>

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.<sup>34</sup> The winter period normally lacks infiltration because of frozen ground.

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

According to the Washburn County Lakes Classification, there are 966 lakes within the county. Of these water bodies, 262 are named lakes and 704 are unnamed. The largest lake in the county is Long Lake, which encompasses 3,289.7 acres. The average size of named lakes in Washburn County is 108 acres, while unnamed lakes average less than 6 acres. The deepest lake in the county is Nice Lake (T37N,R10W) at 79 feet. The average depth of named lakes in Washburn County is about 23 feet.<sup>35</sup>

Riparian surface features such as rivers, creeks, and streams represent unique and diverse natural systems. There are two kinds of streams, perennial and intermittent. Perennial streams flow throughout most (>50%) of the year. Intermittent streams usually flow only after rainstorms or snowmelt and, therefore, are dry most of the year. Intermittent streams must be protected because they channel runoff into perennial streams and lakes and may become part of the

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<sup>33</sup> <http://www.uwex.edu/sco/state.html>

<sup>34</sup> DeVaul, 1967

<sup>35</sup> Washburn County Comprehensive Plan 2025 (draft) <https://www.co.washburn.wi.us/county-information/comprehensive-planning>

aquatic ecosystem when water flows in them. Development on rivers and streams in Washburn County is regulated under the county shoreland zoning ordinance. Total miles of rivers and streams vary by local unit of government. The Town of Frog Creek has the most miles at 79.3 while the Village of Birchwood has the least miles at 0.4.<sup>36</sup>

Wisconsin is a state with a large quantity of groundwater and is a critical resource both statewide and within the county. It is the main source of drinking water for 70 percent of Wisconsin residents and 95 percent of Wisconsin communities. Groundwater quantity and quality is generally good throughout Washburn County, although according to the draft Washburn County Comprehensive Plan 2025, some problem areas (contaminants) have been found.

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. 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.

Groundwater is the primary source of drinking water for most Washburn County residents, conveyed through private wells or municipal water systems. As with 70% of the state, the sand and gravel aquifer is the main source of groundwater. This aquifer includes primarily glacial deposits of unconsolidated sand and gravel. It is not a continuous layer, but rather is deposited in lenses or layers of sand and gravel interspersed with other fine-grained or low permeability deposits. As a result, well yields vary and depend primarily on the permeability and thickness of the sand and gravel at a particular location. The Status of Groundwater Quantity Report states that groundwater in general is abundant in Washburn County.<sup>37</sup>

According to the draft comprehensive plan, the quality of natural groundwater varies by location. As groundwater passes through

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<sup>36</sup> Washburn County Comprehensive Plan 2025 (draft) <https://www.co.washburn.wi.us/county-information/comprehensive-planning>

<sup>37</sup> WDNR, 1997

sediments, naturally occurring chemicals may become deposited in the water. While naturally occurring groundwater contamination is generally mild, human-induced contaminants can make groundwater supplies unusable. The quality of groundwater is directly related to land use activities. The application of fertilizers, chemical spills, urban runoff, and non-point pollution can contribute to decreased quality of groundwater reserves.

The draft comprehensive plan also notes that groundwater depths in Washburn County also vary by location; and that groundwater contamination susceptibility corresponds to groundwater depth with shallow depths being the most vulnerable areas for contamination. Local soil and geologic conditions also impact the degree of susceptibility to contaminants.

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

Washburn County obtains all of its domestic drinking water from groundwater sources, including both municipal and private wells. 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 implements the wellhead protection plan by controlling land uses in the wellhead protection area.
- Animal Waste Management Ordinances: Most Wisconsin counties have adopted an animal waste management ordinance 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 - Aquifers that are close to the land surface have limited natural protection which makes them vulnerable to pollution.

In 2006, the Wisconsin DNR and DATCP reported that NO<sub>3</sub>-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<sub>3</sub>-N in private wells frequently exceed the drinking water limit. For example, in 2005 11.6% of 48,818 private wells exceeded the nitrate limit.

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

- Pesticides - A pesticide is any substance used to kill, control or repel pests or to prevent the damage that pests may cause. Included in the broad term “pesticide” are herbicides to control weeds, insecticides to control insects, and fungicides to control fungi and molds. Pesticides are used by businesses and homeowners as well as by farmers, but figures for the amounts and specific types of pesticides used are not generally available on a county-by-county basis. A 2005 report indicates that approximately 13 million pounds of pesticides are applied to major agricultural crops in Wisconsin each year, including over 8.5 million pounds of herbicides, 315,000 pounds of insecticides, one million pounds of fungicides, and 3 million pounds of other chemicals (this last category applied mainly to potatoes). The report also shows that herbicides are used on 100% of carrots for processing, 99% of potatoes, 98% of cucumbers for processing, 98% of soybeans, 97% of field corn, 89% of snap beans for processing, 87% of sweet corn, and 84% of green peas for processing. Insecticides are used on 97% of potatoes, 96% of carrots, and 88% of apples. Fungicides are used on 99% of potatoes, 88% of carrots, and 89% of apples.
- Arsenic - Arsenic is an element that occurs naturally in some of Wisconsin’s aquifers and may contaminate well water drawn from those aquifers. It is a particular problem in parts of the Fox River valley of northeastern Wisconsin. However, arsenic has been detected in wells in every county in Wisconsin, and arsenic concentrations greater than the drinking water limit of 10 µg/L (micrograms per liter, or parts per billion) have been documented in 51 of Wisconsin’s 72 counties.
- Contaminated Groundwater and/or Soil - Properties that were or are contaminated with hazardous substances can be found using the WDNR's Bureau for Remediation and Redevelopment Tracking System (BRRTS).<sup>38</sup> Washburn County has one open leaking underground storage tank (LUST) site which has contaminated soil and/or

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<sup>38</sup> <https://dnr.wi.gov/topic/Brownfields/botw.html>

groundwater with petroleum, which includes toxic and cancer-causing substances. However, given time, petroleum contamination naturally breaks down in the environment. There are 15 environmental repair (ERP) sites which are sites other than LUSTs that have contaminated soil and/or groundwater. Examples include industrial spills or dumping, buried containers of hazardous substances, and closed landfills that have caused contamination. There are also seven spill sites.

- Concentrated Animal Feeding Operations (CAFO) - There is one concentrated animal feeding operation (i.e., greater than 1,000 animal units) in Washburn County.<sup>39</sup> 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.<sup>40</sup>
- Licensed Landfills and Superfund Sites – There is one licensed landfill and no Superfund sites in Washburn County.<sup>41</sup> <sup>42</sup> In 1980, Congress passed the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly

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<sup>39</sup> [https://www.dnr.state.wi.us/topic/AgBusiness/data/CAFO/cafo\\_cty.asp?CountyChoice=Washburn&Submit=Submit](https://www.dnr.state.wi.us/topic/AgBusiness/data/CAFO/cafo_cty.asp?CountyChoice=Washburn&Submit=Submit)

<sup>40</sup> <https://dnr.wi.gov/topic/AgBusiness/CAFO/>

<sup>41</sup> [https://dnr.wi.gov/topic/waste/documents/faclists/WisLic\\_SWLandfills\\_byCnty\\_withWaste.pdf](https://dnr.wi.gov/topic/waste/documents/faclists/WisLic_SWLandfills_byCnty_withWaste.pdf)

<sup>42</sup> <https://dnr.wi.gov/files/PDF/pubs/rr/RR005.pdf>

known as the Superfund law. The Superfund law created a tax on the chemical and petroleum industries, which went into a trust fund to help pay for cleaning up abandoned or uncontrolled waste sites. The U.S. Environmental Protection Agency (EPA) administers the Superfund trust fund and works closely with state and local governments and tribal groups to remediate sites that may endanger public health or the environment. The contamination at many of these sites was created years ago when environmental regulations were virtually nonexistent and companies dumped or emitted hazardous materials freely into the environment. Years later the threat to humans and the ecosystems remains so great that the sites need to be cleaned up.

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

- Cleanup -
  - Petroleum Environmental Cleanup Fund Award - The Petroleum Environmental Cleanup Fund Award (PECFA) program was created in response to enactment of federal regulations requiring release prevention from underground storage tanks and cleanup of existing contamination from those tanks. PECFA is a reimbursement program returning a portion of incurred remedial cleanup costs to owners of eligible petroleum product systems, including home heating oil systems. This program is scheduled to end



## Physical Characteristics of Washburn County

June 30, 2020; however, liability for clean-up does not end when the program expires. As of June 30, 2004, \$1,763,530 has been reimbursed by the PECFA fund to clean up 22 petroleum-contaminated sites in Washburn County.<sup>43</sup>

- Nitrate Removal Systems – No municipal water systems in Washburn County have spent money to reduce nitrate levels. As of 2005, over 20 municipal water systems in Wisconsin have spent over \$24 million reducing nitrate concentrations in municipal water systems.

WDNR's Outstanding and Exceptional Resource Waters Program provides a designation for Wisconsin's cleanest waters. An outstanding resource water is defined as a lake or stream that has excellent water quality, high recreational and aesthetic value, high quality fishing and is free from point source or non-point source pollution. An exceptional resource water is defined as a stream that exhibits the same high quality resource values as an outstanding resource water but that may be impacted by point source pollution or that may have the potential for future discharge from a small sewer community. Outstanding and exceptional resource waters in Washburn County are:<sup>44</sup>

- Bass Lake (T40N R10W S17): All
- Beaver Brook: All
- Long Lake: All
- Middle McKenzie Lake: All
- Namekagon River: All
- S. Fork Bean Brook: All
- Sawyer Creek: All
- Shell Lake: All
- Stone Lake (T39N R10W S24): All

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<sup>43</sup>

[https://docs.legis.wisconsin.gov/misc/lfb/informational\\_papers/january\\_2005/0059\\_petroleum\\_environmental\\_cleanup\\_fund\\_award\\_pecfa\\_program\\_informational\\_paper\\_59.pdf](https://docs.legis.wisconsin.gov/misc/lfb/informational_papers/january_2005/0059_petroleum_environmental_cleanup_fund_award_pecfa_program_informational_paper_59.pdf)

<sup>44</sup> [http://dnr.wi.gov/topic/SurfaceWater/oerw/orwerw\\_county.pdf](http://dnr.wi.gov/topic/SurfaceWater/oerw/orwerw_county.pdf)

## Physical Characteristics of Washburn County

- Trego Lake: All
- Chippanazie Creek Tributary at T41N R10W S9 to S16: All
- Chippanazie Creek: From Chippanazie Lake to county line
- Crystal Brook: All
- Dago Creek: All
- Dahlstrom Brook: All
- Godfrey Creek: From NW ¼ NE ¼ S9 T39N R10W to S. Fork Bean River
- Gull Creek: All above Gull Lake
- Little Bean Brook: All
- McKenzie Creek: All
- Namekago River Tributary at T41N R13W S18: All
- Shell Creek: From CTH I upstream to springs in NE ¼ SE ¼ S22 T42N R12W
- Spring Brook: All
- Whalen Creek: 1.1 mile above Whalen Lake
- Yellow River Trib T38M R13W S4: All
- Yellow River Trib T39N R12W S31: All

Eleven watersheds are contained completely or partially within Washburn County. Seven of these are part of the St. Croix River Basin; three watersheds drain to the Lower Chippewa River Basin; and one watershed drains to the Upper Chippewa River Basin. The Saint Croix and Eau Claire Rivers, Totagatic River, Lower Namekagon River, Upper Namekagon River, Trego Lake/Middle Namekagon River, Shell Lank and Upper Yellow River and North Fork Clam River watersheds are all located in the St. Croix River Basin. The Brill and Red Cedar Rivers, Red Cedar Lake, and Yellow River watersheds are located in the Lower Chippewa River Basin. The Couderay River watershed, which only has a few square miles of land, is located in the Upper Chippewa Basin.

## Soil Types

The soil of Washburn County is similar to that found throughout Wisconsin. Soils in Washburn County vary from droughty and loamy sands to very poorly drained wet organic soils with a wide range of well drained to moderately well drained, sandy and silty loams between these extremes. A Washburn County digital soil survey was prepared by the Natural Resources Conservation Service and is available for review at the county.

Droughty sands and loamy sands dominate the north and west portions of the county while the more agriculturally valuable silty and sandy loams are more prevalent in the south and east portions. Washburn County soils tend to be acidic and low in essential nutrients necessary for crop production.

The most productive farm soils are located in the southern third of the county. The majority of these soils were formed in outwash material. They include Antigo Silt Loam, Anigon Silt Loam and Rosholt Sandy Loam. Freeon Silt Loam and Haugen Sandy Loam soils are also commonly farmed in Washburn County.

Severe limitations for sewage disposal systems occur in the gravelly sands and poorly drained soils of the county. There are numerous wetlands and organic soils that have severe limitations for septic systems scattered throughout the county.

Parent material largely determines the physical and chemical properties of the soil, such as the capacity or ability of the soil to store water and nutrients for plants and the rate at which water can pass through the soil. The soils in Washburn County formed in a wide variety of parent materials, including till, outwash, glaciolacustrine deposits and alluvial deposits. Till is unsorted, unstratified drift consisting mainly of clay, silt and sand. It may contain gravel, cobbles, stones or boulders.

## Physical Characteristics of Washburn County

The till in the southern part of the county is dominantly sandy loam. Freeon and Magnor soils are examples of soils that formed in silty deposits and in the underlying loamy till. The loamy till is dense at a depth of 40 to 60 inches. This dense layer restricts the movement of water through the soil.

Fremstadt and Spoonerhill soils are examples of till soils that are dominantly sandy throughout. They have a thin loamy upper layer but have friable sandy till in the subsoil and substratum. These soils are in the central part of the county on moraines surrounded by sandy outwash soils.

Some of the soils in the northeastern part of the county that formed in till are underlain by basalt bedrock. Magroc and Metonga soils are examples of soils that formed in silty deposits underlain by till over the bedrock. Outwash is sand, sand and gravel, or stratified sand and gravel deposited by water flowing from a melting glacier.

Rosholt, Scott Lake, and Oesterle soils formed mostly in loamy deposits over sandy and gravelly outwash. Anigon, Antigo, Brill, Sconsin, Billyboy and Poskin soils formed mostly in silty deposits over sandy and gravelly outwash. Graycalm, Grettum, Mahtomedi and Menahga soils are examples of outwash soils that are sandy or gravelly throughout. These soils are in the central and northwestern parts of the county

Glaciolacustrine deposits are materials ranging from fine clay to sand derived from glaciers and deposited in glacial lakes, mainly by glacial meltwater. Many deposits are interbedded or laminated. In Washburn County, ice-walled lake plains formed as surrounding stagnant ice melted. These dish-shaped plateau formations are easy to recognize on topographic maps (Johnson, 2000). Barronett, Comstock, and Crystal Lake soils are examples of soils that formed in areas where these deposits are dominantly loamy. Cublake, Flink and Sissabagama soils are examples of soils that formed in areas where loamy glaciolacustrine deposits are covered by deep deposits of sandy outwash.

Other glaciolacustrine deposits in Washburn County were laid down in areas once covered by Glacial Lake Grantsburg. Glacial Lake Grantsburg formed as the Grantsburg Sublobe of the Des Moines glacial advance dammed the southwest flowing St. Croix River in the vicinity of Grantsburg in Burnett County. It is estimated that Glacial Lake Grantsburg lasted for about 80 to 100 years (Johnson, 2000). Dody, Karlsborg and Perida soils are examples of soils that formed in areas where a thin layer of clayey Glacial Lake Grantsburg glaciolacustrine deposits were covered by moderately deep or deep sandy outwash or glaciolacustrine deposits. These soils occur in small pockets in the east-central part of the county.

Some of the soils in the county, such as Totagatic and Winterfield soils, formed in sandy postglacial alluvial deposits that were laid down as rivers overflowed and deposited fresh sediments on the flood plains. Fordum soils are examples of soils that formed in loamy alluvial deposits.<sup>45</sup>

## 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.<sup>46</sup>

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.

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<sup>45</sup> Soil Survey of Washburn County, 2004

<sup>46</sup> <http://dnr.wi.gov/topic/wetlands/>

Wetlands store flood waters and filter water from precipitation before it enters lakes and streams. Some wetlands also recharge local groundwater aquifers. By slowing water movement, wetlands reduce the likelihood that heavy rainfall or spring snowmelt will cause erosion and flooding. Wetlands retain eroded soil and hold nutrients that would otherwise promote excessive weed growth and algae blooms in lakes and streams. These nutrients, when held in the wetlands, produce a heavy growth of vegetation that provides nesting sites, food and cover for waterfowl, small mammals and many other types of wildlife. Wetlands also provide recreational opportunities for humans (wildlife observation, hiking, hunting, etc).

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

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

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

Wetlands perform an important set of natural functions, which make them particularly valuable resources lending to overall environmental health and diversity. Some wetlands provide seasonal groundwater recharge or discharge. Those wetlands that provide groundwater discharge often provide base flow to surface waters. Wetlands contribute to the maintenance of good water quality, except during unusual periods of high runoff following prolonged drought by serving as traps, which retain nutrients and sediments, thereby preventing them from reaching streams and lakes. They act to retain water during dry periods and hold it during flooding events, thus keeping the water table high and relatively stable. They provide essential breeding, nesting, resting, and feeding grounds and predator escape

cover for many forms of fish and wildlife. These attributes have the net effect of improving general environmental health; providing recreational, research and educational opportunities; maintaining opportunities for hunting and fishing and adding to the aesthetics of an area.

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

There are two main levels of jurisdiction (often overlapping) concerning wetlands in Washburn County are the Wisconsin Department of Natural Resources and municipal zoning agencies. The Zoning Department has jurisdiction over wetlands in county zoning plans while wetlands within city or village boundaries are also subject to the appropriate municipality's regulations.

According to the Wisconsin Department of Natural Resources, Washburn County has approximately 79,140 acres of wetlands (approximately 15.3% of its total area). This is 1.5% of the total statewide acreage of wetlands.<sup>47</sup>

## **Land Use**

The land in Washburn County consists of farmland, shoreland and forests as well as commercial, residential and industrial land. The total area is 857 square miles. Of that area, approximately 810 square miles are land and 44 square miles are surface water. The land is mostly forested or a mixture of forested land and cropland. The Washburn County Forest covers 148,357 acres. Agricultural land use is the second most prevalent land use in

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<sup>47</sup> <http://dnr.wi.gov/topic/wetlands/acreage.html>

## Physical Characteristics of Washburn County

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Washburn County, comprising 62,977 acres or nearly 12 percent of the county's total area. Most agricultural land use is centered in the central and southern portion of the county where soil conditions are generally more favorable for agricultural uses. Areas of the county defined as "prime farmland" (NRCS) are primarily limited to the southern and central portions of Washburn County. Farmland classification identifies the location and extent of the most suitable land for producing food, feed, fiber, forage and oilseed crops.

Washburn County is located within the northwestern part of the State of Wisconsin. This region is characterized by an abundance of lakes, rivers, and streams set amongst a heavily forested landscape. Agricultural activity is a prominent feature of the landscape within the central and southern parts of the county. Like most northern Wisconsin counties, the overall land use and development pattern has been heavily influenced by tourism and recreational home development. Washburn County is predominantly rural and the highest population densities within the county are found in the cities and villages, with a generally low overall population density in the rural areas except along certain lakes. Most home development within Washburn County has occurred in the rural areas.

<b>Washburn County Existing Land Use Acreage (Unincorporated Areas) <sup>48</sup></b>	
<b>Existing Land Use</b>	<b>Total Acres</b>
Agriculture	62,977.1
Communications/Utilities	33.4
Commercial	176.8
County Highways	1,153.6
County Roads	250.1
Farm	76.4
Federal Highways	709.5
Government/Institutional	84.8
Industrial	327.0

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<sup>48</sup> NWRPC GIS Inventory, 2002



## Physical Characteristics of Washburn County

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Local Roads	6,204.2
Mobile Home Park	3.2
Open Space	1,689.3
Park & Recreation	291.1
Residential	3,565.0
Shed	35.3
State Highway	444.6
Water	32,439.1
Woodlands	425,347.9
<b>Total</b>	<b>535,808.3</b>

Washburn County has about 141,500 acres of county forest land (CFL), distributed among 16 towns. CFL lands are publicly owned lands primarily utilized for timber production, wildlife habitat and various forms of recreation. Because these are publicly owned lands, they effectively block development, much like a national or state forest. Additionally, road density within Washburn County forest land blocks is substantially lower than is found elsewhere in the county. It should be noted that private parcels are found within the CFL and some development has occurred on these parcels. A growing trend in the north is the construction of housing in close proximity to large tracts of publicly owned land. Referred to as “fringe growth,” this form of development takes advantage of the access provided by these parcels. Historically, these fringe parcels have been small hunting cabins or seasonal recreational homes. Much like the conversion of lakeshore cabins to permanent residences, these fringe structures are being converted from hunting cabins to homes or larger recreational structures. The National Park Service owns and manages 12,500 acres along the Namekagon River as part of the National Wild and Scenic Rivers system.

There are over 20,300 acres of industrial forestland within Washburn County. The use of these lands for the production of forest products has prohibited other forms of development. While continued industrial use is not ensured, it has in the past served as a “barrier to development”. Most of industrial forest land in Washburn County is found in the Town of Minong, with smaller holdings in the Towns of

## Physical Characteristics of Washburn County

Chicog, Trego, Springbrook, Crystal, Stone Lake, Bass Lake, Evergreen, Madge, Spooner, Brooklyn, Gull Lake, and Casey.

Lands that are enrolled in forest management programs such as Managed Forest Law (MFL) or Forest Crop Law (FCL) can provide some assurance that these lands will continue to be utilized as forest. These lands are under contractual commitment, which may or may not be renewed upon expiration. Development or conversion of use is possible on Forest Tax Law lands; although, various program incentives encourage continued enrollment. Forest Tax Law program enrollment in Washburn County includes 37,136 acres in MFL (20,379 acres open, 16,757 acres closed) and 17,183 acres in the Forest Crop Law program.<sup>49</sup>

Located in Sarona, the Hunt Hill Audubon Sanctuary is an environmental learning community with over 450 acres of wooded glacial hills, mature maples, groves of ancient white pines, meadows of grasses and wildflowers and black spruce and tamarack bogs.

The Namekagon River stretches 50 miles through Washburn County. The Namekagon River and visitors center is located in Trego. The Namekagon River is mostly undeveloped and allows visitors to view deer, muskrats, turtles, herons and bald eagles that live along the riverbank. The National Park Service maintains primitive campsites accessible only by water.

A portion of the Loyhead and Sawmill Lakes Primitive Canoe Routes are located in Washburn County. These routes were used by Native Americans and fur traders of Northern Wisconsin 200 years ago. The routes include access to more than 30 lakes and through an extensive portage and trail system.

The Spooner Area Recreation Trails can be used for hikers, bicyclists, snowmobilers, skiers and horseback riders. They are maintained by the Washburn County Forest Administration.

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<sup>49</sup> Washburn County Comprehensive Plan 2025 (draft) <https://www.co.washburn.wi.us/county-information/comprehensive-planning>

The Gov. Tommy G. Thompson State Fish Hatchery in Spooner is the largest hatchery of its kind in the world. It is operated by the Wisconsin Department of Natural Resources. The facility annually produces nearly 2 million walleyes, 100,000 muskellunge and some northern pike. Each year hatchery workers collect 32 million muskie and walleye eggs and five million northern pike eggs — plus a staggering 100 million sucker eggs to feed the hungry muskie babies. When they arrive at their new home, the eggs first go into hatching jars. In the wild, less than one-tenth of 1 percent of the eggs would survive. In the hatchery, 60 to 95 percent survive. After a few days the fish hatch and swim into indoor tanks. As they grow, they move to one of 46 outdoor rearing ponds for a few weeks. When the fish are big enough, they are stocked back into Wisconsin lakes.

Sawmill Lake offers primitive camping, 20 sites with tables and fire rings, no electricity dock, open shelter, vault toilets, hand pump for water. Totagatic Park, west of Minong, offers 20 sites with electricity and 50 sites without electricity; water, firewood, flush and vault toilets and a dumping station. Trego Town Park offers 50 sites with water, electric; showers, firewood and flush toilets. Shell Lake Municipal Campground offers 45 sites and electric and water hookups. Doolittle Park in Birchwood offers 40 sites; electricity, flush toilets, showers, a dump station, swimming, firewood, boat docking, playground and picnicking.

The Wisconsin Department of Natural Resources has identified four state natural areas within Washburn County:

- Lampson Moraine Pines, 120 acres <sup>50</sup>
- Dory's Bog and Hunt Hill, 160 acres <sup>51</sup>
- Totagatic Highlands Hemlocks, 160 acres <sup>52</sup>
- Tranus Lake, 175 acres <sup>53</sup>

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<sup>50</sup> <http://dnr.wi.gov/topic/Lands/naturalareas/index.asp?SNA=103>

<sup>51</sup> <http://dnr.wi.gov/topic/Lands/naturalareas/index.asp?SNA=116>

<sup>52</sup> <http://dnr.wi.gov/topic/Lands/naturalareas/index.asp?SNA=140>

<sup>53</sup> <http://dnr.wi.gov/topic/Lands/naturalareas/index.asp?SNA=277>

## Vegetation

The northern two-thirds of the county is jackpine and prairie grasses with areas of blue spruce, tamarack and cedar interspersed with white and red pine. The southern one-third of the county contains maple, hemlock and yellow birch. <sup>54</sup>

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<sup>54</sup> <http://www.wisconline.com/counties/washburn/index.html>

# Demographics

## Human Settlement Patterns

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

The first white visitors to present day Washburn County arrived in about 1660. These visitors were missionaries and fur-traders traveling the east-west route provided by the Namekagon River. In 1754, the Ojibwa (Chippewa) Indians migrated south from Lake Superior to occupy the region.

Fur trading was the dominant local industry until 1875, when a dam was constructed along the Namekagon River near Stinnett. Following this period, the logging industry became the principal economic activity in the county, and large tracts of virgin white pine were harvested and floated to mills in Saint Croix Falls, Wisconsin and as far south as Saint Louis, Missouri. The introduction of rail transportation into Washburn County in the year 1879 further expanded the logging industry by providing easier access to lumber in areas farther removed from the traditional river routes.

Washburn County received its name from former Wisconsin governor, businessman, and Civil War veteran, Cadwallader C. Washburn, an entrepreneur and speculator involved in business ventures in northern Wisconsin. Prior to 1883, present day Washburn County was part of Burnett County. The county became official on April 7, 1883, following action by the Wisconsin state legislature.

In the wake of the logging boom, agriculture became prevalent in the county. Former forestlands were converted to agricultural use; and

## Demographics

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by 1935, there were 1,754 farms and 215,000 acres in production. Agricultural productivity was greatly limited by the land, and much of these agricultural lands were eventually returned to forest cover and commercial timber production.

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

## Population

Washburn County is generally rural. In the 2010 U.S. Census, the county was home to 15,911 people and according to the 1 July 2017 U.S. Census Bureau estimate,<sup>55</sup> there were 15,758 people residing in Washburn County for a decrease of 1%.

According to the 2013-2017 U.S. census estimate, there are 7,142 households in Washburn County with an average of 2.16 people per household. The 2013-2017 U.S. census numbers indicate that the median household income is \$46,592 and that the per capita income is \$28,232. Approximately 12.8% of the people live below the poverty line. The 2017 census estimate also indicated that there are approximately 13,305 housing units within the county as of 1 July.

According to the U.S. Census report, the majority of people in Washburn County reported that they were white (95.8%) with 94.3% stating they were white alone. People of Hispanic or Latino origin were counted as a subcategory of those reporting that they were white. Those reporting as two or more races were 1.7%. American Indians account for 1.6% of the population of Washburn County. Black or African American alone was 0.4% and Asian alone was 0.5%. There are no Native American tribal lands located within Washburn County.

Other miscellaneous demographic information reported by the census bureau is detailed below. These figures identify potential

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<sup>55</sup> <https://www.census.gov/quickfacts/fact/table/washburncountywisconsin,US/PST045218>

needs for special consideration in a disaster response or in recovery operation planning and implementation.

- People under 5 years old: 4.6%
- People under 18 years old: 19.0%
- People over 65 years old: 25.7%
- Females: 50.5%
- Foreign born: 1.1%
- People with a disability, under 65 years old: 10.6%

Washburn County contains the Cities of Spooner and Shell Lake; the Villages of Birchwood and Minong; and the Towns of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake, and Trego.

## Transportation Network

Washburn County's road network includes approximately 1,400 miles of highways and local roads that connect the county's inhabitants and visitors to commercial, recreational and educational sites. Several important roadways bisect and cross the county, including US Highways 53 and 63; state trunk highways (STH) 48, 70, 77, and 253 and numerous county trunk highways (CTH). These roadways support the majority of the traffic movement within the county.

Roadways in Washburn County are categorized by a functional classification system based on the level of service the roadway provides in carrying vehicular traffic. Functional road classifications for rural areas include principal arterials, minor arterials, major collectors, minor collectors and local roads. The map in Appendix A shows the various roads in the county.

Washburn County has a sufficient transportation network. State and county roads connect the population centers. US 53 runs north-south through the center of the county and connects Sarona, Trego and Minong. US 63 runs southwest-northeast across the county and passes through Shell Lake, Spooner, Trego, Earl and Springbrook. Washburn County has maintained these roads along with a large

## Demographics

county highway network to provide a safe and efficient transportation system. With continued maintenance, these roads will continue to serve the population effectively.

Washburn County has a good transportation network and 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.

## **Public Safety Support**

The Washburn County Communications Center (ACC) is a 9-1-1 Public Safety Answering Point (PSAP) and Dispatch Center for Washburn County. The communications center is staffed with 24-hour 9-1-1 dispatchers and one communications center controller.

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

## **Medical**

Three ambulance services provide emergency medical transportation in Washburn County. For more information on ambulance and rescue services see appropriate individual town plans. Details about pre-hospital medical units and their licensing levels are listed below: <sup>56</sup>

- **Birchwood Four Corners Emergency Services District** – License level: Emergency Medical Technician
- **Long Lake Area First Responders** – License level: Emergency Medical Responder

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<sup>56</sup> <https://www.dhs.wisconsin.gov/ems/provider/washburn.htm>



- **Minong Area Ambulance Service** - License level: Emergency Medical Technician
- **North Memorial Ambulance Service** – License level: Emergency Medical Technician
- **Shell Lake First Responders** - License level: Emergency Medical Responder

Washburn County has a network of first responders who are paged or called to medical emergencies by the Washburn County Sheriff's Office. They typically provide assistance at the scene, as ambulances are enroute. Many of the first responders are also certified emergency medical technicians (EMTs).

The residents of Washburn County are served by hospitals, medical centers and clinics in Rice Lake, Hayward and the Villages of Birchwood and Minong including the following two hospitals: <sup>57</sup>

- Indianhead Medical Center (IMC) - located at 113 West Fourth Street, Shell Lake. IMC is a care hospital that is state-licensed and accredited by the Joint Commission on Accreditation of Health Care Organizations. A wide range of inpatient and outpatient services are offered, and the emergency room is staffed 24 hours a day. Services include physical therapy, chemotherapy, respiratory therapy, cardiac and pulmonary testing and rehabilitation, mammography, CT scans and diabetes consultation. A staff of specialists provides oncology, orthopedic, podiatry and urology care. IMC Home Health Agency also provides home health care services.
- Spoooner Health System - located at 1280 Chandler Drive, is a state and federally-licensed 20-bed critical access hospital with a wide range of services from 24/7 emergency and inpatient care to outpatient therapy, home health, respiratory therapy, infusion and diagnostic imaging. Spoooner Health offers patients access to visiting specialists in the fields of

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<sup>57</sup> <https://www.dhs.wisconsin.gov/guide/hospitaldir.pdf>

urology, orthopedics, ear nose and throat, podiatry, gastroenterology, pain management and ophthalmology.

## **Fire Service**

Washburn County is served by the following fire departments:<sup>58</sup>

- Birchwood Fire Department
- Chicog Volunteer Fire Department
- Minong Area Fire and Ambulance
- Shell Lake Fire Department
- Spooner Fire District
- Hayward Fire Department (Please note that this department responds from Sawyer County for some towns in Washburn Co.)



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<sup>58</sup> <https://beta.firedepartment.net/directory/wisconsin/washburn-county/>

Cortec Spray Technologies explosion and fire on 18 March 2008. The explosion injured two workers and destroyed 80% of the facility.

The Washburn County Forestry Department and the Wisconsin Department of Natural Resources (DNR) provide the primary firefighting protection in the area of wildfires. At the county level, five forestry staff members are fully trained for wildfire fighting. County wildfire equipment consists of a 550H Dozer with water tanks and PPE, Hester fire plow, semi and trailer with 800 gallon water tank mounted on trailer, two ATV's with water tank inserts, three slip on water tanks for 4 x 4 pickups, JD 6410 and PosiTrack 2810 available for other needs, two water pumps in addition to the pumps on the slip on units, pickups equipped with radios programmed with all necessary emergency frequencies and portable radios. The forestry department operates under a cooperative MOU with DNR Fire Control that commits the county to assist with wildfire suppression on county forest lands and also on other private lands at the request of DNR.<sup>59</sup>

Hazardous materials (HazMat) response is performed by Type II and Type III Teams in the Northwest Task Force.<sup>60</sup> Wisconsin Emergency Management contracts and manages twenty-two Regional Hazardous Materials Response Teams. The teams are divided into Task Forces: Northeast Task Force, Northwest Task Force, Southeast Task Force and the Southwest Task Force. These Task Forces are then divided into Type I, Type II and Type III teams, all with complimentary capabilities and training requirements.

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

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<sup>59</sup> Washburn County Comprehensive Plan 2025 (draft) <https://www.co.washburn.wi.us/county-information/comprehensive-planning>

<sup>60</sup> [https://dma.wi.gov/DMA/divisions/wem/response/images/HazMat\\_Type\\_Teams.pdf](https://dma.wi.gov/DMA/divisions/wem/response/images/HazMat_Type_Teams.pdf)

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.<sup>61</sup>

## Law Enforcement

The Washburn County Sheriff's Office is the primary law enforcement agency within the county. However, there are several municipal and state agencies that have law enforcement responsibilities in their respective jurisdictions (i.e., Wisconsin State Patrol, Wisconsin Department of Natural Resources, Spooner Police Department, Shell Lake Police Department, Minong Police Department and the Birchwood Police Department).

The Washburn County Sheriff's Office provides assistance to the entire county on a 24-hour basis. They are responsible for response to criminal incidents, traffic incidents and other requests for law enforcement services; investigation of criminal offenses and apprehension of the perpetrators; investigation for law violations; maintenance of a smooth, orderly and safe flow of traffic; and public information activities.<sup>62</sup>

The Cities of Spooner and Shell Lake; and Villages of Minong and Birchwood all have their own police services. Also, the Wisconsin State Patrol provides limited coverage from their northwest region office in Spooner.<sup>63</sup>

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<sup>61</sup> [https://dma.wi.gov/DMA/divisions/wem/response/images/HazMat\\_County\\_Teams.pdf](https://dma.wi.gov/DMA/divisions/wem/response/images/HazMat_County_Teams.pdf)

<sup>62</sup> <http://washburnsheriff.org/>

<sup>63</sup> <http://wisconsindot.gov/Documents/about-wisdot/who-we-are/dsp/dsp-regions-map.pdf>

## Amateur Radio

The Burnett-Washburn Radio Association (BWRA) is an amateur radio communications group that can provide emergency communications via handheld, mobile and base radios to augment government resources. Resources and capabilities include the following:

- BWRA has their own state-wide repeater system with the BWRA group having three linked repeaters in Siren, Shell Lake and Lampson. These repeaters have the capability of connecting to linked repeaters north to Solon, WI and Hayward WI.
- The group has APRS tracker stations and transmitters that can be placed on vehicles and people to track them and display their locations on maps at the Incident Command.
- BWRA has emergency generators to support remote location operations.

## Archaeological and Historical Resources

The National Register of Historic Places also includes a listing of locations in Washburn County.<sup>64</sup> 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
Polson, Mrs. Richard House	North of Spooner	Town of Spooner
Salem Lutheran Church	301 8 <sup>th</sup> Avenue West	City of Shell Lake
Siegner, George V. House	513 Dale Street	City of Spooner

<sup>64</sup> <https://nationalregisterofhistoricplaces.com/wi/green+lake/state.html>

## Demographics

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. Up to this point in time, 173 archaeological sites and cemeteries have been reported to the Wisconsin Historical Society for Washburn County. These sites cover an extended period of time, which include campsites/villages/communities, cabins/homesteads, sugar mapping sites, cemetery/burial/ mounds, trading/fur posts, mill/sawmills and kilns.<sup>65</sup>

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.

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<sup>65</sup> Washburn County Comprehensive Plan 2025 (draft) <https://www.co.washburn.wi.us/county-information/comprehensive-planning>

## Hazard Analysis and Previous Mitigation Projects

The following sections identify those hazards that have occurred or could occur in Washburn 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 Washburn County Emergency Management Director has a list 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 coastal erosion, dam failure, flooding, landslides and wildfire; for those hazards, specific locations are identified.

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

## Hazard Analysis

Hazard	Likelihood of Occurrence*	Severity of Effects if It Does Happen*	Misc. Notes
Drought/Dust Storm	1	3	
Earthquake	1	2	
Flood – Flash Flood & River Flood	5	4	Have completed some mitigation projects that have reduced disaster damages and has even help minimize “regular” annual flooding
Flood – Dam Break	3	4	
Forest Fire	5	3	
Wildfire	5	3	
Severe Temperature (Hot)	4	2	
Severe Temperature (Cold)	4	2 / 4	Severity would be higher if there is a utility shortage as there was several years ago when propane cost \$6-7 gallon or in a LTPO due to electrical system failure
Hail	4	1 / 3	Severity would be higher for roofs, cars, crops
Lightning	4	1 / 3	Severity would be higher for electrical, communications
Thunderstorm	4	1	Severity is low but could generate other hazards
Tornado	3	3	
Derecho (High Wind)	4	4	

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



Included in Appendix B are the results of vulnerability assessments prepared by the Region #1 Northwest Wisconsin Healthcare Emergency Readiness Coalition and Washburn County Public Health.

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. Washburn 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 planning will reference this mitigation plan and its contents in the next scheduled plan update. Municipalities that do not have comprehensive planning either are under the purview of and request assistance from the Washburn County Zoning Department or have their own planning departments. Members of the County Zoning Department and municipal planning departments were included on the Hazard Mitigation Workgroup and are aware of the benefits and requirements to utilizing this plan as they go about their preparedness activities.

Washburn 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:

- Community Development Block Grant (CDBG) - The U.S. Department of Housing and Urban Development (HUD) Community Development Block Grant-Disaster Recovery Assistance provides flexible grants to help cities, counties and states recover from Presidentially-declared disasters, especially in low-income areas, subject to availability of supplemental appropriations. In response to disasters, Congress may appropriate additional funding for the CDBG

program as disaster recovery grants to rebuild the affected areas and provide crucial seed money to start the recovery process. Since CDBG Disaster Recovery assistance may fund a broad range of recovery activities, HUD can help communities and neighborhoods that otherwise might not recover due to limited resources. Disaster Recovery grants often supplement the disaster programs of FEMA, the SBA and the U.S. Army Corps of Engineers (i.e., these funds can be used for the local matching requirement of other federal grants).<sup>66</sup>

### Community Development Block Grant (CDBG) Public Facilities (PF) Projects:

- FY04-10234 Shell Lake, City Washburn (\$750,000)  
Construct a drainage pipe to lower lake levels to relieve the flooding

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

- 81195.03 Washburn County Washburn (\$250,000)  
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
  - Shell Lake, City Washburn Acquisition/relocation and demolition and clearance of hazardous structures
- **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

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<sup>66</sup>[http://portal.hud.gov/hudportal/HUD?src=/program\\_offices/comm\\_planning/communitydevelopment/programs/drsi](http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/communitydevelopment/programs/drsi)

the Presidential major disaster declaration is available in all areas of the state following a Presidential disaster declaration.<sup>67</sup>

Hazard Mitigation Grant Program (HMGP) Projects Funded in Washburn County:

- DR-1332 2000: City of Shell Lake (\$52,036) Relocation of community shelter
  - DR-1369 2001: City of Shell Lake (\$250,000) Completion of engineering study for water diversion project
  - DR-1369 2001 City of Shell Lake (\$19,847) New Plan is approved
- **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.<sup>68</sup>

Pre-Disaster Mitigation (PDM) Projects and/or Plans Funded in Washburn County: <sup>69</sup>

- 2006C Washburn County (\$44,000) New Plan is approved
  - 2007C WEM All (\$402,574) Update Agreement with UW for HAZUS flood risk assessment
- **FMA** - The Flood Mitigation Assistance (FMA) program is authorized by Section 1366 of the National Flood Insurance Act of 1968, as amended with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). The

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<sup>67</sup> <http://www.fema.gov/hazard-mitigation-grant-program>

<sup>68</sup> <http://www.fema.gov/pre-disaster-mitigation-grant-program>

<sup>69</sup> Note that several grants to the State of Wisconsin/WEM are listed when searching for Washburn 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.

Repetitive Flood Claims (RFC) program has the goal of reducing flood damages to individual properties for which one or more claim payments for losses have been made under flood insurance coverage and that will result in the greatest savings to the National Flood Insurance Fund (NFIF) in the shortest period of time.<sup>70</sup>

- **SRL** - The Severe Repetitive Loss (SRL) program is authorized by Section 1361A of the NFIA has the goal of reducing flood damages to residential properties that have experienced severe repetitive losses under flood insurance coverage and that will result in the greatest amount of savings to the NFIF in the shortest period of time.<sup>71</sup>
  - List of Communities with Repetitive Loss Properties  
CID# 550606      total 1/remaining 1
- **RFC** - The Repetitive Flood Claims (RFC) grant program was authorized by the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004 (P.L. 108–264), which amended the National Flood Insurance Act (NFIA) of 1968 (42 U.S.C. 4001, et al). Up to \$10 million is available annually for the Federal Emergency Management Agency (FEMA) to provide RFC funds to assist states and communities to reduce flood damages to insured properties that have had one or more claims to the National Flood Insurance Program (NFIP). FEMA may contribute up to 100 percent of the total amount approved under the RFC grant award to implement approved activities, if the applicant has demonstrated that the proposed activities cannot be funded under the FFMA program.<sup>72</sup>
- **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

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<sup>70</sup> Note that several grants to the State of Wisconsin/WEM are listed when searching for Washburn 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.

<sup>71</sup> <http://www.fema.gov/severe-repetitive-loss-program>

<sup>72</sup> <http://www.fema.gov/repetitive-flood-claims-program>

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.<sup>73</sup>

- **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.<sup>74</sup>
  - 2002-03 MFC-65282-A-02 Shell Lake, City Washburn (\$116,921.30) two acquisitions
- **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.<sup>75</sup>

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<sup>73</sup> <http://www.fema.gov/public-assistance-local-state-tribal-and-non-profit/hazard-mitigation-funding-under-section-406-0>

<sup>74</sup> <http://dnr.wi.gov/Aid/MunFloodControl.html>

<sup>75</sup> <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 Washburn County would like to accomplish are detailed in the following sections.

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

Most of 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. Washburn County will maintain the following:

- Facilities, systems and procedures to activate warning and communication capabilities,
- Systems to support communications, including:
  - Sirens to warn the public in municipalities that request it (i.e., Shell Lake, Birchwood, Minong, Stinnett). The current status of sirens in the county is:
    - Shell Lake – two sirens
    - Birchwood – one siren
    - Minong – one siren
    - Stinnett is in the process of purchasing and installing a siren.
    - The City of Spooner has three sirens and would like to install two more because they have annexed additional land and siren coverage at these locations is not good. Overall this is a high priority strategy for the city but it has been identified as a very high need near the high school. The city operates and maintains its own sirens.
    - The Town of Long Lake would like to explore installing sirens at the Boy Scout Camp and at



the Hunt Hill Campground. There are 300 scouts at the camp per week in the summer and three shelters have been put in during the last five years. There are approximately 100 campers at the Hunt Hill Campground each weekend. The building has a basement but would not be used as a shelter.

- Each community should regularly test and maintain its sirens.
  - Telephone and radio to notify public personnel,
  - Local television, radio and newspaper to spread warning information,
  - Local law enforcement, fire and rescue communications,
  - An emergency communications center.

Washburn County Sheriff's office to receive and distribute warning information to the public and first response agencies.

During an emergency, the general public receives information by sirens, Code Red, 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, Washburn County will continue to promote increased use of these radios among the public. The county and its municipalities recognize that the cost-benefit analysis for having adequate sirens for coverage in the rural areas is not feasible. If a grant becomes available, they would like to purchase NOAA weather radios for the rural people not covered by sirens.

Methods for notification of people with functional and access needs include door-to-door warnings, foreign language media messages and closed-caption television messages. Other notices and procedures can be found in Washburn County's Emergency

Operations Plan which is reviewed and updated on a regular schedule.

Modern communications also rely on the ability to use computers and the internet to communicate. The workgroup believed that they have a medium risk of loss from a cyber/data incident but that if it did occur, the severity would be high. The information technology (IT) staff of the communities works hard with limited budget to update and protect computer infrastructure and data and regularly updates security and safety programs for software.

Washburn County should be capable of the following:

- Disseminate emergency warning and notification to the public through its county-wide warning systems;

- Support emergency management operations;

- Provide adequate warning and communication systems;

- Plan for alternative means and resources in the event of a warning or communication system breakdown.

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

A new tower was built in the county to provide wireless internet service (i.e., a hotspot) for emergency personnel to use vehicle data terminals. This project is being led by the Information Technology Department and will be completed with the additional required equipment as grants are available. The Spooner Police Department used this tower to solve a communications issue with the Utility Departments. Because these departments were on the same frequency, they often interfered with each other's transmissions; the addition of the tower allowed them to go onto separate frequencies. This \$16,000 project was self-funded and is now completed.

## Website

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

## Other Potential Projects

The county and/or its municipalities would like to also address the following:

- The Washburn County Emergency Management Office, would like to annually publish a special section in the paper(s) of record with emergency information on severe weather and a list of emergency agencies to contact. This medium priority project would cost approximately \$3,000 per printing and would be dependent upon the receipt of grant funding.
- The Towns of Long Lake and Birchwood would like to explore options for reducing/eliminating gaps in the public safety radio communications network due to an area which is in a depression and there is no line-of-sight for radios. The Town of Long Lake went to the Law Enforcement/Emergency Management Committee. Land is available but the issue was not able to be funded at that time.

## 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 Washburn 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 Washburn County. This assertion is further bolstered by the fact that there is very little irrigation done within the county and that the soils in Washburn County are not prone to blowing. While there are concerns about topsoil erosion and some mitigation activities may be planned that would reduce the effects of these types of events, they will not be a major focus of this plan.

## Physical Characteristics

The understanding that a deficit of precipitation has different impacts on groundwater, reservoir storage, soil moisture, snowpack and streamflow led to the development of the Standardized Precipitation Index (SPI) in 1993. The SPI quantifies the precipitation deficit for

multiple time scales. These time scales reflect the impact of drought on the availability of the different water resources. Soil moisture conditions respond to precipitation anomalies on a relatively short scale. Groundwater, streamflow, and reservoir storage reflect longer-term precipitation anomalies. For these reasons, the SPI is calculated for 3-, 6-, 12-, 24- and 48-month time scales.

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

The classification system shown in the SPI values table (below) defines drought intensities resulting from the SPI. The criteria for a drought event are also defined for any of the time scales. A drought event occurs any time the SPI is continuously negative and reaches an intensity of -1.0 or less. The event ends when the SPI becomes positive. Each drought event, therefore, has a duration defined by its beginning and end and an intensity for each month that the event continues. The positive sum of the SPI for all the months within a drought event can be termed the drought’s “magnitude”.<sup>76</sup>

SPI Values	
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

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<sup>76</sup> <https://www.ncdc.noaa.gov/temp-and-precip/drought/nadm/indices/spi/div#select-form>

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

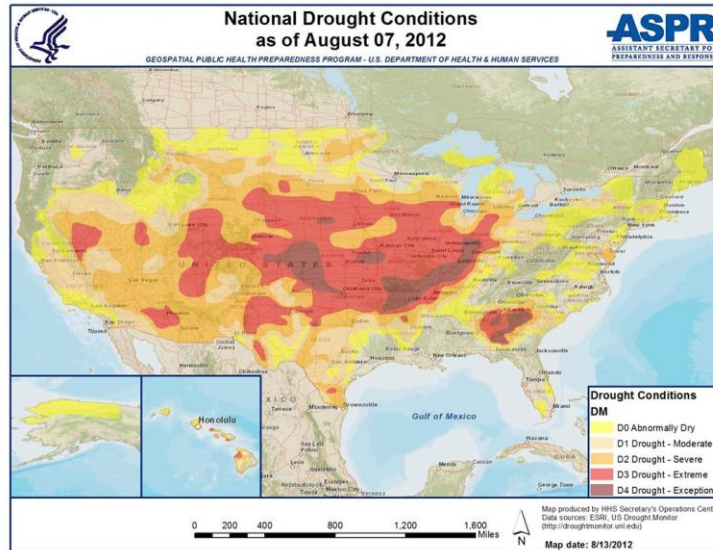
Drought conditions may vary from below-normal precipitation for a few weeks to a severe lack of normal precipitation for several months. Drought primarily affects agricultural areas because the amount and timing of rainfall has a significant impact on crop production. The severity of a drought cannot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

### **Frequency of Occurrence**

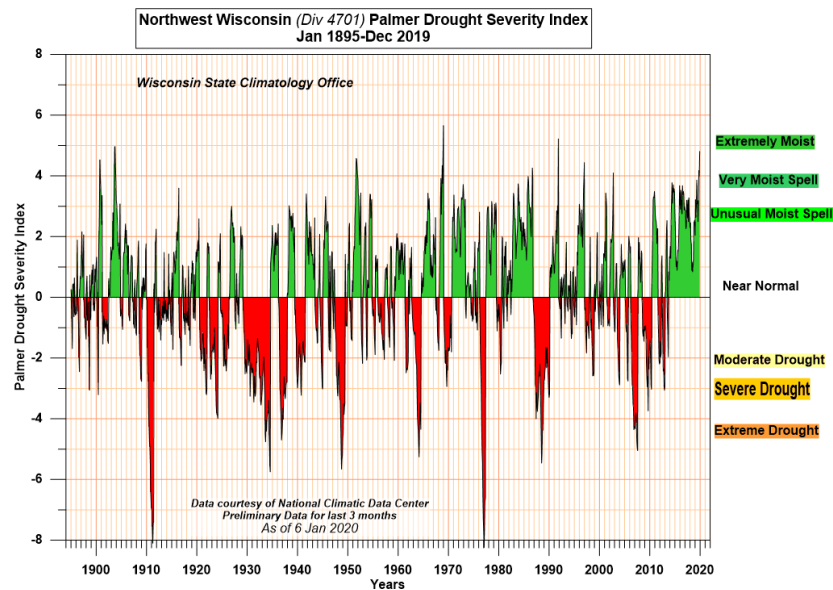
Drought is a relatively common phenomenon in Wisconsin and has occurred statewide in 1895, 1910, 1939, 1948, 1958, 1976, 1988, 1992, 2003 and 2005. The 1976 drought received a Presidential Emergency Declaration with damage to 64 Wisconsin counties. Estimated losses of \$624 million primarily affected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

The 2012 heat wave resulted in significant droughts across more than half the country as well as increases in heat related illnesses and deaths. July, 2012 was the hottest month in US history, eclipsing the record set during the heart of the Dust Bowl in 1936. The worst of the heat was in the Midwest, the Plains and along the Eastern Seaboard. Most of the contiguous US had record and near-record warmth for the seven-month period, except the Pacific Northwest, which was near average. The August 7, 2012 Drought Monitor map shows 52.27% of the United States and Puerto Rico in moderate

drought or worse with Washburn County in the D2 – Severe Drought category.<sup>77</sup>



The Palmer Index chart Northwest Wisconsin, which includes Washburn County, follows<sup>78</sup>:



<sup>77</sup> 2012 Heat & Drought Federal Report, HHS ESF 8, UPDATE #2, U.S. Department of Health and Human Services, Assistant Secretary for Preparedness and Response

<sup>78</sup> <http://www.aos.wisc.edu/~sco/clim-watch/graphics/pdsi-ts-01-l.gif>

As can be seen from the frequency table above, Washburn 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”.<sup>79</sup>

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 Washburn County can be found in Appendix B.

Considering past occurrences, it can be surmised that Washburn County has a low probability of drought occurrence in the future and the likelihood of damage due to drought is considered moderate for agricultural losses and very high for other types of losses. The probability of dust storm and damages due to dust storms would be moderate.

## Vulnerability

Droughts and dust storms could impact Washburn County disproportionately because a portion of the land area is used for agricultural activities. Drought generally impacts farm output by reducing crop yields and the health and product output (e.g., milk) of livestock. As a result, a drought will seriously impact the economy of the entire county. Dust storms impact farms in the long term by blowing away the top levels of soil, which are the richest. This could economically impact the county by reducing its long-term viability for farming. The concern for agricultural losses due to drought is difficult to estimate because each incident will impact the county differently based on the length of the drought, when it occurs in the planting

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<sup>79</sup> State of Wisconsin Hazard Mitigation Plan



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 Washburn County economy and that the losses could be staggering:

- Average size of farms: 224 acres
- Average value of agricultural products sold per farm: \$36,363
- Average value of crops sold per acre for harvested cropland: \$157.88
- The value of livestock, poultry, and their products as a percentage of the total market value of agricultural products sold: 67.29%
- Harvested cropland as a percentage of land in farms: 33.66%
- Average number of cattle and calves per 100 acres of all land in farms: 11.78
- Corn for grain: 8,668 harvested acres
- All wheat for grain: 342 harvested acres
- Soybeans for beans: 1,735 harvested acres
- Vegetables: 800 harvested acres
- Land in orchards: 19 acres<sup>80</sup>

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 Washburn County, the

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<sup>80</sup> [http://www.city-data.com/county/Washburn\\_County-WI.html](http://www.city-data.com/county/Washburn_County-WI.html)

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

## **Hazard Mitigation Strategies**

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

Washburn County will provide information to farmers concerning the potential severity of drought events. Information on potential drought has been publicized during previous heat events (e.g., 2012) specifically targeting farmers and the extreme concerns they could face. The county will also prepare and publicize water usage information during drought conditions for the general public.

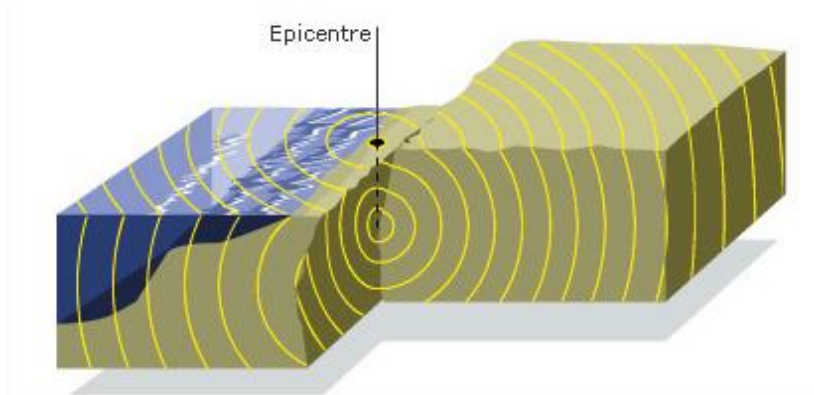
Some Washburn County communities have adopted water usage regulations during drought conditions but more could be done to prepare and publicize water usage regulations and restrictions for non-farm areas during drought. Also, it is important to encourage residents and businesses to reduce water consumption through implementing water flow reduction measures. These efforts will be conducted by the county's municipalities, including the City of Spooner, and will be funded through the annual budget.

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

The hazard mitigation strategies listed above primarily involve providing information on water conservation measures to farmers and the public. Water conservation will ensure that the resource is available for critical residential, business and agricultural uses (e.g., drinking, food irrigation, manufacturing, firefighting) and good farming practices may help prevent erosion of the rich topsoil found in Washburn 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).<sup>81</sup>



## Physical Characteristics

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

Earthquakes are measured by two principle methods: seismographs and human judgment. The seismograph measures the magnitude of an earthquake and interprets the amount of energy released on the Richter Scale, a logarithmic scale with no upper limit. For example, an earthquake measuring 6.0 on the Richter Scale is ten times more powerful than a 5.0 and 100 times more powerful than a 4.0. This is a measure of the absolute size or strength of an earthquake and

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<sup>81</sup> [http://news.bbc.co.uk/2/shared/bsp/hi/pdfs/earthquake\\_guide.pdf](http://news.bbc.co.uk/2/shared/bsp/hi/pdfs/earthquake_guide.pdf)

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<sup>82</sup>:

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<sup>82</sup> Wald, Quitoriano, Heaton and Kanamori, 1999

## Earthquakes

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

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

## 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	Longitude	Maximum Intensity	Magnitude
		North	West		
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	--

## Earthquakes

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6/28/2004	Troy Grove, IL	41° 46'	88°91'	IV	4.2
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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 Washburn County citizens:<sup>83</sup>

*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.*

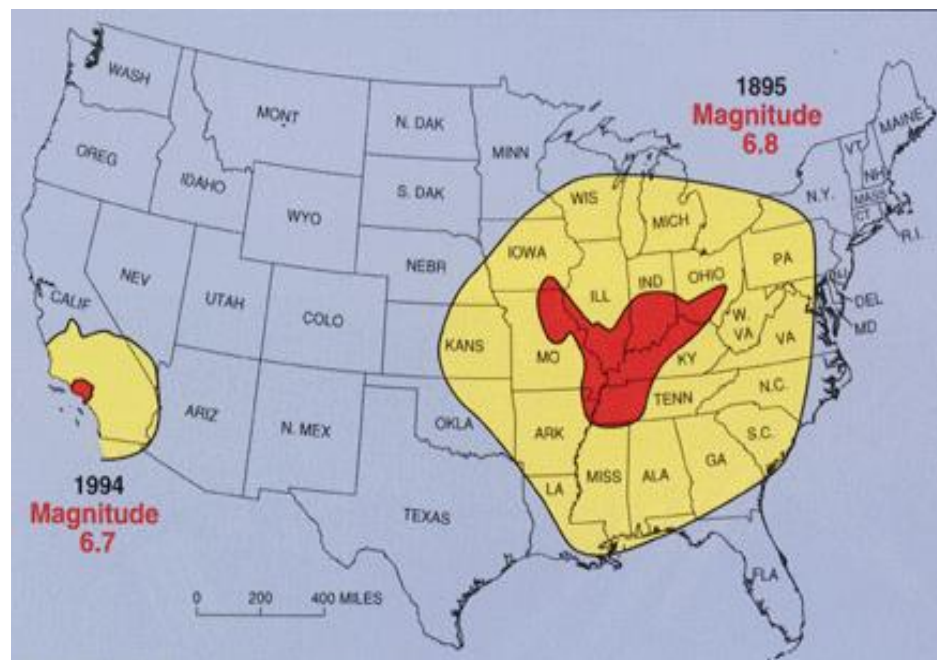
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<sup>83</sup> <http://www.jsonline.com/news/wisconsin/rumblings-booming-resumes-in-clintonville-6e4p9o8-144653925.html>



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

The nearest major active fault is the New Madrid Fault, stretching along the central Mississippi River Valley in Missouri. In recent years, considerable attention has focused on seismic activity in the New Madrid seismic zone that lies within the central Mississippi Valley, extending from northeast Arkansas through southeast Missouri, western Tennessee and western Kentucky to southern Illinois. Scientists at the Center for Earthquake Information have computed a set of probabilities that estimates the potential for different magnitude earthquakes to occur at the New Madrid Fault. Even an 8.3 magnitude earthquake at the New Madrid Fault, however, would cause only minor damage in the southeastern corner of Wisconsin. At this time it is not possible to predict the exact date, duration or magnitude of an earthquake.



As seen on the map in Appendix A, the earthquake threat to Washburn County is considered very low (the 50-year acceleration probability is 2%). Minor damage (e.g., cracked plaster, broken windows) from earthquakes has occurred in Wisconsin but most often the results have been only rattling windows and shaking ground. There is little risk except to structures that are badly

## Earthquakes

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 low.

## **Vulnerability**

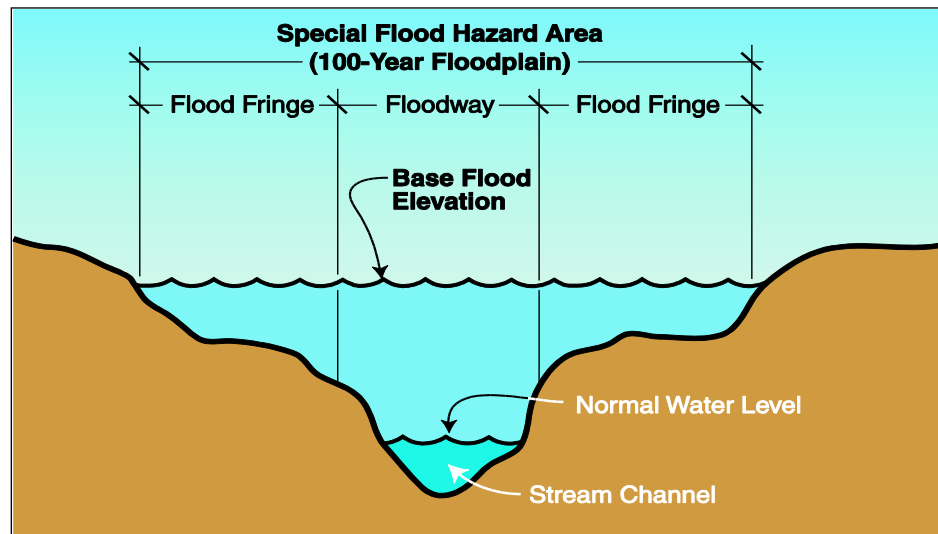
Any impact in the community from earthquake would likely be due to a few broken windows and personal effects that fell in the earthquake. The damage to critical infrastructure and buildings would be negligible although there could be indirect effects from any unlikely losses to the electrical grid, transportation routes/goods shipments and pipelines.

## **Hazard Mitigation Strategies**

Since Washburn 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. If there is ever a need, obviously emergency resources will be mobilized but the goal for this section of the plan is therefore to educate on the very low risks of earthquake damage in Washburn 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.<sup>84</sup>



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

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<sup>84</sup> FEMA, August 2001

in rivers and streams over a period of days. This buildup continues until the river or stream overflows its banks, for as long as a week or two, then slowly recedes. Generally the timing and location of this type of flooding is fairly predictable and allows ample time for evacuation of people and property.

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

Generally the amount of damage from flooding is a direct consequence of land use. If the ground is already saturated, stripped of vegetation or paved, the amount of run-off increases, adding to the flooding. There is also a concern regarding the loss of topsoil and erosion due to flooding.

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

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

**Flood Probability Terms Table<sup>85</sup>**

<b>Flood Recurrence Intervals</b>	<b>Percent Chance of Occurrence Annually</b>
10 year	10.0%

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<sup>85</sup> State of Wisconsin Hazard Mitigation Plan

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 failure) or by natural events (e.g., landslide, earthquake) with flooding being the most common result.

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

The federal government has jurisdiction over most large dams in Wisconsin that produce hydroelectricity - approximately 5% or nearly 200 dams. The Wisconsin Department of Natural Resources regulates the rest of the dams. A dam with a structural height of over 6 feet and impounding 50 acre-feet or more, or having a structural height of 25 feet or more and impounding more than 15 acre-feet is classified as a large dam. There are approximately 1,160 large dams in the State of Wisconsin.

The Wisconsin DNR database lists the following small, uncontrolled agricultural dams included in Washburn County<sup>86</sup>:

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<sup>86</sup> <https://dnr.wi.gov/damsafety/damSearch.aspx>

## Flooding and Dam Failure

Dam Official Name* (Popular Name)	Size	Lat	Long	Owner Type	Waterway Name (Downstream City)
65.04 Mile Creek Dam		46.1139999	-92.0037784		Five Mile Creek
Anderson, Sanny	Small	45.7616195	-92.0310117	Priv	Bashaw Cr
Badger Cranberry Company	Large	45.7679442	-91.8322712	Cran	Beaver Brook
Beaver Creek Dam		45.7741604	-91.8414754		Beaver Creek
Bernhard	Small	45.769007	-91.8976064	Priv	Trib To Sawyer Creek
Birch Lake	Large	45.65997	-91.5577	Co	Birch Creek
Black Brook Dam	Large	46.1345347	-91.6132798	Co	Black Brook
Bulkhead Lake		45.809353	-91.765208	Priv	
Cartwright	Small	46.1052697	-91.8177541	Priv	Shell Creek
Colton	Large	46.151	-91.66027	Cran	Totagatic R
Conroy Ford	Large	45.9870211	-91.990694	Co	Casey Creek
Crandell	Small	45.8392105	-91.6133516	Priv	
Dam on Bean Brook		45.8993129	-91.656597		Bean Brook
Dam on Beaver Creek		45.8022167	-91.8674335		Beaver Creek
Dam on Chicog Creek		46.049057	-91.9156922		Chicog Creek
Dam on Chicog Creek		46.0597543	-91.9337416		Chicog Creek
Dam on Chicog Creek		46.0598494	-91.9270634		Chicog Creek
Dam on Frog Creek		46.1166738	-91.7530233		Frog Creek
Dam on Frog Creek		46.121458	-91.6687485		Frog Creek
Dam on Frog Creek		46.1199907	-91.7456509		Frog Creek
Dam on Hay Creek		45.9007005	-91.7855053		Hay Creek
Dam on Mud Creek		45.8122797	-91.7638426		Mud Creek
Dam on Namekagon River		45.9016899	-91.7857567		Namekagon River
Dam on Shell Creek		46.1345857	-91.8648866		Shell Creek
Dam on Shell River		46.109478	-91.8583729		Shell River
Dam on Slim Creek		45.7751717	-91.6161509		Slim Creek
Dam on Spring Brook		45.992951	-91.7218667		Spring Creek
Dam on Totagatic River		46.1300297	-91.5584005		Totagatic River
Dam on Totagatic River		46.1528482	-91.5767988		Totagatic River

## Flooding and Dam Failure

Dam Official Name* (Popular Name)	Size	Lat	Long	Owner Type	Waterway Name (Downstream City)
Dam on Totagatic River		46.1484012	-91.6587371		Totagatic River
Davis Wildlife	Large	46.0395873	-91.6084777	Priv	Chippanazie Creek
Fischer	Small	46.1132954	-91.8594198	Priv	Shell Creek
Gull Lake	Small	45.9817375	-91.7390834	Co	Gull Creek
Hatchery	Small	45.8092946	-91.7652131	Priv	Crystal Brook
Lake Island Fish Farm		45.7623803	-92.0312632	Priv	Bashaw Cr
Ligler, Wayne	Small	45.9457521	-91.8841117	Priv	Unnamed
Little Grassy Lake	Large	45.7009731	-91.9194003	Co	Little Grassy Lake Outlet
Long Lake	Large	45.66801	-91.68066	Co	Brill
Lower Flowage		Unknown	Unknown		
Lower Kimball Lake	Large	46.1141477	-91.9526276	Cran	Lower Kimball Lake Outlet
Lower McKenzie Lake	Small	45.9882595	-92.0213411	Town	McKenzie Creek
Lutz Lake	Small	45.7516494	-91.8232384	Cran	Beaver Brook
Minong Flowage	Large	46.1203114	-91.9341412	Co	Totagatic
Ness, Norman	Small	45.6475993	-91.94812	Priv	Unnamed Stream
Pokegama Lake	Large	46.108791	-91.858728		
Potato Creek Dam		45.8581607	-91.7401212		Potato Creek
Sawyer Creek Wildlife Area	Small	45.7776311	-91.9566471	DNR	Beaver Lodge Pond Outlet
Shell Lake Diversion	Small	45.6951445	-91.9801473	Co	Clam River
Shell Lake Pond 1	Small	45.7485713	-91.9254492	DNR	Sawyer Creek
Shell Lake Pond 2	Small	45.7501159	-91.9283749	DNR	Sawyer Creek
Skelton	Large	45.882344	-91.782501		Veazie Creek
Slim Creek	Large	45.7913576	-91.5980642	Co	Slim Creek
Spooner Electric	Large	45.8209864	-91.898043	DNR	Yellow
Spooner Lake	Large	45.83721	-91.83671	City	Yellow
Spring Lake	Large	45.8824503	-91.7823634	Priv	Spring Lake Outlet
Spring Lake Dam		46.1227807	-91.8561048		Rice Creek
Stinnett Dam		45.9874717	-91.5991212		Namekagon River
Taylor Lake	Large	46.0656805	-91.7353427	DNR	Trib Little Frog Creek

## Flooding and Dam Failure

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Dam Official Name* (Popular Name)	Size	Lat	Long	Owner Type	Waterway Name (Downstream City)
Totagatic Wildlife	Large	46.1300801	-91.5576107	DNR	Totagatic
Trego	Large	45.94791	-91.88801	Util	Namekagon
Upper Flowage	Large	45.8100727	-91.764744	Priv	Crystal Brook

Most of these dams are small, mill-type dams under the jurisdiction of the DNR, municipalities and are also privately owned. Management and maintenance of dams is critical because severe flooding can result from inadequate attention to the dams. Long Lake dam is considered a high-hazard but managed dam. Birch Lake, Minong Flowage Spooner Electric and Spooner Lake dams are considered significant hazards. The Nancy Hydroelectric Project has an Emergency Action Plan for dam failure that is written and maintained by North American Hydro Holdings, Inc.

The other dams in Washburn 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. Because of regular attention and maintenance, there are no dams in other counties that pose a significant flooding risk to the citizens of Washburn County although if the Nelson Lake Dam in Sawyer County failed, it would impact approximately 20 homes in Washburn County. 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. It should be noted that any dams with EAPs have inundation areas mapped and overlaid with address maps. Those maps are in the Emergency Management Office and in the Sheriff's Office/Dispatch so residents can be quickly notified in emergency.

One potential effect of flooding is erosion. Erosion is defined as the removal of soil by the force of waves, currents and/or ice at a lakeshore or stream bank or by the power of wind or water on open land. Erosion is a natural process that can be accelerated by natural disasters (e.g., flooding, heavy rains, strong winds, drought) or by



human activity (e.g., removal of plants/trees, tilling). Because of the many waterways in Washburn County, and the high use of recreational watercraft, there is concern about ensuring the stabilization of the shorelines.

## Watersheds

Washburn County is affected by 11 watersheds.<sup>87</sup> The maps in Appendix A show the watershed boundaries and 100-year floodplains for the entire county. Following is a brief description of each watershed:

### Mississippi River Basin

#### **Brill and Red Cedar Rivers (LC10)<sup>88</sup>**

The Brill and Red Cedar Rivers watershed in northeastern Barron County and southeastern Washburn County, with small sections in Rusk and Sawyer Counties, is the drainage area for the Red Cedar River between its exit from Red Cedar Lake and its crossing beneath Highway 53 south of the City of Rice Lake.

The northern half of this watershed is mostly wooded, while the southern half is mostly agricultural land. Originally, 94 percent of this watershed was forested. The most notable water resources in the watershed are Long Lake, Bear Lake, and Rice Lake. Long Lake and Bear Lake are classified as outstanding resource waters. The city of Rice Lake is located on the shores of Rice Lake.

The Washburn County and Sawyer County sections of the watershed are composed of a mix of glacial end moraines and pitted outwash. Of the watershed's lakes, 85 percent are found in these counties. The watershed has a total of 130 lakes larger than 10 acres, with a combined area of 11,332 acres. The greatest density of lakes occurs in the end moraine area east of Long Lake. Most of the land in these sections is forested, but substantial areas of

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<sup>87</sup> <http://dnr.wi.gov/water/watershedsearch.aspx>

<sup>88</sup> <https://dnr.wi.gov/water/watershedDetail.aspx?key=924807>

agricultural land exist south and west of Long Lake. Long Lake has extensive shoreline development.

### **Couderay River (UC20) <sup>89</sup>**

The Couderay River Watershed lies in west central Sawyer County and also includes a small piece of eastern Washburn County. Mostly forested and wetland, this watershed contains five state wildlife and fishery areas and most of the Lac Courte Oreilles Indian reservation. There are significant amounts of pasture in the southeastern corner, and the hilly topography of the south central region tend to make the streams there hydrologically flashy.

The wastewater treatment plants at Radisson and Stone Lake discharge to groundwater. The facility near the Reserve maintained by the Lac Courte Oreilles Tribe discharges to surface water. The water resources of this watershed are dominated by its large, high quality lakes.

With the exception of six trout streams-Eddy, Swift, Devils, Alder, Hauer, and Grindstone-the streams in this watershed support mainly warm water forage fish communities. Area fisheries management files also document widespread beaver activity. Of the 14 named streams in this watershed, only four, the Couderay River and Section 20, Grindstone and Sand Creeks, had no records of beaver disturbance.

### **Lower Namekagon River (SC19) <sup>90</sup>**

The Lower Namekagon River Watershed includes the Namekagon River drainage from below the Trego Lake dam down to the confluence with the St. Croix River except for the Totagatic River drainage. Included in this area is a portion of west central Washburn County and a part of northeastern Burnett County. The watershed is approximately 153,176 acres in size and contains 172 miles of streams and rivers, 12,590 acres of lakes and 21,781 acres of wetlands. The watershed is dominated by forest (62%) and wetlands

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<sup>89</sup> <https://dnr.wi.gov/water/watershedDetail.aspx?key=924743>

<sup>90</sup> <https://dnr.wi.gov/water/watershedDetail.aspx?key=924840>

(14%) and is ranked low for nonpoint source issues affecting groundwater.

### **North Fork Clam River (SC13) <sup>91</sup>**

The North Fork Clam River Watershed is located mainly in southeastern Burnett County but also includes small portions of Washburn, Barron and Polk Counties. It is approximately 111,044 acres in size and contains 232 miles of streams and rivers, 3,279 acres of lakes and 12,359 acres of wetlands. The watershed is dominated by forest (53%) and grassland (23%), and is ranked low for nonpoint source issues affecting water bodies.

The North and South Forks of the Clam River are classified as outstanding resource waters and six additional trout streams in the watershed are proposed for designation as outstanding resource waters.

### **Red Cedar Lake (LC11) <sup>92</sup>**

The Red Cedar Lake Watershed includes the headwater area of the Red Cedar River. It covers the adjoining corners of Barron, Rusk, Sawyer, and Washburn counties. A small portion of the Lac Courte Oreilles Indian Reservation lies within the Red Cedar Lake Watershed north and west of Lake Chetac. Much of this watershed is forested, with county forest land a large component of the watershed.

The north central portion of the watershed consists of glacial pitted outwash and contains numerous small to large lakes. Lake Chetac and Birch Lake are located in this area. The area is mostly forested, but some agricultural land exists northwest and southeast of Birch Lake.

The southeastern part of the watershed is in the rocky, hilly area known as the Blue Hills. The area consists of glacial end moraines and ground moraine. It is underlain by quartzite bedrock and is steep-

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<sup>91</sup> <https://dnr.wi.gov/water/watershedDetail.aspx?key=924838>

<sup>92</sup> <https://dnr.wi.gov/water/watershedDetail.aspx?key=924649>

sloped and forested. There are few lakes present in this area.

The western portion of the watershed consists of end moraines and also contains a substantial number of lakes, the largest of which are Red Cedar, Hemlock, and Balsam. Most of the area is forested, though significant agricultural areas exist northeast and east of Red Cedar Lake, and southeast of Hemlock Lake.

### **Shell Lake and Upper Yellow River (SC15) <sup>93</sup>**

The Shell Lake and Lower Yellow River Watershed is located in western Washburn County and extends into a small portion of eastern Burnett County. The watershed is 106,665 acres in size and contains 118 miles of rivers and streams, 5,764 acres of lakes and 9,834 acres of wetlands. The watershed is dominated by forest (52%) and grassland (19%), and is ranked low for nonpoint source issues affecting groundwater.

### **St. Croix and Eau Claire Rivers (SC17) <sup>94</sup>**

The St. Croix and Eau Claire Rivers Watershed is in south central Douglas County with a small portion in northern Burnett County. The watershed is approximately 126,256 acres in size and contains 214 miles of streams and rivers, 582 acres of lakes and 33,874 acres of wetlands. The watershed is dominated by forest (62%) and wetlands (26%) and is ranked low for nonpoint sources issues affecting groundwater.

This long and narrow watershed includes the St. Croix River drainage from below the Gordon dam down to Riverside. Much of this watershed is poorly drained upland with an abundance of wetlands.

### **Totagatic River (SC20) <sup>95</sup>**

The Totagatic River watershed is rather large at 177,850 acres and includes all of the Totagatic River drainage. Portions of Douglas,

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<sup>93</sup> <https://dnr.wi.gov/water/watershedDetail.aspx?key=924891>

<sup>94</sup> <https://dnr.wi.gov/water/watershedDetail.aspx?key=924707>

<sup>95</sup> <https://dnr.wi.gov/water/watershedDetail.aspx?key=924911>

Bayfield, Sawyer, Washburn and Burnett Counties are included in this watershed. The watershed contains 153 miles of rivers and streams, 7,654 acres of lakes and 13,694 acres of wetlands. The watershed is dominated by forest (67%) and wetlands (20%), and is ranked low for nonpoint source issues affecting groundwater.

### **Trego Lake - Middle Namekagon River (SC21) <sup>96</sup>**

The Trego Lake - Middle Namekagon River Watershed includes the Namekagon River drainage from above the Trego Lake dam up to the Hayward Lake dam. The area encompasses a large portion of east central Washburn County and includes a small part of west central Sawyer County. The watershed is 172,087 acres in size and includes 217 miles of streams and rivers, 4463 acres of lakes and 28,205 acres of wetlands. The watershed is dominated by forest (63%), wetlands (16%) and grassland (12%), and is ranked low for nonpoint source issues affecting groundwater.

### **Upper Namekagon River (SC22) <sup>97</sup>**

The Upper Namekagon River Watershed includes a portion of northwestern Sawyer County and extends into south central Bayfield County. The watershed is approximately 126,591 acres in size and contains 135 miles of rivers and streams, 6,298 acres of lakes and 19,026 acres of wetlands. The watershed is dominated by forest (70%) and wetlands (15%) and is ranked low for nonpoint source issues affecting groundwater.

### **Yellow River (LC09) <sup>98</sup>**

The Yellow River watershed drains the area around the Yellow River and a portion of the Red Cedar River. The watershed primarily spans central Barron County with very small sections extending into Washburn and Burnett counties.

The watershed is close to the major population centers in Barron

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<sup>96</sup> <https://dnr.wi.gov/water/watershedDetail.aspx?key=924923>

<sup>97</sup> <https://dnr.wi.gov/water/watershedDetail.aspx?key=924841>

<sup>98</sup> <https://dnr.wi.gov/water/watershedDetail.aspx?key=924907>

County. The watershed's land use shows a significant change from forested to agricultural lands. Public use of the watershed's streams and lakes is very high. The watershed contains high quality warm water fishery streams as well as 39 miles of trout streams.

The northern third of the watershed is composed of glacial pitted outwash and end moraines. The great majority of the watershed's lakes are located in this area. A fairly even mix of forested and agricultural land is present.

The southern two-thirds of the watershed is ground moraine with an area of pitted outwash centered around the cities of Barron and Cameron. Drainage patterns are more developed and fewer lakes are present. Land use is mostly agricultural. There are 24 lakes in the watershed, many of which have considerable shoreline development. Several State Fishery Areas are on various stretches of the Yellow River above Barron.

## Floodplain Regulations

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

Chapter 614, Laws of Wisconsin 1965, requires counties to adopt regulations giving all lands within 300 feet of navigable rivers or streams protection from haphazard development. Under this legislation, Washburn 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 floodplains or urban areas in Wisconsin can be considered safe from damages. Washburn County does have a history of flooding problems.

A series of severe storms from May 26 to July 19, 2000 followed the wettest month of May in Wisconsin since 1870. The subsequent flooding resulted in disaster declaration 1332-WI, which had damages totaling approximately \$100,000. Washburn County received Public Assistance only. Washburn County has had two Flood-Related Emergencies and Disasters between 1971 and 2001. The declaration in 2001 was due to excessive rainfall paired with rapid snow melt. The county was declared for public and individual assistance and damages totaled about \$150,000. Washburn County experienced high water levels on several lakes due to excessive rainfall in 1996, 1997 and 2000.

In 2003, Wisconsin Governor Doyle declared a state of emergency in Washburn County for the Shell Lake area in response to an all-time record high water level on Shell Lake that was impacting the lakeside homes.

The City of Shell Lake had experienced a rise in the level of its lakes of nine feet over the past 50 years prior to the installation of the lake diversion project. The lake diversion project was completed in November 2003 and consisted of installing a diversion pipe to drain water out of Shell Lake and deposit it approximately 4.5 miles away in the Yellow River. Financing and/or project assistance was provided by the City of Shell Lake, Wisconsin Emergency

Management, the Natural Resources Conservation Service, Wisconsin Department of Commerce and the Wisconsin Department of Natural Resources. The continued operation of this diversion project is considered vital to managing the lake levels so that property around the lake is no longer flooded.

Washburn County does have a history of flooding problems although when there are localized floods, they tend to be in Frog Creek and in Minong along the highway. Washburn County has been included in Presidential Disaster Declarations requests for flooding, the most recent of which are detailed below:

- FEMA-DR-1332-WI: On June 24, 2000, the President declared a Major Disaster as a result of severe storms, tornadoes and flooding that occurred May 26, 2000 to July 19, 2000. The declaration was granted for Public Assistance.
- FEMA-DR-1369-WI: On May 11, 2001, the President declared a major disaster as a result of flooding that occurred April 10, 2001 to July 6, 2001. The declaration was granted for Individual and Public Assistance.
- FEMA-DR-4276-WI: On August 9, 2016, the President declared a Major Disaster as a result of severe storms and flooding during the period of July 11-12, 2016.

The following list summarizes damages attributed to flooding in Washburn County by the National Flood Insurance Program through 30 September 2018: <sup>99</sup>

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<sup>99</sup> <http://bsa.nfipstat.fema.gov/reports/1040.htm>



Washburn County NFIP Loss Claims				
Jurisdiction	Total Loss	Closed Loss	Closed Without Payment	Total Payments
City of Shell Lake	17	12	5	\$ 688,418.07
Washburn County	9	8	1	\$ 287,766.60
Village of Birchwood	1	0	1	\$0.00

There was one repetitive loss property through 31 December 2018. The property is a single-family residential structure in the City of Shell Lake with two claims. The total NFIP claims shown above include the repetitive loss property.

There were no flood events recorded by the National Weather Service and tables showing flash flood events recorded by the National Weather Service can be found in Appendix B. Mitigation projects have occurred to reduce future damages. Because of this, a current review of the geography and history of flooding in Washburn County leads to a belief that there is a very high probability of flooding in the future and a high probability of damage and losses due to flooding. This flooding could occur due to riverine and/or flash flooding. There is a moderate probability of flooding due to dam failure and a high probability of damage if it does occur.

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

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

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

Appendix A contains maps depicting the floodplain. Appendix F contains excerpts from the Washburn 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 Washburn County by identifying potential property damage risks and recommending appropriate mitigation strategies to minimize potential property damage during/due to flooding.
- Goal 3: To promote countywide planning that avoids transferring the risk from one community to an adjacent community.
- Goal 4: To encourage all communities in Washburn County to participate in the NFIP so that all county residents have access to affordable flood insurance coverage.
- Goal 5: To identify potential funding sources for mitigation projects and form the basis for project grant applications through FEMA's Pre-Disaster Mitigation (PDM) and/or Flood Mitigation Assistance (FMA) programs.

Washburn County is committed to remaining compliant with the requirements of the National Flood Insurance Program (NFIP) and all other state and federal laws. According to the NFIP, the following communities participate in the program: <sup>100</sup>

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<sup>100</sup> <http://www.fema.gov/cis/WI.html>

## Flooding and Dam Failure

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- Washburn County
- Cities of Shell Lake and Spooner
- Villages of Birchwood and Minong

There are no areas in Washburn 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. Presently, Washburn County maintains a limited stock of sandbags to assist with flood containment.

Other potential projects include:

- Dams - The county will continue to participate in the preparedness program and work with partners to monitor the dams and plans to ensure currency.
  - The Minong and Trego utility dams are concerns. Washburn Co. owns the dams, which are operated by North American Hydro. There is a program for maintenance and emergency planning for failures, which includes an annual tabletop exercise. Approximately 20-30 properties would be impacted by the failure of either dam. Both are regularly inspected and the Minong dam was rebuilt in 2013. North American Hydro placed warning sirens on Trego Dam

in 2014. There are campsites there. Will continue monitoring.

- The Nelson Lake Dam in Sawyer County has a slight chance of problems but would impact approximately 20 homes if it failed. The dam is on the Totogatic River and would impact the Towns of Frog Creek and Minong. The dam generates electricity and is the responsibility of Xcel Energy. Most other dams have few improved properties downstream. Smaller dams were brought under stronger zoning laws in 2007 & 2009. Zoning will prohibit building below dams.
  
- The Yellow River dam in the City of Spooner is an old utility dam that is currently used by the WI DNR for their fish hatchery. If it breaches, there are four properties downstream that would likely be impacted.
  
- Seal manholes below MSL 1226.0 in the City of Shell Lake. Some of these were done. WDOC and US EDA grant funding is a possibility for these projects.
  
- Work with local, state and federal agencies in addressing the rising water of area lakes. This is part of an ongoing groundwater study. Some work is done and work will continue as funding is available.
  
- Develop a comprehensive approach to reducing the possibility of damage and loss of function to structures, critical facilities and infrastructure. Some work is done and work will continue as funding is available.
  
- Identify sites where environmental restoration work can benefit flood mitigation efforts.
  
- Identify sites and sources of funding with WEM/FEMA on moving buildings and/or acquisition of green space in floodplain areas.
  
- Seal the City of Spooner's old manholes that are subjected to flooding because some are an older style that have holes. Some have been done but the project is not complete.

## Flooding and Dam Failure

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- Encourage the development of acquisition and management strategies to preserve open space for flood mitigation.
- Develop a public information and education program on the impact of storm water to the community and critical facilities.
- Provide information to citizens about the purchase of flood insurance. A link will be made available on the website.

The current emphasis in flood mitigation is on long-range actions. Such actions include the adoption of proper flood plain zoning ordinances and land use planning. The county and the municipalities will work together to ensure that the various plans take into account the long-range mitigation planning as a consistent theme and to ensure data sharing and consistency between the communities. The Zoning Department will lead this effort. Also, it has been shown that floodplain management reduces the cost of damages attributed to flooding. The Washburn County Zoning Department enforces county zoning ordinances related to floodplains.

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

- Post flood recovery plans and programs to help county residents rebuild and implement mitigation measures to protect against future floods.
- Distribute National Flood Insurance Program information.
- Provide information and offer education to make people aware of natural floodplain resources and functions; and how they can protect them.

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

## Wildfires

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

Washburn County is one of the most diverse county forests in the state. There are a multitude of forest types ranging from cedar swamps to northern hardwood forests to jack pine. A wide variety of forest products are offered through the management program, which supports many community loggers and supports timber industries both locally and statewide.

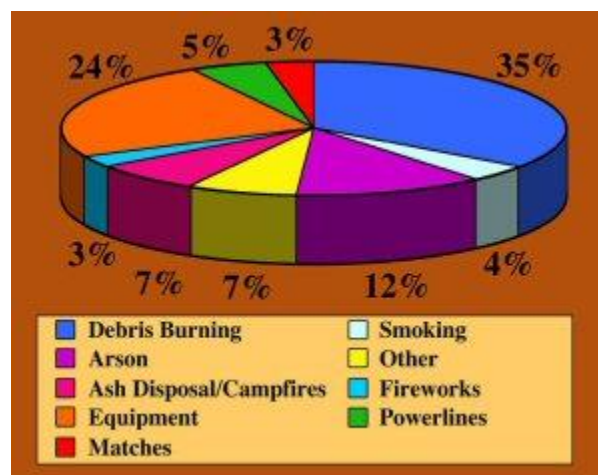
Washburn County manages the public forestland using the ecosystem management principle, which states that the forest is not managed exclusively for trees and fiber production. Management activities are undertaken with an eye to also balancing the needs of wildlife, water resources, endangered species and recreation. Therefore the Washburn County Forestry is considered a "working" forest. The forest is managed jointly between the Washburn County Forest Department and the Wisconsin Department of Natural Resources (DNR). Management is based on an annual allowable harvest of 3,150 acres achieved by a combination of selective thinnings and clear-cuts in aspen, pine, northern hardwood, red oak, and other forest species.

## Forest and Wildfires

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The Washburn County Forestry Committee offers approximately 45 timber sales per year in three separate bid openings conducted in March, July and November. Sales are sold through a sealed bid process. Gross timber sale revenues range from \$1.75 to \$2 million per year. Fifteen percent of this revenue is paid directly to local towns as a payment in lieu of taxes. The remaining monies are returned to the county's general fund, a portion of which funds the operating budget of the Forestry Department. Timber sale revenues also support the recreation program on the county forest.

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



The Washburn County Forestry Department and the Wisconsin Department of Natural Resources (DNR) provide the primary fire management services within the county and pair with local fire departments to provide firefighting protection when needed.

At the county level, five forestry staff members are fully trained for wildfire fighting. County wildfire equipment consists of a 550H bulldozer with water tanks and personal protective equipment (PPE), Hester fire plow, semi and trailer with 800 gallon water tank mounted on trailer, two ATV's with water tank inserts, three slip on water tanks for 4 x 4 pickups, JD 6410 and PosiTrack 2810 available for other needs, two water pumps in addition to the pumps on the slip on units, pickups equipped with radios programmed with all necessary



emergency frequencies, and portable radios. The Forestry Department operates under a cooperative memorandum of understanding (MOU) with DNR Fire Control that commits the county to assist with wildfire suppression on county forest lands and also on other private lands at the request of DNR.

## Frequency of Occurrence

While the total number of open fires in Wisconsin has decreased over the years, the potential danger to lives and property remains due to the increased encroachment of development into previously open lands. Overall, the probability of a wildfire in Washburn County is very high due to the forested lands in Washburn County. The probability of damage from wildfires is considered moderate with Spooner being one of the highest-rated fire concern areas in Wisconsin (along with Black River Falls) because of soils, vegetation and other localized conditions.

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).

There have been two recorded forest fires over 500 acres in Washburn County between 1976 and 2001. On April 30, 1977, approximately 13,375 acres burned at Five Mile Tower. On April 22, 1980, approximately 11,418 acres burned at Oak Lake.

## Vulnerability

Wildfires can impact the ecology of the open lands. Washburn County, which has only two natural park areas, would not be greatly impacted by a wildfire although a disruption from fire could erase the usability of this habitat for wildlife and/or recreational purposes for many years.

The vulnerability to wildfire in forested areas is much higher since there is much more forested land in Washburn County and the ability to fight a wildfire (i.e., ready equipment, trained personnel, standing

infrastructure) is much less robust due to the mostly rural nature of the county.

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.<sup>101</sup>

As can be seen on the map in Appendix A the following were identified as Communities at Risk or Communities of Concern: <sup>102</sup>

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<sup>101</sup> Wisconsin State Hazard Mitigation Plan

<sup>102</sup> <https://dnr.wi.gov/topic/forestFire/documents/communitiesAtRiskWildfire.pdf>

**Community at Risk – Very High:**

- Town of Casey
- Town of Chicog
- Town of Evergreen
- Town of Minong
- Town of Spooner
- Town of Spring Brook
- Town of Trego

**Communities at Risk – High:**

- City of Shell Lake
- City of Spooner
- Village of Birchwood
- Village of Minong
- Town of Bashaw
- Town of Bass Lake
- Town of Beaver Brook
- Town of Brooklyn
- Town of Crystal
- Town of Madge
- Town of Stone Lake

**Communities of Concern:**

- Town of Frog Creek
- Town of Gull Lake
- Town of Stinnett

## **Hazard Mitigation Strategies**

Government at all levels is developing mitigation programs in fire control and firefighting tactics with the goal of protecting lives and

property from loss due to forest and wildfire. Local fire departments attend regular trainings on firefighting tactics to keep their skills honed. 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 departments responsible for forest management and firefighting would like to continue to enhance local intergovernmental cooperation in emergency response by, for example, providing ample training for volunteer fire fighters for larger fires. Local departments would like to have regular training a mock fire exercise every three years with the DNR.

The GIS Department and the Wisconsin DNR zone-mapped the entire county for emergency responders, including fire in 2012. There was a reprint scheduled for 2019 but it did not occur; the next reprint is planned for 2024. The project was funded by a mix of DNR grant funding and county funding. The maps will need to be updated over time to reflect changes and development. The county would also like to have the ability to print the fire zone maps in-house on a three to four year update schedule.

The Zoning Department, in cooperation with local fire departments would like to ensure emergency service access to all structures, critical facilities and other infrastructure by ensuring that driveways are wide enough for emergency vehicle access. There may be funding options but having a Community Wildfire Protection Plan (CWPP) greatly increases the availability of grants. Grants can have soft match which could be accomplished by:

- Encouraging the towns to enforce the county ordinance regarding driveway widths on a regular basis and on zoning permits for new construction.
- Conducting public information campaign regarding the importance of adequate entries.
- Removing trees.
- Old fire addressing signs in the towns are in the process of being updated. Old signs need to be removed; new signs are double-sided.

- The City of Shell Lake has no permitting process in place; the Administrator will address in the future.
- Create a Community Wildfire Protection Plans (CWPP) for the entire county, focusing on high and very high areas first.

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

- Encouraging residents to have fire plans and practice evacuation routes.
- The DNR leads wildfire safety and the municipalities would like to work with them, as they have in the past, to continue with a stronger focus on wildfires (FIREWISE).
- The Fire Association purchased a training trailer/smokehouse for children to go through.

Other projects might include:

- Review and update zoning ordinances to standardize location of fire sign placement and road name signs. Important aspects of this project include:
  - Getting sign posts above snow line.
  - Using fire resistant posts.
  - Installing summary signs (list properties down and along unnamed roads).
- Ensure that local fire departments are aware of the changing fire-risk in their coverage areas each season. The DNR provides a wildfire book with areas of concern highlighted.
- Inspect high-risk areas and provide mitigation recommendations to facility owners. The Spooner Fire Department contracts with the DNR to do FIREWISE inspections/education in high-risk areas. They also get Global Positioning System (GPS) coordinates for buildings, rate maintenance issues, and give recommendations for improvement. Project covers approximately 150 homes/year.

- Continue maintenance of a clear zone along the western edge of the City of Shell Lake to prevent wildfires.
- Not all of the communities have a solid water supply for fire-fighting. Install dry hydrants as deemed necessary to ensure adequate emergency water supply.

The hazard mitigation strategies listed above are designed to reduce damages to existing or future buildings and infrastructure by providing information on general fire safety measures to the public for residential and commercial structures and providing ongoing training to the firefighters who fight these types of fires.

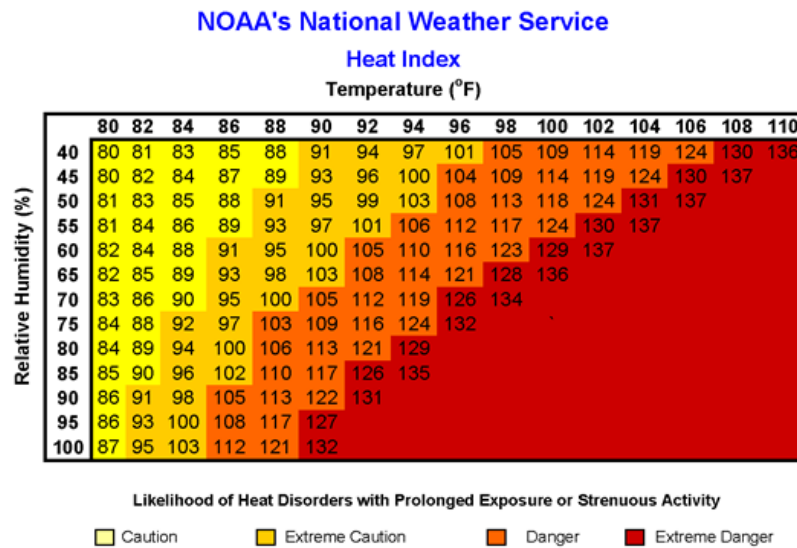
# Severe Temperatures

## 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<sup>103</sup>:

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<sup>103</sup> 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.

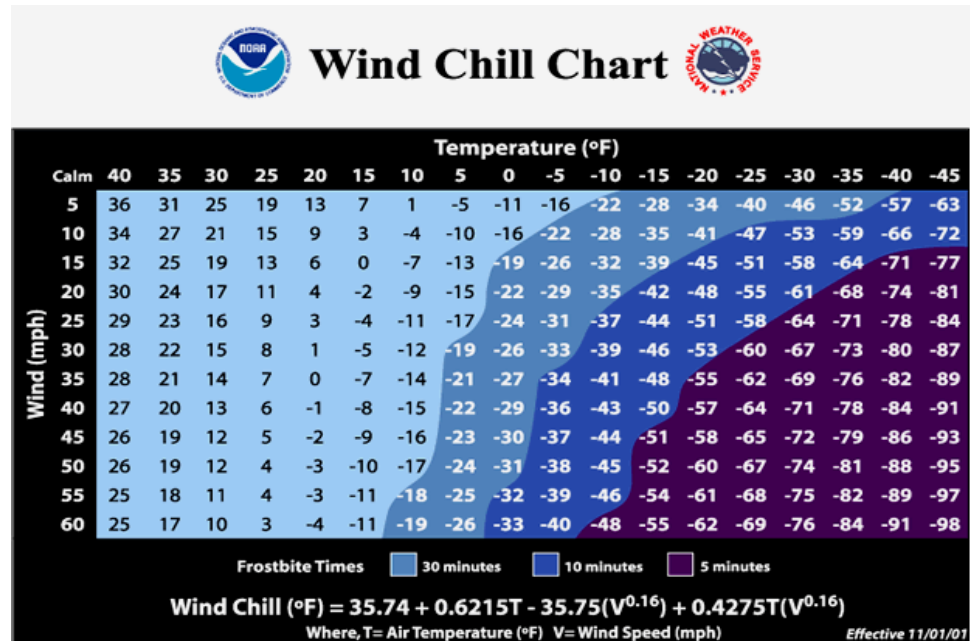
## Physical Characteristics: Cold

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

## Severe Temperatures

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eventually core body temperature. The following table illustrates this relationship.<sup>104</sup>



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.

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<sup>104</sup> <https://www.weather.gov/safety/cold-wind-chill-chart>

- Superficial Frostbite – involves the skin and subcutaneous layers.
- Freezing – is deep frostbite in which the skin, subcutaneous layers and deeper structures (e.g., muscles, bone, deep blood vessels, organ membranes) of the body are affected and can become frozen.
- Chilblains - lesions that occur from repeated/chronic exposure of bare skin to temperatures of 60°F or lower.
- Trench foot – a condition that occurs when the lower extremities remain in cool water for a prolonged period of time.

## Frequency of Occurrence: Heat

Wisconsin has been affected by several bouts of extreme heat including during the Dust Bowl period from 1934-1936. 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 Washburn County <sup>105</sup> can be found in Appendix B.

According to the State of Wisconsin Hazard Mitigation Plan, extreme heat is the number-one weather killer in Wisconsin with most of the heat deaths attributed to major heat waves. The workgroup therefore felt that there was a high likelihood of occurrence in any given year. The committee also felt that the loss of property, primarily crop and livestock output has a low likelihood of occurring in a drought year. The loss of life or injury to people has a low likelihood of occurrence for the general population but the committee recognized that the likelihood increases for certain populations such as the elderly, chronically ill, children, those who work outdoors and those with limited financial resources (i.e., to pay for air conditioning).

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<sup>105</sup> <http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=55%2CWISCONSIN>

## 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 Washburn County<sup>106</sup> can be found in Appendix B.

After examining this data, the workgroup believed that cold and/or extreme cold has a high likelihood of occurrence in any given year. Since there are no crops out during the winter and most properties (homes, businesses, barns) are insulated for this climate, the loss of property due to temperature extremes is low and individuals may suffer damage due to water main breaks and other such problems. They further believed that the loss of life or injury to people has a high likelihood of occurrence among the general population when there are cold/extreme cold weather events. Again, the workgroup recognized that people who work outdoors, who have limited financial resources, the elderly, the young and the chronically ill have a higher risk profile.

## 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 impact 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

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49 & 106 <http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=55%2CWISCONSIN>

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.

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

## **Hazard Mitigation Strategies**

The goal of severe temperature mitigation activities is to reduce, in a cost effective manner, the loss of lives and property due to these events. Temperature extremes are difficult for a community to mitigate and the risks are to the health and safety of citizens, animals and crops. There are no strategies that need to be employed to reduce damages to buildings and infrastructure. The county and its municipalities will encourage the continued use of local facilities open to the elderly or those with disabilities needing a place to escape the extreme temperatures.

Washburn County Emergency Management 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. Along with the American Red Cross, Public Health and the municipalities, Emergency Management will also provide safety brochures in display racks and

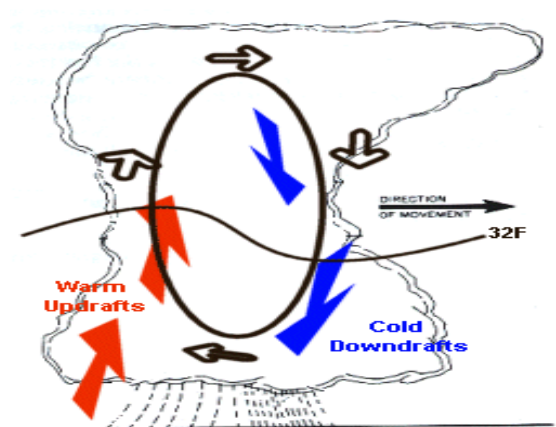
## Severe Temperatures

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other locations as available. The City of Shell Lake will also post public information on social media outlets.

## 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: <sup>107</sup>



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

## Physical Characteristics

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

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<sup>107</sup> NWS, January 10, 2003

<b>Hail Size Estimates <sup>108</sup></b>	
<b>Size</b>	<b>Inches in Diameter</b>
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. Washburn County has a high probability of hail occurrence in Wisconsin. The likelihood of damage due to hail is therefore considered medium.

Most hail damage occurs in rural areas because maturing crops are particularly susceptible to bruising and other damage caused by hailstones. The four months of hailstorm activity correspond to the growing and harvesting seasons for most crops. A table showing the

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<sup>108</sup> NWS, January 10, 2003



hail events recorded by the National Weather Service in Washburn County <sup>109</sup> can be found in Appendix B.

It should be noted that this table represents only the hail incidents reported to the National Weather Service. One limitation of the source data is that it showed no property or crop loss, death or injury while it is likely that there was some loss incurred.

After a careful review of the data by the workgroup, it was believed that there has been more accurate record-keeping and recording since the 1990s but that the table also shows an increasing frequency in the occurrence of hailstorms, with Washburn County having a hailstorm usually at least once per year. With that understanding, it was decided that the probability of hail is medium and the severity of effect should it happen is also medium.

## Vulnerability

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

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

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<sup>109</sup> <http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=55%2CWISCONSIN>

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

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

## **Hazard Mitigation Strategies**

The goal of mitigating for hail is to reduce the amount of financial loss due to these 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.

Washburn 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.

### FORMATION OF LIGHTNING<sup>110</sup>



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.

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<sup>110</sup> 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. Washburn County has a high probability of lightning occurrence at any one location within it. This was determined by recognizing that lightning usually happens in conjunction with thunderstorms, and that Wisconsin and Washburn County generally have several severe thunderstorms per summer. The likelihood of damage due to lightning is considered low for areas of the county.

A table showing the lightning events recorded by the National Weather Service (NWS) in Washburn County <sup>111</sup> 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.

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<sup>111</sup> <http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=55%2CWISCONSIN>

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

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 City of Shell Lake has inventoried all of its critical facilities (two well houses, eight lift stations, the city shop, water treatment plant) to determine if they are properly grounded and to plan for and/or install upgrades as the budget allows.

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

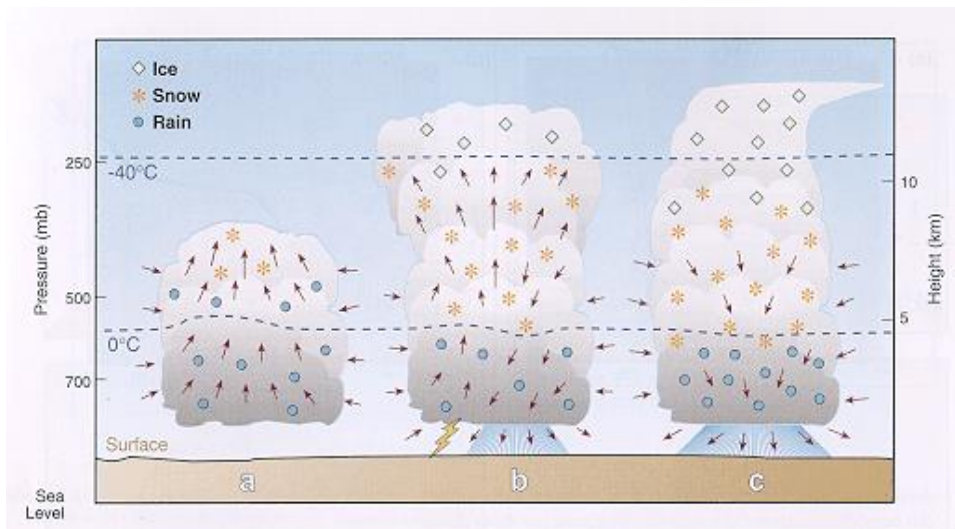
## Storms: Thunderstorms

There are three distinct stages of development for thunderstorms (birth, growth, maturity), each of which can be seen in the following schematic.<sup>112</sup>

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

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

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



## Physical Characteristics

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

<sup>112</sup> National Weather Service - Flagstaff

between thirty and fifty miles per hour. Strong frontal systems may create one squall line after another, each composed of many individual thunderstorm cells. These fronts can often be tracked across the state from west to east with a constant cycle of birth, growth, maturity and death of individual thunderstorm cells.

## Frequency of Occurrence

Thunderstorm frequency is measured as the number of days per year with one or more incidents. There are approximately 100,000 thunderstorms in the United States every year and approximately 10% of those are considered severe (i.e., has at least  $\frac{3}{4}$ " hail, winds of at least 58 mph or a tornado). Most Wisconsin counties average between 30 and 40 thunderstorm days per year although a portion of southwestern and south-central Wisconsin average 40 to 50 thunderstorm days per year. In Washburn County there is typically one or more severe thunderstorm per year. Thunderstorms can occur throughout the year with the highest frequency during the months of May through September. The majority of storms occur between the hours of noon and midnight.

The probability of thunderstorms occurring in Washburn County is high as these storms usually occur one or more times each year during the summer in Wisconsin and Washburn County.

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 discussed in the appropriate chapters.

Tables showing the thunderstorm events that have been recorded by the National Weather Service in Washburn County<sup>113</sup> can be found in Appendix B. There were no high wind events recorded for the county.

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<sup>113</sup> <http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=55%2CWISCONSIN>



## **Vulnerability**

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

## **Hazard Mitigation Strategies**

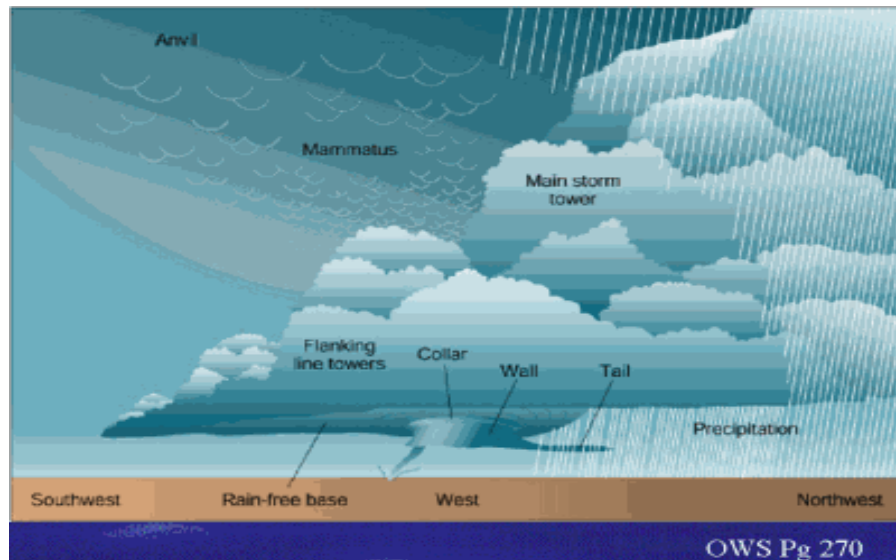
The goal of thunderstorm mitigation activities is to reduce, in a cost effective manner, the loss of lives and property due to these events.

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

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

## Storms: Tornadoes and High Winds

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

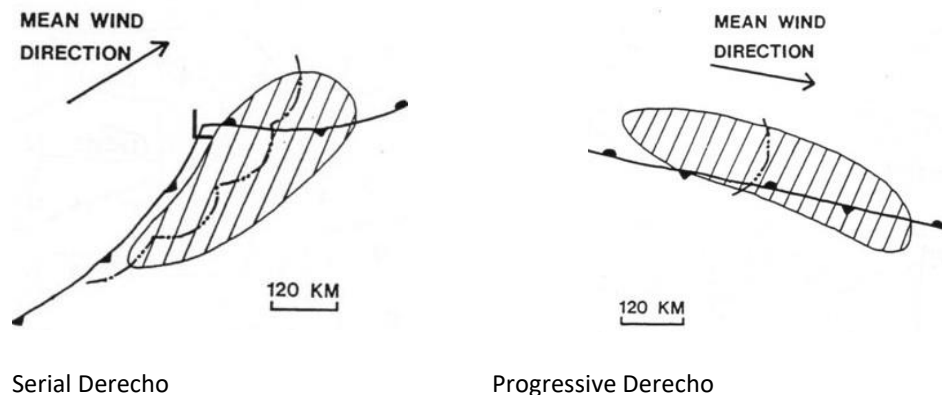


A derecho is a widespread, long-lived, violent, convectively-induced straight-line windstorm that is associated with a fast-moving band of severe thunderstorms usually taking the form of a bow echo. Derechos blow in the direction of movement of their associated storms; this is similar to a gust front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

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

and usually manifest two or more downbursts. There are three types of derechos:<sup>114</sup>

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



## 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

<sup>114</sup> <http://en.wikipedia.org/wiki/Derecho>

## Storms: Tornadoes and High Winds

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

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

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

<b>THE FUJITA TORNADO SCALE<sup>115</sup></b>		
<b>Category</b>	<b>Wind Speed</b>	<b>Description of Damage</b>
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:

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<sup>115</sup> FEMA, 1997

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

## Downburst Characteristics

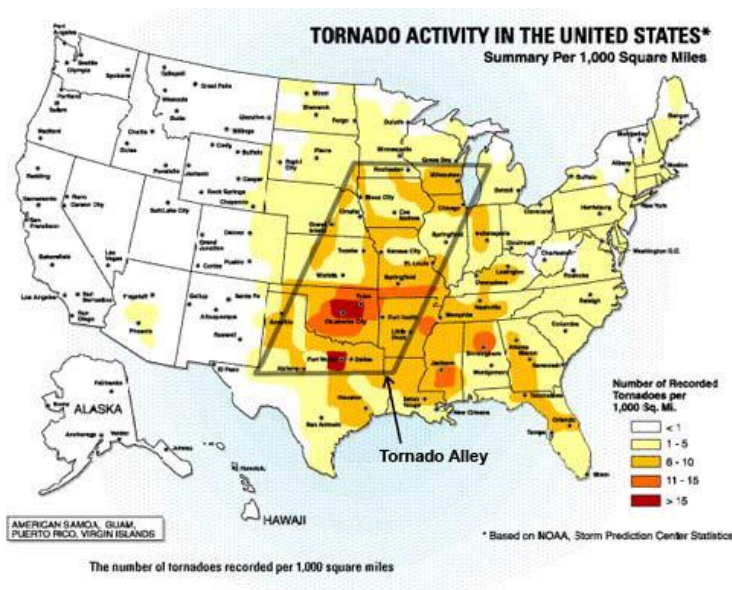
Downburst damage is often highly localized but resembles damage caused by a tornado. In some cases, even an experienced investigator cannot identify the nature of a storm without mapping the direction of the damaging winds over a large area. There are significant interactions between tornadoes and nearby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

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

## Frequency of Occurrence

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

## Storms: Tornadoes and High Winds



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

Tables showing the frequency of high winds and tornadoes as reported by the National Weather Service can be found in Appendix B.<sup>116</sup> There have been no funnel clouds reported for the county. The probability of Washburn County being struck by a tornado in the future is medium and the likelihood of damage from future tornadoes is medium. The probability of high wind is high and the likelihood of damages is high. All parts of Washburn County are equally susceptible to tornadoes and high winds.

## 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; Washburn County has several of each type of property. Both have high concentrations of people in a small area,

<sup>116</sup> <http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=55%2CWISCONSIN>

generally have structures that provide less protection than standard construction homes, which 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.

<b>Mobile Home Parks</b> <sup>117 118</sup>	
<b>Park Name</b>	<b>Location</b>
Village East Mobile Home Park	Spooner (Thompson Dr.)
Hansen Mobile Home Park	Shell Lake
Park West Mobile Home Park	Spooner
Village East Mobile Home Park	Spooner (Hwy. 70)
Benson and Thompson Park	Birchwood
Buliks Amusement Center and Mobile Home Park	Spooner

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<sup>117</sup> <https://www.mobilehome.net/mobile-home-park-directory/wisconsin/county/washburn-county>

<sup>118</sup> <https://www.mhvillage.com/Communities/MobileHomeParks.php?State=WI&County=Washburn>

## Storms: Tornadoes and High Winds

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<b>Campgrounds <sup>119</sup></b>	
<b>Campground Name</b>	<b>Location</b>
Log Cabin Resort and Canoe Rental	Trego
Trego Town Park Campground	Trego
Jack's Canoe Rental and Campground	Trego
Country House Motel and RV Park	Spoooner
Highland Park Campground	Spoooner
West Point Campgrounds	Spoooner
Scenic View Campgrounds	Spoooner
Benoit Lake Campgrounds	Spoooner
Anchor Bay Camping and Cabins	Spoooner
Camp Namekagon	Springbrook
Brad and Kay's Campground	Trego
Dahle's Campground	Sarona
T.P. Resort and Campground	Birchwood
Red Barn Campground	Shell Lake
Doolittle City Park	Birchwood
Chicog Town Park	Trego
Bay Park Resort and Campgrounds	Trego
Featherstone RV Park	Birchwood
Waldo Carlson Park	Birchwood
Swift Nature Camp	Minong
Dugan Run Horse South Trailhead	Sarona
Leesome Pine Campgrounds	Sarona

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<sup>119</sup> [http://www.hikercentral.com/campcounty/Wisconsin\\_Washburn.html](http://www.hikercentral.com/campcounty/Wisconsin_Washburn.html)



Camping in the county forest is allowed with the prior permission of the Forest Administrator and with a tent or lesser facility. Camping during the nine-day gun deer season is allowed with larger facilities within 200 feet of a town road or County Forest Road.

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.

Washburn 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.

As discussed in the All Hazards Chapter, 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 spring. Media information packets are distributed to reemphasize and alert the public to tornado warning procedures and to help citizens understand weather alert terms. Washburn County actively promotes tornado safety public information as well as other summer severe weather public awareness and educational efforts, including applicable links on the county website. Washburn County also assists the National Weather Service with sponsoring tornado spotter training and in organizing local tornado spotter networks, upon request.

As part of the tornado preparedness program, the county plans to work with the City of Shell Lake, the Village of Birchwood and other interested municipalities to identify governmental and private buildings that can be used as tornado shelters and develop an

implementation plan for activating the sites when a tornado is imminent.

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

Providing information to builders and owners of manufactured and mobile homes regarding the use of tie-downs with ground anchors. These relatively inexpensive strategies reduce the damage to these homes in lower F-scale tornadoes.

Identifying and constructing tornado shelters in mobile home parks and campgrounds as grant funding is available, especially in the county-owned Totogatic Campground and other campgrounds as deemed appropriate. The U.S. Department of Commerce Community Development Block Grants may be an avenue to achieve the necessary funding.

The City of Spooner has two mobile home parks (i.e., Pinewood and Park West) in which they would also like to explore having tornado shelters installed. Previously residents could shelter in the National Guard armory but that is no longer an option because the military does not allow the armories to be used for this type of purpose any longer.

## Storms: Winter

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



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

## Physical Characteristics

The National Weather Service descriptions of winter storm elements are:

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

- 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 an accumulation of frozen rain pellets on the ground during a sleet storm, which can make driving hazardous.

## Frequency of Occurrence

Annual snowfall in Wisconsin varies between thirty inches in southern counties to one hundred inches in the north. Washburn County averages approximately 52 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. It should be noted that there were two additional large snow storms that occurred in late February and late March of 2011.

Both ice and sleet storms can occur at any time throughout the winter season from November to April. Ice storms of disastrous proportions occurred in central Wisconsin in February 1922 and in southern Wisconsin in March 1976. A Presidential Disaster Declaration occurred as a result of the 1976 storm. Utility crews from surrounding states were called in to restore power, which was off for up to ten days in some areas. Other storms of lesser magnitude caused power outages and treacherous highway conditions.

Tables showing winter storm statistics as reported by the National Weather Service can be found in Appendix B.<sup>120</sup> The tables show that there is little property damage but this does not take into account the public costs of managing the snow and ice as well as the costs of managing utility repair to power, telephone and water lines. There are no recorded blizzard events for the county.

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

## 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

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<sup>120</sup> <http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=55%2CWISCONSIN>

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. In a snow emergency, it is critical to open roadways as quickly and efficiently as possible for emergency purposes. Funding is budgeted for the overtime hours of extra personnel but in a large emergency this may not be adequate. Redundant communication modes (e.g., radio, telephone) exist between government, police, fire, EMS, hospitals and highway departments. The Washburn 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 Washburn County Emergency Management Office during Winter Awareness Week in November. Preparedness information is also available from display racks and the website. During a storm, the public is advised to monitor local radio, television and NOAA weather alert radios for up-to-date forecasts.

The hazard mitigation strategies listed above primarily involve providing information on general safety measures to the public. These measures provide basic safety information but, since the response to winter storms is primarily a government and/or corporate function comprised of tasks such as clearing roads of snow and ice and repairing downed utility lines, there are few measures that can be employed to reduce damages to existing or future buildings and infrastructure.

## Utility Failure

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

## Physical Characteristics

Modern society is very dependent on electrical power for normal living and is therefore quite disrupted by loss of power. Most power outages last about fifteen minutes to one hour. If longer, the utilities will inform the local news media of the anticipated duration of the outage. Thunderstorms with lightning can also cause power failure.

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

Three electric companies and one municipal provider serve Washburn County. Barron Electric Cooperative, Xcel Energy and Spooner Municipal Utilities are the primary providers of electric services to the county.

- Spoooner Municipal Utilities- serves the City of Spooner and portions of the Town of Spooner and the Town of Evergreen.
- Xcel Energy- serves residents in the City of Shell Lake, Village of Birchwood, and parts of the Towns of Trego, Springbrook, Sarona, Stone Lake, Bashaw, Barronett, Beaver Brook, Long Lake and Birchwood.
- Polk Burnett Electric Cooperative – serves a few residents on the western edges of the Towns of Minong and Chicog.
- Barron Electric Cooperative- serves rural portions of Washburn County including the Towns of Gull Lake, Stinnett,



Spoooner, Bass Lake, Madge, Crystal, and parts of the Towns of Casey, Trego, Stone Lake, Bashaw, Beaver Brook, Birchwood, Long Lake, Sarona, Barronett, and Evergreen.

- Dahlberg Light & Power- is an investor owned electric utility which serves approximately 11,000 retail customers in Douglas, Bayfield and Washburn Counties. Communities served in Washburn County include Frog Creek, Wascott, Minong, Brooklyn, and Chicog.
- East Central Energy- serves the Minong and Frog Creek areas and is a member owned electric cooperative that provides electric service to nearly 61,000 homes, farms, and businesses in east central Minnesota and northwestern Wisconsin.

In Washburn County, natural gas services are provided by WE Energies via a steel high-pressure natural gas main with a carrying capacity of 450 pounds of pressure, which runs from Shell Lake to Spooner following Highway 63, and follows CTH K north to CTH E into Trego. From Trego, the line follows STH 63 into Sawyer County servicing the communities of Earl and Springbrook. Natural gas from WE Energies also serves the Village of Minong and some of the Town of Minong with a pipeline that comes from Trego north to Minong.

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

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

On January 25, 2014 the Governor declared a state of emergency in response to the shortage and the state provided and estimated \$31.2 million in funding to residents of Burnett, Polk and Washburn Counties. Washburn County had a 65% increase in the number of households that applied for energy assistance with average payments increasing from \$331 (2013) to \$531 (2014). 87% of households in Washburn County used propane to heat their homes in 2014, an increase over the 56% that had in 2013. During this period, suppliers were rationing propane forcing people to use alternative heat sources, which can cause carbon monoxide poisoning or may lead to fires.

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

Washburn 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. Historically, a beaver damaged a phone line and it temporarily disabled part of the banking system. Due to the mostly rural nature of Washburn County, brown-outs (i.e., times when, because of high power demand, areas are purposefully turned off of the power grid) are not a strategy used by the power companies that provide service.

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

## **Vulnerability**

The failure of a utility to function can have wide-ranging impact in Washburn County. People, especially those with functional and access needs, 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. Utilities may also be non-operational due to damaged infrastructure, which can be very expensive to replace and/or repair. Critical infrastructure such as hospitals, schools and governmental facilities may not be able to operate or may have to operate at a reduced capacity due to the loss of utility services. 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 asset may be impacted by the loss of utilities because extreme temperatures reduce the volume of livestock products and products such as milk may not be able to be properly stored.

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

All of these concerns are exacerbated by the extreme cold that is not uncommon in northern areas of Wisconsin, including Washburn

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

## Hazard Mitigation Strategies

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

Washburn County has worked directly with the utility companies and first responders in formulating emergency management plans. During a fuel or power shortage, residents, schools, industry and businesses will be asked to take measures to conserve fuel. If the fuel shortage reaches a critical stage, all non-essential facilities will be closed down and contingency plans will be put into effect.

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. In the event of a prolonged power outage Washburn County has generators available in the County Highway Shop for EOC operation or a community shelter. Local hospitals have emergency generators for their own use but otherwise, there are few generators in the county. The county would like to add emergency power generators to emergency shelters in Birchwood, Minong, Spooner and Shell Lake for emergency heat, shelter and feeding. They would also like to install generators at the volunteer fire halls in the county, as funding is available. The City of Spooner would like to install a generator at the City Hall/Police Department, as funding available. The City of Shell Lake would like to continue the partnership with local utility companies with inventorying critical assets and identifying potential concerns due to severe weather. Another strategy is to add emergency power generators to support the water and sewage systems. Multiple communities throughout the county would like to inventory power

needs and install generators in to support key community infrastructure (see table).

The Barron Electric Cooperative would like to bury above-ground power lines in selected areas (see table in Appendix E). These areas are highly dense with mature trees. Power disruption to customers is common, especially in storms.

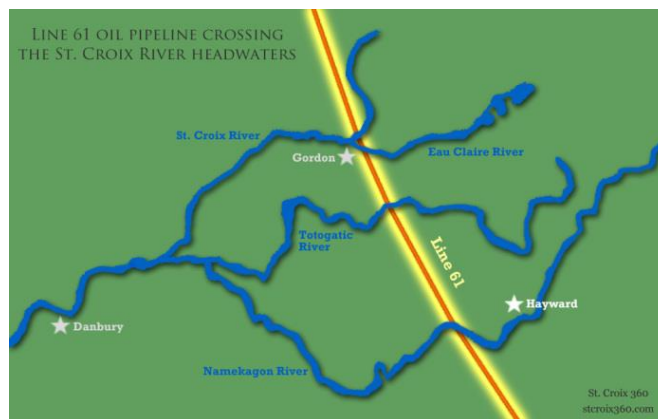
## Pipeline Failure

Washburn County is concerned about the possibility of a failure/breach of the Enbridge Energy pipeline, which traverses a portion of the county. A failure of the pipeline may be the direct result of a natural disaster (e.g., tornado) or may be the result of a purposeful criminal/terrorist action.

## Physical Characteristics

Enbridge, a Canadian company, currently operates Line 61, a 42-inch pipeline that heavy crude oil (bitumen) from Canada's tar sands. Bitumen is the heaviest crude oil in use today; it is the consistency of peanut butter and requires dilution with other chemicals to flow through pipelines.

Built in 2007 and 2008, it has been carrying up to 16.8 million gallons of oil each day since 2009 at a diagonal from Superior, WI to Illinois. Line 61 follows a route carrying four pipes; three of them head southeast from Superior and one carries diluting chemicals back north. This year, new pumping stations were built that allow the pipeline to carry 23.5 million gallons per day. By 2015, the company plans to increase the number to 50 million gallons.<sup>121</sup>



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<sup>121</sup> <http://www.stcroix360.com/2014/10/oil-water-pipeline-to-triple-flows-under-st-croix-headwaters/>

## Frequency of Occurrence

Major pipeline breaches are rare events but they have occurred. Enbridge Energy experienced a pipeline breach in 2010 at Kalamazoo, Michigan.

## Vulnerability

Line 61 was placed under the St. Croix River (in northern Wisconsin) where springs bubble up in bogs and trickle together to form the river. Just a few miles downstream, the Eau Claire River flows in and another twenty miles south, the Namekagon (which was joined by the Totogatic River just upstream) enters the St. Croix. Aside from the four rivers, the pipeline flows under forests, fields, creeks and wetlands. This ecosystem is home to smallmouth bass, muskie, sturgeon, mussels, birds and various insects, all of which depend on clean water to thrive. It is also a draw for thousands of people who fish, paddle, boat, swim, and admire the area throughout the year.

It should also be noted that the St. Croix and the Namekagon Rivers were among the eight inaugural Wild and Scenic Rivers when the landmark legislation was passed in 1968, which designates them in the elite .25% of all American rivers. They are managed today as a National Park and the Totogatic is one of four state-designated Wild Rivers in Wisconsin.

Aside from the impacts to the natural area, its flora and fauna and the economic impact from loss of recreational activities, there are factors in this type of oil spill that may complicate matters, including:

- Bitumen oil is very heavy and may sink to the bottom of the waterways, making clean-up very difficult and costly, as was the case in the Michigan spill.
- The oil is also more corrosive than regular crude, and some of the chemicals used to dilute it are toxic including benzene, which can cause health problems when inhaled.
- Tar sands oil may corrode pipelines faster than regular crude. To keep the thick bitumen flowing, the pipelines operate at

temperatures reaching 150 degrees, increasing the corrosive effects.

## Hazard Mitigation Strategies

The goal of pipeline failure mitigation activities is to reduce, in a cost-effective manner, the fiscal and environmental losses due to these incidents. Washburn County and area first responders are working directly with Enbridge to prepare for the increased activity in Line 61. All interested parties agree that continuing pre-incident preparedness (i.e., planning, training, exercising) and equipping is the most effective mitigation strategy at this point including:<sup>122</sup>

Environmental Protection Groups: *“It is critical that human safety and environmental protections are adequately addressed, with thorough training for first responders. The oil and chemicals themselves could do unthinkable harm. The intense clean-up efforts would likely cause major problems, too,”* says the St. Croix River Association’s Deb Ryun.

Washburn County: *The county’s emergency planner says the pipeline company has been very proactive. “Enbridge is making a fair effort to make sure that their systems are up and running,”* says Carol Buck. *She said she saw how the company responded quickly and thoroughly to a false alarm, “I’ve had one incident and they were on it for days.”*

Enbridge: *Becky Haase, spokesperson, says the trainings and regular communication with first responders are key to the company’s strategy. “The worst and last thing Enbridge wants is to have a release, and be meeting people [for the first time]. We want to say, ‘Hey Jim, this is what’s going on.’”* The company has also donated money to the county and fire departments for equipment that could help in the event of a spill.

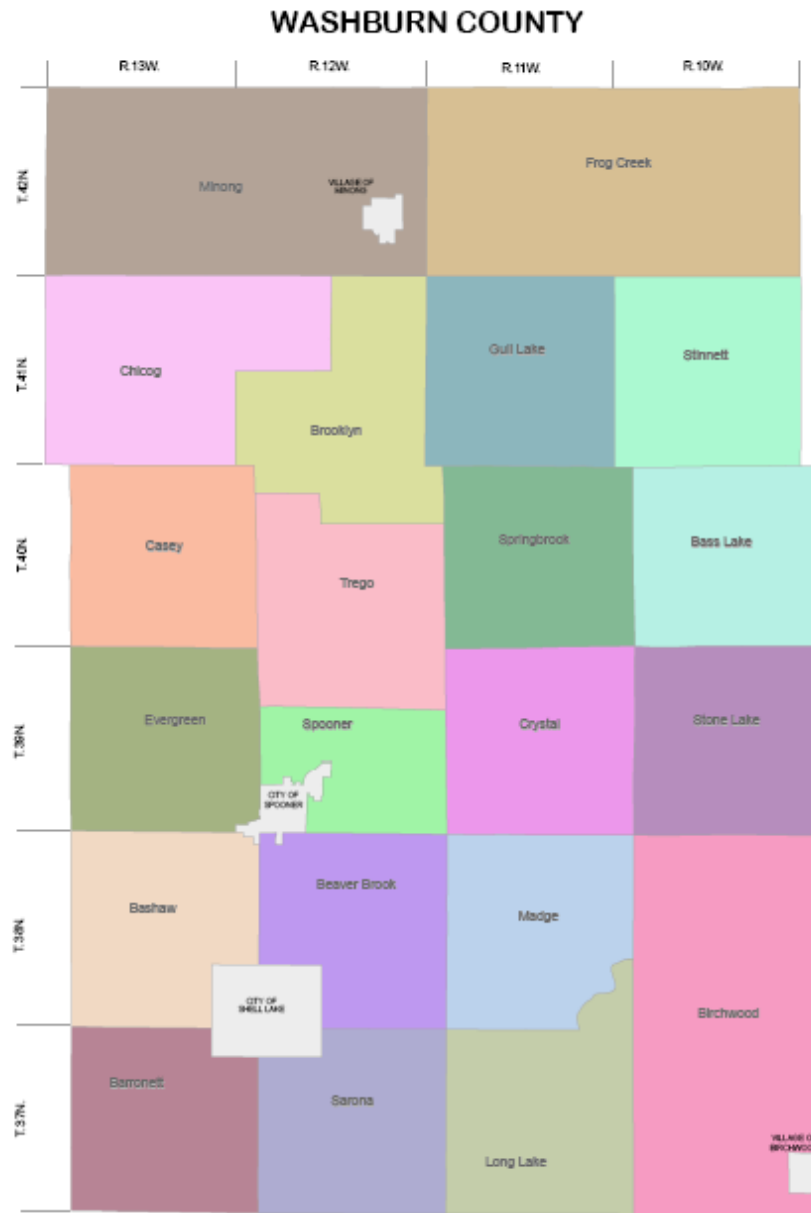
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<sup>122</sup> <http://www.stcroix360.com/2014/10/oil-water-pipeline-to-triple-flows-under-st-croix-headwaters/>

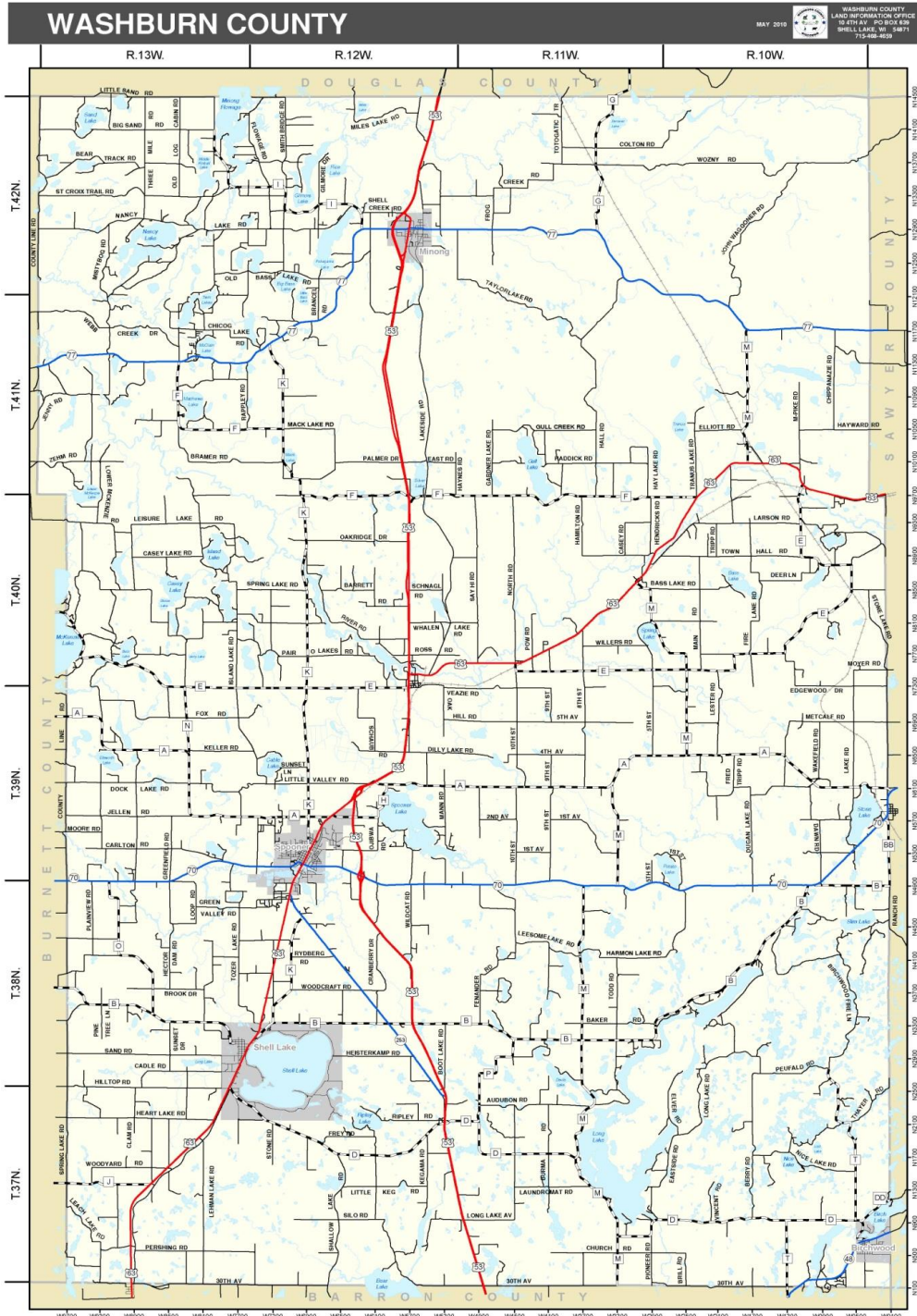


# Appendix A: Maps

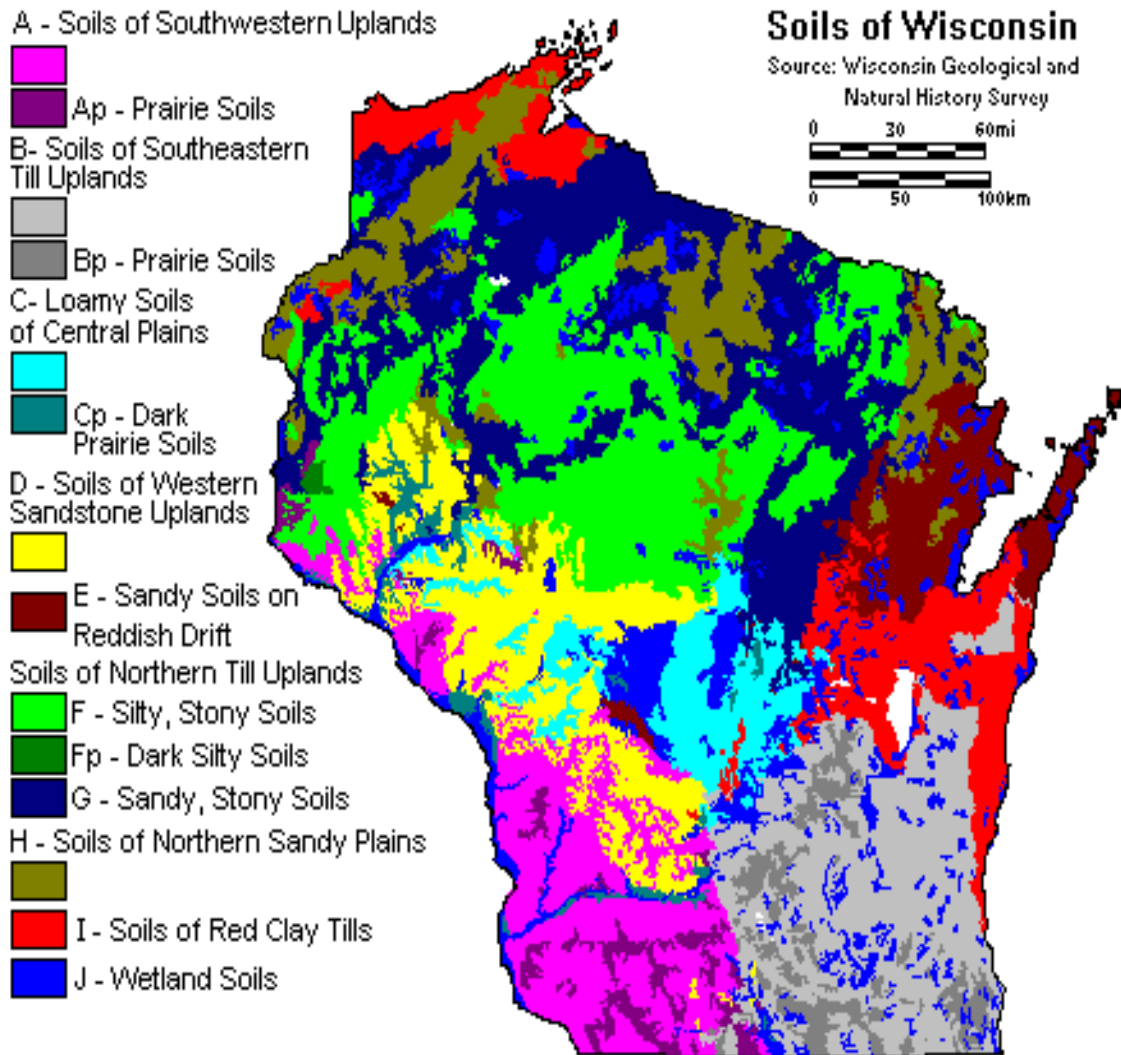
## Washburn County Municipal Divisions



# Washburn County Road Network

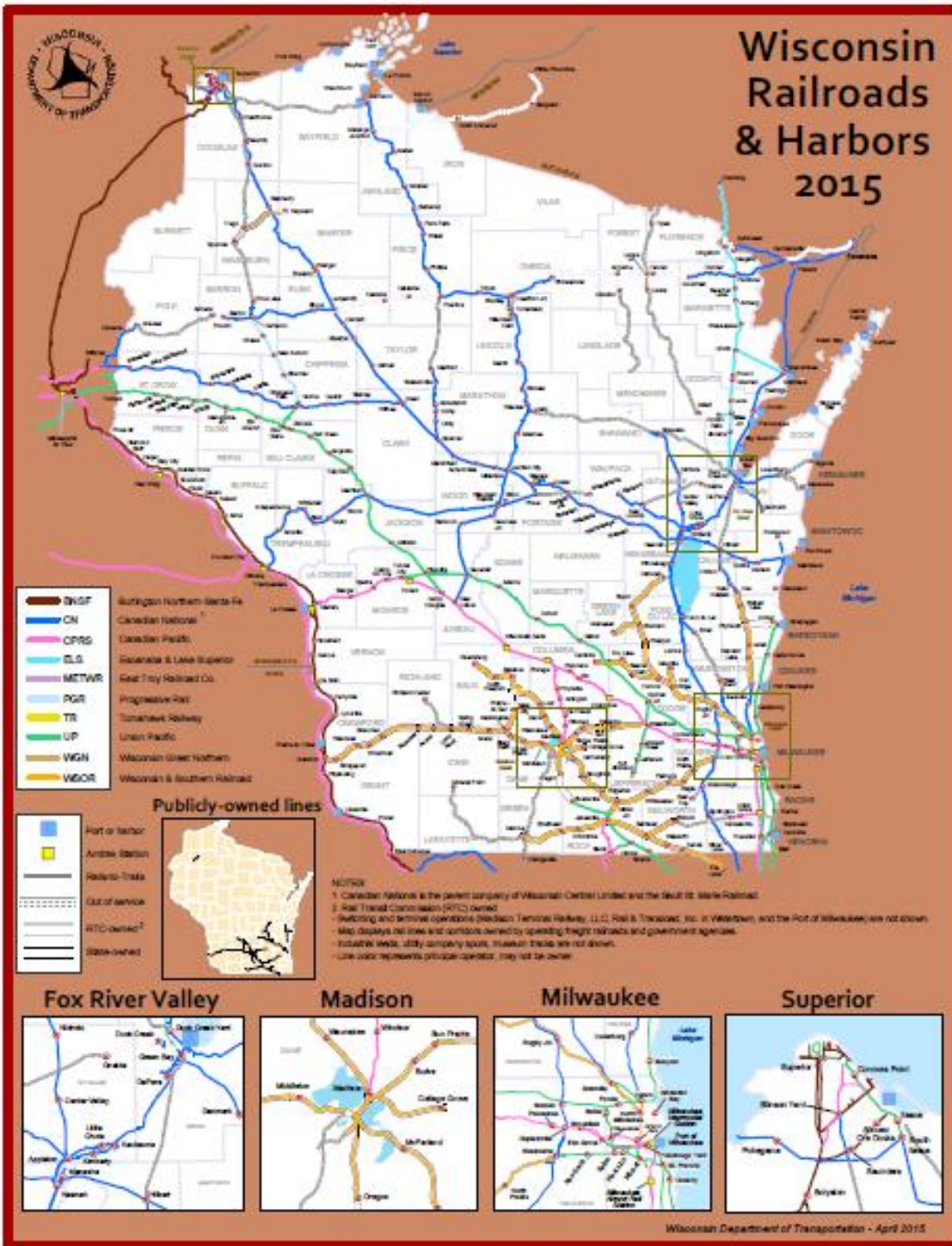


Soils Types <sup>123</sup>

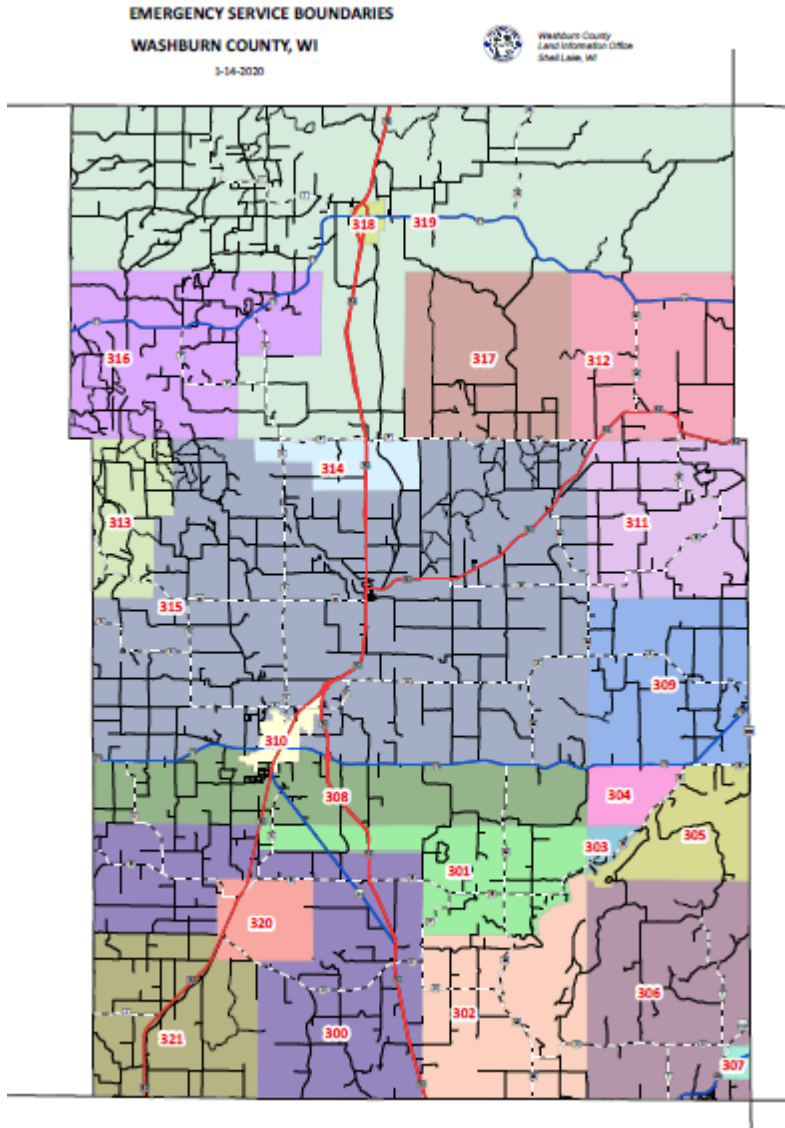


<sup>123</sup> Source: Soils of Wisconsin compiled by F. D. Hole, 1973; Wisconsin Geological and Natural History Survey Map, scale (approx.) 1: 3,150,000.

Wisconsin Railroads & Harbors



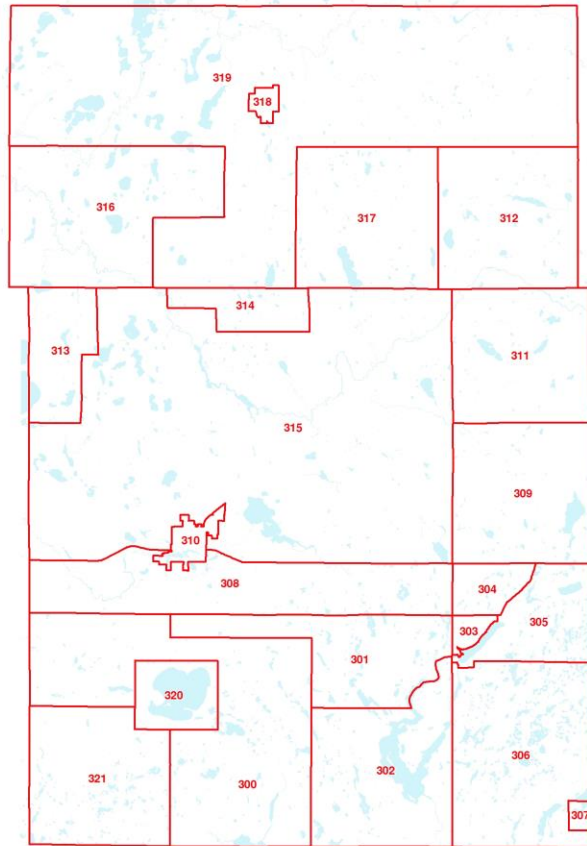
# Washburn County Emergency Services Districts (Color)



Appendix A: Maps

Washburn County Emergency Services Districts (Legend)

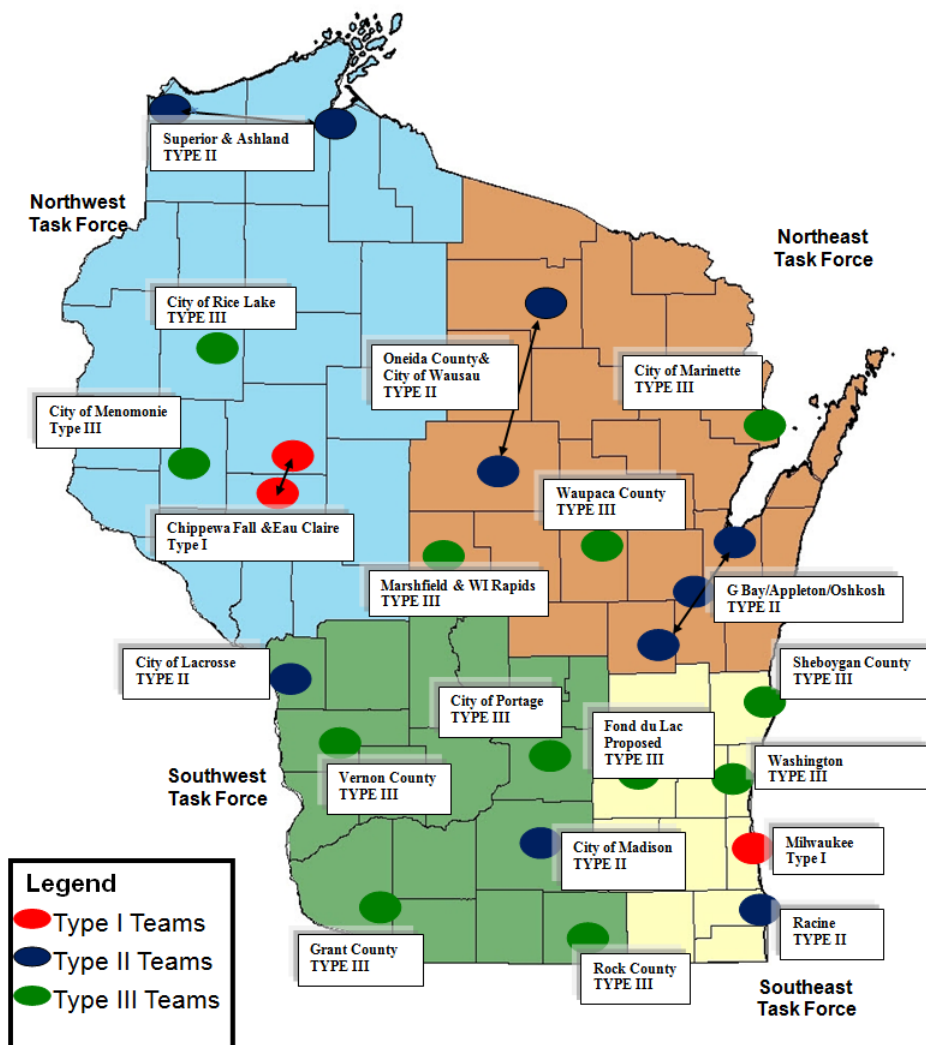
Emergency Service Zones		Washburn County		
District	FIRE	MEDICAL	LAW	DNR
300	SHELL LAKE FD	NORTH AMBULANCE - 5109	WASHBURN COUNTY SHERIFF	SPOONER SOUTH DNR
301	SPOONER FD	NORTH AMBULANCE - 5109	WASHBURN COUNTY SHERIFF	SPOONER SOUTH DNR
302	BIRCHWOOD FD	LAKEVIEW MEDICAL CENTER AMBULANCE	WASHBURN COUNTY SHERIFF	SPOONER SOUTH DNR
303	STONE LAKE FD	STONE LAKE AREA AMBULANCE	WASHBURN COUNTY SHERIFF	SPOONER SOUTH DNR
304	STONE LAKE FD	STONE LAKE AREA AMBULANCE	WASHBURN COUNTY SHERIFF	SPOONER SOUTH DNR
305	STONE LAKE FD	STONE LAKE AREA AMBULANCE	WASHBURN COUNTY SHERIFF	SPOONER SOUTH DNR
306	BIRCHWOOD FD	BIRCHWOOD - 120	WASHBURN COUNTY SHERIFF	SPOONER SOUTH DNR
307	BIRCHWOOD FD	BIRCHWOOD - 120	BIRCHWOOD PD	SPOONER SOUTH DNR
308	SPOONER FD	NORTH AMBULANCE - 5109	WASHBURN COUNTY SHERIFF	SPOONER SOUTH DNR
309	STONE LAKE FD	STONE LAKE AREA AMBULANCE	WASHBURN COUNTY SHERIFF	SPOONER NORTH DNR
310	SPOONER FD	NORTH AMBULANCE - 5109	SPOONER PD	SPOONER NORTH DNR
311	TOWN OF HAYWARD FD	SAWYER COUNTY AMBULANCE	WASHBURN COUNTY SHERIFF	SPOONER NORTH DNR
312	TOWN OF HAYWARD FD	SAWYER COUNTY AMBULANCE	WASHBURN COUNTY SHERIFF	MINONG DNR
313	SPOONER FD	NORTH AMBULANCE - 5104	WASHBURN COUNTY SHERIFF	SPOONER NORTH DNR
314	MINONG FD	MINONG AMBULANCE	WASHBURN COUNTY SHERIFF	SPOONER NORTH DNR
315	SPOONER FD	NORTH AMBULANCE - 5109	WASHBURN COUNTY SHERIFF	SPOONER NORTH DNR
316	CHICOG FD	MINONG AMBULANCE	WASHBURN COUNTY SHERIFF	MINONG DNR
317	SPOONER FD	NORTH AMBULANCE - 5109	WASHBURN COUNTY SHERIFF	MINONG DNR
318	MINONG FD	MINONG AMBULANCE	MINONG PD	MINONG DNR
319	MINONG FD	MINONG AMBULANCE	WASHBURN COUNTY SHERIFF	MINONG DNR
320	SHELL LAKE FD	NORTH AMBULANCE - 5109	SHELL LAKE PD	SPOONER SOUTH DNR
321	SHELL LAKE FD	CUMBERLAND HOSPITAL AMBULANCE	WASHBURN COUNTY SHERIFF	SPOONER SOUTH DNR



APRIL 2014

# Wisconsin's Regional & County/Local HazMat Response Teams<sup>124</sup>

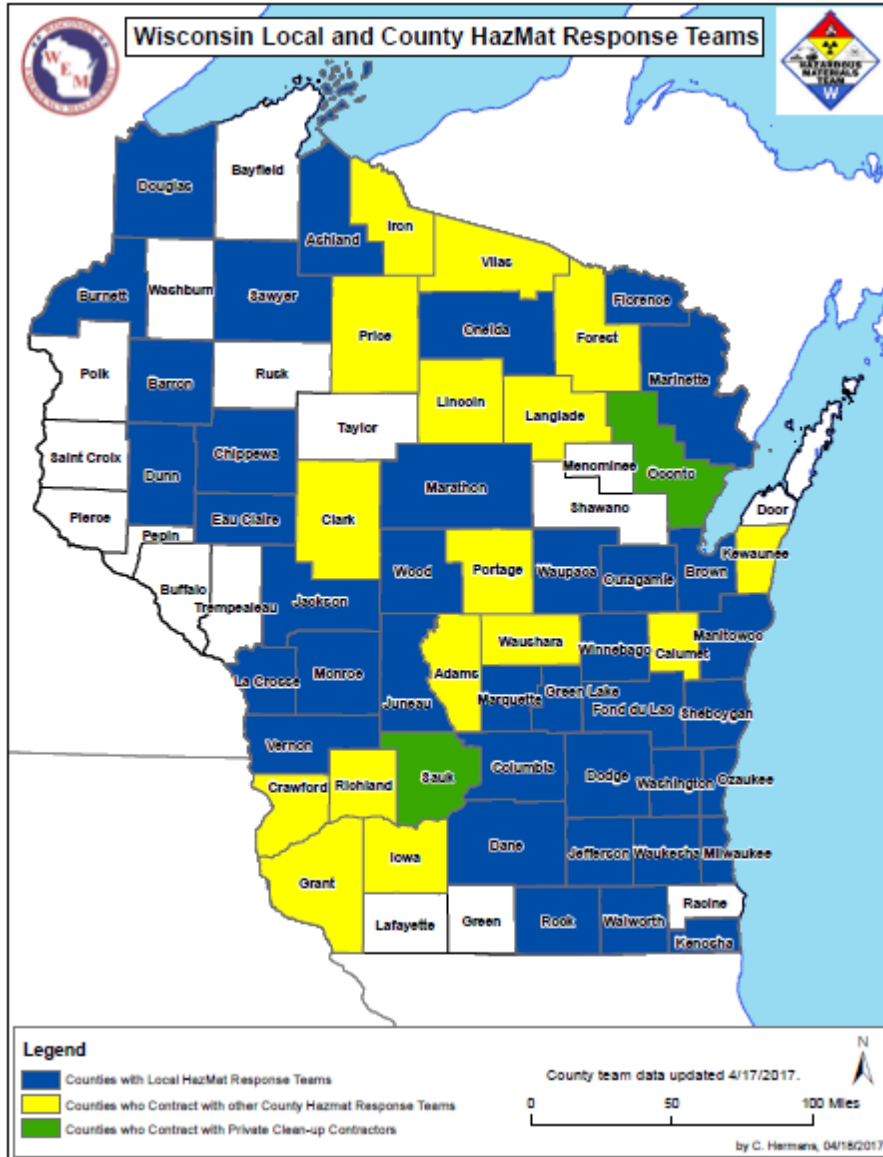
## Wisconsin Hazardous Materials Response System



<sup>124</sup> <http://www.wsfca.com/files/cache/c1e510bdc2d15a686a3e1793a4418804.jpg>

Appendix A: Maps

Wisconsin Hazardous Materials Response Teams<sup>125</sup>

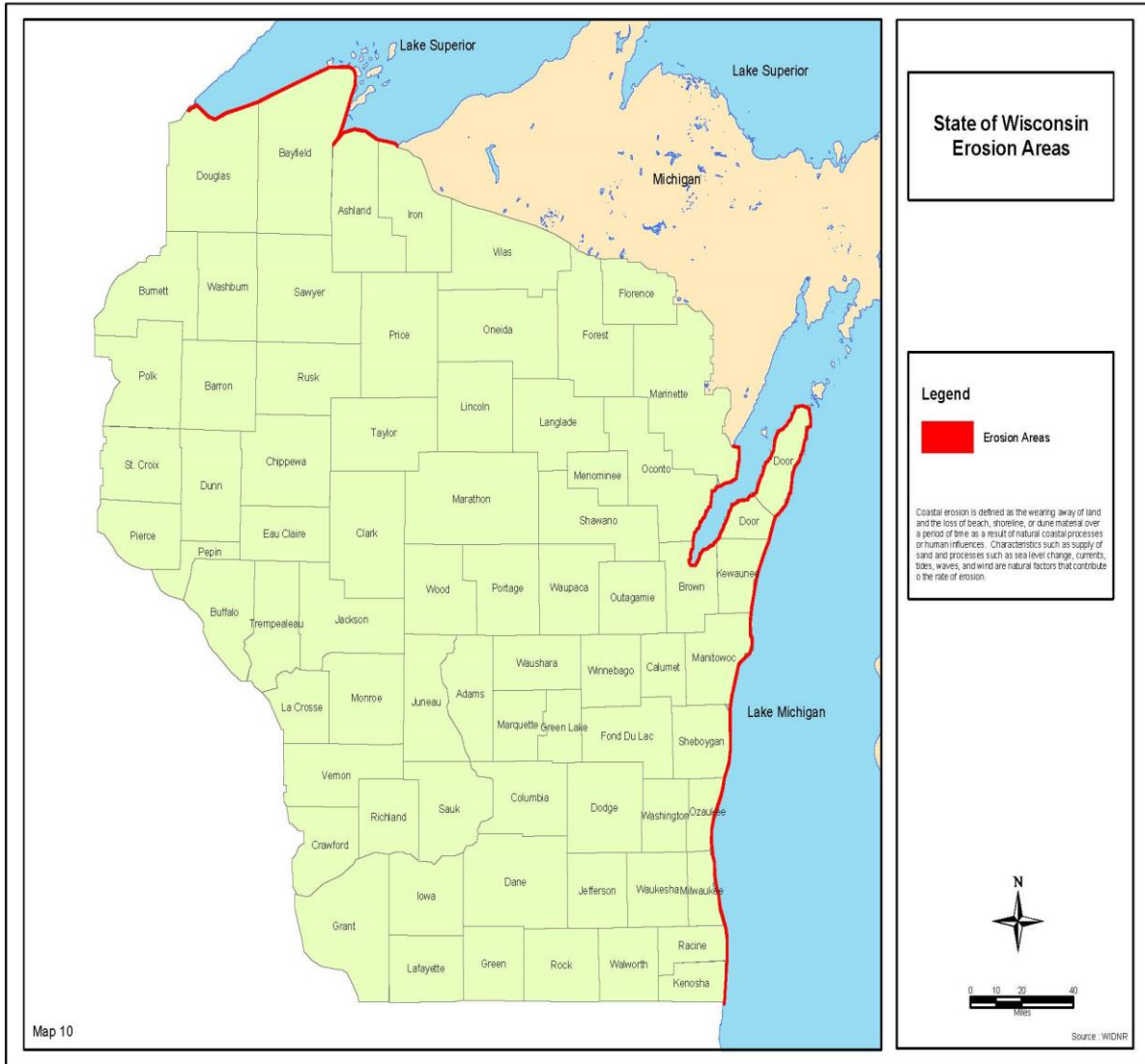


\*Please note that Burnett Co. no longer has a local team.

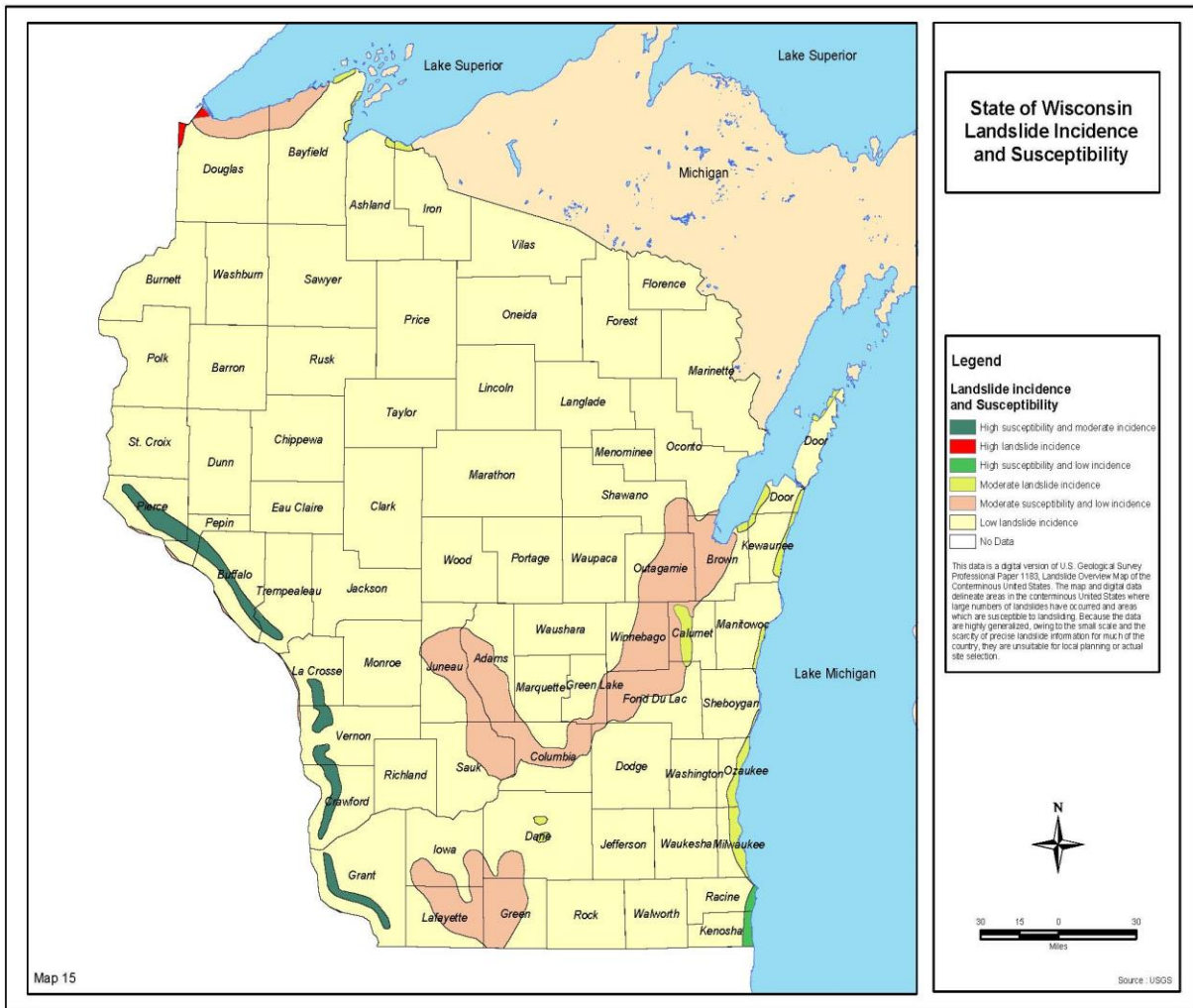
<sup>125</sup> [https://dma.wi.gov/DMA/divisions/wem/response/images/HazMat\\_County\\_Teams.pdf](https://dma.wi.gov/DMA/divisions/wem/response/images/HazMat_County_Teams.pdf)



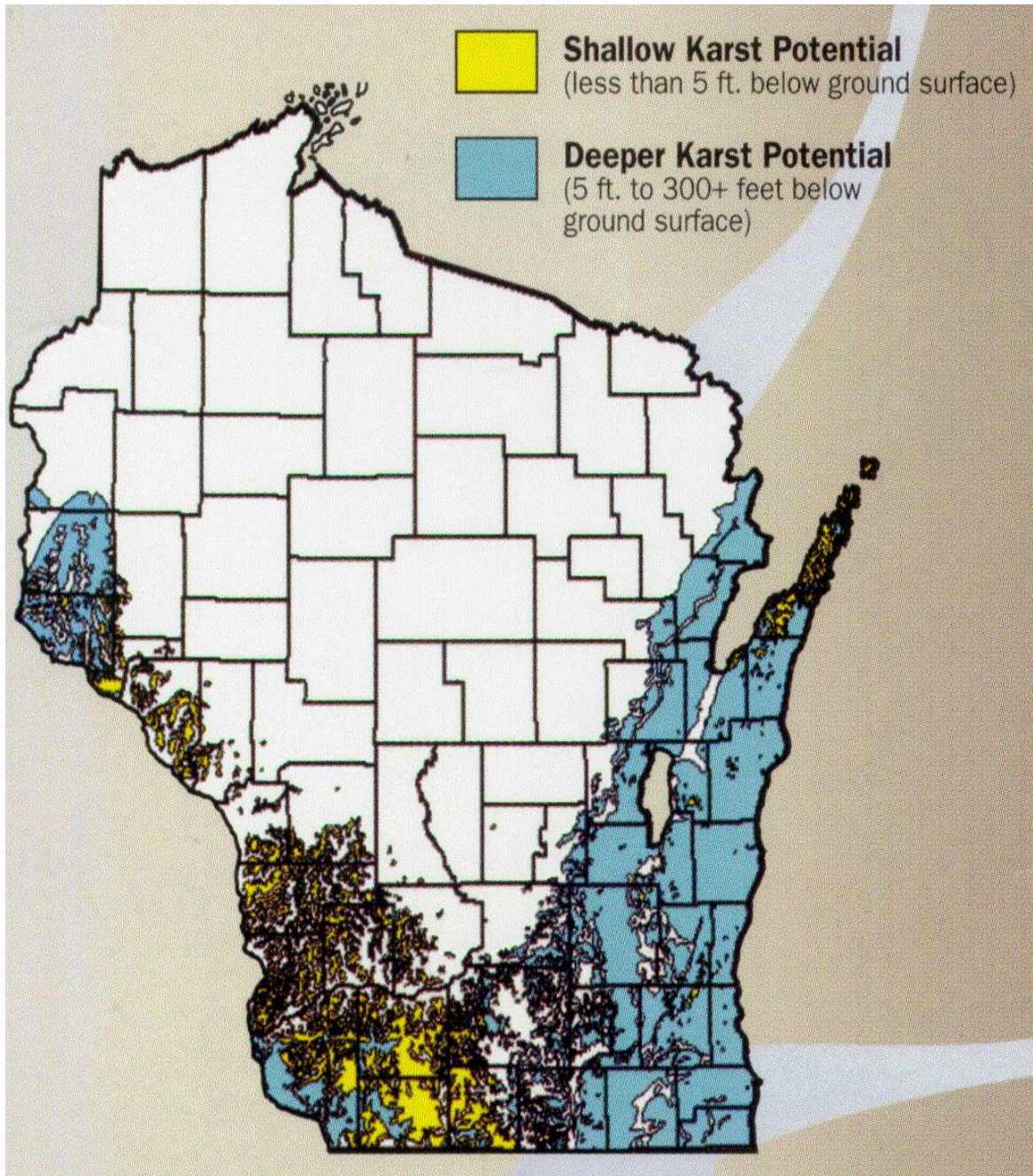
# Erosion Areas in Wisconsin 126



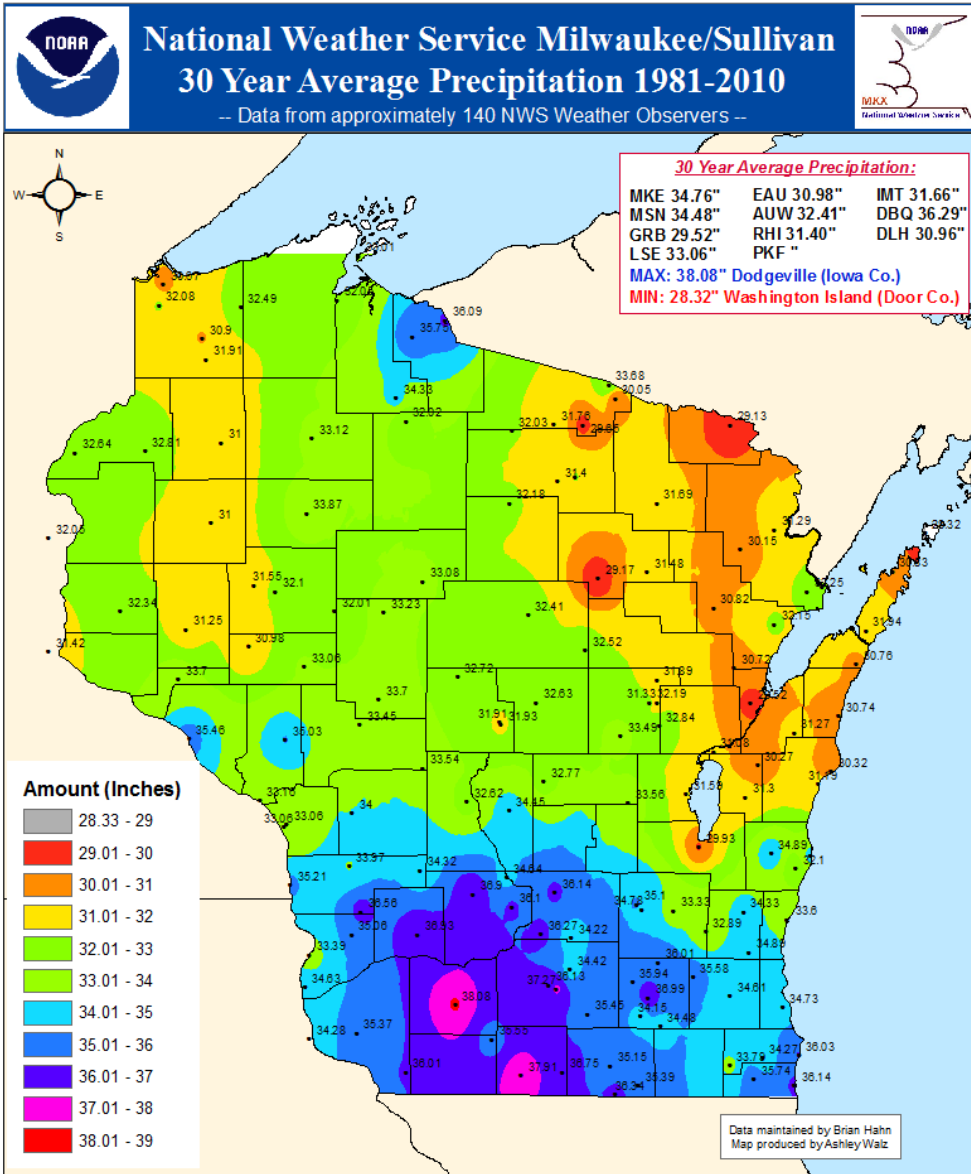
# Landslide Incidence and Susceptibility <sup>127</sup>



## Karst Potential <sup>128</sup>



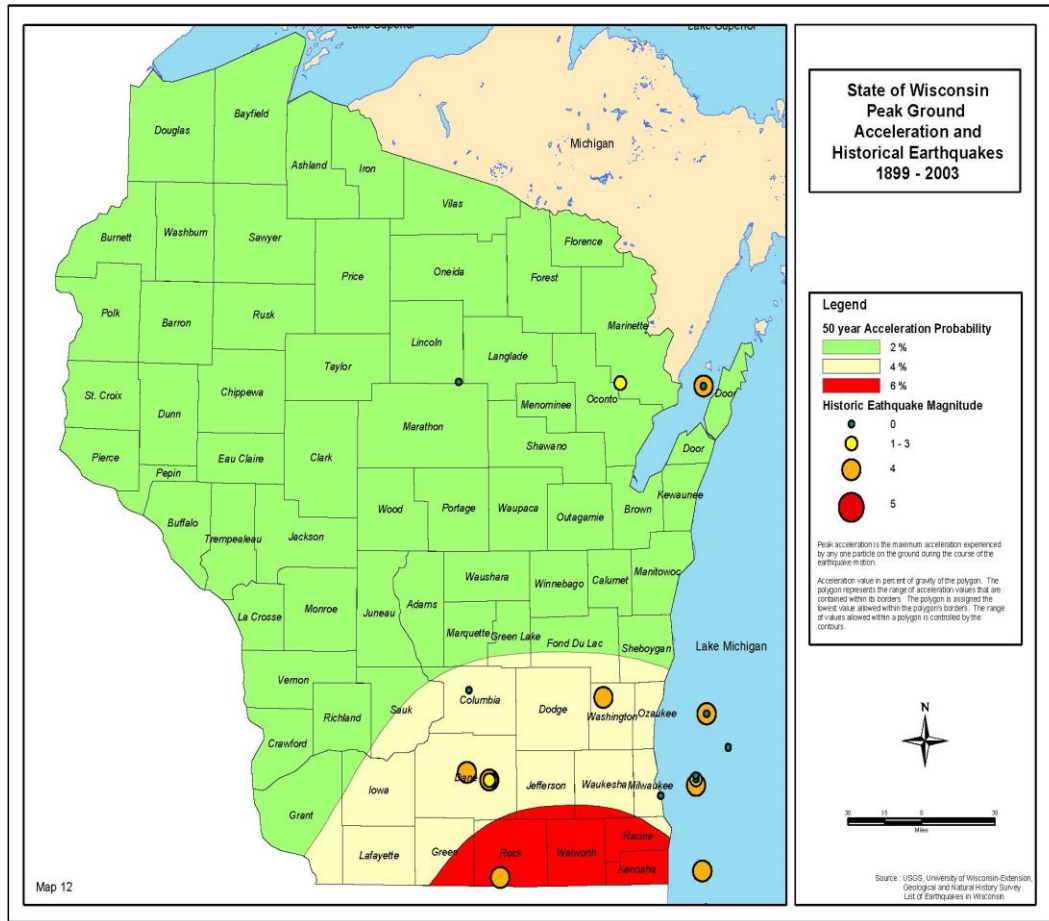
# Wisconsin 30-Year Average Precipitation <sup>129</sup>



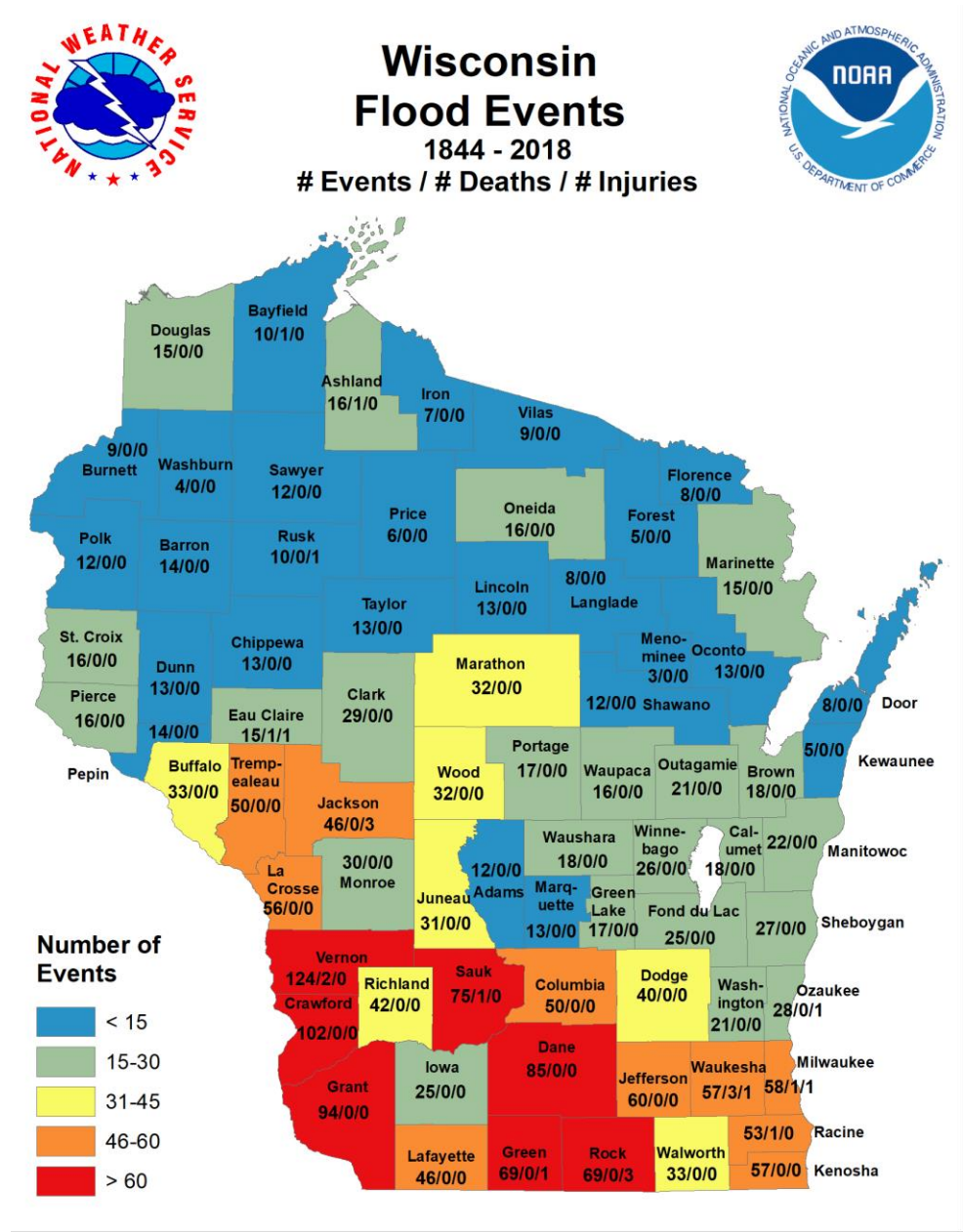
<sup>129</sup> [http://www.crh.noaa.gov/images/mkx/climate/avg\\_30\\_year\\_precip.png](http://www.crh.noaa.gov/images/mkx/climate/avg_30_year_precip.png)

# Earthquakes in Wisconsin 130

## Peak Ground Acceleration Contours and Historical Earthquakes in Wisconsin

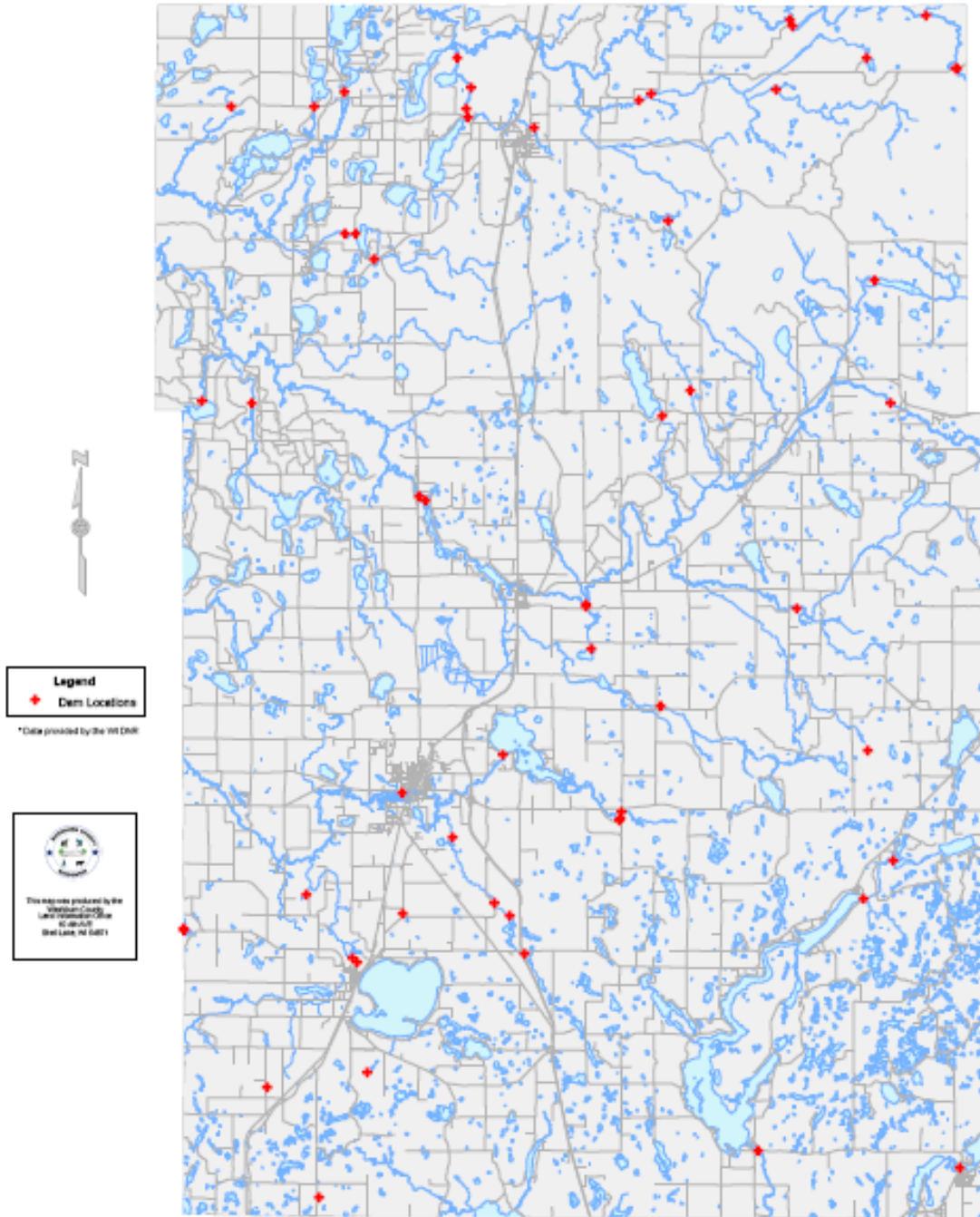


# Wisconsin Total Flood Events

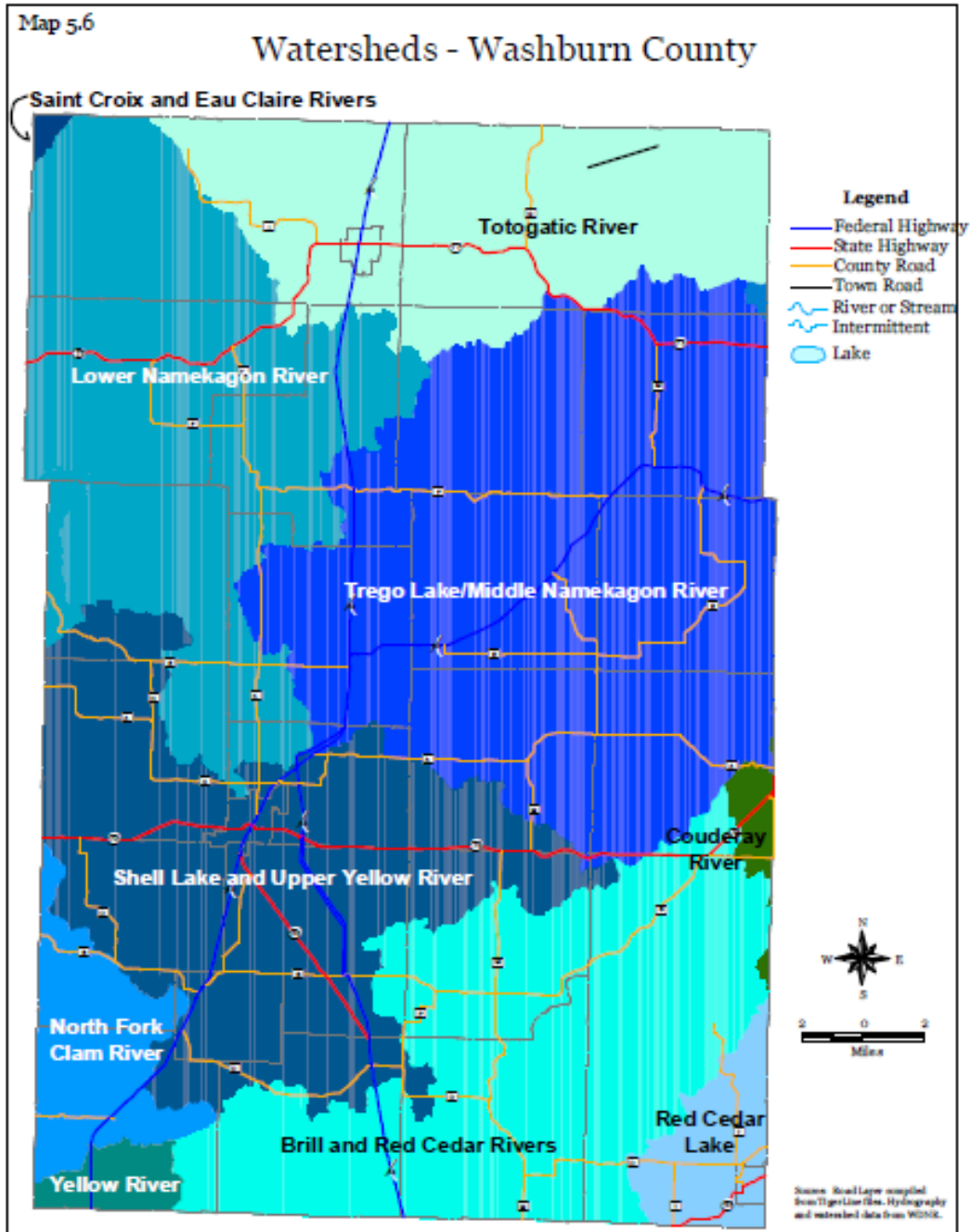


# Washburn County Dams

## WASHBURN COUNTY DAMS

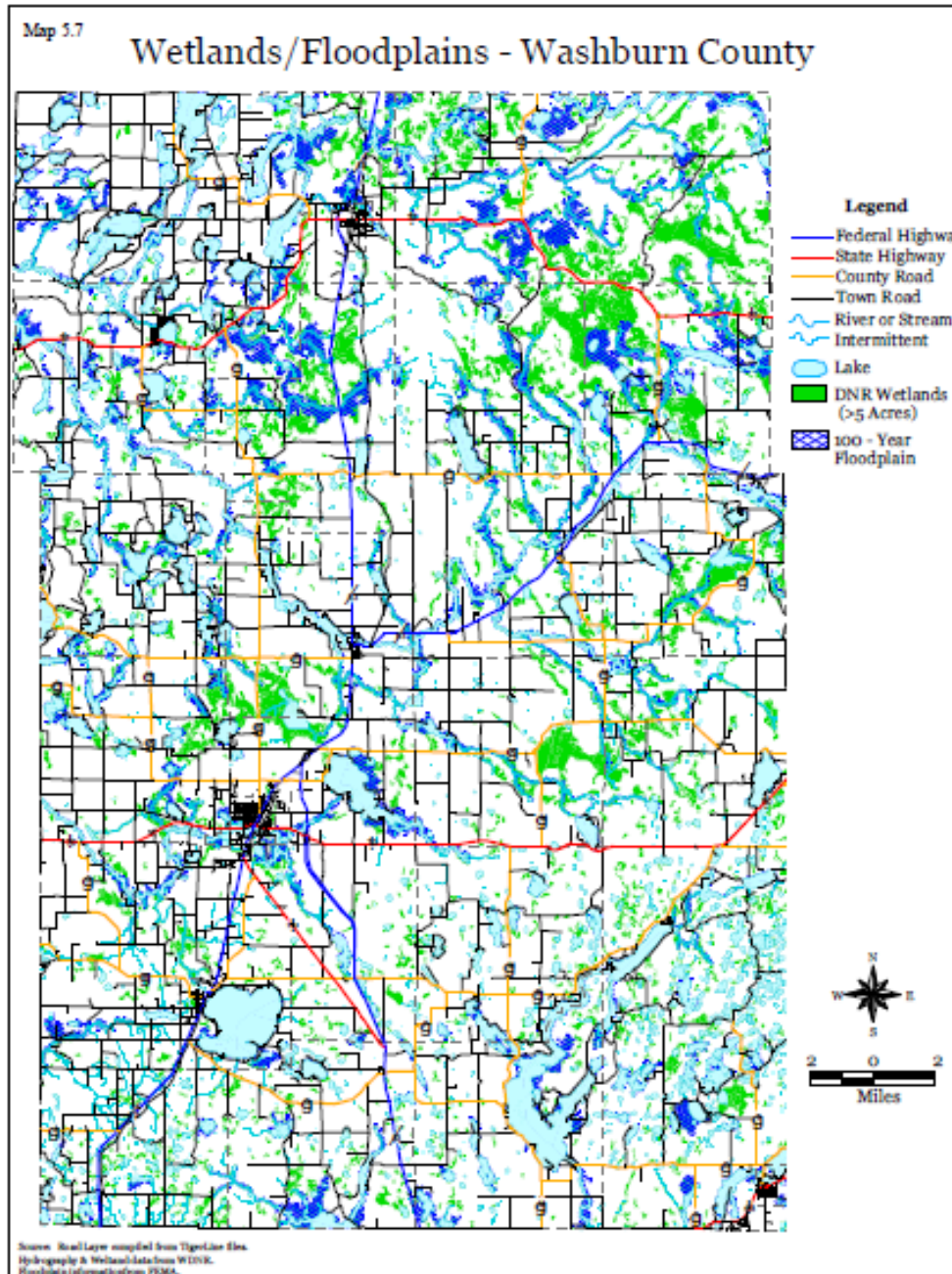


# Washburn County Watersheds

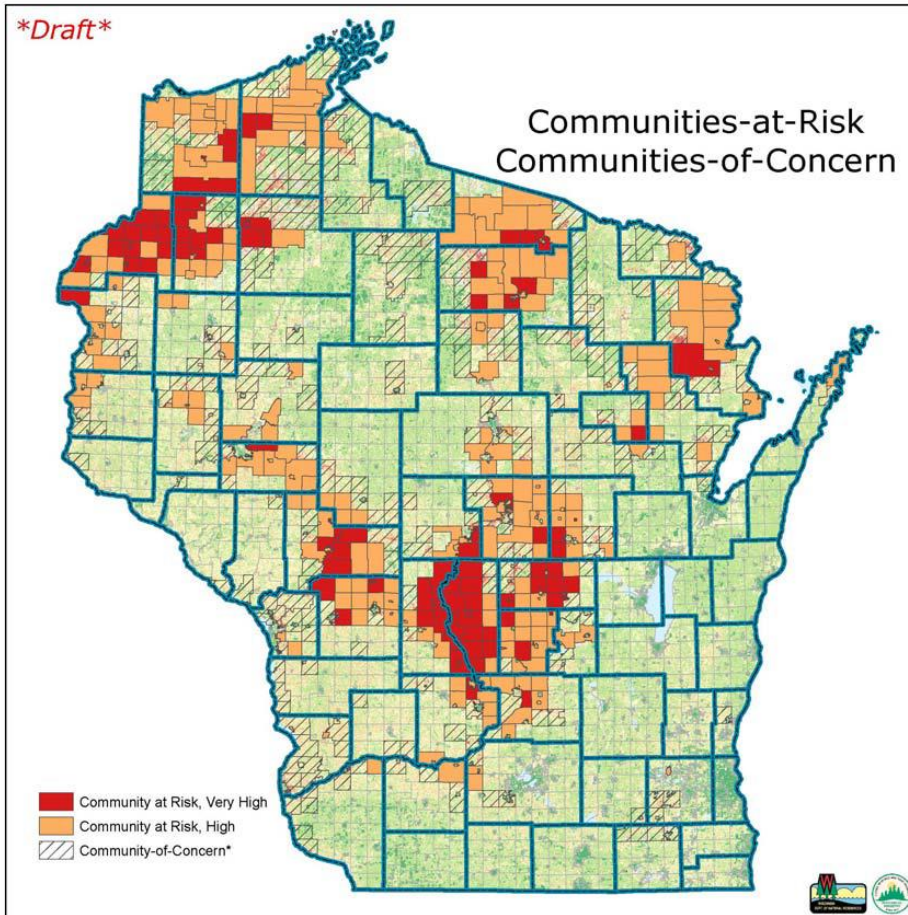




# Washburn County Floodplain Map



Wildfire Communities at Risk <sup>131</sup>



**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\*

\* A Community of Concern is a Wisconsin DNR concept whereby it is demonstrated that a significant portion of the community (more than 2 adjoining square miles) are at high or very high risk, but where the community as a whole falls below the Community-at-Risk threshold.

**Defining Community**

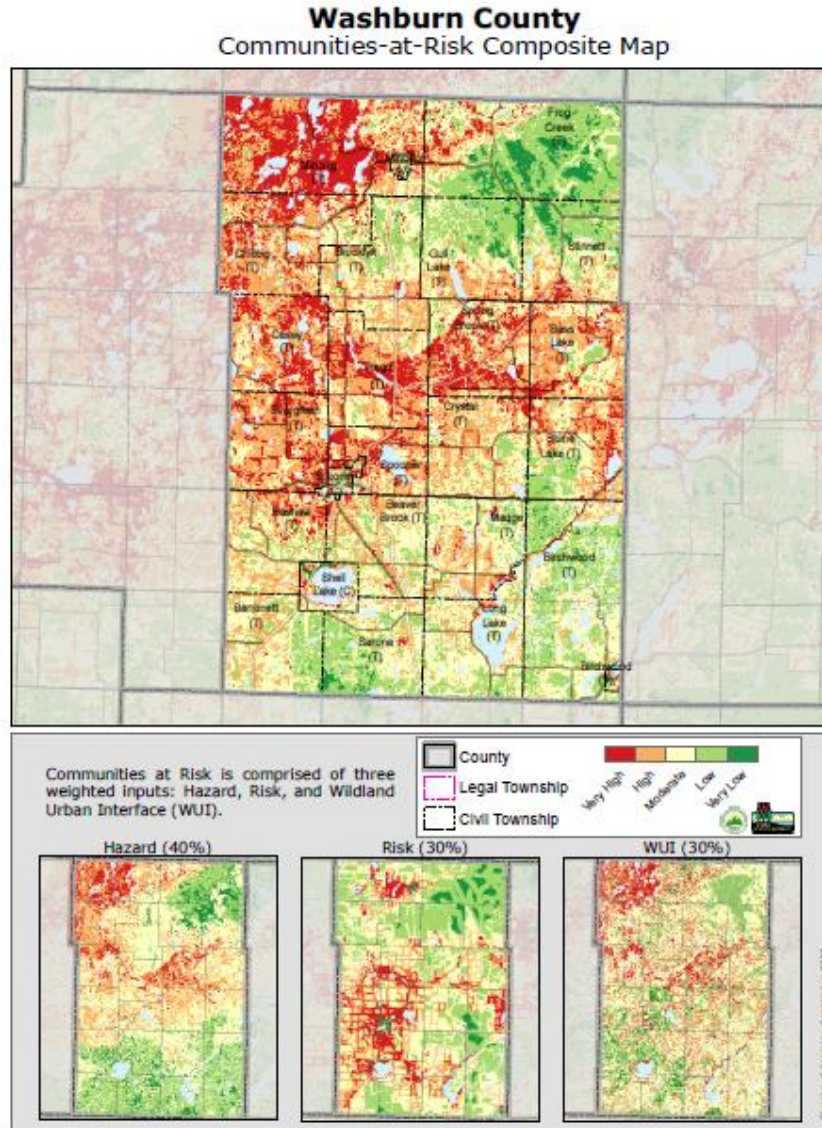


For Wisconsin, Communities-at-Risk are reported at the MCD (municipal civil division) level\*. MCD was chosen due to its identifiable legal boundaries, ease in reporting, and usage in the development of Community Wildfire Protection Plans.

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

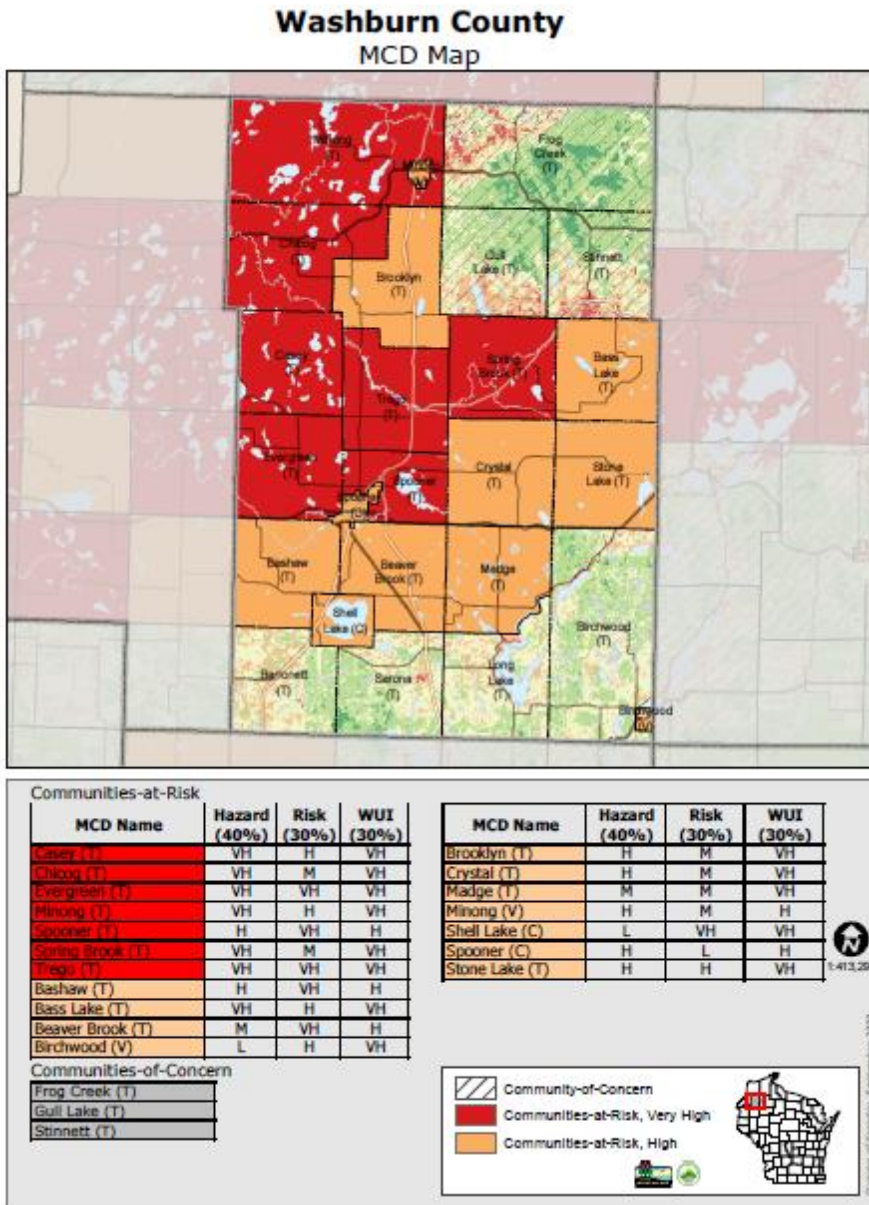
10/5/07

Washburn County Communities at Risk Composite <sup>132</sup>

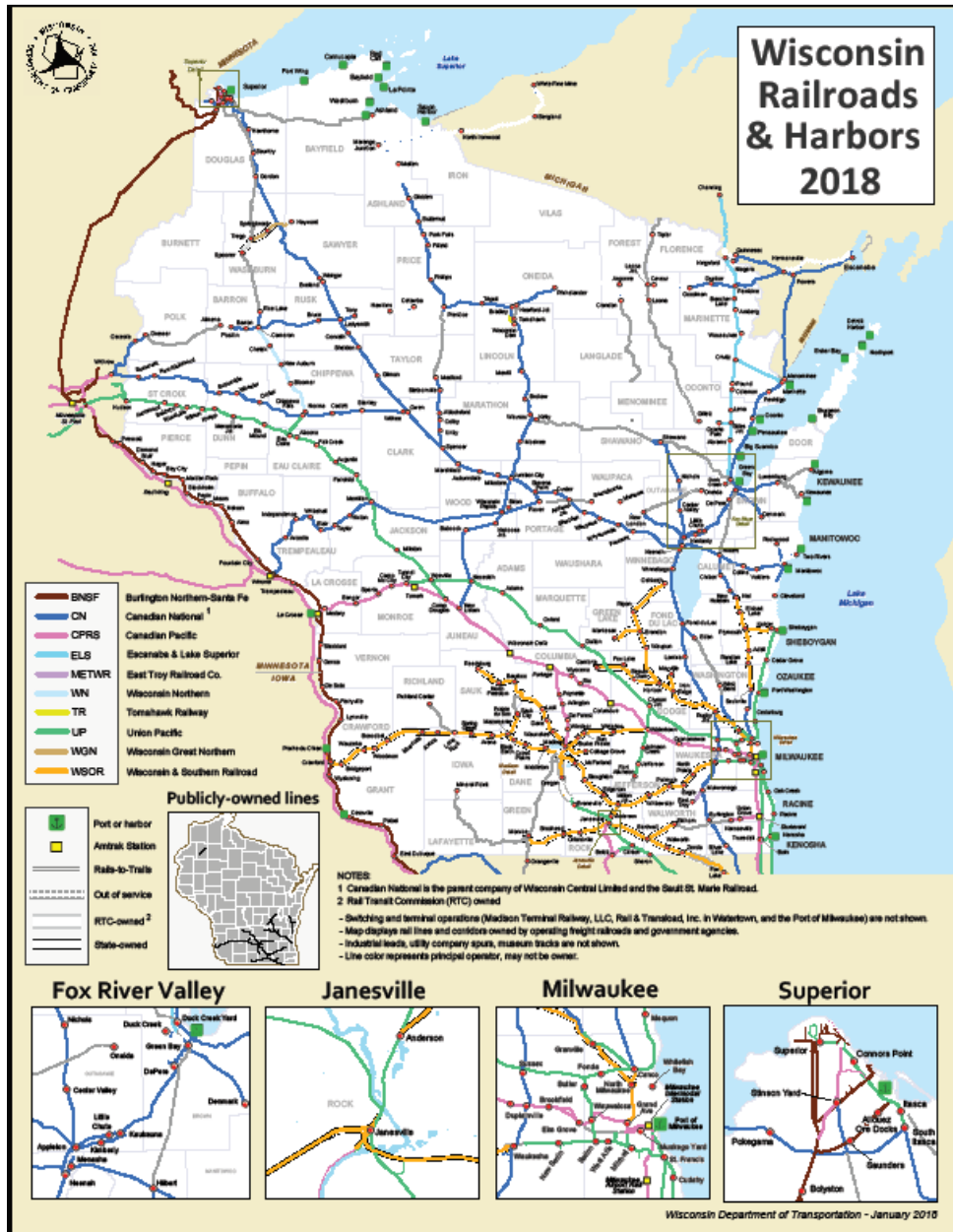


<sup>132</sup> Wisconsin Department of Natural Resources

Washburn County Communities at Risk Municipal Map <sup>133</sup>

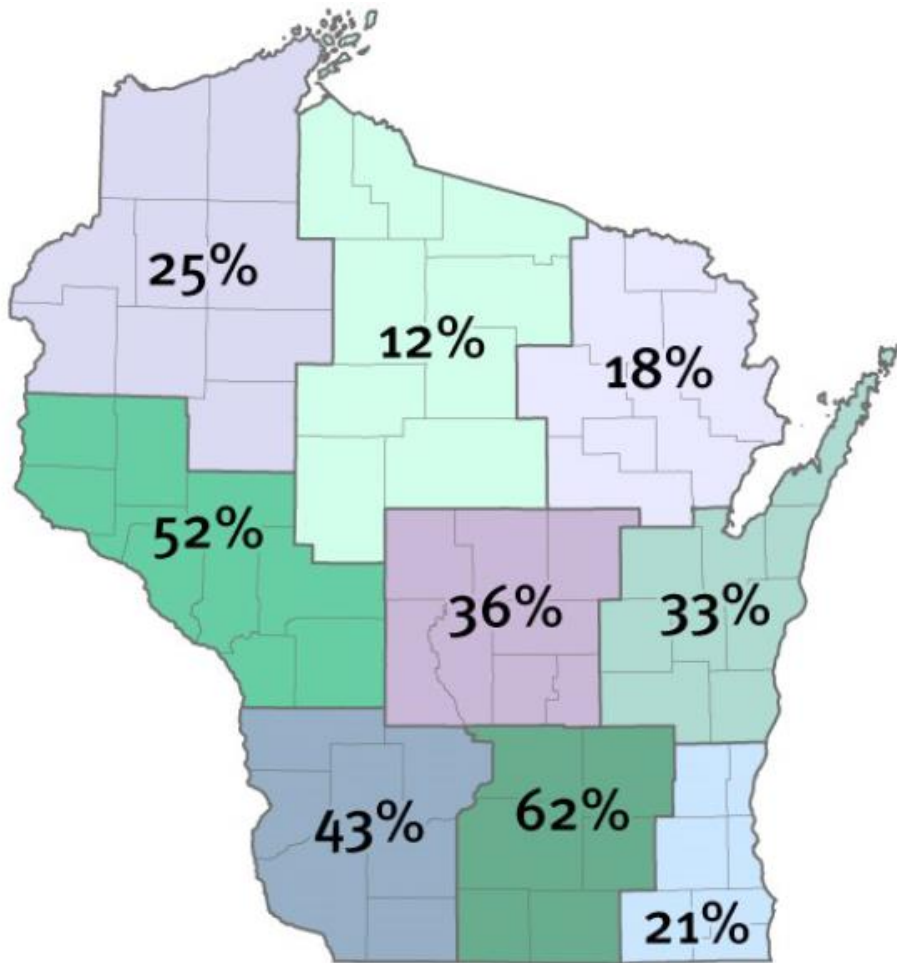


Wisconsin Railroads and Harbors<sup>134</sup>



<sup>134</sup> <http://wisconsindot.gov/Documents/travel/rail/railmap.pdf>

## Percentage of Private Wells with Detectable Herbicides or Herbicide Metabolites (2001)<sup>135</sup>



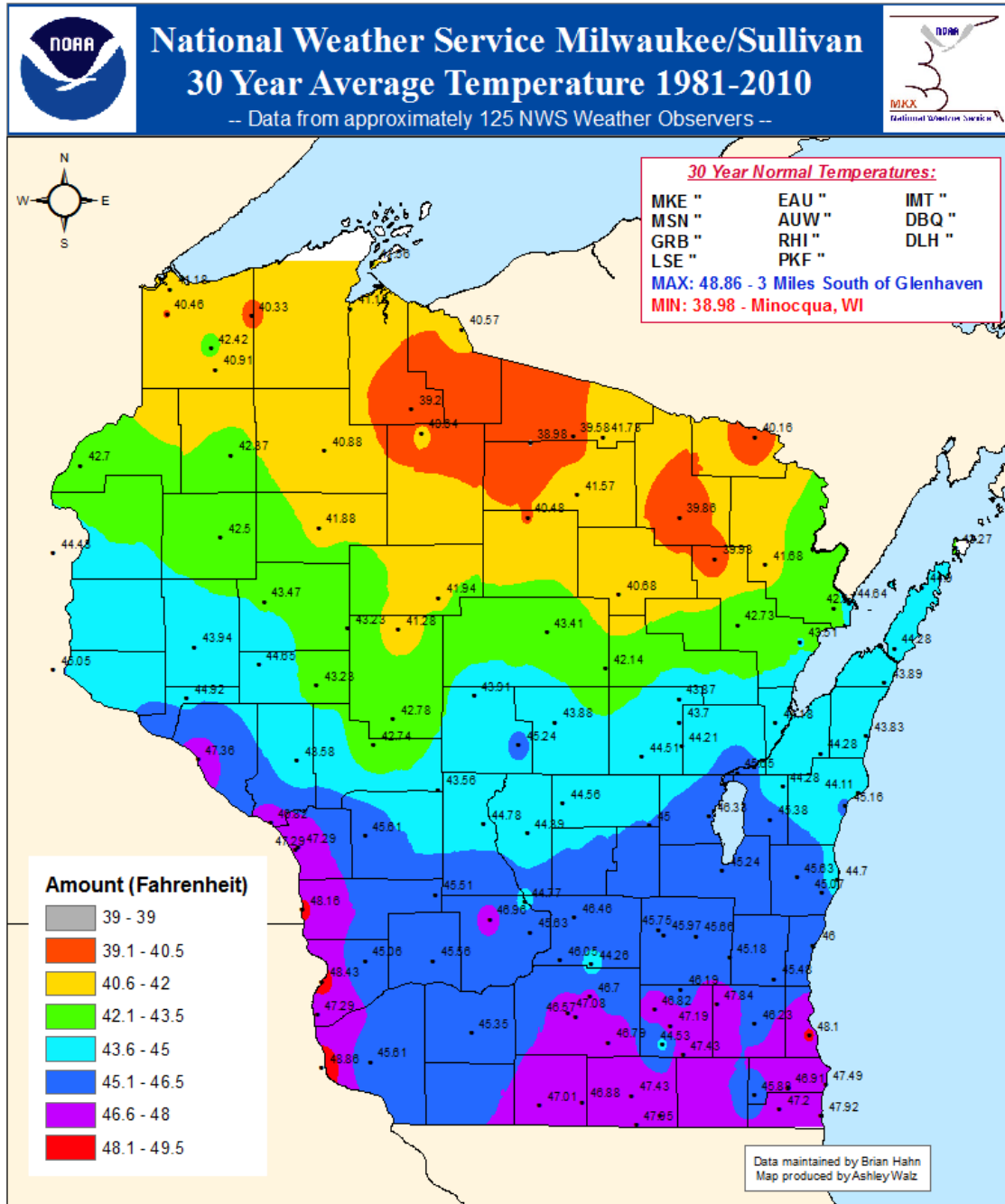
Herbicide data: Wisconsin Department of Agriculture, Trade and Consumer Protection, 2002, Agricultural chemicals in Wisconsin groundwater: final report, [http://www.datcp.state.wi.us/arm/agriculture/land-water/environ\\_quality/pdf/arm-pub-98.pdf](http://www.datcp.state.wi.us/arm/agriculture/land-water/environ_quality/pdf/arm-pub-98.pdf)

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

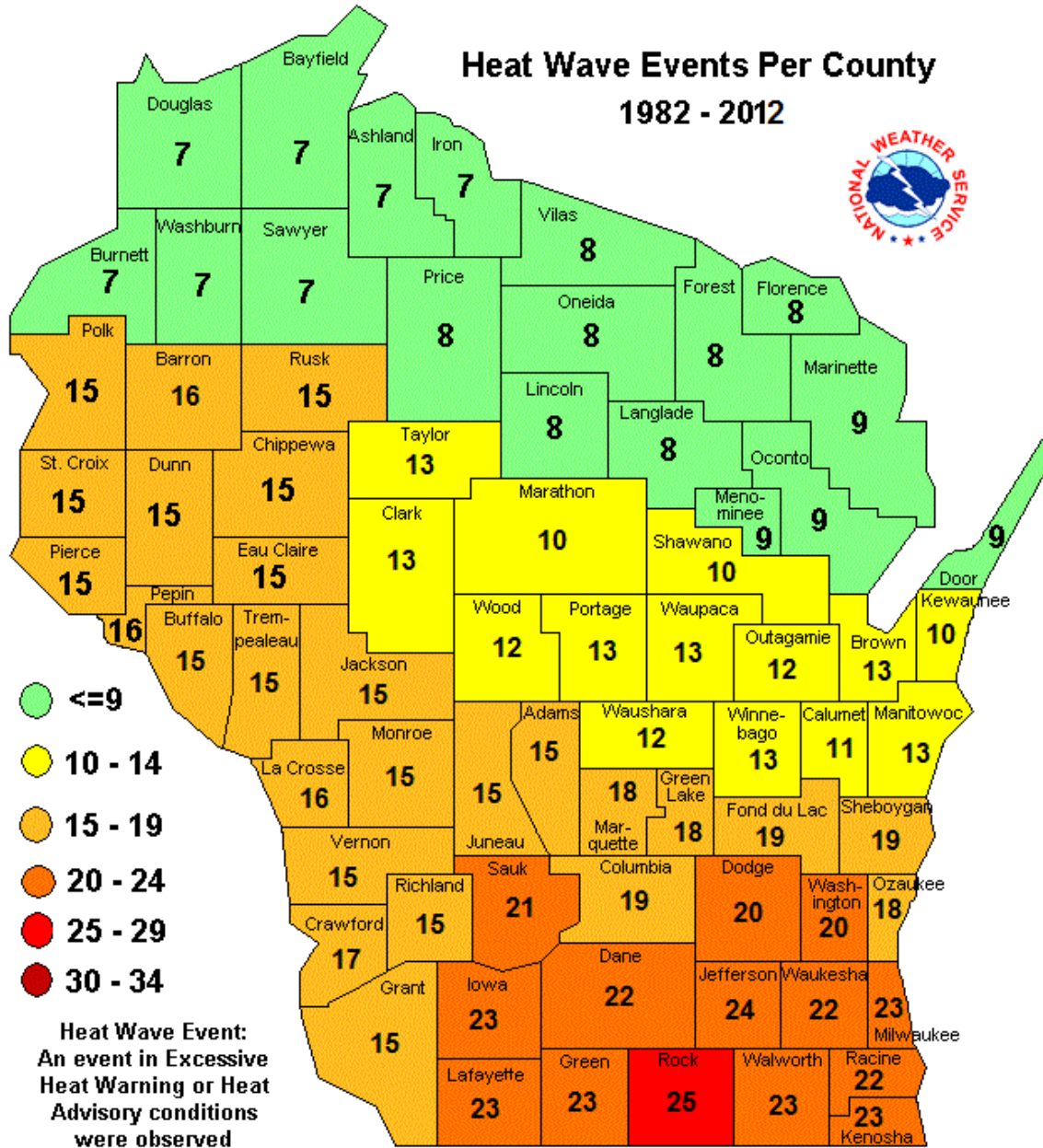
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<sup>135</sup> <https://wi.water.usgs.gov/gwcomp/find/washburn/pesticidestate.html>

# Wisconsin 30 Year Average Temperature

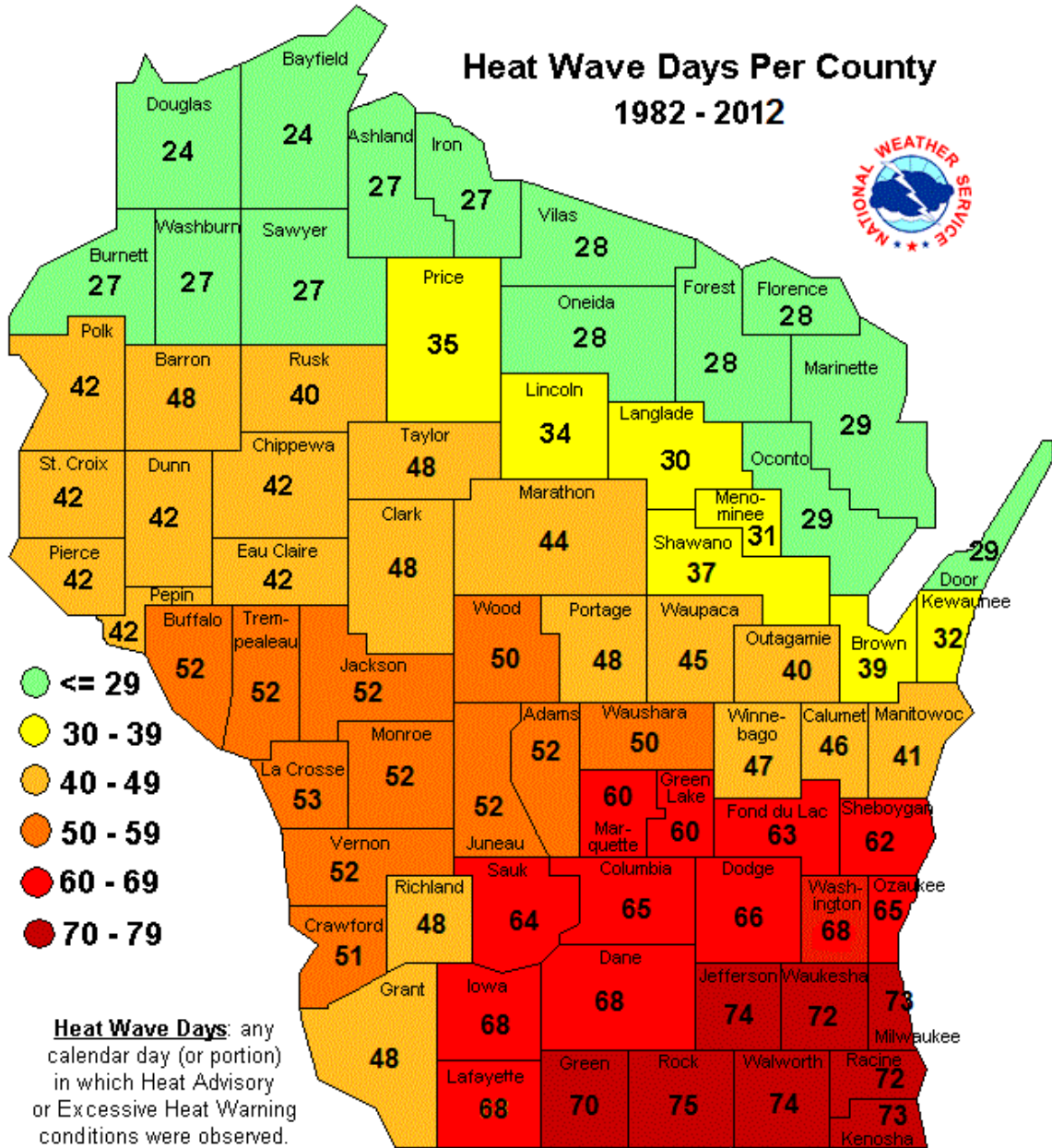


## Wisconsin Heat Wave Events

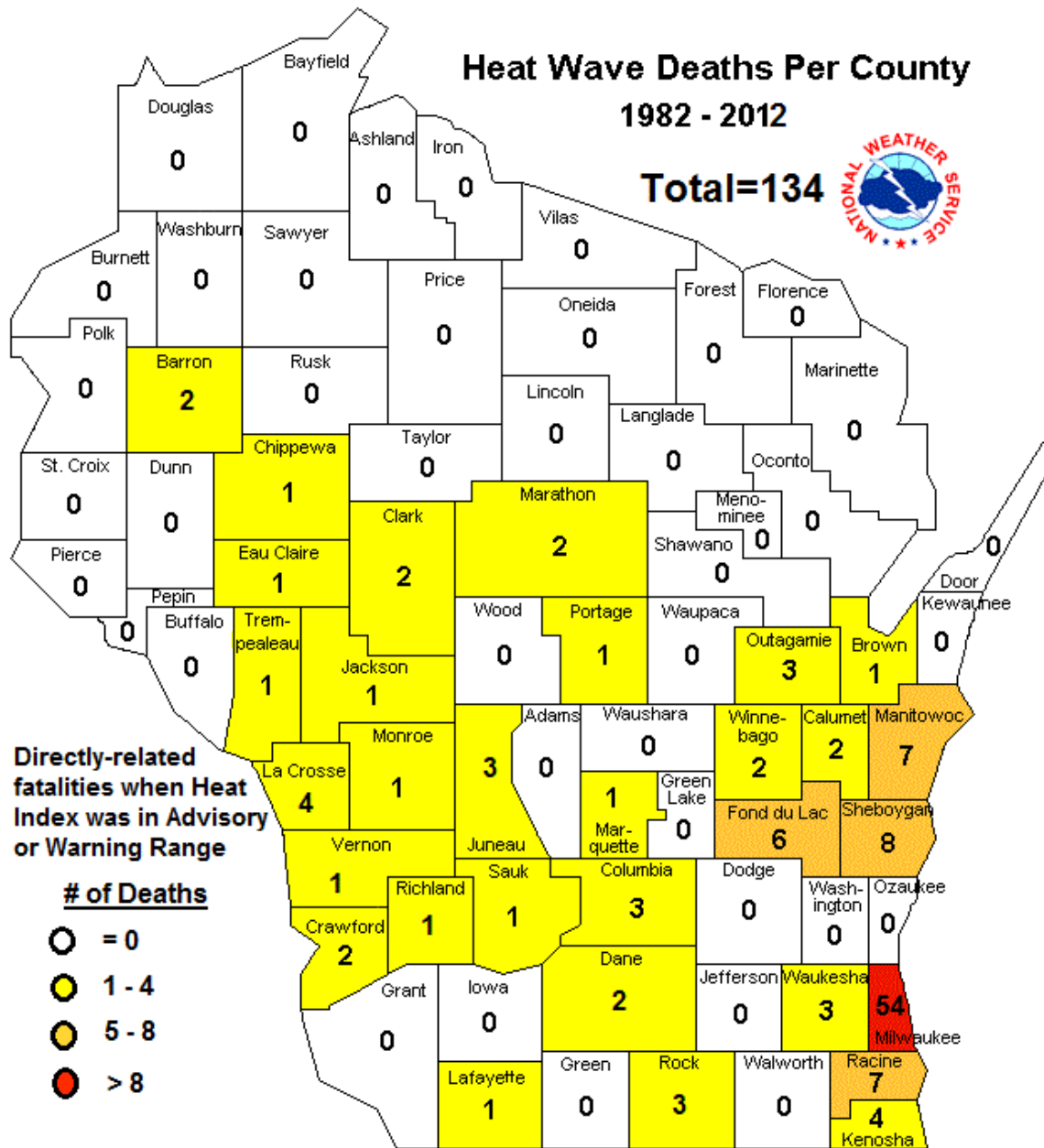




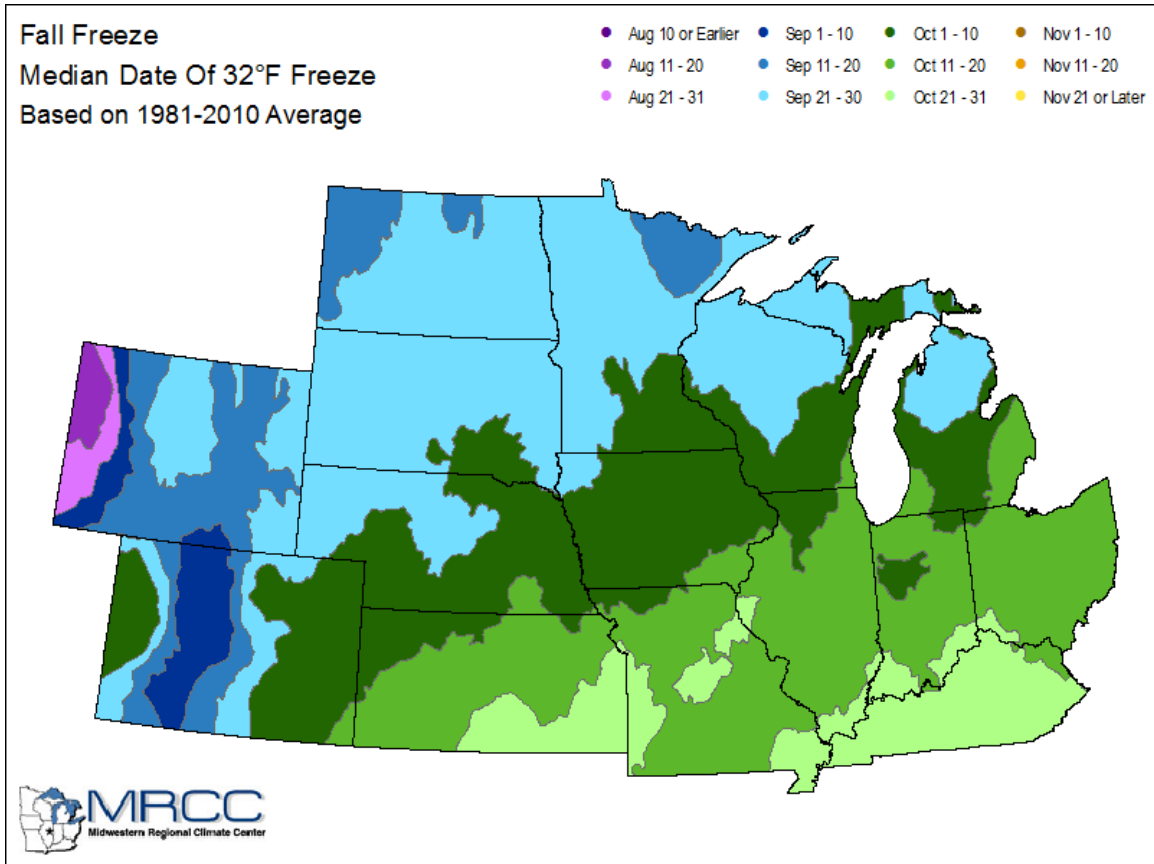
## Wisconsin Heat Wave Days



## Wisconsin Heat Wave Deaths

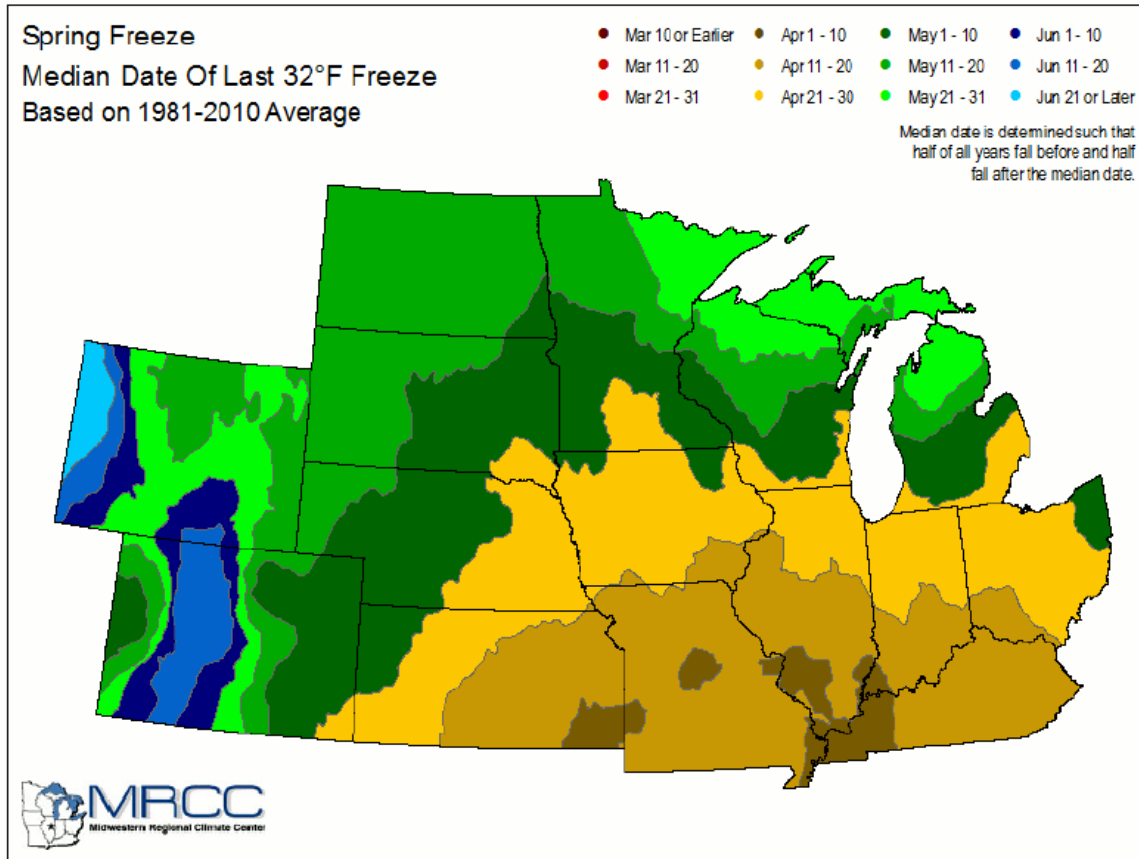


## Median Date of First Freeze<sup>136</sup>



<sup>136</sup> <http://www.crh.noaa.gov/images/mkx/climate/FallFirstFreeze.png>

## Median Date of Last Freeze<sup>137</sup>



<sup>137</sup> <http://www.crh.noaa.gov/images/mkx/climate/springlastfreeze.png>

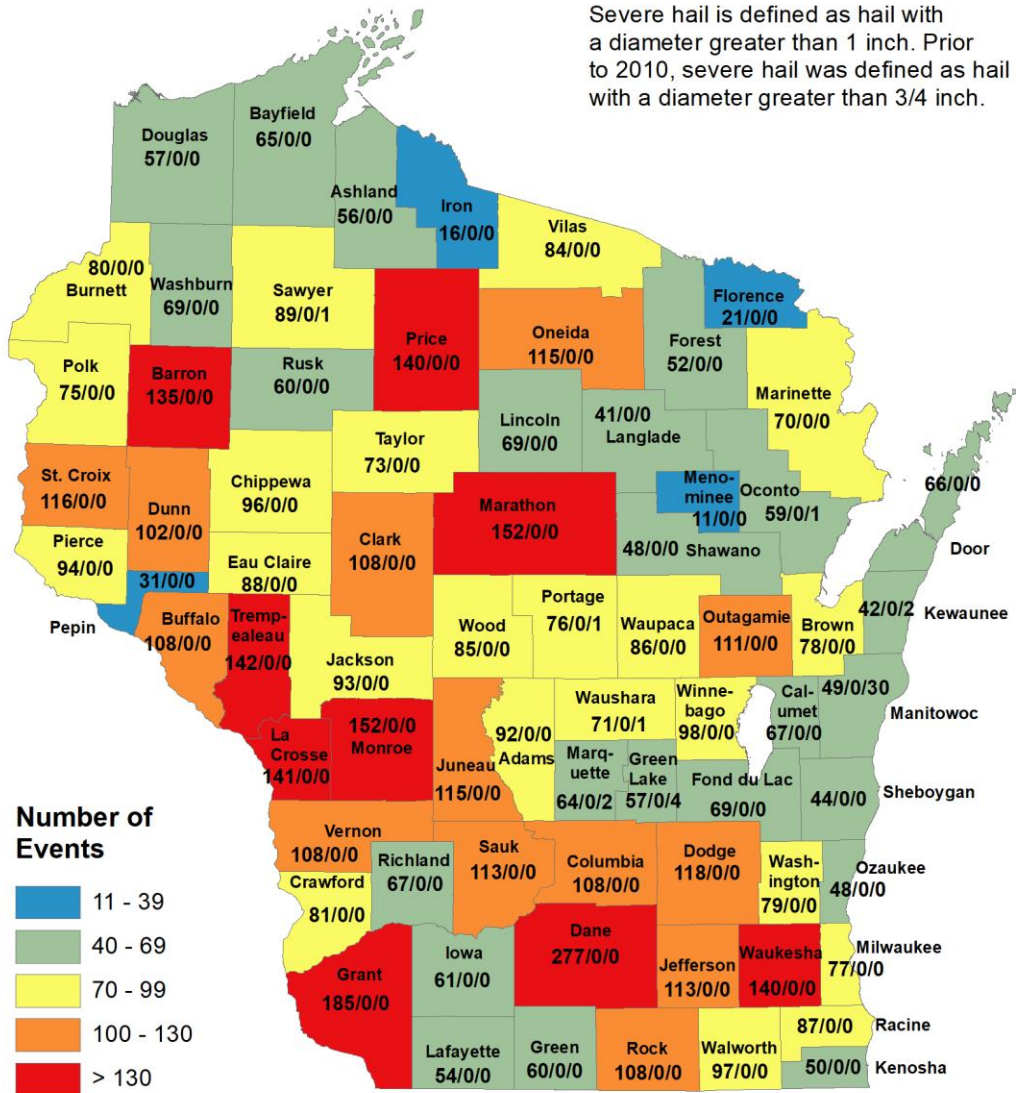
## Wisconsin Hail Events



### Wisconsin Severe Hail Events 1982 - 2018 # Events / # Deaths / # Injuries



Severe hail is defined as hail with a diameter greater than 1 inch. Prior to 2010, severe hail was defined as hail with a diameter greater than 3/4 inch.



# Wisconsin Lightning Events



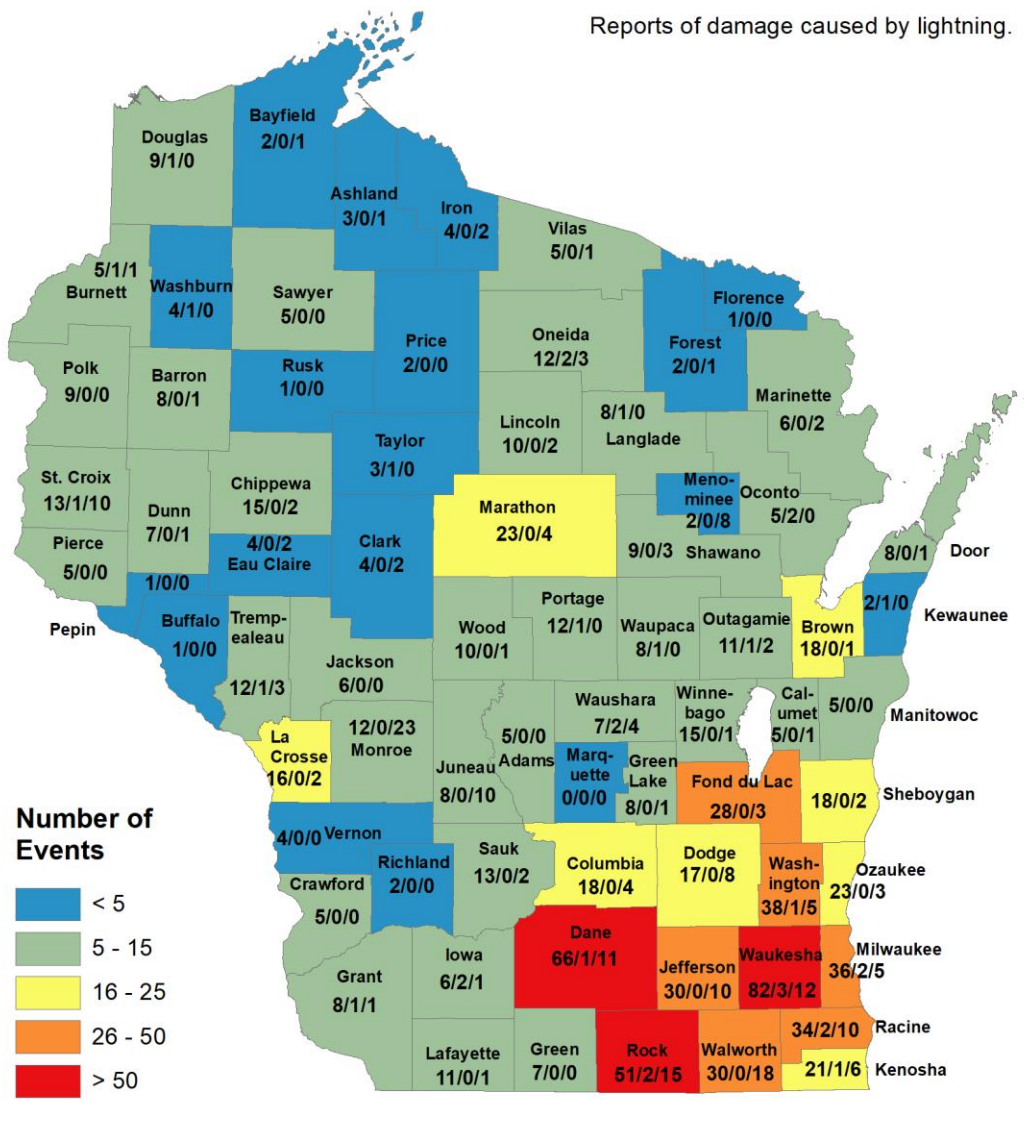
## Wisconsin Lightning Events

1982 - 2018

# Events / # Deaths / # Injuries



Reports of damage caused by lightning.



## Wisconsin Severe Thunderstorm Winds

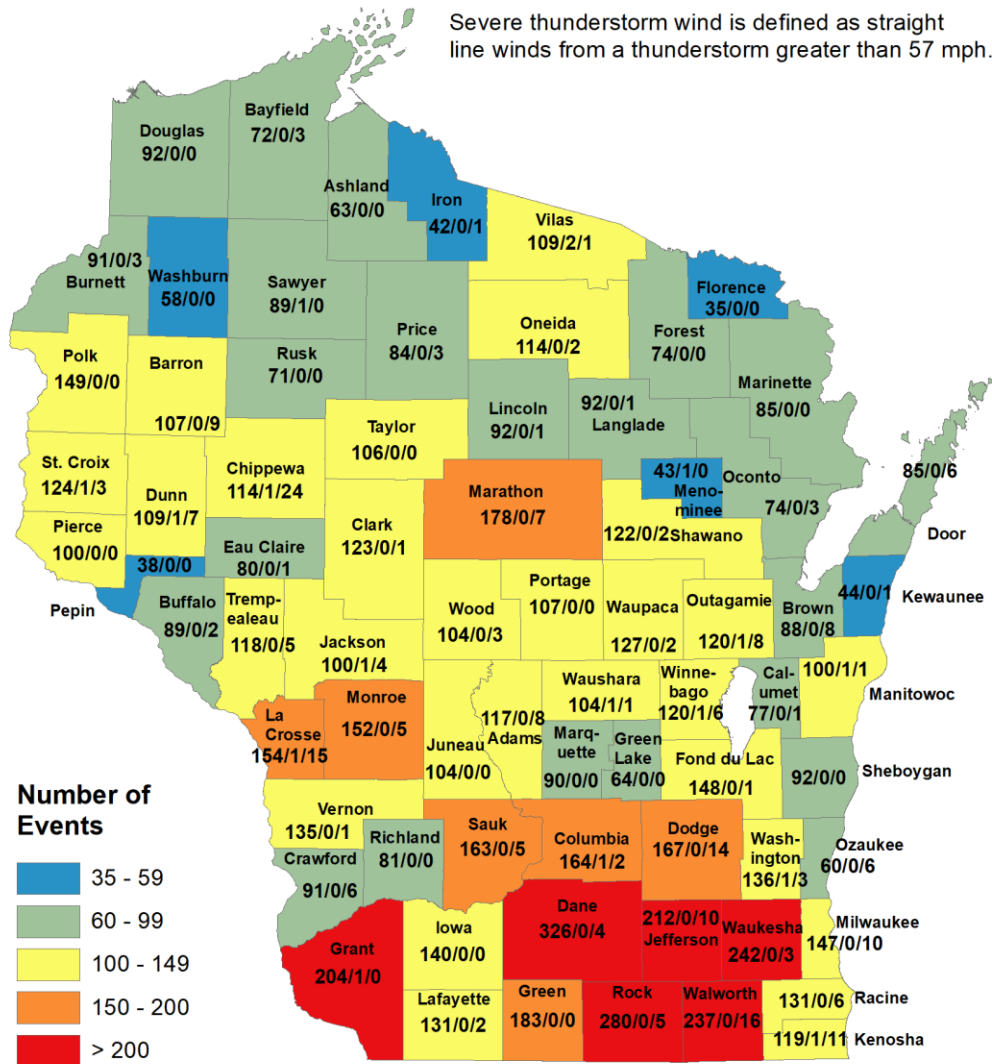


### Wisconsin Severe Thunderstorm Wind Events

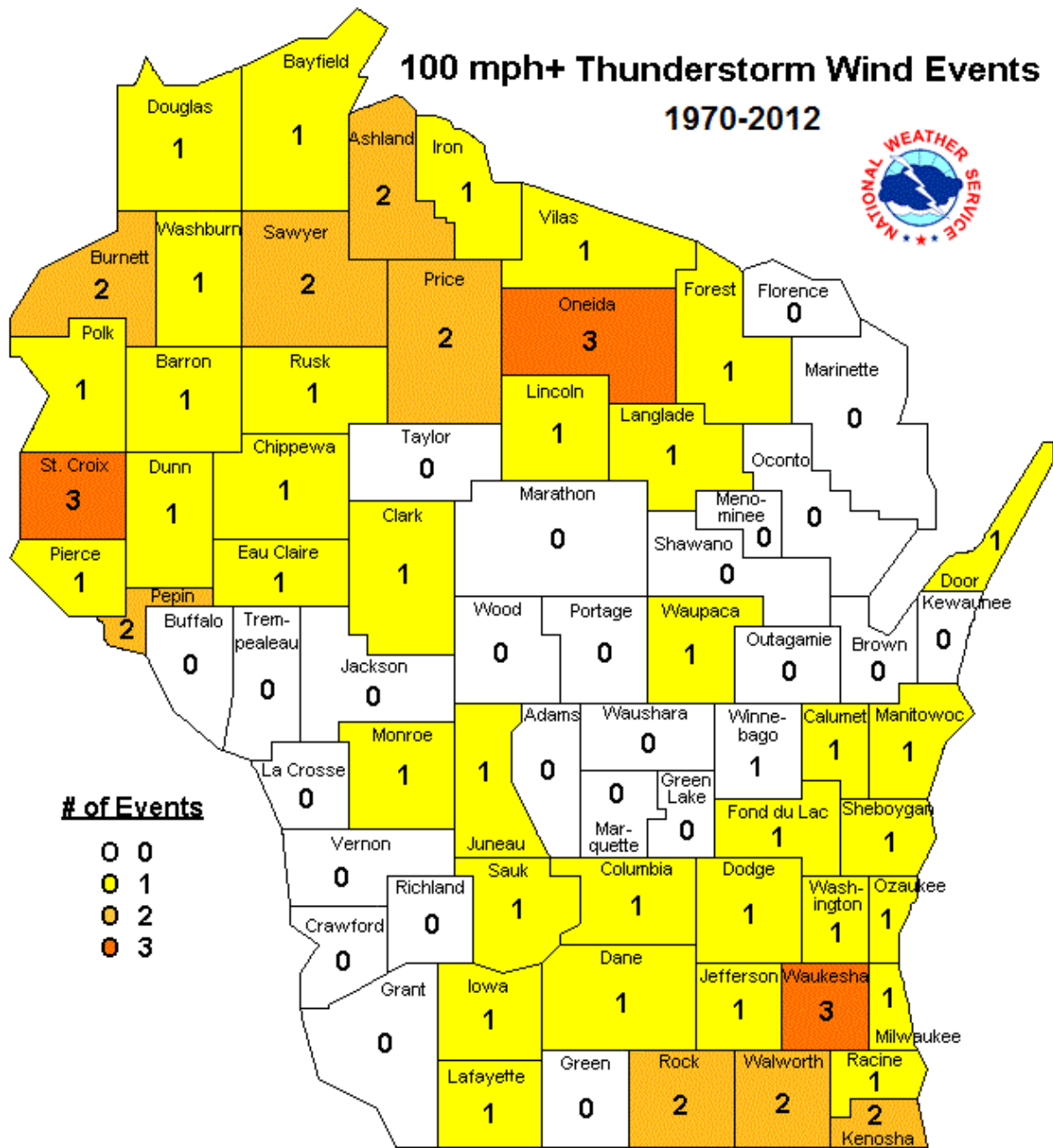
1844 - 2018

# Events / # Deaths / # Injuries

Severe thunderstorm wind is defined as straight line winds from a thunderstorm greater than 57 mph.

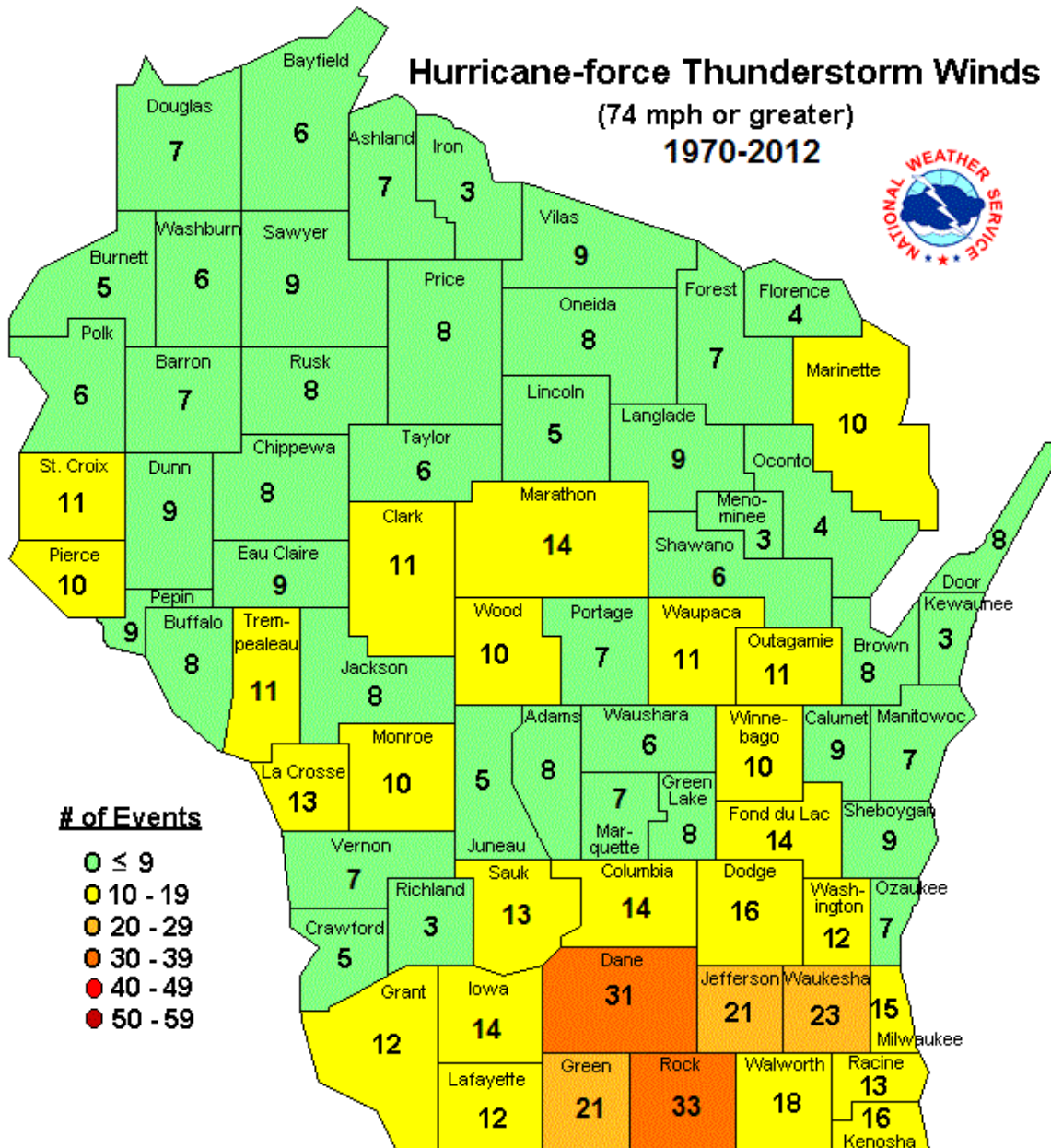


Wisconsin 100+ mph Thunderstorm Wind Events





## Wisconsin Hurricane-force (74+ mph) Thunderstorm Winds



# Wisconsin Tornado Events



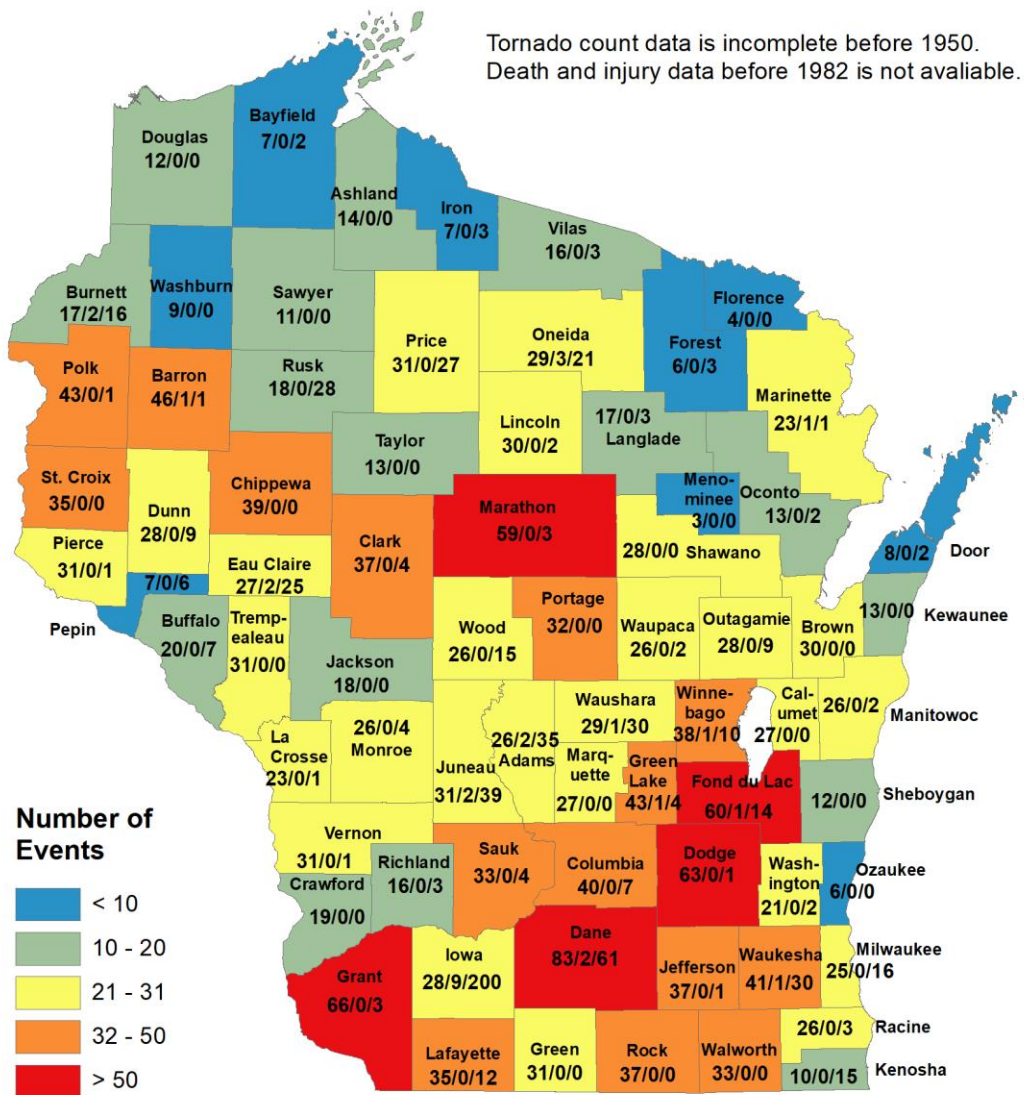
## Wisconsin Tornado Events

1844 - 2018

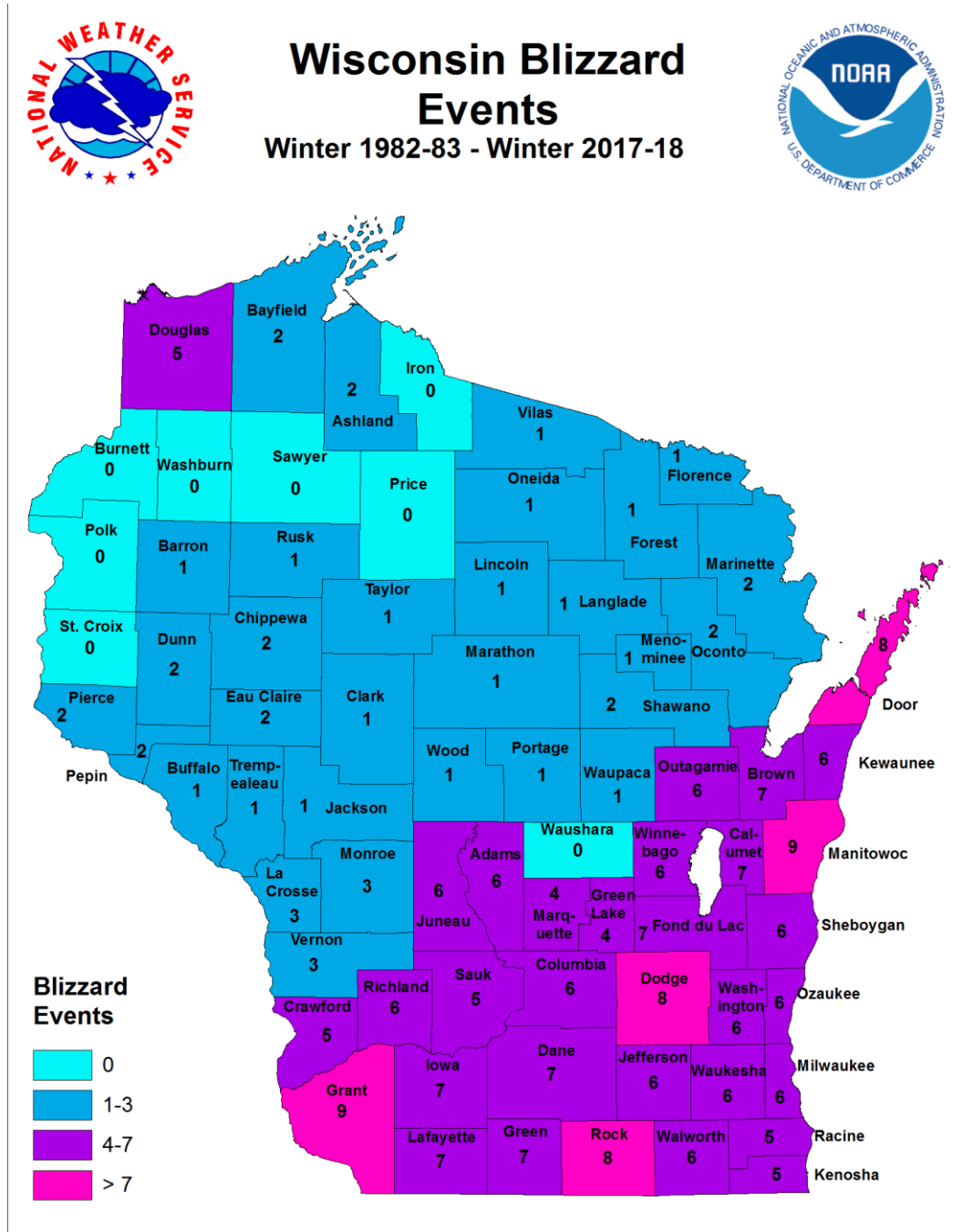
# Events / # Deaths / # Injuries



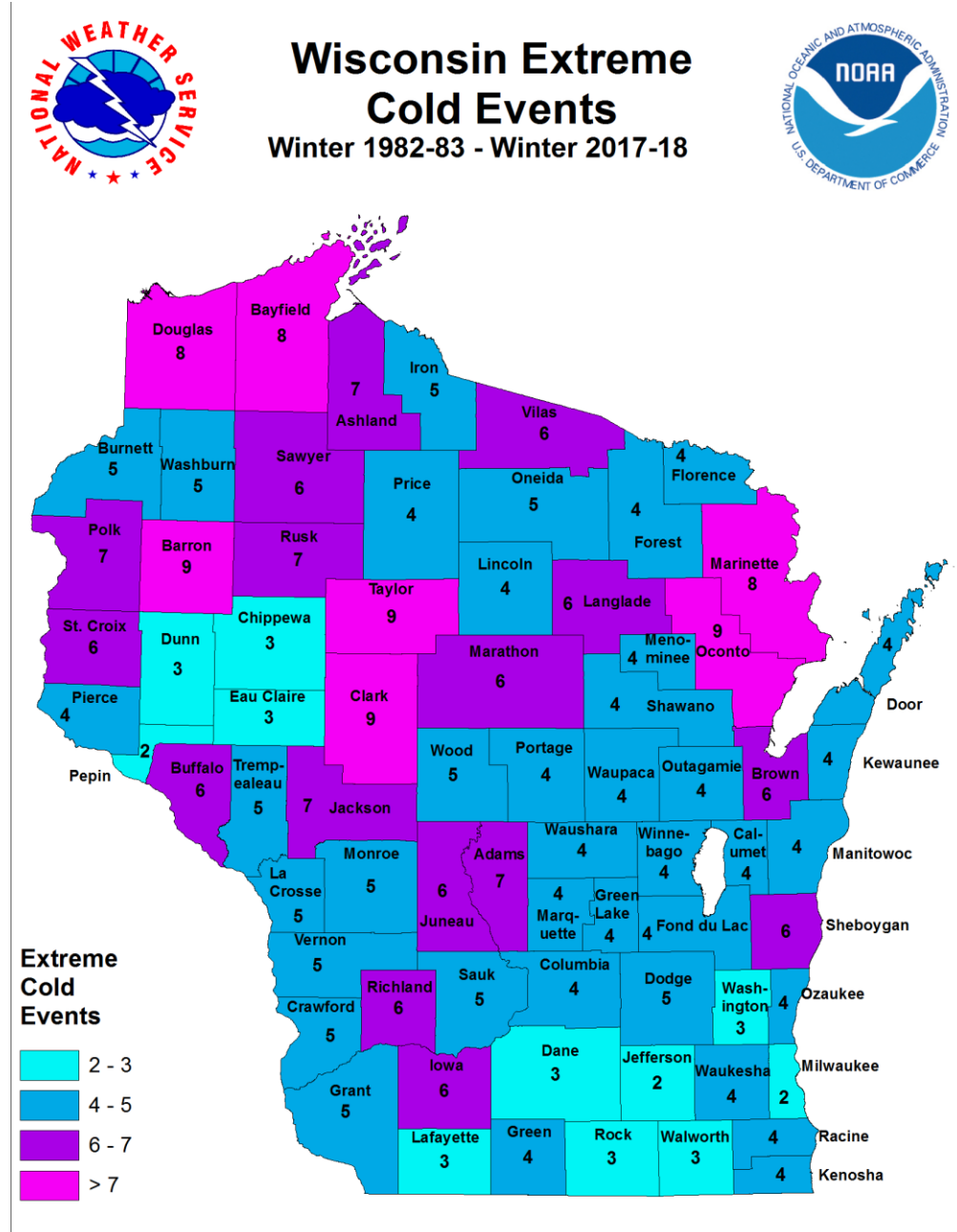
Tornado count data is incomplete before 1950.  
Death and injury data before 1982 is not available.



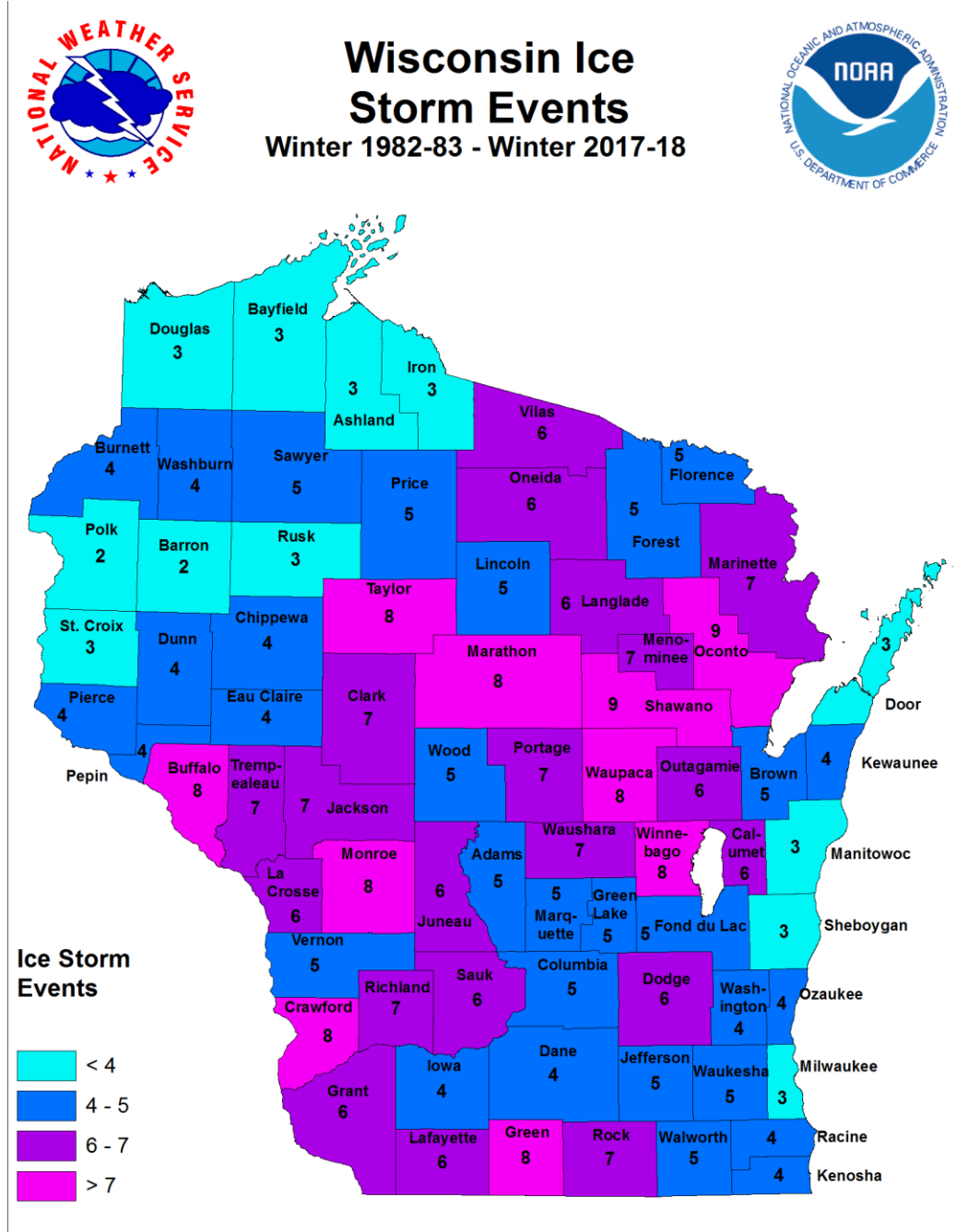
# Wisconsin Blizzard Events



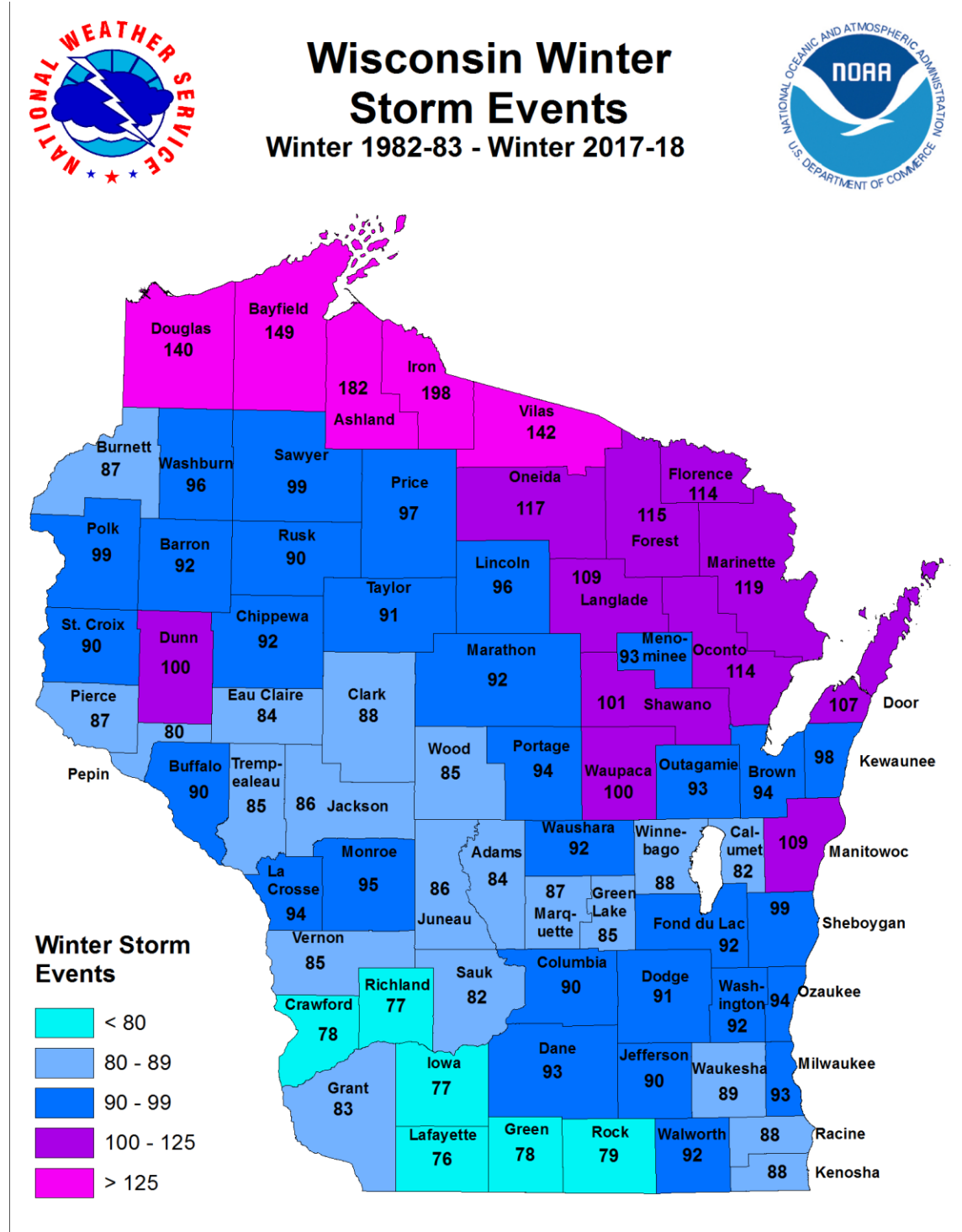
# Wisconsin Extreme Cold Events



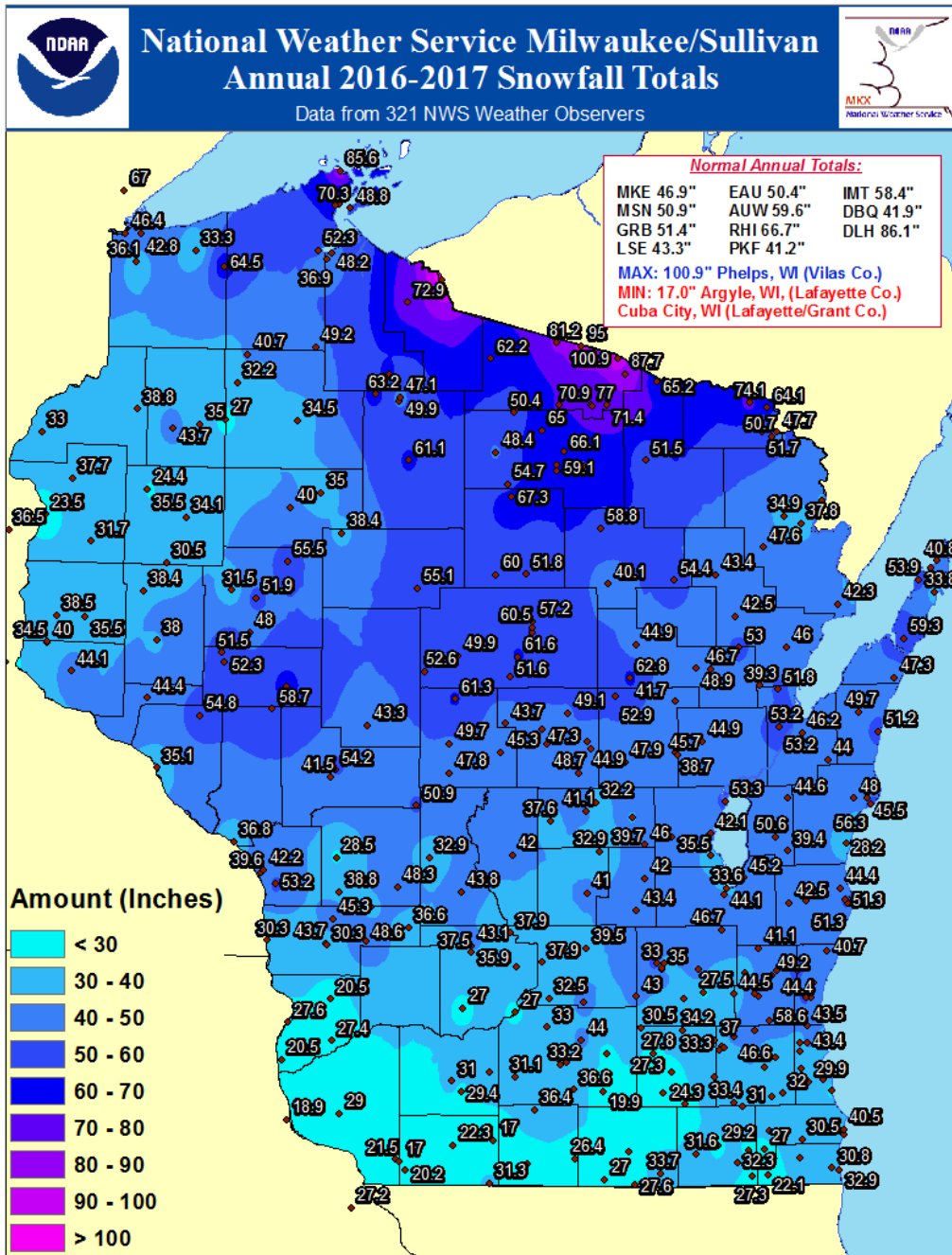
# Wisconsin Ice Storm Events



# Wisconsin Winter Storm Events



# Wisconsin Annual 2016-2017 Snowfall Totals



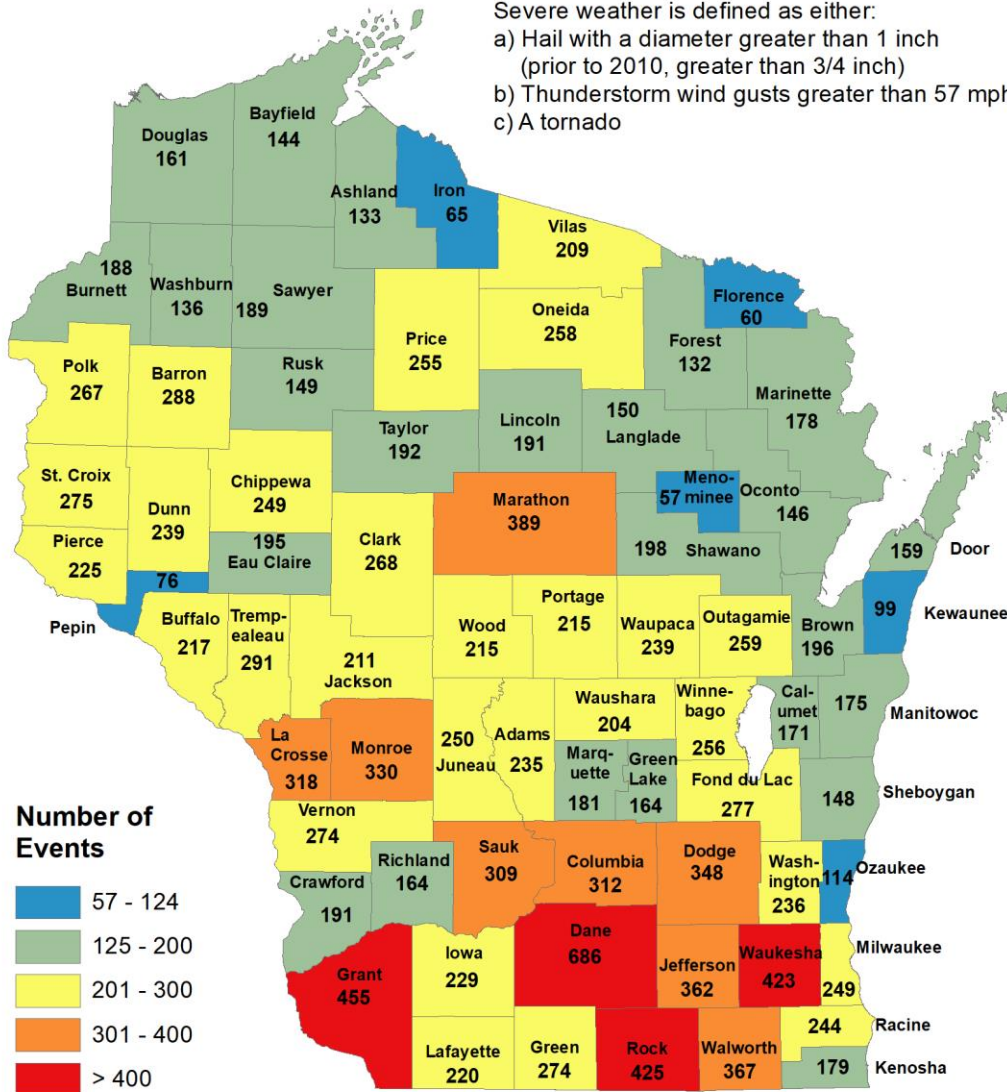
## Wisconsin Total Severe Weather Events



### Wisconsin Total Severe Weather Events 1844 - 2018

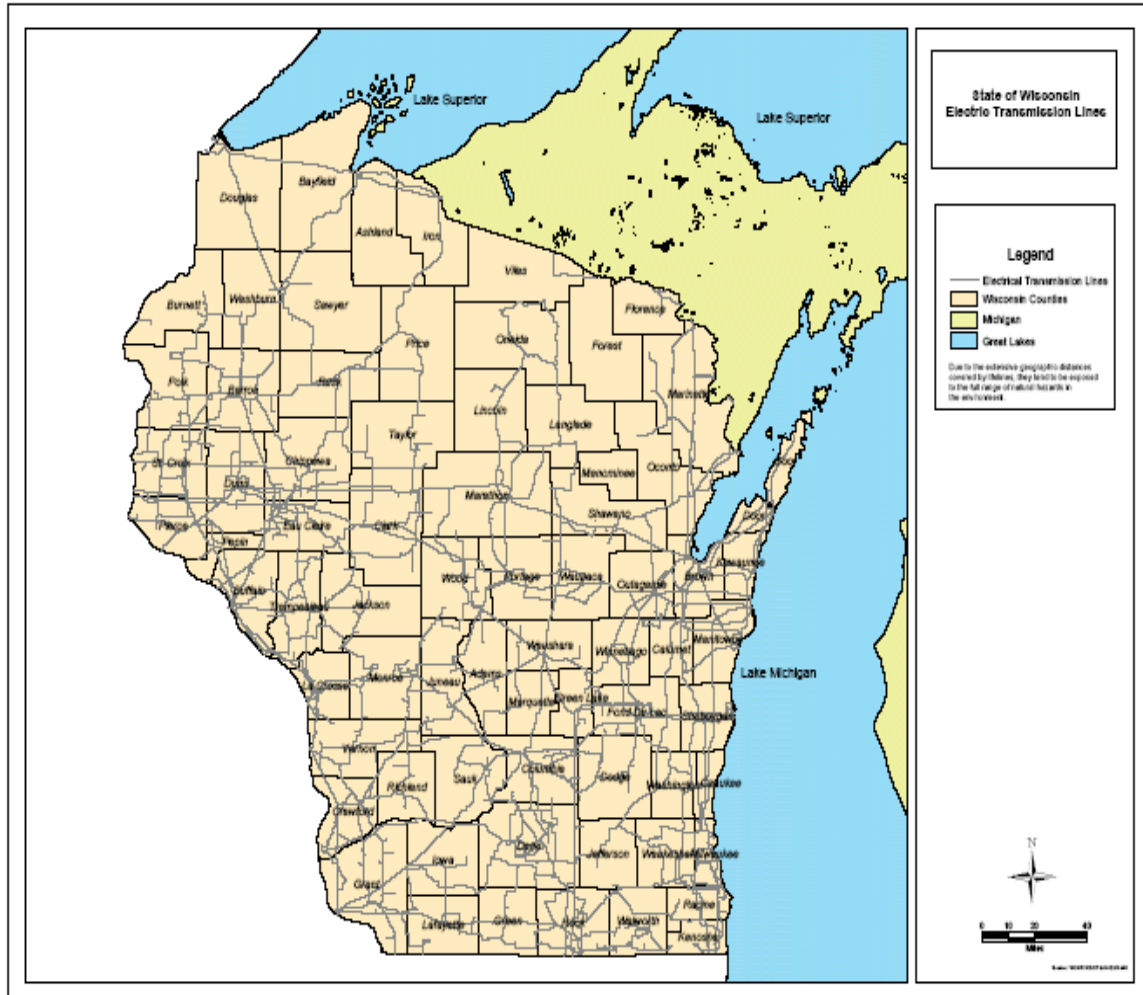


Severe weather is defined as either:  
 a) Hail with a diameter greater than 1 inch (prior to 2010, greater than 3/4 inch)  
 b) Thunderstorm wind gusts greater than 57 mph  
 c) A tornado

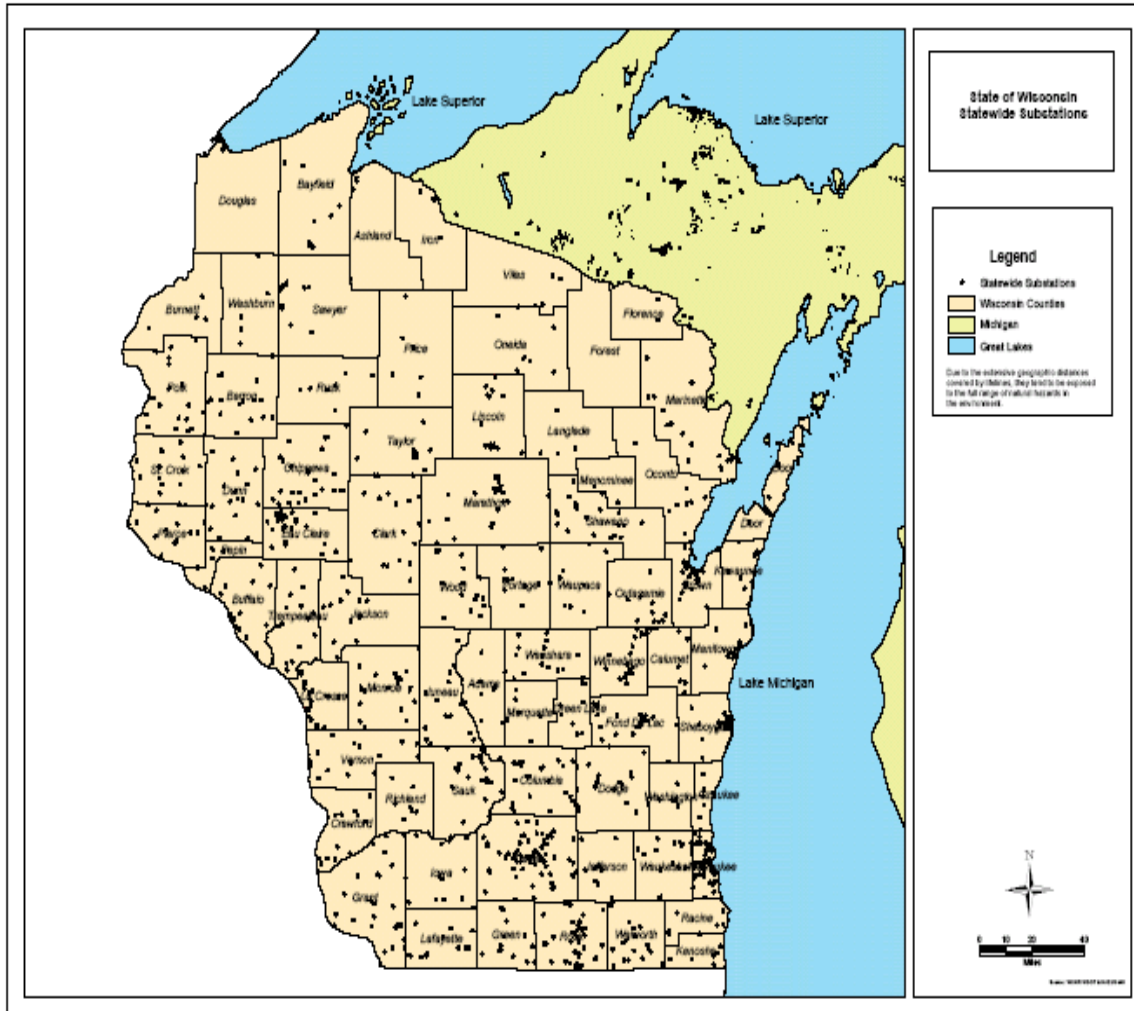




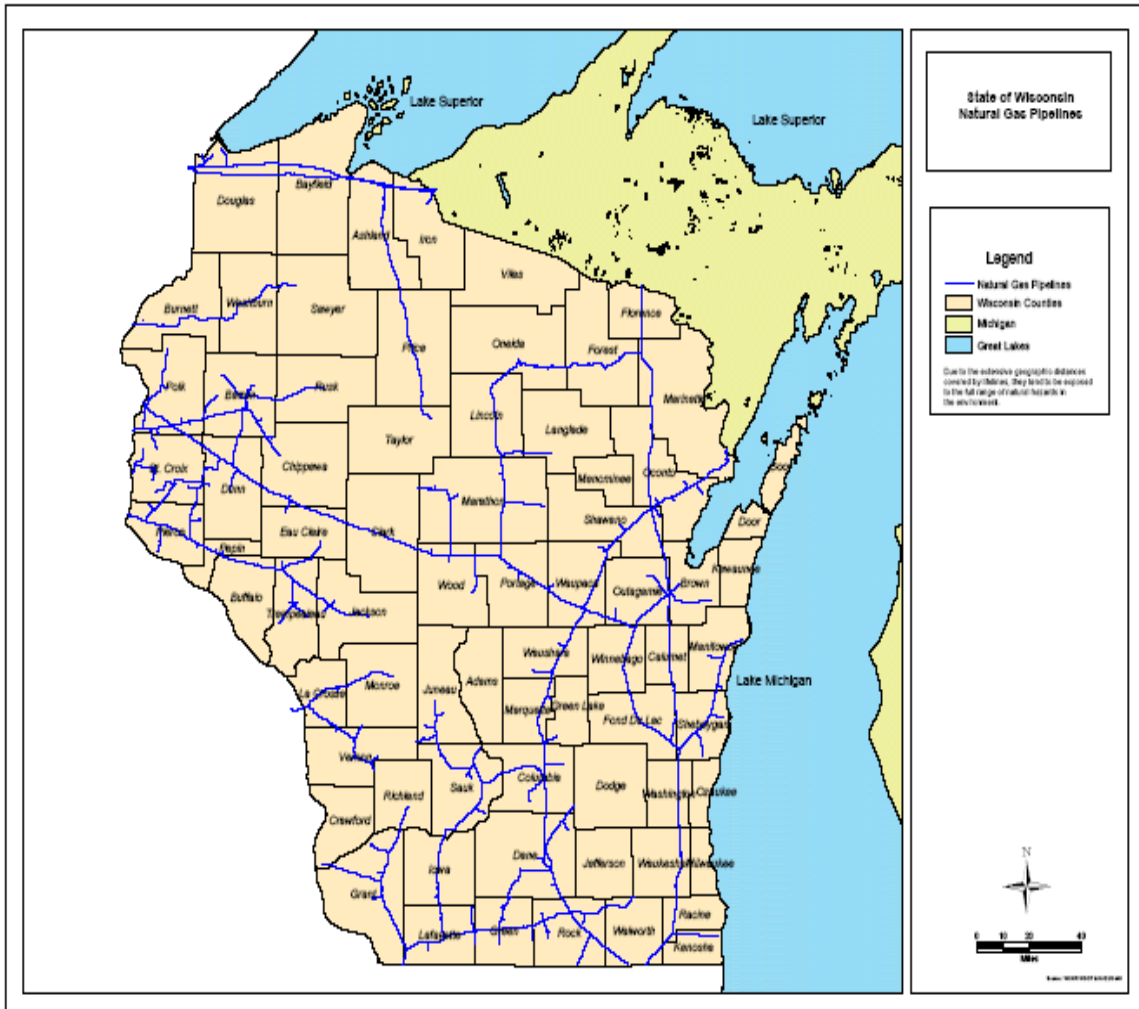
Electric Transmission Lines 138



# Electrical Substations 139

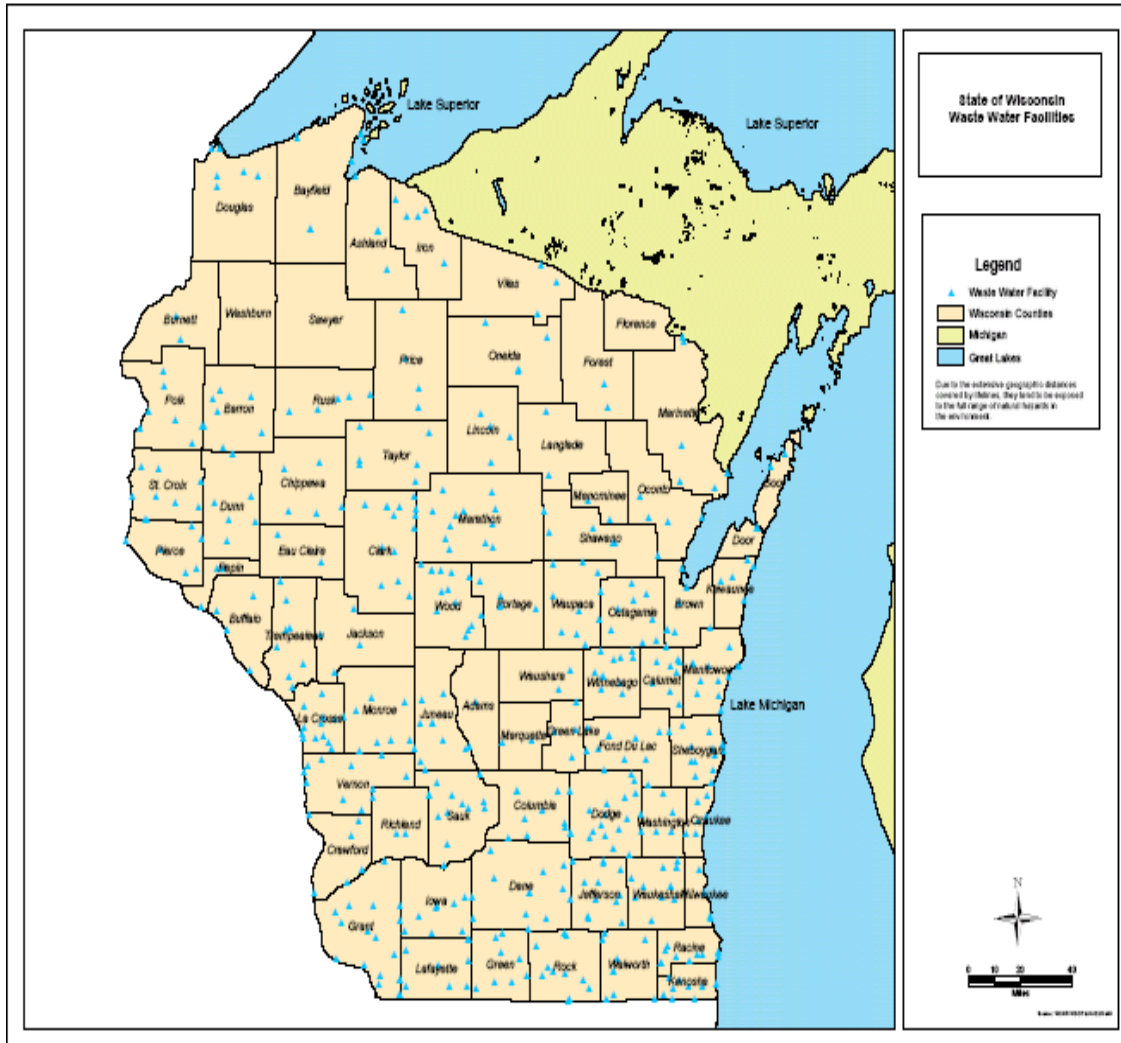


# Natural Gas Pipelines <sup>140</sup>



<sup>140</sup> Wisconsin State Hazard Mitigation Plan

# Wastewater Facilities <sup>141</sup>



## Appendix B: Frequency of Occurrence

<b>BLIZZARD</b>					
<i>Location</i>	<i>Date</i>	<i>Deaths</i>	<i>Injuries</i>	<i>Property Damage</i>	<i>Crop Damage</i>
NO OCCURRENCES					

<b>COLD/WIND CHILL</b>					
<i>Location</i>	<i>Date</i>	<i>Deaths</i>	<i>Injuries</i>	<i>Property Damage</i>	<i>Crop Damage</i>
WASHBURN COUNTY	02/02/1996	0	0	0	0
WASHBURN COUNTY	01/15/1997	0	0	0	0
WASHBURN COUNTY	01/14/2005	0	0	0	0
WASHBURN COUNTY	02/17/2006	0	0	0	0
WASHBURN COUNTY	02/10/2008	0	0	0	0

<b>DENSE FOG</b>					
<i>Location</i>	<i>Date</i>	<i>Deaths</i>	<i>Injuries</i>	<i>Property Damage</i>	<i>Crop Damage</i>
WASHBURN COUNTY	03/25/2004	0	2	0	0

<b>DROUGHT</b>					
<i>Location</i>	<i>Date</i>	<i>Deaths</i>	<i>Injuries</i>	<i>Property Damage</i>	<i>Crop Damage</i>
WASHBURN COUNTY	07/18/2006	0	0	0	0
WASHBURN COUNTY	08/01/2006	0	0	0	0
WASHBURN COUNTY	09/17/2006	0	0	0	0
WASHBURN COUNTY	10/01/2006	0	0	0	0
WASHBURN COUNTY	11/01/2006	0	0	0	0

Appendix B: Frequency of Occurrence

WASHBURN COUNTY	12/01/2006	0	0	0	0
WASHBURN COUNTY	01/01/2007	0	0	0	0
WASHBURN COUNTY	02/01/2007	0	0	0	0
WASHBURN COUNTY	05/01/2007	0	0	0	0
WASHBURN COUNTY	06/01/2007	0	0	0	0
WASHBURN COUNTY	07/01/2007	0	0	0	0
WASHBURN COUNTY	08/01/2007	0	0	0	0
WASHBURN COUNTY	09/01/2007	0	0	0	0
WASHBURN COUNTY	07/01/2009	0	0	0	0
WASHBURN COUNTY	08/01/2009	0	0	0	0
WASHBURN COUNTY	09/01/2009	0	0	0	0
WASHBURN COUNTY	10/01/2009	0	0	0	0
WASHBURN COUNTY	11/01/2009	0	0	0	0
WASHBURN COUNTY	12/01/2009	0	0	0	0
WASHBURN COUNTY	01/01/2010	0	0	0	0
WASHBURN COUNTY	02/01/2010	0	0	0	0
WASHBURN COUNTY	03/01/2010	0	0	0	0
WASHBURN COUNTY	04/01/2010	0	0	0	0
WASHBURN COUNTY	05/01/2010	0	0	0	0
WASHBURN COUNTY	06/01/2010	0	0	0	0
WASHBURN COUNTY	11/01/2012	0	0	0	0
WASHBURN COUNTY	12/01/2012	0	0	0	0
WASHBURN COUNTY	01/01/2013	0	0	0	0
WASHBURN COUNTY	02/01/2013	0	0	0	0
WASHBURN COUNTY	03/01/2013	0	0	0	0
WASHBURN COUNTY	04/01/2013	0	0	0	0

<b>EXCESSIVE HEAT</b>					
<i>Location</i>	<i>Date</i>	<i>Deaths</i>	<i>Injuries</i>	<i>Property Damage</i>	<i>Crop Damage</i>

Appendix B: Frequency of Occurrence

WASHBURN COUNTY	07/20/2016	0	2	0	0
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**EXTREME COLD/WINDCHILL**

<i>Location</i>	<i>Date</i>	<i>Deaths</i>	<i>Injuries</i>	<i>Property Damage</i>	<i>Crop Damage</i>
WASHBURN COUNTY	01/30/2008	0	0	0	0
WASHBURN COUNTY	01/13/2009	0	0	0	0
WASHBURN COUNTY	01/04/2014	0	0	0	0
WASHBURN COUNTY	01/27/2014	0	0	0	0
WASHBURN COUNTY	02/27/2014	0	0	0	0

**FLASH FLOOD**

<i>Location</i>	<i>Date</i>	<i>Deaths</i>	<i>Injuries</i>	<i>Property Damage</i>	<i>Crop Damage</i>
WASHBURN COUNTY	07/08/2000	0	0	0	0

**FLOOD**

<i>Location</i>	<i>Date</i>	<i>Deaths</i>	<i>Injuries</i>	<i>Property Damage</i>	<i>Crop Damage</i>
NO OCCURRENCES					

**FUNNEL CLOUD**

<i>Location</i>	<i>Date</i>	<i>Deaths</i>	<i>Injuries</i>	<i>Property Damage</i>	<i>Crop Damage</i>
NO OCCURRENCES					

**HAIL**

<i>Location</i>	<i>Date</i>	<i>Diameter</i>	<i>Deaths</i>	<i>Injuries</i>	<i>Property Damage</i>	<i>Crop Damage</i>
WASHBURN COUNTY	09/11/1990	1.00 in.	0	0	0	0

## Appendix B: Frequency of Occurrence

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WASHBURN COUNTY	09/11/1990	2.75 in.	0	0	0	0
WASHBURN COUNTY	03/26/1991	0.75 in.	0	0	0	0
WASHBURN COUNTY	05/28/1991	1.00 in.	0	0	0	0
WASHBURN COUNTY	07/05/1991	0.75 in.	0	0	0	0
WASHBURN COUNTY	08/29/1992	1.00 in.	0	0	0	0
SARONA	07/14/1995	2.75 in.	0	0	\$3,000	0
SPOONER	07/14/1995	1.75 in.	0	0	0	0
STONE LAKE	07/14/1995	0.75 in.	0	0	0	0
SHELL LAKE	05/19/1996	0.75 in.	0	0	0	0
SARONA	09/10/1996	1.00 in.	0	0	0	0
SARONA	05/12/1998	0.75 in.	0	0	0	0
TREGO	06/15/1998	0.75 in.	0	0	0	0
SPOONER	06/15/1998	2.00 in.	0	0	0	0
SPOONER	06/15/1998	0.88 in.	0	0	0	0
BIRCHWOOD	06/05/1999	0.75 in.	0	0	0	0
SPOONER	07/25/2000	0.75 in.	0	0	0	0
BIRCHWOOD	08/08/2000	0.75 in.	0	0	0	0
TWIN OAKS	08/14/2000	1.00 in.	0	0	0	0
SPOONER	08/14/2000	0.75 in.	0	0	0	0
SPOONER	08/14/2000	1.00 in.	0	0	0	0
TREGO	05/14/2001	1.00 in.	0	0	0	0
SPRING BROOK	05/14/2001	0.75 in.	0	0	0	0
TREGO	06/16/2001	0.75 in.	0	0	0	0
TREGO	06/18/2001	0.75 in.	0	0	0	0
SPOONER	06/18/2001	2.00 in.	0	0	0	0
SPOONER	06/18/2001	1.50 in.	0	0	0	0
TREGO	06/18/2001	1.00 in.	0	0	0	0
SHELL LAKE	06/25/2002	0.75 in.	0	0	0	0
SHELL LAKE	08/11/2002	1.00 in.	0	0	0	0
SPOONER	04/18/2004	0.75 in.	0	0	0	0
SHELL LAKE	04/18/2004	2.00 in.	0	0	0	0
SPOONER	04/18/2004	1.00 in.	0	0	0	0
SPOONER	06/07/2005	1.00 in.	0	0	0	0
STANBERRY	06/20/2007	0.88 in.	0	0	0	0
SPRING BROOK	06/20/2007	0.75 in.	0	0	0	0
SPOONER	06/26/2007	1.00 in.	0	0	0	0
SHELL LAKE	08/28/2007	0.75 in.	0	0	0	0
TREGO	09/21/2007	0.75 in.	0	0	0	0



## Appendix B: Frequency of Occurrence

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TREGO	09/21/2007	1.50 in.	0	0	0	0
TREGO	09/21/2007	1.75 in.	0	0	0	0
SPOONER	05/25/2008	0.88 in.	0	0	0	0
EARL	06/15/2008	0.75 in.	0	0	0	0
MINONG	08/03/2008	1.00 in.	0	0	0	0
SPOONER	06/19/2009	1.00 in.	0	0	0	0
SPOONER	05/10/2011	0.75 in.	0	0	0	0
SPOONER	05/10/2011	2.75 in.	0	0	\$4,000	0
SPOONER	05/30/2011	0.75 in.	0	0	0	0
SPRING BROOK	05/30/2011	0.75 in.	0	0	0	0
SPRING BROOK	07/19/2011	2.00 in.	0	0	0	0
SPRING BROOK	07/19/2011	2.50 in.	0	0	\$10,000	0
BIRCHWOOD	07/19/2011	1.75 in.	0	0	0	0
TREGO	06/15/2013	0.88 in.	0	0	0	0
SCHULTZ SPOONER ARPT	06/26/2013	0.88 in.	0	0	0	0
SARONA	06/24/2014	0.75 in.	0	0	0	0
LONG LAKE	06/24/2014	0.75 in.	0	0	0	0
BEAVER BROOK	07/26/2014	0.75 in.	0	0	0	0
STANBERRY	07/30/2014	1.50 in.	0	0	0	0
STANBERRY	07/30/2014	1.00 in.	0	0	0	0
BEAVER BROOK	07/30/2014	0.88 in.	0	0	0	0
BEAVER BROOK	08/18/2014	0.75 in.	0	0	0	0
SPOONER	09/03/2014	1.75 in.	0	0	0	0
SHELL LAKE	09/03/2014	1.00 in.	0	0	0	0
TWIN OAKS	09/03/2014	1.75 in.	0	0	0	0
MINONG	09/04/2014	1.25 in.	0	0	0	0
STANBERRY	09/04/2014	0.75 in.	0	0	0	0
MINONG	07/12/2015	0.88 in.	0	0	0	0
SCHULTZ SPOONER ARPT	08/02/2015	1.75 in.	0	0	0	0
SCHULTZ SPOONER ARPT	08/02/2015	1.75 in.	0	0	0	0
TREGO	08/02/2015	0.88 in.	0	0	0	0
SCHULTZ SPOONER ARPT	08/03/2015	1.75 in.	0	0	0	0
MINONG	05/25/2016	1.50 in.	0	0	0	0
SHELL LAKE	05/16/2017	1.00 in.	0	0	0	0
SPOONER	05/16/2017	1.00 in.	0	0	0	0

Appendix B: Frequency of Occurrence

SPOONER	05/16/2017	0.88 in.	0	0	0	0
SCHULTZ SPOONER ARPT	05/16/2017	0.88 in.	0	0	0	0
SPOONER	06/11/2017	0.75 in.	0	0	0	0
SPOONER	06/11/2017	0.75 in.	0	0	0	0
SPOONER	07/06/2017	0.75 in.	0	0	0	0
MINONG	08/04/2017	0.88 in.	0	0	0	0
MINONG	08/04/2017	0.88 in.	0	0	0	0
MINONG SUTHERLAND AR	08/04/2017	0.75 in.	0	0	0	0
TREGO	09/02/2017	0.88 in.	0	0	0	0
SARONA	09/22/2017	1.00 in.	0	0	0	0
SARONA	09/22/2017	2.00 in.	0	0	0	0
TWIN OAKS	09/22/2017	1.50 in.	0	0	0	0
MINONG	05/25/2018	0.88 in.	0	0	0	0
SPOONER	06/15/2018	0.88 in.	0	0	0	0

**HEAT**

<i>Location</i>	<i>Date</i>	<i>Deaths</i>	<i>Injuries</i>	<i>Property Damage</i>	<i>Crop Damage</i>
WASHBURN COUNTY	07/16/2011	0	0	0	0

**HEAVY RAIN**

<i>Location</i>	<i>Date</i>	<i>Deaths</i>	<i>Injuries</i>	<i>Property Damage</i>	<i>Crop Damage</i>
PRESCOTT	07/01/1999	0	0	0	0

**HEAVY SNOW**

<i>Location</i>	<i>Date</i>	<i>Deaths</i>	<i>Injuries</i>	<i>Property Damage</i>	<i>Crop Damage</i>
WASHBURN COUNTY	01/17/1996	0	0	0	0
WASHBURN COUNTY	01/28/1996	0	0	0	0
WASHBURN COUNTY	03/23/1996	0	0	0	0
WASHBURN COUNTY	12/14/1996	0	0	0	0

## Appendix B: Frequency of Occurrence

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WASHBURN COUNTY	01/04/1997	0	0	0	0
WASHBURN COUNTY	03/13/1997	0	0	0	0
WASHBURN COUNTY	01/13/1998	0	0	0	0
WASHBURN COUNTY	02/15/2000	0	0	0	0
WASHBURN COUNTY	02/24/2001	0	0	0	0
WASHBURN COUNTY	03/11/2001	0	0	0	0
WASHBURN COUNTY	02/20/2002	0	0	0	0
WASHBURN COUNTY	02/02/2003	0	0	0	0
WASHBURN COUNTY	11/22/2003	0	0	0	0
WASHBURN COUNTY	02/01/2004	0	0	0	0
WASHBURN COUNTY	03/05/2004	0	0	0	0
WASHBURN COUNTY	01/21/2005	0	0	0	0
WASHBURN COUNTY	03/12/2006	0	0	0	0
WASHBURN COUNTY	03/31/2008	0	0	0	0
WASHBURN COUNTY	04/01/2008	0	0	0	0
WASHBURN COUNTY	12/20/2008	0	0	0	0
WASHBURN COUNTY	12/30/2008	0	0	0	0
WASHBURN COUNTY	02/26/2009	0	0	0	0
WASHBURN COUNTY	11/13/2010	0	0	0	0
WASHBURN COUNTY	12/11/2010	0	0	0	0
WASHBURN COUNTY	12/20/2010	0	0	0	0
WASHBURN COUNTY	02/20/2011	0	0	0	0
WASHBURN COUNTY	03/22/2011	0	0	0	0
WASHBURN COUNTY	12/03/2011	0	0	0	0
WASHBURN COUNTY	02/28/2012	0	0	0	0
WASHBURN COUNTY	12/09/2012	0	0	0	0
WASHBURN COUNTY	04/22/2013	0	0	0	0
WASHBURN COUNTY	05/01/2013	0	0	0	0
WASHBURN COUNTY	12/04/2013	0	0	0	0
WASHBURN COUNTY	02/20/2014	0	0	0	0

Appendix B: Frequency of Occurrence

WASHBURN COUNTY	03/17/2014	0	0	0	0
WASHBURN COUNTY	04/03/2014	0	0	0	0
WASHBURN COUNTY	04/16/2014	0	0	0	0
WASHBURN COUNTY	11/10/2014	0	0	0	0
WASHBURN COUNTY	12/23/2015	0	0	0	0
WASHBURN COUNTY	02/02/2016	0	0	0	0
WASHBURN COUNTY	03/16/2016	0	0	0	0
WASHBURN COUNTY	01/22/2018	0	0	0	0
WASHBURN COUNTY	02/22/2018	0	0	0	0
WASHBURN COUNTY	02/24/2018	0	0	0	0
WASHBURN COUNTY	03/05/2018	0	0	0	0
WASHBURN COUNTY	03/31/2018	0	0	0	0

<b>HIGH WIND</b>						
<i>Location</i>	<i>Date</i>	<i>KTS</i>	<i>Deaths</i>	<i>Injuries</i>	<i>Property Damage</i>	<i>Crop Damage</i>
NO OCCURRENCES						

<b>ICE STORM</b>						
<i>Location</i>	<i>Date</i>	<i>Deaths</i>	<i>Injuries</i>	<i>Property Damage</i>	<i>Crop Damage</i>	
WASHBURN COUNTY	02/01/1999	0	0	0	0	
WASHBURN COUNTY	01/29/2001	0	0	0	0	
WASHBURN COUNTY	04/16/2003	0	0	0	0	

<b>LIGHTNING</b>						
<i>Location</i>	<i>Date</i>	<i>Deaths</i>	<i>Injuries</i>	<i>Property Damage</i>	<i>Crop Damage</i>	
MINONG	07/21/2002	1	0	0	0	

**STRONG WIND**

Appendix B: Frequency of Occurrence

<i>Location</i>	<i>Date</i>	<i>KTS</i>	<i>Deaths</i>	<i>Injuries</i>	<i>Property Damage</i>	<i>Crop Damage</i>
WASHBURN COUNTY	09/15/2004	40	0	0	\$1,000	0

<b>THUNDERSTORM WIND</b>						
<i>Location</i>	<i>Date</i>	<i>KTS</i>	<i>Deaths</i>	<i>Injuries</i>	<i>Property Damage</i>	<i>Crop Damage</i>
WASHBURN COUNTY	05/28/1991	0	0	0	0	0
WASHBURN COUNTY	05/28/1991	0	0	0	0	0
WASHBURN COUNTY	05/28/1991	0	0	0	0	0
WASHBURN COUNTY	07/05/1991	0	0	0	0	0
SPOONER	07/12/1995	0	0	0	0	0
MINONG	08/19/1995	0	0	0	0	0
SHELL LAKE	08/19/1995	0	0	0	0	0
SHELL LAKE	08/19/1995	0	0	0	0	0
MINONG	08/19/1995	0	0	0	0	0
SHELL LAKE	05/18/1996	50	0	0	0	0
SHELL LAKE AIRPORT	05/19/1996	60	0	0	0	0
MINONG	09/02/1996	52	0	0	0	0
SHELL LAKE	05/15/1998	50	0	0	0	0
TREGO	05/15/1998	50	0	0	0	0
SPOONER	06/05/1999	50	0	0	0	0
SHELL LAKE	06/22/1999	50	0	0	0	0
MINONG	07/25/1999	50	0	0	0	0
MINONG	07/30/1999	50	0	0	0	0
SPOONER	07/30/1999	55	0	0	0	0
SARONA	07/08/2000	52	0	0	0	0
SPRING BROOK	07/08/2000	55	0	0	0	0
SHELL LAKE	07/25/2000	50	0	0	0	0
SHELL LAKE	07/25/2000	50	0	0	0	0
SPOONER	06/11/2001	52	0	0	0	0
SPOONER	06/11/2001	52	0	0	0	0
SPOONER	06/18/2001	60	0	0	0	0
SARONA	06/25/2002	50	0	0	0	0
SHELL LAKE	04/18/2004	60	0	0	0	0

## Appendix B: Frequency of Occurrence

SARONA	06/11/2005	60	0	0	0	0
SPOONER	06/27/2005	52	0	0	0	0
SPOONER	06/29/2005	60	0	0	0	0
MINONG	09/12/2005	52	0	0	0	0
MINONG	07/28/2006	55	0	0	0	0
MINONG	07/28/2006	55	0	0	0	0
SPOONER	07/30/2006	50	0	0	0	0
MINONG	07/11/2008	52	0	0	0	0
MINONG	07/14/2010	60	0	0	\$10,000	0
TREGO	07/14/2010	52	0	0	\$10,000	0
SPOONER	07/27/2010	50	0	0	\$500	0
BIRCHWOOD	07/27/2010	50	0	0	\$15,000	0
MINONG	08/12/2010	50	0	0	\$1,000	0
SHELL LAKE ARPT	05/30/2011	50	0	0	0	0
MINONG	07/01/2011	70	0	0	0	0
BEAVER BROOK	07/01/2011	61	0	0	0	0
LAMPSON	07/19/2011	51	0	0	0	0
SPRING BROOK	07/19/2011	52	0	0	0	0
SPRING BROOK	07/19/2011	70	0	0	\$30,000	0
SPOONER	07/30/2014	61	0	0	0	0
MINONG	09/04/2014	52	0	0	0	0
STANBERRY	09/04/2014	52	0	0	0	0
MINONG	07/12/2015	52	0	0	0	0
MINONG	07/12/2015	52	0	0	0	0
SHELL LAKE	06/25/2016	61	0	0	0	0
SHELL LAKE	06/11/2017	61	0	0	0	0
SPOONER	06/11/2017	61	0	0	0	0
SARONA	06/11/2017	52	0	0	0	0
SPRING BROOK	06/11/2017	56	0	0	0	0
SPRING BROOK	06/11/2017	61	0	0	0	0
MINONG SUTHERLAND AR	06/14/2017	50	0	0	0	0
MINONG SUTHERLAND AR	08/27/2018	50	0	0	0	0
SCHULTZ SPOONER ARPT	08/27/2018	50	0	0	0	0

**TORNADO**

Appendix B: Frequency of Occurrence

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<i>Location</i>	<i>Date</i>	<i>Strength</i>	<i>Deaths</i>	<i>Injuries</i>	<i>Property Damage</i>	<i>Crop Damage</i>
SARONA	06/05/1999	F0	0	0	0	0
SPOONER	06/18/2001	F2	0	0	0	0

<b>WINTER STORM</b>						
<i>Location</i>	<i>Date</i>	<i>Deaths</i>	<i>Injuries</i>	<i>Property Damage</i>	<i>Crop Damage</i>	
WASHBURN COUNTY	01/01/2005	0	0	0	0	
WASHBURN COUNTY	02/24/2007	0	0	0	0	
WASHBURN COUNTY	03/01/2007	0	0	0	0	
WASHBURN COUNTY	04/03/2007	0	0	0	0	
WASHBURN COUNTY	12/01/2007	0	0	0	0	
WASHBURN COUNTY	12/23/2007	0	0	0	0	
WASHBURN COUNTY	04/10/2008	0	0	0	0	
WASHBURN COUNTY	12/14/2008	0	0	0	0	
WASHBURN COUNTY	12/08/2009	0	0	0	0	
WASHBURN COUNTY	12/23/2009	0	0	0	0	
WASHBURN COUNTY	04/14/2018	0	0	0	0	

<b>WINTER WEATHER</b>						
<i>Location</i>	<i>Date</i>	<i>Deaths</i>	<i>Injuries</i>	<i>Property Damage</i>	<i>Crop Damage</i>	
WASHBURN COUNTY	04/12/1996	0	0	0	0	

Appendix B: Frequency of Occurrence

<b>WI HAZARD VULNERABILITY ASSESSMENT TOOL</b> <b>Region #1 Northwest WI Healthcare Emergency Readiness Coalition</b>	PROBABILITY	HUMAN IMPACT	HEALTH CARE SERVICES IMPACT	COMMUNITY IMPACT	LPHA IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	MITIGATION		PREPAREDNESS		RESPONSE		RECOVERY		RISK
	Likelihood of future occurrence	Percentage of population likely to be injured or death under an average occurrence of the hazard	Percentage of health care services likely to be affected under an average occurrence of the hazard	Percentage of community members likely to be affected under an average occurrence of the hazard	Percentage of public health services likely to be affected under an average occurrence of the hazard	Percentage of properties likely to be affected under an average occurrence of the hazard	Percentage of businesses likely to be affected under an average occurrence of the hazard	Internal (Jurisdictional)	External (Region/State)	Internal (Jurisdictional)	External (Region/State)	Internal (Jurisdictional)	External (Region/State)	Internal (Jurisdictional)	External (Region/State)	Relative threat (increases with percentage)



## Appendix B: Frequency of Occurrence

	3 = High (4+ events / 30 years)	ed) 3 = High (>10% affected)	d) 3 = High (>10% affected)	d) 3 = High (>10% affected)	ed) 3 = High (>10% affected)	d) 3 = High (>10% affected)	ed) 3 = High (>10% affected)										
<b>Local Planning Events*</b>																	
Acts or Threats of Violence	3	3	2	2	2	1	2	2	2	2	2	2	2	2	3	3	<b>73%</b>
Blizzard	2	2	3	3	2	1	3	2	2	2	2	2	2	2	2	2	<b>46%</b>
Civil Disturbance	1	1	1	1	1	1	1	3	3	3	3	3	3	3	3	3	<b>27%</b>
Computer Failure	3	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	<b>68%</b>
Cyber Attack-Major	3	2	3	3	3	3	3	2	2	2	2	2	2	2	2	2	<b>74%</b>
Cyber Attack-Minor	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	<b>67%</b>
Drought	2	1	1	2	1	1	2	1	1	2	2	2	2	2	1	1	<b>32%</b>
Earthquake	1	2	2	2	2	3	3	3	3	2	2	2	2	1	2		<b>24%</b>
Evacuation	1	3	3	3	3	2	3	2	2	2	2	2	2	3	3		<b>27%</b>

## Appendix B: Frequency of Occurrence

Extreme Cold	3	3	2	3	2	3	3	1	1	1	1	2	2	2	2	61%
Extreme Heat	3	3	2	3	2	1	2	1	1	1	1	2	2	2	2	56%
Flash Flooding	3	2	2	3	2	2	2	1	2	1	1	2	2	2	2	59%
Flood (External)	2	1	2	2	2	2	2	1	1	1	1	2	2	2	2	35%
Hazardous Material Release (External-Direct)	1	3	3	3	3	3	3	3	2	3	2	2	1	3	1	26%
Hazmat Release/Explosion (fixed site)	3	1	2	2	1	1	1	2	2	2	2	2	1	2	1	55%
Hazmat Release/Explosion (transport)	3	1	2	2	1	1	1	2	2	2	2	2	1	2	1	55%
Ice Storm Moderate	3	1	1	1	1	1	2	2	2	2	2	1	1	2	1	50%
Ice Storm Severe	1	1	2	3	3	2	3	2	2	2	2	2	3	3	3	26%
Infectious Disease	2	3	3	3	3	1	3	2	2	1	1	1	1	2	2	40%

## Appendix B: Frequency of Occurrence

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Outbreak (Global-Major)																
Infectious Disease Outbreak (Local/Regional)	3	2	3	3	3	1	2	2	2	2	2	2	2	2	2	70%
Landslide	2	2	1	1	1	1	1	2	2	2	2	2	2	1	2	37%
Loss of all Electrical Power (Regionally)	1	3	3	3	3	2	3	2	2	2	2	2	2	2	2	25%
Loss of Normal Electrical Power	3	2	2	2	2	1	2	2	2	2	2	2	2	2	2	65%
Loss of Sewer Systems (Regionally)	1	3	3	3	3	1	3	3	3	3	3	2	2	3	3	30%
Loss/Fuel Shortage	1	3	3	3	1	2	3	2	2	2	2	2	2	2	2	24%
Loss/Water System Failure (Municipalities)	2	2	2	2	3	1	2	2	2	2	2	2	2	2	2	44%

## Appendix B: Frequency of Occurrence

y/Regionally)																
Major Communications Disruption	2	2	3	3	2	1	3	2	2	2	2	2	2	2	2	46%
MCI- Major External Hazardous Material Release	1	2	3	2	2	1	3	2	1	2	1	2	1	2	1	19%
MCI- Major Transportation Accident	2	3	3	1	2	2	2	1	1	2	2	2	2	1	1	37%
MCI- External Fire/Explosion	2	1	3	1	1	1	2	2	2	2	2	2	2	2	2	41%
MCI-Natural Disaster	2	1	2	3	1	2	2	2	2	2	2	2	2	2	2	43%
Multiple House/Building Fire	2	1	1	1	1	3	1	1	1	1	1	1	1	1	1	24%
Multiple Vehicle Highway Accident	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	33%

## Appendix B: Frequency of Occurrence

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Municipal Water Contamination	2	2	3	3	3	1	2	1	2	1	2	1	2	2	2	40%
Nuclear Facility Incident (fixed site)	1	2	2	2	2	1	1	2	2	2	2	2	2	2	2	21%
Nuclear Facility Incident (transport)	1	2	1	2	1	1	1	2	2	2	2	2	2	2	2	20%
Pharmaceutical Supply Shortage	3	2	3	1	1	1	2	2	2	2	2	2	2	2	2	64%
Power Outage (Major-External)	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	43%
Severe Thunderstorm	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	35%
Snowfall	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	33%
Structural Collapse	1	1	3	1	1	1	1	1	1	1	2	2	2	2	2	17%
Supply Disruption	2	2	3	2	3	1	3	1	1	1	1	2	2	2	2	38%

## Appendix B: Frequency of Occurrence

Terrorism (CBRNE)	1	3	3	3	3	2	3	3	3	3	3	2	2	2	2	29%
Tornado	3	2	1	1	2	2	2	2	2	1	1	1	1	1	2	48%
VIP Visit	1	1	1	2	1	1	2	1	1	1	1	1	1	1	1	12%
Wild Fire	2	2	1	1	1	1	1	2	2	2	2	2	2	1	1	35%
<b>Community-specific Planning Events**</b>																<b>0%</b>
Civic/Sports Events/Music Festivals	2	2	3	1	1	1	1	2	2	2	1	1	1	2	2	35%
High-density population (University, etc.)	1	1	3	1	1	1	1	2	1	2	1	2	1	2	1	16%
Military Base	2	2	1	1	1	3	3	2	1	2	1	2	1	2	1	35%
Other Federal Installations	1	1	1	1	1	1	1	2	1	2	1	2	1	2	1	15%

Appendix B: Frequency of Occurrence

<b>WI HAZARD VULNERABILITY ASSESSMENT TOOL</b> Washburn County Public Health	PROBABILITY	HUMAN IMPACT	HEALTHCARE SERVICES IMPACT	COMMUNITY IMPACT	LPHA IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	MITIGATION		PREPA
	Likelihood of future occurrence	Percentage of population likely to be injured or killed under an average occurrence of the hazard	Percentage of healthcare services likely to be affected under an average occurrence of the hazard	Percentage of community likely to be affected under an average occurrence of the hazard	Percentage of public health services likely to be affected under an average occurrence of the hazard	Percentage of properties likely to be affected under an average occurrence of the hazard	Percentage of businesses likely to be affected under an average occurrence of the hazard	Internal (Jurisdictional)	External (Region/State)	Internal (Jurisdictional)
<b>National Planning Scenarios*</b>	0 = N/A (implausible) 1 = Low (0-1 event / 30 years) 2 = Moderate (2-3 events / 30 years) 3 = High (4+ events / 30 years)	0 = N/A (no impact expected) 1 = Low (<1% affected) 2 = Moderate (1-10% affected) 3 = High (>10% affected)	0 = N/A (no impact expected) 1 = Low (<1% affected) 2 = Moderate (1-10% affected) 3 = High (>10% affected)	0 = N/A (no impact expected) 1 = Low (<1% affected) 2 = Moderate (1-10% affected) 3 = High (>10% affected)	0 = N/A (no impact expected) 1 = Low (<1% affected) 2 = Moderate (1-10% affected) 3 = High (>10% affected)	0 = N/A (no impact expected) 1 = Low (<1% affected) 2 = Moderate (1-10% affected) 3 = High (>10% affected)	0 = N/A (no impact expected) 1 = Low (<1% affected) 2 = Moderate (1-10% affected) 3 = High (>10% affected)	1 = Substantial 2 = Moderate 3 = Limited or none	1 = Substantial 2 = Moderate 3 = Limited or none	1 = Substantial 2 = Moderate 3 = Limited or none
Natural Disaster – Major Earthquake	0	0	0	0	0	0	0	3	3	3
Natural Disaster – Major Hurricane	0	0	0	0	0	0	0	3	3	3

## Appendix B: Frequency of Occurrence

Biological Disease Outbreak – Pandemic flu	2	3	3	3	3	0	3	1	1	1
Biological Attack – Aerosol Anthrax	1	3	3	2	3	0	2	3	1	1
Biological Attack – Plague	1	3	3	2	3	0	2	3	1	1
Biological Attack – Food Contamination	1	3	3	2	3	0	2	3	1	2
Biological Attack – Foreign Animal Disease	1	3	3	2	3	0	2	3	1	2
Chemical Attack – Toxic Industrial Chemicals	1	3	3	2	3	0	2	3	1	2
Chemical Attack – Chlorine Tank Explosion	1	3	3	2	3	2	2	3	1	2
Chemical Attack – Blister Agent	1	3	3	2	3	0	2	3	1	3
Chemical Attack – Nerve Agent	1	3	3	2	3	0	2	3	1	3
Explosives Attack – Improvised Explosive	1	3	3	2	3	2	3	3	1	3



## Appendix B: Frequency of Occurrence

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Nuclear Detonation – Improvised Device	1	3	3	2	3	3	3	3	1	3
Radiological Attack – Radiological Dispersal	1	3	3	3	3	2	3	3	1	3
Cyber Attack	1	1	3	3	3	0	3	3	1	2
<b>Local Planning Events*</b>										
Earthquake	0	0	0	0	0	0	0	3	3	3
Drought	3	1	0	2	0	2	2	2	2	2
Wild Fire	3	1	1	2	1	1	1	2	1	1
Severe Thunderstorm	3	1	1	2	1	1	1	2	2	2
Tornado	3	2	3	3	3	3	3	2	2	2
Flooding	3	1	1	1	2	3	1	1	2	2
Flash Flooding	3	1	1	1	1	1	1	3	2	2
Landslide	0	0	0	0	0	1	0	2	2	3
Extreme Heat	3	1	1	2	1	0	1	2	1	2
Extreme Cold	3	1	1	3	1	1	1	2	1	2
Blizzard	3	1	3	3	3	1	3	2	1	2

## Appendix B: Frequency of Occurrence

Ice Storm	3	1	3	3	3	2	3	2	1	2
Hazmat Release/Explosion (fixed site)	2	2	3	3	3	1	2	3	2	2
Hazmat Release/Explosion (transport)	3	1	3	2	2	1	1	1	2	2
Nuclear Facility Incident (fixed site)	0	0	0	0	0	0	0	3	2	3
Nuclear Facility Incident (transport)	1	3	3	3	3	3	3	3	2	3
Epidemic	3	2	3	2	3	0	2	2	1	1
Pandemic	3	3	3	3	3	0	3	2	1	1
Power Outage	3	1	1	2	3	1	3	2	2	2
Water System Failure	2	1	2	3	3	1	3	2	2	2
Major Communications Disruption	3	1	3	3	2	0	3	2	2	2
Computer Failure	3	1	3	2	1	0	2	2	2	2
Airplane Crash	3	1	1	1	0	1	0	2	1	1
Civil Disturbance	0	1	1	1	1	1	1	3	1	1
Fuel Shortage	1	1	2	3	3	0	3	2	2	2

Appendix B: Frequency of Occurrence

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Multiple House/Building Fire	1	1	1	1	0	1	1	2	1	1
Multiple Vehicle Highway Accident	3	1	2	2	0	1	0	2	1	1
Municipal Water Contamination	3	1	1	3	3	1	3	2	2	2
Supply Disruption	1	2	3	3	3	0	3	2	2	2
VIP Visit	3	0	0	1	0	0	1	2	1	1
<b>Community-specific Planning Events**</b>										
Civic/Sports Events	3	1	1	1	0	1	1	2	1	1
High-density population (University, etc.)	0	0	0	0	0	0	0	3	1	3
Military Base	0	0	0	0	0	0	0	3	1	3
Other Federal Installations	0	0	0	0	0	0	0	3	1	3

## Appendix C: Plan Adoption

This plan has been adopted by Washburn County and all of its municipal bodies including the Washburn County Board; the Cities of Shell Lake and Spooner; the Villages of Birchwood and Minong; and the Towns of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake, and Trego.



U.S. Department of Homeland Security  
536 S. Clark St. 6<sup>th</sup> Floor  
Chicago, IL 60605

**FEMA**

June 1, 2020

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

Dear Ms. Fennig:

Thank you for submitting the adoption documentation for the Washburn County Hazard Mitigation Plan. The plan was reviewed based on the local plan criteria contained in 44 CFR Part 201, as authorized by the Disaster Mitigation Act of 2000. The Washburn County plan met the required criteria for a multi-jurisdiction hazard mitigation plan and the plan is now approved for the cities of Shell Lake and Spooner; the villages of Birchwood and Minong; and the towns of Bass Lake, Beaverbrook, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Minong, Spooner, Springbrook, Stinnett, and Stone Lake. Please submit the adoption resolutions for any remaining jurisdictions who participated in the planning process.

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

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

Please pass on our congratulations to the cities of Shell Lake and Spooner; the villages of Birchwood and Minong; and the towns of Bass Lake, Beaverbrook, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Minong, Spooner, Springbrook, Stinnett, and Stone Lake. If you or the communities have any questions, please contact Cadence Peterson at [cadence.peterson@fema.dhs.gov](mailto:cadence.peterson@fema.dhs.gov) or at 312-408-5260.

Sincerely,

A handwritten signature in black ink, appearing to read "Julia McCarthy".

Julia McCarthy  
Chief, Risk Analysis Branch  
Mitigation Division

## Appendix C: Plan Adoption

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### U.S. Department of Homeland Security



July 28, 2020

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

Dear Ms. Fennig:

Thank you for submitting the adoption documentation for the Washburn County Hazard Mitigation Plan. The plan was reviewed based on the local plan criteria contained in 44 CFR Part 201, as authorized by the Disaster Mitigation Act of 2000. The Washburn County plan met the required criteria for a multi-jurisdiction hazard mitigation plan and the plan is now approved for Washburn County and the towns of Barronett, Bashaw, Birchwood, Madge, Sarona, and Trego. Please submit the adoption resolutions for any remaining jurisdictions who participated in the planning process.

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

We encourage Washburn County and the participating jurisdictions to follow the plan's schedule for monitoring and updating the plan, and to continue their efforts to implement the mitigation measures. The expiration date of the Washburn County plan is May 31, 2020. To continue project grant eligibility, the plan must be reviewed, revised as appropriate, resubmitted, and approved no later than the plan expiration date.

Please pass on our congratulations to Washburn County and the towns of Barronett, Bashaw, Birchwood, Madge, Sarona, and Trego. If you or the communities have any questions, please contact Cadence Peterson at [cadence.peterson@fema.dhs.gov](mailto:cadence.peterson@fema.dhs.gov) or at 312-408-5260.

Sincerely,

A handwritten signature in black ink, appearing to read "Julia McCarthy".

Julia McCarthy  
Chief, Risk Analysis Branch  
Mitigation Division



**STATE OF WISCONSIN**  
**DEPARTMENT OF MILITARY AFFAIRS**  
**DIVISION OF EMERGENCY MANAGEMENT**

Darrell L. Williams, Ph.D.  
Administrator

Tony Evers  
Governor

June 2, 2020

Ms. Carol Buck, Director  
Washburn County Emergency Management  
421 Hwy 63  
Shell Lake, WI 54871

Dear Carol:

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

The plan complies with the requirements of the Disaster Mitigation Act of 2000. The approved jurisdictions are eligible to apply for funding through the Hazard Mitigation Grant Program, Pre-Disaster Mitigation program, and Flood Mitigation Assistance program through May 31, 2025, for projects identified in the Plan. Per regulation, the Plan must be updated and resubmitted for approval every five years for the participating jurisdictions to remain eligible for mitigation funding.

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

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

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

Sincerely,

Katie Sommers, CFM  
Hazard Mitigation Section Supervisor

Enclosure

Cc: Randy Books, Northwest Region Emergency Management Director, WEM  
Anita Smith, Northwest Region Office Operations Associate, WEM  
Lenora Borchardt, EPTEC, Inc.

Appendix C: Plan Adoption

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**STATE OF WISCONSIN**  
*DEPARTMENT OF MILITARY AFFAIRS*  
**DIVISION OF EMERGENCY MANAGEMENT**

Darrell L. Williams, Ph.D.  
Administrator

Tony Evers  
Governor

February 18, 2020

Ms. Carol Buck, Director  
Washburn County Emergency Management  
421 Hwy 63  
Shell Lake, WI 54871

Dear Ms. <sup>Carol</sup>Buck:

Wisconsin Emergency Management (WEM) has reviewed the *Washburn County Hazard Mitigation Plan*. The Federal Emergency Management Agency (FEMA) and WEM have signed a Program Administration by States operational agreement, dated November 6, 2018, allowing WEM to review local mitigation plans to ensure they meet the required criteria for a multi-jurisdiction hazard mitigation plan outlined in 44 CFR Part 201. Upon review, Washburn County has met the required criteria for a multi-jurisdictional hazard mitigation plan.

The county and participating jurisdictions *must now adopt* the plan in order to have a FEMA-approved hazard mitigation plan and be eligible for funding through the Hazard Mitigation Grant Program, Pre-Disaster Mitigation program, and the Flood Mitigation Assistance program.

I have emailed a copy of the Mitigation Plan Review Tool for your records.

If you have any questions, please feel free to call me at (608) 242-3252, or Katie Sommers, Mitigation Section Supervisor, at (608) 242-3222.

Sincerely,

A handwritten signature in blue ink, appearing to read "Margaret Zieke".

Margaret Zieke  
Hazard Mitigation Planner  
Wisconsin Emergency Management

Enclosures

Cc: Randy Books, Northwest Region Emergency Management Director  
Anita Smith, Northwest Region Emergency Management Office Associate  
Lenora Borchardt, EPTEC, Inc



**RESOLUTION # \_\_\_\_\_**

**ADOPTING THE WASHBURN COUNTY ALL HAZARDS MITIGATION  
PLAN UPDATE**

**FISCAL IMPACT:** None

**WHEREAS,** Washburn 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

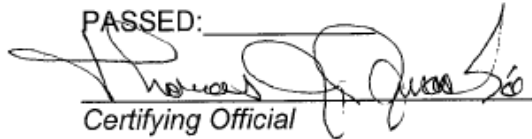
**WHEREAS,** an adopted all hazards mitigation plan is required by FEMA as a condition of future grant funding for mitigation projects; and

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

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

**BE IT FURTHER RESOLVED,** that the Washburn 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 Update to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final review and approval. Minor changes been made upon advice from Wisconsin Emergency Management and Federal Emergency Management Agency will not require re-adopting this resolution.

PASSED: \_\_\_\_\_



*Certifying Official*

Signed this 3rd day of April, 2020

Thomas J. Mackie, County Board Chair

Appendix C: Plan Adoption

RESOLUTION # 41-20

ADOPTING THE WASHBURN COUNTY ALL HAZARDS MITIGATION  
PLAN UPDATE

FISCAL IMPACT: None

WHEREAS, Washburn 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

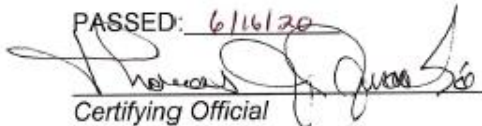
WHEREAS, an adopted all hazards mitigation plan is required by FEMA as a condition of future grant funding for mitigation projects; and

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

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

BE IT FURTHER RESOLVED, that the Washburn 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 Update to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final review and approval. Minor changes been made upon advice from Wisconsin Emergency Management and Federal Emergency Management Agency will not require re-adopting this resolution.

PASSED: 6/16/20



Certifying Official

Signed this 3rd day of April, 2020  
Thomas J. Mackie, County Board Chair

RATIFIED BY THE WASHBURN COUNTY BOARD OF SUPERVISORS

THIS 16th day of June 2020.

Motion: Wilson Second: Graber

(Voice) (Roll) vote: Yes X No \_\_\_\_\_

I, Lolita Olson, as County Clerk, do hereby certify that the foregoing is a true and correct copy of the resolution adopted by the County of Washburn at the meeting held on: 6-16-20



**RESOLUTION # 2-2020**

**ADOPTING THE WASHBURN COUNTY ALL HAZARDS MITIGATION  
PLAN UPDATE**

**FISCAL IMPACT:** None

**WHEREAS**, the City of Shell Lake 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 hazards mitigation plan is required by FEMA as a condition of future grant funding for mitigation projects; and

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

**NOW, THEREFORE, BE IT RESOLVED**, that the City Council of the City of Shell Lake adopts the Washburn County All Hazards Mitigation Plan Update as an official updated plan; and

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

PASSED: 3/09/2020

  
\_\_\_\_\_  
Certifying Official

Andrew Eiche, City Administrator/Clerk/Treasurer

**RESOLUTION # 20-05**  
**03/03/2020**

**ADOPTING THE WASHBURN COUNTY ALL HAZARDS MITIGATION  
PLAN UPDATE**

**FISCAL IMPACT:** None

**WHEREAS**, the City of Spooner 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

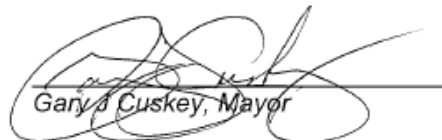
**WHEREAS**, an adopted all hazards mitigation plan is required by FEMA as a condition of future grant funding for mitigation projects; and

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

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

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

PASSED and adopted this 3<sup>rd</sup> day of March, 2020.

  
\_\_\_\_\_  
Gary A. Cuskey, Mayor

ATTESTED BY:

  
\_\_\_\_\_  
Patricia Parker, City Clerk

**RESOLUTION # 198-20**

**ADOPTING THE WASHBURN COUNTY ALL HAZARDS MITIGATION  
PLAN UPDATE**

**FISCAL IMPACT:** None

**WHEREAS**, the Village of Birchwood 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

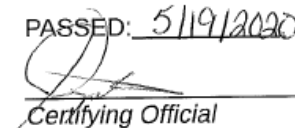
**WHEREAS**, an adopted all hazards mitigation plan is required by FEMA as a condition of future grant funding for mitigation projects; and

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

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

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

PASSED: 5/19/2020

  
\_\_\_\_\_  
Certifying Official

Roll Call

Nancy Seffinga, Rocky Vangilder, John Depoister, Stacey Small,

Nancy Seffinga, Second Stacey Small  
Carried 5-0

Appendix C: Plan Adoption

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**RESOLUTION # 2020-09-03**

**ADOPTING THE WASHBURN COUNTY ALL HAZARDS MITIGATION  
PLAN UPDATE**

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**FISCAL IMPACT:** None

**WHEREAS**, the Village of Minong 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 hazards mitigation plan is required by FEMA as a condition of future grant funding for mitigation projects; and


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

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

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

Passed this 9<sup>th</sup> Day of March, 2020.

  
\_\_\_\_\_  
President - Village of Minong

  
\_\_\_\_\_  
Clerk - Village of Minong

**RESOLUTION # 20-01**

**03/11/2020**

**ADOPTING THE WASHBURN COUNTY ALL HAZARDS MITIGATION  
PLAN UPDATE**

**FISCAL IMPACT:** None

**WHEREAS**, the Town of Barronett 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

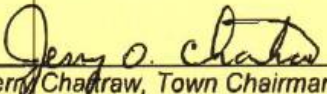
**WHEREAS**, an adopted all hazards mitigation plan is required by FEMA as a condition of future grant funding for mitigation projects; and

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


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

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

PASSED: March 11, 2020

  
Jerry Chafrow, Town Chairman

ATTESTED BY:

  
Patricia Parker, Town Clerk

RESOLUTION # \_\_\_\_\_

ADOPTING THE WASHBURN COUNTY ALL HAZARDS MITIGATION  
PLAN UPDATE

FISCAL IMPACT: None

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

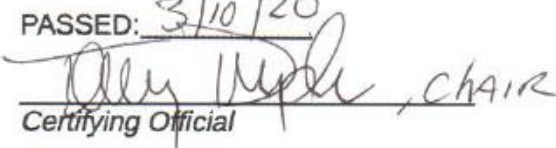
WHEREAS, undertaking hazard mitigation actions before disasters occur will reduce the potential for harm to people and property and save tax payer dollars; and

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

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

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

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

PASSED: 3/10/20  
  
\_\_\_\_\_  
Certifying Official, CHAIR



**RESOLUTION # 2020-1**

**ADOPTING THE WASHBURN COUNTY ALL HAZARDS MITIGATION  
PLAN UPDATE**

**FISCAL IMPACT:** None

**WHEREAS**, the Town of Bass Lake 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

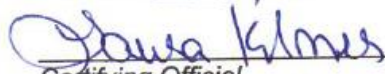
**WHEREAS**, an adopted all hazards mitigation plan is required by FEMA as a condition of future grant funding for mitigation projects; and

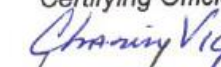
**WHEREAS**, the Town of Bass Lake participated jointly in the planning process with Washburn County and the other local units of government within the County to prepare an All Hazards Mitigation Plan Update, which was made available for review via a Legal Notice and a copy of which will reside permanently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

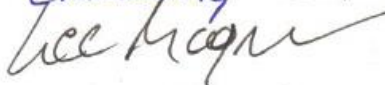
**NOW, THEREFORE, BE IT RESOLVED**, that the Town Board of the Town of Bass Lake, hereby adopts the Washburn County All Hazards Mitigation Plan Update as an official updated plan; and

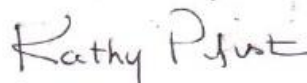
**BE IT FURTHER RESOLVED**, that the Washburn County Emergency Management Department will submit, on behalf of the Town, the adopted All Hazards Mitigation Plan Update to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final review and approval. Minor changes been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

PASSED: 3-10-20

 Chair  
Certifying Official

 Sup I

 Sup II

 Clerk

**RESOLUTION # 2020-1**

**ADOPTING THE WASHBURN COUNTY ALL HAZARDS MITIGATION  
PLAN UPDATE**

**FISCAL IMPACT:** None

**WHEREAS**, the Town of Beaverbrook 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 hazards mitigation plan is required by FEMA as a condition of future grant funding for mitigation projects; and

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

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

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

PASSED: Yes.

Henry J. [Signature] Chair  
Certifying Official

**RESOLUTION # R3-2020**

**ADOPTING THE WASHBURN COUNTY ALL HAZARDS MITIGATION  
PLAN UPDATE**

**FISCAL IMPACT:** None

**WHEREAS**, the Town of Birchwood 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 hazards mitigation plan is required by FEMA as a condition of future grant funding for mitigation projects; and

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

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

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

PASSED: 2-0, 3/9/2020

*Robert Stone*  
Certifying Official

**RESOLUTION # 2020-001**

**ADOPTING THE WASHBURN COUNTY ALL HAZARDS MITIGATION  
PLAN UPDATE**

**FISCAL IMPACT:** None

**WHEREAS**, the Town of Brooklyn 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 hazards mitigation plan is required by FEMA as a condition of future grant funding for mitigation projects; and

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

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

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

PASSED:

  
\_\_\_\_\_  
Certifying Official

5/11/2020



**RESOLUTION # 2020-1**

**ADOPTING THE WASHBURN COUNTY ALL HAZARDS MITIGATION  
PLAN UPDATE**

**FISCAL IMPACT:** None

**WHEREAS**, the Town of Casey 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 hazards mitigation plan is required by FEMA as a condition of future grant funding for mitigation projects; and

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

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

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

PASSED: 3 - 0

  
Certifying Official

Courne Stabaugh, Clerk

RESOLUTION # 202031873

**ADOPTING THE WASHBURN COUNTY ALL HAZARDS MITIGATION PLAN UPDATE**

**FISCAL IMPACT:** None

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

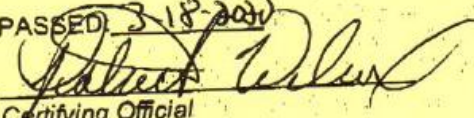
**WHEREAS**, undertaking hazard mitigation actions before disasters occur will reduce the potential for harm to people and property and save tax payer dollars; and

**WHEREAS**, an adopted all hazards mitigation plan is required by FEMA as a condition of future grant funding for mitigation projects; and

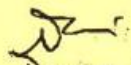
**WHEREAS**, the Town of Chicog participated jointly in the planning process with Washburn County and the other local units of government within the County to prepare an All Hazards Mitigation Plan Update, which was made available for review via a Legal Notice and a copy of which will reside permanently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

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

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

PASSED: 3-18-2020  
  
Certifying Official



Attest by  
  
Teressa L. Conner  
Town Clerk

**RESOLUTION # 3-12-20**

**ADOPTING THE WASHBURN COUNTY ALL HAZARDS MITIGATION  
PLAN UPDATE**

**FISCAL IMPACT:** None

**WHEREAS**, the Town of Crystal 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 hazards mitigation plan is required by FEMA as a condition of future grant funding for mitigation projects; and

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

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

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

**PASSED: 3-12-20**

  
\_\_\_\_\_  
Certifying Official

**RESOLUTION # 2020-1**

**ADOPTING THE WASHBURN COUNTY ALL HAZARDS MITIGATION  
PLAN UPDATE**

**FISCAL IMPACT:** None

**WHEREAS**, the Town of Evergreen 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

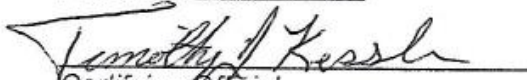
**WHEREAS**, an adopted all hazards mitigation plan is required by FEMA as a condition of future grant funding for mitigation projects; and

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

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

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

PASSED: 5/11/2020

  
\_\_\_\_\_  
Certifying Official



RESOLUTION # 65

ADOPTING THE WASHBURN COUNTY ALL HAZARDS MITIGATION  
PLAN UPDATE

**FISCAL IMPACT:** None

**WHEREAS**, the Town of Frog Creek 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

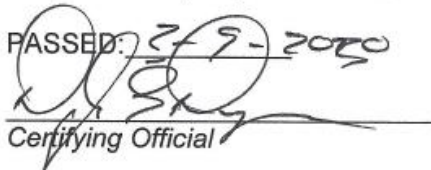
**WHEREAS**, an adopted all hazards mitigation plan is required by FEMA as a condition of future grant funding for mitigation projects; and

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

**NOW, THEREFORE, BE IT RESOLVED**, that the Town Board of the Town of Frog Creek, hereby adopts the Washburn County All Hazards Mitigation Plan Update as an official updated plan; and

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

PASSED: 3-9-2020

  
\_\_\_\_\_  
Certifying Official

*Ja Henninger, Clerk*  
*Certified 3-9-2020*

**RESOLUTION # 2020-01**

**ADOPTING THE WASHBURN COUNTY ALL HAZARDS MITIGATION  
PLAN UPDATE**

**WHEREAS**, the Town of Gull Lake 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 hazards mitigation plan is required by FEMA as a condition of future grant funding for mitigation projects; and


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

**NOW, THEREFORE, BE IT RESOLVED**, that the Town Board of the Town of Gull Lake, hereby adopts the Washburn County All Hazards Mitigation Plan Update as an official updated plan; and

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

Fiscal Impact: None

Approved this 10<sup>th</sup> day of March, 2020 by the Town of Gull Lake Board.

  
Katherine Berndt, Chair

Attest:  
  
Lolita Olson, Clerk/Treasurer

**Town of Long Lake, Washburn County**

**RESOLUTION #2020-1**

**ADOPTING THE WASHBURN COUNTY ALL HAZARDS MITIGATION  
PLAN UPDATE**

**FISCAL IMPACT:** None

**WHEREAS**, the Town of Long Lake 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

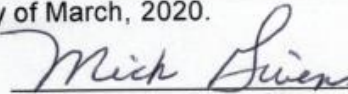
**WHEREAS**, an adopted all hazards mitigation plan is required by FEMA as a condition of future grant funding for mitigation projects; and

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

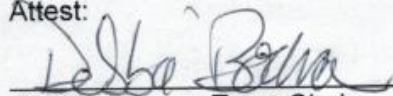
**NOW, THEREFORE, BE IT RESOLVED**, that the Town Board of the Town of Long Lake, hereby adopts the Washburn County All Hazards Mitigation Plan Update as an official updated plan; and

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

Passed and adopted this 10<sup>th</sup> day of March, 2020.

  
\_\_\_\_\_  
Mick Givens, Town Chairman

Attest:

  
\_\_\_\_\_  
Debbie Bouma, Town Clerk

**RESOLUTION # 2020-6-1**

**ADOPTING THE WASHBURN COUNTY ALL HAZARDS MITIGATION  
PLAN UPDATE**

**FISCAL IMPACT:** None

**WHEREAS**, the Town of Madge 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 hazards mitigation plan is required by FEMA as a condition of future grant funding for mitigation projects; and

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

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

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

PASSED: June 4, 2020

Town Board: Michael W. Baker Chairman, Michael Baker  
Derrick Olson Supervisor, Derrick Olson  
Kevon Cronk Supervisor, Kevon Cronk

Attested: Michelle Jung Clerk, Michelle Jung

Date: June 4 2020

**RESOLUTION # 105**

**ADOPTING THE WASHBURN COUNTY ALL HAZARDS MITIGATION  
PLAN UPDATE**

**FISCAL IMPACT:** None

**WHEREAS**, the Town of Minong 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 hazards mitigation plan is required by FEMA as a condition of future grant funding for mitigation projects; and

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

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

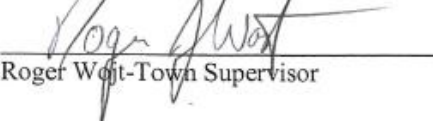
**BE IT FURTHER RESOLVED**, that the Washburn County Emergency Management Department will submit, on behalf of the Town, the adopted All Hazards Mitigation Plan Update to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final review and approval. Minor changes been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

  
Harold Smith-Town Chairman

  
Linda Featherly-Town Supervisor


  
Chuck Warner-Town Supervisor

  
Jim Smith-Town Supervisor

  
Roger Wojt-Town Supervisor

Adopted: March 9, 2020

Passed & Posted: 3/9/2020

Attest:   
Susan A Conaway-Town Clerk/Treasurer

Dated: 3/9/2020

**RESOLUTION # \_\_\_\_\_**

**ADOPTING THE WASHBURN COUNTY ALL HAZARDS MITIGATION  
PLAN UPDATE**

**FISCAL IMPACT:** None

**WHEREAS**, the Town of Sarona 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 hazards mitigation plan is required by FEMA as a condition of future grant funding for mitigation projects; and

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

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

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

PASSED: 11-2019

       Susan Krantz-Treasurer, Town of Sarona \_\_\_\_\_  
*Certifying Official*

**RESOLUTION # 03-10-2020**

**ADOPTING THE WASHBURN COUNTY ALL HAZARDS MITIGATION  
PLAN UPDATE (2020)**

**FISCAL IMPACT:** None

**WHEREAS**, the Town of Spooner 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

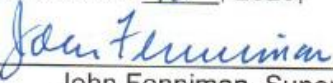
**WHEREAS**, an adopted all hazards mitigation plan is required by FEMA as a condition of future grant funding for mitigation projects; and

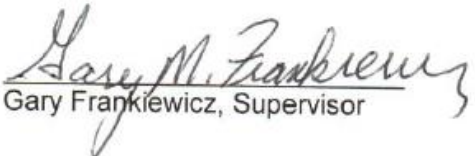
**WHEREAS**, the Town of Spooner participated jointly in the planning process with Washburn County and the other local units of government within the County to prepare an All Hazards Mitigation Plan Update, which was made available for review via a Legal Notice and a copy of which will reside permanently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

**NOW, THEREFORE, BE IT RESOLVED**, that the Town Board of Supervisors of the Town of Spooner, hereby adopts the Washburn County All Hazards Mitigation Plan Update as an official updated plan; and

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

Dated March 10<sup>th</sup>, 2020,

  
\_\_\_\_\_  
John Fenniman, Supervisor

  
\_\_\_\_\_  
Gary Frankiewicz, Supervisor

  
\_\_\_\_\_  
Miles McCone, Supervisor

**RESOLUTION # 2020-1**

**ADOPTING THE WASHBURN COUNTY ALL HAZARDS MITIGATION  
PLAN UPDATE**

**FISCAL IMPACT:** None

**WHEREAS**, the Town of SPRINGBROOK 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 hazards mitigation plan is required by FEMA as a condition of future grant funding for mitigation projects; and

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

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

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

PASSED: 3-10-20

*Wendy Bangert* CHAIRMAN  
Certifying Official



**RESOLUTION # 20-0310**

**ADOPTING THE WASHBURN COUNTY ALL HAZARDS MITIGATION  
PLAN UPDATE**

**FISCAL IMPACT:** None

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

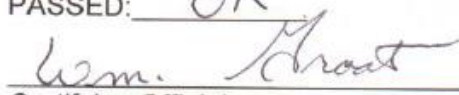
**WHEREAS**, undertaking hazard mitigation actions before disasters occur will reduce the potential for harm to people and property and save tax payer dollars; and

**WHEREAS**, an adopted all hazards mitigation plan is required by FEMA as a condition of future grant funding for mitigation projects; and

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

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

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

PASSED: OK  
  
\_\_\_\_\_  
Certifying Official

**RESOLUTION # 2020 03/09**

**ADOPTING THE WASHBURN COUNTY ALL HAZARDS MITIGATION  
PLAN UPDATE**

**FISCAL IMPACT:** None

**WHEREAS**, the Town of Stone Lake 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 hazards mitigation plan is required by FEMA as a condition of future grant funding for mitigation projects; and

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

**NOW, THEREFORE, BE IT RESOLVED**, that the Town Board of the Town of Stone Lake, hereby adopts the Washburn County All Hazards Mitigation Plan Update as an official updated plan; and

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

PASSED: March 9, 2020

Ted Crandell  
Certifying Official Ted Crandell, Town Chairman

**RESOLUTION # 05-01-20**

**ADOPTING THE WASHBURN COUNTY ALL HAZARDS MITIGATION  
PLAN UPDATE**

**FISCAL IMPACT:** None

**WHEREAS**, the Town of Trego 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 hazards mitigation plan is required by FEMA as a condition of future grant funding for mitigation projects; and

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

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

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

PASSED: 05-19-20

  
\_\_\_\_\_  
Certifying Official

## Appendix D: Report on Previous Mitigation Strategies

Report on Previous Mitigation Strategies							
Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefiting	Comments
All Hazards	Promote the use of National Oceanic and Atmospheric Administration (NOAA) weather radios	Covered by annual budget	EM Dept, City of Shell Lake	Ongoing, as grants available	Medium	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	<p>Municipally-owned sirens are in Spooner (4), Shell Lake (2), Birchwood (1), Minong (1). Otherwise, will encourage people to purchase their own radios.</p> <p>If a grant becomes available, would like to purchase radios for the rural people not covered by sirens.</p> <p><i>County has given to each building safety monitor. Hwy has weather channel on radios. Spooner not getting more radios. Stinnett went with weather radios.</i></p> <p><i>County EM and PH regularly promote. PH has small grant to give away. Promotes on social media. Shell Lake and Chicog have community radios out to people.</i></p> <p><i>Will carry forward.</i></p>
	Purchase and install two sirens to extend coverage.	~\$25,000	City of Spooner and Fire Department	As grant or other funding is available	High/ Very High	City of Spooner	Since the last plan, the City of Spooner has annexed some land. The Fire Department did a siren test and found that it was difficult to hear in some

Appendix D: Report on Previous Mitigation Strategies

Report on Previous Mitigation Strategies							
Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
							locations. They would like to extend siren coverage for these areas by purchasing two sirens. Priority is high generally and very high by the high school. <i>Since the last plan update, the City of Spooner has rebuilt the sirens to ensure future operations. The one downtown needs to be replaced and will cost appx. \$9K. Plan to do this in 2020.</i>
	Explore installing sirens at the Boy Scout Camp and at the Hunt Hill Campground.	~\$10,000	Town of Long Lake	2017	Medium	Town of Long Lake	<ul style="list-style-type: none"> <li>• There are 300 scouts at the camp per week. Three shelters have been put in during the last five years.</li> <li>• There are approximately 100 campers here each weekend. Building has a basement but would not be used as a shelter.</li> </ul> <i>The community will continue to explore cost-effective options for increasing safety at the camp grounds.</i>
	Continue to add/update Emergency Management Department links on the existing county web site (e.g., ARC, Homeland Security/FEMA, WEM, Ready.gov) especially focusing on preparedness bulletins. Publicize the website.	Covered by annual budget	EM Dept	Ongoing	Medium	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook,	<i>County EM currently has links to the National Flood Insurance Program, emergency kits, hail safety information, manufactured homes – piers and ground anchors; and will be adding winter weather awareness information.</i>

Appendix D: Report on Previous Mitigation Strategies

Report on Previous Mitigation Strategies							
Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
						Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	<p><i>Done as needed, will carry forward.</i></p> <p><i>The CI of Spooner will add a link to the county website in next five years.</i></p> <p><i>Village of Birchwood would also like to do this.</i></p>
	Publish a special section in the paper(s) of record with emergency information on severe weather and a list of emergency agencies to contact.	~\$3,000	EM Dept., Cities of Shell Lake and Spooner	As grant funding available	Medium	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	<p>FEMA PDM program grants may be a funding source.</p> <p><i>Not current method of publishing information - use social media, free media.</i></p> <p><i>Will drop and not carry forward.</i></p>

Appendix D: Report on Previous Mitigation Strategies

Report on Previous Mitigation Strategies							
Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
	Conduct a feasibility study and cost benefit analysis for installing a Reverse 9-1-1 communications system in the county. Explore options from vendors since costs are going down.	Covered by annual budget	EM Dept/ Sheriff's Dept./PH	Ongoing	Low	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	<p>This project is an expensive one that the county cannot afford but is important for rural notification. There are technical problems with switching capacity at the Century Tel switches.</p> <p><i>Will be dropped going forward, as the county has purchased CodeRed.</i></p> <p><i>An associated project will go forward as the county and its municipalities work together to promote the CodeRed system and its benefits. The VI of Birchwood will create a promotional campaign.</i></p>
	Purchase of CodeRed software	\$5,700/year	EM/Sheriff's Dept/EM	2016	High	All Communities	<p>Purchased 3 years ago.</p> <p><i>Will be dropped going forward, as this has been purchased.</i></p>
	Explore options for reducing/ eliminating gaps in the public safety radio communications network due to an area which is in a depression and there is no line-of-sight for radios.	Unknown funding source or cost	Town of Long Lake, Town of Birchwood	Ongoing	High	Towns of Long Lake and Birchwood	<p>The Town of Long Lake went to the Law Enforcement/ Emergency Management Committee. Land is available but the issue was not able to be funded.</p> <p><i>Issue with old and new equipment linking, but getting</i></p>

Appendix D: Report on Previous Mitigation Strategies

Report on Previous Mitigation Strategies							
Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
							<p><i>resolved. County purchased and installed a tower in Nov. 2018. The county has a lease with Tn of Long Lake for land. Tower is up and working.</i></p> <p><i>Will be dropped going forward.</i></p>
<b>Drought and Dust Storms</b>	Encourage municipalities to prepare/publicize water usage regulations/restrictions for non-farm areas during drought	Covered by annual budget	Municipalities	Ongoing	Low	Cities of Shell Lake and Spooner, Villages of Birchwood and Minong and Washburn Co (with and for the Towns)	<p>Monitored through DPW, City Administrator will address as needed.</p> <p><i>Shell Lake and Birchwood haven't had to do restrictions</i></p> <p><i>Spooner did exercise and found that they needed a new water lines. Installed in 2016 as part of Hwy. 63 upgrade.</i></p> <p><i>Will carry forward and tie together with strategy below.</i></p>
	Encourage residents and businesses to reduce water consumption through implementing water flow reduction measures.	Covered by annual budget	City of Spooner and Municipalities	Ongoing	Low	Cities of Shell Lake and Spooner, Villages of Birchwood and Minong and Washburn Co (with and for the Towns)	<p>Monitored through DPW, City Administrator will address as needed.</p> <p><i>PSC and focus on energy showing people how to reduce power and water usage.</i></p> <p><i>Will carry forward and tie together with strategy above.</i></p>



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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
	Conduct an assessment of water and sewage capacity for residential/human use and manufacturing/industrial needs based on existing and projected future inhabitants and development.	\$1,000/assessment	City of Shell Lake	2014	Low	City of Shell Lake	Will be completed by contractor in the future.  <i>Completed with DPW Director about 3 years ago and will be removed.</i>
	County should be prepared to provide information to farmers during times of drought (including information on the purchase of crop insurance)	Covered by annual budget	UW-Ext./FSA	As needed	Low	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Saron, Spooner, Springbrook, Stinnett, Stone Lake & Trego	The county has sandy soils so water mainly drains away after rains.  <i>There has been no need to do this during the last plan period because there have been no droughts.</i>  <i>Will carry forward.</i>
<b>Flooding and Dam Failure</b>	Do a hydrology analysis to determine if additional and/or upgraded culverts and/or bridges are required. *Tozier Lake Road (on the Yellow River in the Town of Evergreen) floods because the culverts are not	Unknown	Municipalities (Town of Evergreen & Co Hwy)	As grant funding available	Low	Town of Evergreen	The county did many flooding improvement projects after the 2001 Presidential Disaster Declaration for flooding.

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	large enough to handle sudden snow melts and strong rains.						<i>Not necessary - new pipes were oversized and worked. Will be dropped going forward.</i>
	<p>The county will continue to participate in the preparedness program and work with partners to monitor the dams and plans to ensure currency.</p> <ul style="list-style-type: none"> <li>The Minong and Trego utility dams are concerns.</li> </ul>	Covered by annual budget	EM Dept.	Ongoing	Medium	Towns of Minong and Trego	<p>Washburn Co. owns the dams, which are operated by North American Hydro. There is a program for maintenance and emergency planning for failures, which includes an annual tabletop exercise. Approximately 20-30 properties would be impacted by the failure of either dam. Both are regularly inspected and the Minong dam was rebuilt in 2013. North American Hydro is placing warning sirens on Trego Dam in 2014. There are campsites there. Will continue monitoring.</p> <p><i>Minong and Trego ERP updated annually. Will carry forward.</i></p>
	<ul style="list-style-type: none"> <li>The Nelson Lake Dam in Sawyer County has a slight chance of problems</li> </ul>				Low	Towns of Frog Creek and Minong	<p>The dam is on the Totogatic River and would impact the Towns of Frog Creek and Minong. The dam generates electricity and is the responsibility of Xcel Energy.</p>

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
	<ul style="list-style-type: none"> <li>Yellow River dam</li> </ul>				Low	City of Spooner	<p>Most other dams have no improved property downstream. Smaller dams were brought under stronger zoning laws in 2007 &amp; 2009. Zoning will manage building below dams.</p> <p><i>Still monitoring as needed.</i></p> <p>This is an old utility dam that is currently used by the WI DNR for their fish hatchery. If it breaches, there are 4 properties downstream that would likely be impacted.</p> <p><i>Still monitoring as needed. Did \$20K of spring maintenance - rehab hydraulic system that operates the gates (Spring 2019). Inspected annually in Spring and Fall. Future - will be maintenance items. Review EAP annually. Will look at signing off and exercising in future. Will carry forward.</i></p>
	Seal manholes below MSL 1226.0	\$50,000	City of Shell Lake	As grant funding available	Medium	City of Shell Lake	<p>WDOC and US EDA funding possible. Some done; working on as funding is available.</p> <p><i>Still progressing - some done during Hwy 63 update. Ongoing, so will carry forward.</i></p>

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
	Work with local, state and federal agencies in addressing the rising water of area lakes <i>to include developing a comprehensive strategy to manage lake levels to avoid loss.</i>	Covered by annual budget	City of Shell Lake	Ongoing	Medium	City of Shell Lake	This is part of an ongoing groundwater study. Some done; working on as funding is available.  <i>Have a plan and the ability to make lake levels by permit. Studies are part of the permit. Will carry forward with updated strategy verbiage.</i>
	Develop a comprehensive approach to reducing the possibility of damage and loss of function to structures, critical facilities and infrastructure.	~\$5,000	City of Shell Lake	As grant funding available	Medium	City of Shell Lake	FEMA PDM possible funding source. Some done; working on as funding is available.  <i>Covered by strategy immediately preceding this one. Will drop moving forward.</i>
	Conduct a regional flood elevation on Round Lake, Chain Lake and Little Ripley Lake.	~\$10,000	City of Shell Lake	As grant funding available	Medium	City of Shell Lake	FEMA's Flood Mitigation Program (FMA) and DNR possible funding source. Some done; working on as funding is available.  <i>Was part of diversion project. Will drop moving forward.</i>
	Follow through on all conditions of the Wisconsin DNR permit to assure continued operation of the diversion project.	Covered by annual budget	City of Shell Lake	Ongoing	Medium	City of Shell Lake	<i>Completed. Will drop moving forward.</i>
	Complete a hydrogeology study in the Shell Lake area to predict the effects of the diversion project on future lake levels of Shell Lake/other area lakes.	~\$100,000	City of Shell Lake	2009-2014	High	City of Shell Lake	In 6/06 the City of Shell Lake signed an agreement with the USGS to complete this study. The study was completed in 2006 but mapping still needs to be done.

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
							<i>Completed. Will be removed.</i>
	Identify sites where environmental restoration work can benefit flood mitigation efforts.	~\$3,000	City of Shell Lake, Village of Birchwood and LWCD	Ongoing	High	City of Shell Lake; Village of Birchwood	Work with LWCD and seek possible DNR funds.  <i>Flooding at Peepers Pond watershed. Culvert getting fixed in 2019.</i>  <i>Will continue to seek opportunities as they arise.</i>
	Identify sites and sources of funding with WEM/FEMA on moving buildings and/or acquisition of green space in floodplain areas.	~\$300,000	City of Shell Lake, WEM, FEMA	2009 - 2014	High	City of Shell Lake	FEMA's FMA and DNR possible funding sources.  <i>No RLPs- will be removed.</i>
	<i>Rebuild Elm Street storm/sewer system and added new sewer</i>	<i>\$50K</i>	<i>City of Spooner</i>	<i>2017-2019</i>	<i>Medium</i>	<i>City of Spooner</i>	<i>This project has been completed and will be removed.</i>
	<i>Build new subdivision on east end of town (East Hills)</i>	<i>Unknown</i>	<i>Village of Birchwood &amp; DNR</i>	<i>2014</i>	<i>High</i>	<i>Village of Birchwood</i>	<i>Worked with DNR on water management and put in a retention pond.</i>  <i>This project has been completed and will be removed.</i>
	Seal old manholes subjected to flooding	~\$40,000 – as funding available	City of Spooner	2015	Medium	City of Spooner	Some old manhole lids have holes in them. Some have been done but not all.  <i>Over the last 5 years, have spent appx. \$50K as roads updated. Will carry forward.</i>

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefiting	Comments
	Replace storm sewer system	~\$ 500,000 – as funding available	City of Spooner	2015	High	City of Spooner	The existing system is undersized and salt applied by the county highway dept. is destroying many of the concrete structures  <i>Scheduled for 2021. Securing funding with DOT now. \$290K. Will carry forward with amount changed to \$290K and timetable changed to 2021.</i>
	Construct a regional storm pond in TID 4 Industrial Park	\$340,000 – as funding available	City of Spooner	2014	Medium	City of Spooner	<i>Completed in 2015. Will be removed.</i>
	Create rain gardens up stream of existing storm sewers	\$5,000 – as funding available	City of Spooner	2014	Medium	City of Spooner	This will reduce overall flow and clean storm water before discharge to river. A couple of projects have been completed; more will be done.  <i>Last one was done in 2014. Will do in the future as funding is available.</i>  <i>Carry forward with timetable changed to “as funding is available.”</i>
	*Encourage the development of acquisition and management strategies to preserve open space for flood mitigation (e.g., buy out, elevation, flood-proofing).	Covered by annual budget	EM Dept.	Ongoing	Medium	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook,	<i>Will continue to seek opportunities as they arise. Carry forward.</i>

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
						Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	
	Raise road center line elevation two feet on CTH I – Just south of the intersection with Bobber Drive	\$36,000	Co. Hwy. Dept.	2018	Low	Washburn County, Town of Minong	Has flooded with heavy spring run-off; floods about every 5 years.  <i>Done in 2017 and will be dropped moving forward.</i>
	Elevate road center line three feet and install a balancing culvert pipe on CTH I – 100' south of Captain's Drive	\$42,000	Co. Hwy. Dept.	2018	Low	Washburn County, Town of Minong	Has flooded with heavy spring run-off; floods about every 5 years. This area has limited holding capacity on the west side of CTH I and may cause longer-term flooding. Flooding happens more often due to the Minong Flowage being a major contributor.  <i>Diverted water instead – will be dropped moving forward.</i>
	Develop a public information and education program on the impact of storm water to the community and critical facilities.	Covered by annual budget	EM Dept.	2012	Low	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of	<i>Mapped and shared with first responders – will be dropped moving forward</i>

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
						Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	
	*Provide information to citizens about the purchase of flood insurance	Covered by annual budget	EM Dept.	Ongoing	Medium	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook,	<p>Link will be made available on the website</p> <p><i>Done during disasters in the state by EM.</i></p> <p><i>Village of Birchwood will link to county website.</i></p> <p><i>City of Spooner will link to county website.</i></p> <p><i>Will carry forward.</i></p>



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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
						Stinnett, Stone Lake & Trego	
	Explore options for defining and addressing flooding.	Covered by annual budget	City of Spooner	2019	Medium	City of Spooner	<p>Minor flooding occurs on city streets a couple of times per year; major flooding occurs every couple of years. This impacts homes, government buildings and businesses as a result of Spring snow melt or heavy rains.</p> <p><i>The projects on Hwys 63 &amp; 21 will address the in-town flooding. Will be removed.</i></p>
	Evaluate and explore hazard mitigation options for the Highway 63 rebuild.	Covered by annual budget	City of Shell Lake and WI DNR	2019	Low	City of Shell Lake	<p>The Highway 63 rebuild has the potential for diverting more water and may flood the municipal airport. Working with DNR – there is a retention pond.</p> <p><i>Bigger pipes to pond. Done in 2016 and will be dropped moving forward.</i></p>
	Stabilize shoreline on the Totagatic River.	\$25K	LWCD	2018	High	Tn of Minong	<p><i>After 15" rain, LWCD designed, managed the bidding process and helped to execute installing about 100' of rip rap by the river for a land/homeowner who lost about 12' of shoreline property.</i></p>

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
							<i>Project completed and will be removed.</i>
	<i>Boat access road to Long Lake</i>	<i>\$19K. DNR did 70% funding &amp; LWCD provided match for labor; town funded remaining</i>		<i>2018</i>	<i>High</i>	<i>Tn of Long Lake</i>	<i>200' of rock to prep the road. Was eroding a gully into a live waterway and damaging road bed.  Project completed and will be removed.</i>
<b>Forest Fires and Wildfires</b>	The county would like to have the ability to print fire zone maps in-house on a 3-4 year update schedule.	\$9,000	County GIS Dept. and WI DNR	2019	Medium	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	The GIS Dept. and the DNR zone-mapped the whole county for emergency responders (fire and others). The project was funded by a mix of DNR grant funding and county funding. The maps will need to be updated over time to reflect changes/development.  <i>EM got software for GIS to be able to print internally. Saves a lot of money when minor changes. Hired dedicated GIS staff for mapping. This part of the strategy was completed in 2013-2014 and will be dropped moving forward. New strategy will be added for the book to be redone.</i>

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
	<p>Ensure emergency service access to all structures, critical facilities and other infrastructure by ensuring that driveways are adequate for emergency vehicle access.</p> <p>Old fire addressing signs need to be removed. New signs are double-sided and provided only for new properties.</p>	<p>Covered by annual budget;</p> <p>Grant funding possibly available from the Healthy Forest Restoration Act (HFRA) grant (50/50).</p>	<p>Zoning and Local Fire Departments</p>	<p>Ongoing</p>	<p>High</p>	<p>Washburn Co.; CIs of Spooner &amp; Shell Lake; VIs of Birchwood &amp; Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake &amp; Trego</p>	<p>Accomplished by:</p> <ul style="list-style-type: none"> <li>▪ Encourage the towns to enforce the county ordinance regarding driveway widths on a regular basis and on zoning permits for new construction. <i>Zoning is doing but there are 2 parallel programs.</i></li> <li>▪ Conduct public information campaign regarding the importance of adequate entries</li> <li>▪ Remove trees</li> <li>▪ May be funding options. CWPP is required first. Grant can have soft match.</li> <li>▪ The City of Shell Lake has no permitting process in place; the Administrator will address in the future. / <i>This is a work in progress and will be carried forward.</i></li> </ul> <p><i>Summer 2019-will starting replacing county signs with double-sides; will continue the project for the next 5 years.</i></p> <p><i>In 2010, new construction and faded numbers started getting updated.</i></p>

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
							<i>Funding notation for HFRA grant will be removed going forward. Land Information Grant funding project total is \$500K</i>
	Create a Community Wildfire Protection Plans (CWPP) for the entire county, focusing on high and very high areas first.		Local municipalities, Local fire departments, Emergency Management, DNR	2019	High	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	<i>The plan only covers 5 towns. DNR will target other high-rated towns individually. This will not continue as a county plan but will be carried forward as ongoing work by the municipalities.</i>
	Review and update zoning ordinances to standardize location of fire sign placement and road name signs.		County Zoning and EM Dept.	2019	High	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass	<ul style="list-style-type: none"> <li>• Get sign posts above snow line.</li> <li>• Fire resistant posts</li> <li>• Summary signs (list properties down and along unnamed roads)</li> </ul>

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefiting	Comments
						Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	<p><i>Ordinance updated by fire departments and Zoning; adopted 2016-2017.</i></p> <p><i>Sign placement, etc. is being done as part of another project elsewhere in this table.</i></p> <p><i>Will be removed.</i></p>
	Provide good public information on fire-safety and wildfire concerns. Encourage residents to have fire plans and practice evacuation routes.	Covered by annual budget	Local Fire Departments, DNR	Ongoing	Medium	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	<ul style="list-style-type: none"> <li>▪ Local departments provide public information regarding fires every year during fire safety week in October.</li> <li>▪ The DNR leads wildfire safety. Have worked together in the past and would like to continue with a stronger focus on wildfires (FIREWISE).</li> <li>▪ The Fire Association purchased a training trailer/smokehouse for children to go through.</li> <li>▪ DNR Fire Safety Week in April</li> </ul> <p><i>Fire departments do in October during fire week and also do other education.</i></p>

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
							<p><i>VI Birchwood - Education/promotion to schools annually in October. Open house/promotional materials annually during the third week of July.</i></p> <p><i>Will carry forward.</i></p>
	Ensure that local fire departments are aware of the changing fire-risk in their coverage areas each season.	Covered by annual budget	Local Fire Depts., DNR	Ongoing	High	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	<p>The DNR provides a wildfire book with areas of concern highlighted.</p> <p><i>Done regularly at countywide Fire Association meeting.</i></p> <p><i>Will carry forward.</i></p>
	Inspect high-risk areas and provide mitigation recommendations to facility owners.	Covered by annual budget	Spooner Fire Department	Ongoing	High	City of Spooner	The Spooner Fire Department contracts with the DNR to do FIREWISE inspections/education in high-risk areas. They also get GPS points of buildings, rate

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
							<p>maintenance issues and give recommendations for improvement. Project covers approximately 150 homes/year.</p> <p><i>Done by Firewise and will be removed.</i></p>
	Continue maintenance of a clear zone along the western edge of the City of Shell Lake to prevent fires.	Covered by annual budget	City of Shell Lake, DPW, Fire Department	Ongoing	Medium	City of Shell Lake	<p><i>School is in area. Done bi-annually by DPW.</i></p> <p><i>Ongoing routine maintenance. Will carry forward.</i></p>
	<i>Educate homeowners on clear-space zones as part of the home ignition site program.</i>	<i>Unknown</i>	<i>Towns of Minong, Brooklyn, Chicog &amp; Frog Creek</i>	<i>2024</i>	<i>High</i>	<i>Towns of Minong, Brooklyn, Chicog &amp; Frog Creek</i>	<p><i>3,000 assessments are being funded by the WI DNR, which is paying local fire departments \$20 per location as part of a Wildfire Risk Reduction program federal grant. The DNR has spent \$20,000 on two towns in Washburn. About 20% of homeowners who have received education are mitigating, which is considered a very high success rate. The initial thrust will be done in 5 years, then there will be ongoing maintenance.</i></p> <p><i>Will be carried forward.</i></p>
	Install dry hydrants in each of the 21 towns to ensure adequate emergency water supply.	\$1,000/town \$21,000 total	Local Fire Departments, EM Dept.	Ongoing	Medium	Towns of Barronett, Bashaw, Bass Lake, Beaverbrook,	Not all of the town fire departments have a solid water supply.

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
						Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake, Trego	<p><i>Is an Ongoing issue. As water levels have changed, dry hydrants are needing different maintenance.</i></p> <p><i>Will be carried forward with priority changed to low; noted that DNR may have grants; and language for measure changed to "Create more water access sites for every water supply."</i></p>
	Continue to enhance local intergovernmental cooperation in emergency response by, for example, providing ample training for volunteer firefighters for larger fires	Costs vary	Local Fire Depts., DNR, EM Dept.	Ongoing	High	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	<p>Local departments would like to have regular training a mock fire exercise every three years with the DNR.</p> <p><i>DNR completed a mock fire exercise in 2016.</i></p> <p><i>Minong area mock fire exercise planned for 2020.</i></p> <p><i>Countywide fire association did an exercise with law enforcement, EMS and Public Health.</i></p> <p><i>Will carry forward.</i></p>
<b>Severe Temperatures</b>	Continue public informational campaigns about severe weather and	Covered by annual budget	EM Dept. and Health Dept.	Ongoing	Medium	Washburn Co.; CIs of Spooner &	<ul style="list-style-type: none"> <li>Done in an annual campaign in spring (heat)</li> </ul>



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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
	preparing emergency kits for home and auto.					Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	<p>and fall (cold) and will be added to the website.</p> <ul style="list-style-type: none"> <li>• The City of Shell Lake also utilizes social media.</li> <li>• County HHS has a Facebook page with this information.</li> <li>• County EM has a Facebook page.</li> <li>• County EM sends information to county Highway department and to municipalities for use on social media and websites.</li> <li>• The county sends letters to daycares and adult living facilities in April to prepare for severe weather.</li> <li>• Shell Lake PD has a Facebook page tied to Twitter.</li> </ul> <p><i>Will carry forward.</i></p>
	Encourage the continued use of local facilities open to the elderly or those with disabilities needing a place to escape the extreme temperatures.	Covered by annual budget	Aging Dept., EM Dept., Health Dept. & City of Shell Lake	Ongoing	Medium	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood,	<p><i>There has been no call for this over the last 5 years. Emergency Management has a shelter map.</i></p> <p><i>Will carry forward.</i></p>

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
						Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	
<b>Storms: Hail</b>	Place hail storm safety materials on the website and publicize during severe weather week.	Covered by annual budget	EM Dept.	Ongoing	Medium	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	<i>Done in April each year and also using social media more. Done as part of the Skywarn program.</i>  <i>Will carry forward.</i>
	Make information available regarding the purchase of crop insurance	Covered by annual budget	UW Ext.	Ongoing	Low	Washburn Co.; CIs of Spooner & Shell Lake; VIs of	<i>Done on an as-needed basis.</i>  <i>Will carry forward.</i>

Appendix D: Report on Previous Mitigation Strategies

Report on Previous Mitigation Strategies							
Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefiting	Comments
						Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	
<b>Storms: Lightning</b>	Place lightning safety materials on the website and publicize during severe weather week.	Covered by annual budget	EM Dept.	Ongoing	Medium	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona,	<i>Done in April each year. Will carry forward.</i>

Appendix D: Report on Previous Mitigation Strategies

Report on Previous Mitigation Strategies							
Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefiting	Comments
						Spooner, Springbrook, Stinnett, Stone Lake & Trego	
	Explore options for properly grounding electrical equipment in all critical facilities.	~\$5,000	City of Shell Lake	Ongoing	Low	City of Shell Lake	<ul style="list-style-type: none"> <li>The city will plan for and/or install upgrades as the budget allows.</li> <li>Critical facilities identified include 2 well houses, 8 lift stations, city shop, water treatment plant.</li> <li>New facilities will be part of the engineering plan.</li> </ul> <p><i>Have been doing as PW budget allows. Is an ongoing project - will carry forward.</i></p>
	Provide information regarding the use of fire-resistant materials, lightning rods, surge protectors and other grounding equipment.	Covered by annual budget	EM Dept. and Local Fire Departments	Ongoing	Low	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Saronia, Spooner,	<p><i>County EM has provided lightning information annually during Spring's severe weather awareness campaigns. Area utilities have also sent out information with Fall's hazardous weather awareness campaigns.</i></p> <p><i>Fire departments have provided information about fire-resistant materials, lightning rods, etc.</i></p> <p><i>Will carry forward.</i></p>

Appendix D: Report on Previous Mitigation Strategies

Report on Previous Mitigation Strategies							
Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefiting	Comments
						Springbrook, Stinnett, Stone Lake & Trego	
<b>Storms: Thunderstorm</b>	Increase citizen understanding of thunderstorm warning and watch advisories.	Covered by annual budget	EM Dept	Ongoing	Medium	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Saron, Spooner, Springbrook, Stinnett, Stone Lake & Trego	Place thunderstorm safety materials on the website and publicize during severe weather week.  <i>Done in April each year.</i>  <i>County EM offers Skywarn training annually for citizens and will go to businesses/ nursing homes upon request.</i>  <i>Will carry forward.</i>
	Explore shelter options at the County Fairgrounds.	Unknown	Fair Board	As assistance available	Medium	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey,	<ul style="list-style-type: none"> <li>The fairground hosts the county fair and the rodeo – both very large local events.</li> <li>If funding were available for shelters, the board would be informed.</li> <li>There is an emergency plan in place.</li> </ul>

Appendix D: Report on Previous Mitigation Strategies

Report on Previous Mitigation Strategies							
Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
						Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Saron, Spooner, Springbrook, Stinnett, Stone Lake & Trego	<i>Focus has been on evacuation planning. A shelter for 5,000 people is not feasible. Will be removed.</i>
<b>Storms: Tornadoes and High Winds</b>	Explore the feasibility of constructing a tornado shelter in the county-owned Totogatic Campground and other campgrounds as deemed appropriate.	Costs vary	EM Dept	As grant funding available	Low	Washburn Co. and Village of Minong	Utilize Department of Commerce's CDBG for funding assistance.  <i>Explored but cost-prohibitive. Will look at reinforcing bathrooms. Will drop moving forward.</i>
	Explore options for a tornado shelter next to the municipal park/campground.	As grant funding is available	City of Shell Lake	2019	Medium	City of Shell Lake	<i>Explored but cost-prohibitive. Will drop moving forward.</i>
	Explore options for a tornado shelter for Park West and Pinewood mobile home parks.	As grant funding is available	City of Spooner	As grant funding available	Medium	City of Spooner	Identify at least one shelter.  <i>Explored but cost-prohibitive. Will drop moving forward.</i>
	Encourage builders and owners of manufactured and mobile homes to use tie-downs with ground anchors and personal shelters.	Covered by annual budget	EM Dept	Ongoing	Medium	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood,	Will provide information via website link.  <i>Added "personal shelters" to strategy. Can make personal shelters from new septic tanks buried under homes with trap doors.</i>

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Report on Previous Mitigation Strategies							
Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
						Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Saron, Spooner, Springbrook, Stinnett, Stone Lake & Trego	<p><i>Mobile home park in VI Birchwood has closed and ordinance does not allow a new one.</i></p> <p><i>The county will put on their website so when municipalities link, it is there.</i></p> <p><i>Done with Spring awareness campaign.</i></p> <p><i>Will carry forward.</i></p>
	Identify sites available to local citizens in a tornado and develop an implementation plan when a tornado is imminent.	As grant funding is available	City of Shell Lake, EM Dept, Health Dept. & ARC	Ongoing	Medium	City of Shell Lake and Village of Birchwood	<p><i>Tn Stinnett has storm shelter in Town Hall basement. Open 24/7 with propane back-up generator. CI Shell Lake - PD will open government facilities. PD does PA rounds in severe weather. VI Birchwood – people can go to the fire hall.</i></p> <p><i>Will carry forward.</i></p>
	Promote tornado awareness, including safety measures such as understanding the meaning of tornado warnings and watches	Covered by annual budget	EM Dept	Ongoing	Medium	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal,	<p><i>Done during tornado awareness week in April and by sponsoring Skywarn classes as requested. Information will be included on the website for homes, schools and business safety measures.</i></p> <p><i>VI Birchwood does a monthly sire test for storm sirens and posts the date/time all over town.</i></p>

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Report on Previous Mitigation Strategies							
Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
						Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	<i>Ongoing and will carry forward.</i>
<b>Storms: Winter</b>	Promote winter hazards awareness, including home and travel safety measures (including home and auto emergency kits).	Covered by annual budget	EM Dept	Ongoing	Medium	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	Done during winter weather awareness week in November and will be added to the website.  <i>Done annually and in November during awareness week. Will carry forward.</i>
	Clear roadways as quickly and efficiently as possible for emergency purposes.	Covered by annual budget	Washburn Co. Highway Dept.,	Ongoing, as needed	High	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood &	<i>Done as needed. Because this is a normal part of their job, this strategy will be dropped moving forward.</i>



Appendix D: Report on Previous Mitigation Strategies

Report on Previous Mitigation Strategies							
Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefiting	Comments
			Municipal DPWs			Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	
	Explore options for snow removal and dump plan near the hospital.	Covered by annual budget	City of Shell Lake and WI DNR	2019	Medium	City of Shell Lake	<p>The hospital is in the city but there is no green space to put the snow. In winter, snow piles up and blocks access for supply delivery and the Emergency Department. Flooding occurs between hospital and clinic.</p> <p><i>Is being updated with new 3-building plan. Slope and grade will be fixed to fix flooding and glare ice problem. New footprint will include dump site. Will be completed Nov. 2020. Will carry forward.</i></p>

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Report on Previous Mitigation Strategies							
Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
Utility Failure	Bury above-ground power lines in selected areas. These areas are highly dense with mature trees. Power disruption to customers is common, especially in storms.	Unknown (but in the millions of dollars for all projects)	Barron Electric Cooperative	As grant funding available	High	Towns of Long Lake, Madge, Birchwood, Spooner and Evergreen	<ul style="list-style-type: none"> <li>▪ Long Lake (sections of the Towns of Long Lake, Madge &amp; Birchwood) affects 450-500 members <i>Will be removed.</i></li> <li>▪ Holy Island (Town of Long Lake, sections 23 &amp; 26) affects approximately 50 members <i>Will carry forward.</i></li> <li>▪ Spooner Lake (Town of Spooner, sections 22, 26, 27 &amp; 35) affects approximately 130 members <i>Will carry forward.</i></li> <li>▪ Cable Lake (Town of Evergreen/Sect. 13 and Town of Spooner/Sect. 18) affects about 70 members <i>Will carry forward.</i></li> <li>▪ Spider Lake - Birchwood North (BN) &amp; Birchwood South (BS) townships, beginning in BN, section 29 feeding east to Spider Lake in BS, section 11. <i>Will affect approximately 101 members. Added 2019 and will carry forward.</i></li> </ul>
	Continue the partnership of the City of Shell Lake with local utility companies with inventorying critical	Covered by annual budget	Utilities, City of Shell Lake, Shell Lake	2014	Medium	City of Shell Lake	<i>Completed and will be dropped.</i>

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Report on Previous Mitigation Strategies							
Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
	assets and identifying potential concerns due to severe weather.		Fire Dept., EM Dept.				
	Add emergency power generators to buildings in Birchwood, Minong and Shell Lake for emergency heat, shelter and feeding.  Add emergency power generators to all of the volunteer fire halls in the county.	\$80,000/shelter or \$360,000 total  TBD	EM Dept.	As grant funding available	Medium	Cities of Spooner and Shell Lake and Villages of Birchwood and Minong	<ul style="list-style-type: none"> <li>There are very few emergency generators in the county so that when there is a power failure, there are no shelters.</li> <li>The Highway Shop has a generator and can serve as the EOC and/or a shelter.</li> <li>The hospitals have emergency generators for their use.</li> </ul>
	The Spooner City Hall/Police Department would like to install an emergency power generator	\$80,000	EM Dept	2019	High	City of Spooner	<i>No funding available yet; will carry all projects forward.</i>
	The Office of Tourism would like to install a generator to support emergency operations.	\$5,000	Tourism with EM Dept.	As funding available	Medium	Washburn County	
	Add emergency power generators to support the water and sewage systems. <ul style="list-style-type: none"> <li>Spooner would like to purchase and install 6 more stationary generators.</li> <li>Shell Lake would like to inventory the system, purchase and install where deficiencies exist.</li> </ul>	Approximately \$10,000/generator	Utilities, Cities of Shell Lake and Spooner	As grant funding available	Medium	Cities of Shell Lake and Spooner	<ul style="list-style-type: none"> <li>Spooner has 2 mobile and 3 stationary back-up generators for water and sewage. <i>Updated lift station to include generator (by EOC) so will work in an emergency.</i></li> <li>One generator would support the EOC (and a new hospital being built across the road because the lift station supporting this critical infrastructure</li> </ul>

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
							<p>currently has no permanent emergency generator. Got a generator for lift station that supported City Hall.</p> <p><i>Will carry this forward, removing the specific bullet points but leaving the general statement; to be completed as needed.</i></p>
<b>Pipeline Failure</b>	Continue pre-incident preparedness (i.e., planning, training, exercising) and equipping first responders for the consequences of a pipeline breach.	Unknown	Washburn County, municipal first response agencies	Ongoing	High	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	<p><i>Pipeline safety training is done annually in April for PD, FD, EMS, EM, utilities and contractors.</i></p> <p><i>Enbridge will be invited to Fire Association meetings.</i></p> <p><i>Will carry forward.</i></p>

\* - Denotes those mitigation strategies that support continued compliance with the National Flood Insurance Program (NFIP)

## Appendix D: Report on Previous Mitigation Strategies

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EM Dept. = Washburn County Emergency Management Department  
LWCD = Washburn County Land and Water Conservation Department  
DPW = Department of Public Works  
WDOC = Wisconsin Department of Commerce  
FSA = Farm Services Agency  
EDA = US Economic Development Administration  
CDBG = Community Development Block Grant  
PDM = Pre-Disaster Mitigation  
ARC = American Red Cross

DNR = Wisconsin Department of Natural Resources  
UW Ext. = University of Wisconsin Extension Service  
WEM = Wisconsin Emergency Management  
FEMA = Federal Emergency Management Agency  
USGS = United States Geological Survey  
GIS = Geographic Information System  
FMA = Flood Mitigation Program  
EOC = Emergency Operations Center

## Appendix E: Summary of Mitigation Strategies

Summary of Mitigation Strategies							
Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefiting	Comments
All Hazards	Promote the use of National Oceanic and Atmospheric Administration (NOAA) weather radios	Covered by annual budget	EM Dept, City of Shell Lake	Ongoing, as grants available	Medium	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	<p>Municipally-owned sirens are in Spooner (4), Shell Lake (2), Birchwood (1), Minong (1). Otherwise, will encourage people to purchase their own radios.</p> <p>If a grant becomes available, would like to purchase radios for the rural people not covered by sirens.</p> <p>County has given to each building safety monitor. Hwy has weather channel on radios. Spooner not getting more radios. Stinnett went with weather radios.</p> <p>County EM and PH regularly promote. PH has small grant to give away. Promotes on social media. Shell Lake and Chicog have community radios out to people.</p>
	Purchase and install two sirens to extend coverage.	~\$25,000	City of Spooner and Fire Department	As grant or other funding is available; plan to do in 2020	High/ Very High	City of Spooner	Since the last plan update, the City of Spooner has rebuilt the sirens to ensure future operations. The one downtown needs to be replaced and will cost appx. \$9K.

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
	Explore installing sirens at the Boy Scout Camp and at the Hunt Hill Campground.	~\$10,000	Town of Long Lake	2025	Medium	Town of Long Lake	<ul style="list-style-type: none"> <li>There are 300 scouts at the camp per week. Three shelters have been put in during the last five years.</li> <li>There are approximately 100 campers here each weekend. Building has a basement but would not be used as a shelter.</li> </ul> <p>The community will continue to explore cost-effective options for increasing safety at the camp grounds.</p>
	Check Spanish population and FEMA requirements to see if have to buy translator for CodeRed	\$250/year	Co EM, Sheriff Dept., PH	2020	Medium	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Saronia, Spooner, Springbrook, Stinnett, Stone Lake & Trego	Check alert and warning threshold population number for translation. Use 15% of the population.

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
	Continue the public information campaign on registering for CodeRed	Unknown	Co EM, PH, Sheriff Dept.	Ongoing	Medium	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Saron, Spooner, Springbrook, Stinnett, Stone Lake & Trego	EM puts info in ADRC newsletter (17K readers) and newspapers annually.
	Research/implement an emergency escape route in a vulnerable area of the community –Blue Bird Trail is a dead end road with a large number of properties along South Twin Lake.	Any and all grants available	Administration	2025	Medium	TN Chicog	Consider developing a connecting road system with Middle Road.
	Will work with the support of Co EM to develop a plan for emergency public communications, to include publicizing and educating the population on CodeRed.	Unknown	VI Minong, Co EM	Ongoing	Medium	VI Minong	
	Continue to evaluate and improve communications technology, as makes sense in a cost-benefit analysis.	Unknown	Co FDs, EMS, PD, SO, EM	As funding is available	High	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood &	



Summary of Mitigation Strategies							
Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefiting	Comments
						Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	
	Continue to add/update Emergency Management Department links on the existing county web site (e.g., ARC, Homeland Security/FEMA, WEM, Ready.gov) especially focusing on preparedness bulletins. Publicize the website.	Covered by annual budget	EM Dept	Ongoing	Medium	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner,	County EM currently has links to the National Flood Insurance Program, emergency kits, hail safety information, manufactured homes – piers and ground anchors; and will be adding winter weather awareness information.  The CI of Spooner will add a link to the county website in next five years.  Village of Birchwood would also like to do this.

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Summary of Mitigation Strategies							
Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefiting	Comments
						Springbrook, Stinnett, Stone Lake & Trego	
<b>Drought and Dust Storms</b>	Encourage municipalities to prepare/publicize water usage regulations/restrictions for non-farm areas during drought	Covered by annual budget	Municipalities	Ongoing	Low	Cities of Shell Lake and Spooner, Villages of Birchwood and Minong and Washburn Co (with and for the Towns)	Monitored through DPW, City Administrator will address as needed.  Shell Lake and Birchwood haven't had to do restrictions  Spooner did exercise and found that they needed a new water lines. Installed in 2016 as part of Hwy. 63 upgrade.  Tie together with strategy below.
	Encourage residents and businesses to reduce water consumption through implementing water flow reduction measures.	Covered by annual budget	City of Spooner and Municipalities	Ongoing	Low	Cities of Shell Lake and Spooner, Villages of Birchwood and Minong and Washburn Co (with and for the Towns)	Monitored through DPW, City Administrator will address as needed.  PSC and focus on energy showing people how to reduce power and water usage.  Tie together with strategy above.
	County should be prepared to provide information to farmers during times of drought (including information on the purchase of crop insurance)	Covered by annual budget	UW-Ext./FSA	As needed	Low	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver	The county has sandy soils so water mainly drains away after rains.  There has been no need to do this during the last plan period because there have been no droughts.

<b>Summary of Mitigation Strategies</b>							
<b>Hazard Type</b>	<b>Mitigation Measures</b>	<b>Costs of Project</b>	<b>Responsible Management</b>	<b>Project Timetable</b>	<b>Project Priority</b>	<b>Community(ies) Benefitting</b>	<b>Comments</b>
						Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	

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<p><b>Flooding and Dam Failure</b></p>	<p>The county will continue to participate in the preparedness program and work with partners to monitor the dams and plans to ensure currency.</p> <ul style="list-style-type: none"> <li>The Minong and Trego utility dams are concerns.</li>   <li>The Nelson Lake Dam in Sawyer County has a slight chance of problems</li> </ul>	<p>Covered by annual budget</p>	<p>EM Dept.</p>	<p>Ongoing</p>	<p>Medium</p> <p>Low</p>	<p>Towns of Minong and Trego</p> <p>Towns of Frog Creek and Minong</p>	<p>Washburn Co. owns the dams, which are operated by North American Hydro. There is a program for maintenance and emergency planning for failures, which includes an annual tabletop exercise. Approximately 20-30 properties would be impacted by the failure of either dam. Both are regularly inspected and the Minong dam was rebuilt in 2013. North American Hydro is placing warning sirens on Trego Dam in 2014. There are campsites there. Will continue monitoring.</p> <p>Minong and Trego ERP updated annually.</p> <p>The dam is on the Totogatic River and would impact the Towns of Frog Creek and Minong. The dam generates electricity and is the responsibility of Xcel Energy. Most other dams have no improved property downstream. Smaller dams were brought under stronger zoning laws in 2007 &amp; 2009. Zoning will manage building below dams.</p>
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	<ul style="list-style-type: none"> <li>Yellow River dam</li> </ul>				Low	City of Spooner	<p>This is an old utility dam that is currently used by the WI DNR for their fish hatchery. If it breaches, there are 4 properties downstream that would likely be impacted.</p> <p>Still monitoring as needed. Did \$20K of spring maintenance - rehab hydraulic system that operates the gates (Spring 2019). Inspected annually in Spring and Fall. Future - will be maintenance items. Review EAP annually. Will look at signing off and exercising in future.</p>
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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
	Seal manholes below MSL 1226.0	\$50,000	City of Shell Lake	As grant funding available	Medium	City of Shell Lake	WDOC and US EDA funding possible. Some done; working on as funding is available.  Still progressing - some done during Hwy 63 update.
	Work with local, state and federal agencies in addressing the rising water of area lakes to include developing a comprehensive strategy to manage lake levels to avoid loss.	Covered by annual budget	City of Shell Lake	Ongoing	Medium	City of Shell Lake	This is part of an ongoing groundwater study. Some done; working on as funding is available.  Have a plan and the ability to make lake levels by permit. Studies are part of the permit.
	Identify sites where environmental restoration work can benefit flood mitigation efforts.	~\$3,000	City of Shell Lake, Village of Birchwood and LWCD	Ongoing	High	City of Shell Lake; Village of Birchwood	Work with LWCD and seek possible DNR funds.  Flooding at Peepers Pond watershed. Culvert getting fixed in 2019.  Will continue to seek opportunities as they arise.
	Seal old manholes subjected to flooding	~\$40,000 – as funding available	City of Spooner	Ongoing	Medium	City of Spooner	Some old manhole lids have holes in them. Some have been done but not all.  Over the last 5 years, have spent appx. \$50K as roads updated.
	Replace storm sewer system	~\$ 290,000 – DOT funding	City of Spooner	2021	High	City of Spooner	The existing system is undersized and salt applied by the county highway dept. is destroying many of the concrete structures

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Summary of Mitigation Strategies							
Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefiting	Comments
	Create rain gardens up stream of existing storm sewers	\$5,000 – as funding available	City of Spooner	As funding available	Medium	City of Spooner	This will reduce overall flow and clean storm water before discharge to river. A couple of projects have been completed; more will be done. Last one done in 2014.
	*Encourage the development of acquisition and management strategies to preserve open space for flood mitigation (e.g., buy out, elevation, flood-proofing).	Covered by annual budget	EM Dept.	Ongoing	Medium	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	Will continue to seek opportunities as they arise.
	Fix terrible roadbed on Co HWY MD southeast – roadway is substandard and subject to washout.	\$2M	County and Long Lake Twp	As funding available	Very High	TN Long Lake	
	*Provide information to citizens about the purchase of flood insurance; Add web link to county Emergency Management site for information on NFLP	Covered by annual budget	EM Dept.	Ongoing	Medium	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of	Link will be made available on the website  Done during disasters in the state by EM.

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Summary of Mitigation Strategies							
Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
						Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	Village of Birchwood will link to county website.  City of Spooner will link to county website.
<b>Forest Fires and Wildfires</b>	Redo Zoning book.	\$9,000	County GIS Dept., WI DNR, Co EM, Fire Association	2024	Very High	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook,	



Summary of Mitigation Strategies							
Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
						Stinnett, Stone Lake & Trego	
	<p>Ensure emergency service access to all structures, critical facilities and other infrastructure by ensuring that driveways are adequate for emergency vehicle access.</p> <p>Old fire addressing signs need to be removed. New signs are double-sided and provided only for new properties.</p>	Covered by annual budget; \$500K Land Information Grant Funding	Zoning and Local Fire Departments	Ongoing	High	<p>Washburn Co.; CIs of Spooner &amp; Shell Lake; VIs of Birchwood &amp; Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Saron, Spooner, Springbrook, Stinnett, Stone Lake &amp; Trego</p>	<p>Accomplished by:</p> <ul style="list-style-type: none"> <li>▪ Encourage the towns to enforce the county ordinance regarding driveway widths on a regular basis and on zoning permits for new construction. <i>Zoning is doing but there are 2 parallel programs.</i></li> <li>▪ Conduct public information campaign regarding the importance of adequate entries</li> <li>▪ Remove trees</li> <li>▪ May be funding options. CWPP is required first. Grant can have soft match.</li> <li>▪ The City of Shell Lake has no permitting process in place; the Administrator will address in the future. /</li> </ul> <p>Summer 2019-will starting replacing county signs with double-sides; will continue the project for the next 5 years.</p>
	Create a Community Wildfire Protection Plans (CWPP) for the entire county, focusing on high and very high areas first.		Local municipalities, Local fire departments, Emergency	Ongoing	High	CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett,	DNR will target other high-rated towns individually.

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
			Management, DNR			Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	
	Provide good public information on fire-safety and wildfire concerns. Encourage residents to have fire plans and practice evacuation routes.	Covered by annual budget	Local Fire Departments, DNR	Ongoing	Medium	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook,	<ul style="list-style-type: none"> <li>▪ Local departments provide public information regarding fires every year during fire safety week in October.</li> <li>▪ The DNR leads wildfire safety. Have worked together in the past and would like to continue with a stronger focus on wildfires (FIREWISE).</li> <li>▪ The Fire Association purchased a training trailer/smokehouse for children to go through.</li> <li>▪ DNR Fire Safety Week in April</li> </ul>

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
						Stinnett, Stone Lake & Trego	Fire departments do in October during fire week and also do other education.  VI Birchwood - Education/promotion to schools annually in October. Open house/promotional materials annually during the third week of July.
	Ensure that local fire departments are aware of the changing fire-risk in their coverage areas each season.	Covered by annual budget	Local Fire Depts., DNR	Ongoing	High	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	The DNR provides a wildfire book with areas of concern highlighted.  Done regularly at countywide Fire Association meeting.
	Continue maintenance of a clear zone along the western edge of the City of Shell Lake to prevent fires.	Covered by annual budget	City of Shell Lake, DPW, Fire Department	Ongoing	Medium	City of Shell Lake	School is in area. Done bi-annually by DPW.  Ongoing routine maintenance.

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
	Educate homeowners on clear-space zones as part of the home ignition site program.	Unknown	Towns of Minong, Brooklyn, Chicog & Frog Creek	2024	High	Towns of Minong, Brooklyn, Chicog & Frog Creek	3,000 assessments are being funded by the WI DNR, which is paying local fire departments \$20 per location as part of a Wildfire Risk Reduction program federal grant. The DNR has spent \$20,000 on two towns in Washburn. About 20% of homeowners who have received education are mitigating, which is considered a very high success rate. The initial thrust will be done in 5 years, then there will be ongoing maintenance.
	Explore options for including whole building surge protectors at electrical panels for government facilities.	Unknown	Maintenance	Ongoing, as budget allows	Low	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner,	

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefiting	Comments
	Explore options for dealing with aging (v 2012) fire zone maps in Washburn County.	Unknown, has been done with DNR grants ~ \$10K	WI DNR, Co. EM, Co. GIS, Fire Chiefs Association	2020	High	Springbrook, Stinnett, Stone Lake & Trego Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Saron, Spooner, Springbrook, Stinnett, Stone Lake & Trego	
	Educate homeowners on clear-space zones.	DNR grants	WI DNR	Initial thrust 2024, then ongoing maintenance	Very High	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey,	Towns of Minong, Brooklyn, Chicog, Frog Creek are educating homeowners on clear-space zones. 3K assessments by DNR. DNR is paying local fire departments \$20/place Wildfire Risk Reduction (Federal grant, administered by DNR). DNR spent \$20K on two towns in Washburn Co. About 20% of

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Summary of Mitigation Strategies							
Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefiting	Comments
						Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	the homeowners receiving the education are completing mitigation tasks.
	Adopt the Community Wildfire Protection Plan (CWPP), including its hazard mitigation strategies.	DNR funding	???	???	???	All townships covered by a plan.	CWPP is cross-listed the with county hazard mitigation plan.
	Create more water access sites for every water supply.	\$1,000/town \$21,000 total  DNR may have grants	Local Fire Departments, EM Dept.	Ongoing	Low	Towns of Barronett, Bashaw, Bass Lake, Beaverbrook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake, Trego	Not all of the town fire departments have a solid water supply.  Is an Ongoing issue. As water levels have changed, dry hydrants are needing different maintenance.
	Continue to enhance local intergovernmental cooperation in emergency response by, for example, providing ample training for volunteer firefighters for larger fires	Costs vary	Local Fire Depts., DNR, EM Dept.	Ongoing	High	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of	Local departments would like to have regular training a mock fire exercise every three years with the DNR.

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
						Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	Minong area mock fire exercise planned for 2020.
<b>Severe Temperatures</b>	Continue public informational campaigns about severe weather and preparing emergency kits for home and auto.	Covered by annual budget	EM Dept. and Health Dept.	Ongoing	Medium	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook,	<ul style="list-style-type: none"> <li>• Done in an annual campaign in spring (heat) and fall (cold) and will be added to the website.</li> <li>• The City of Shell Lake also utilizes social media.</li> <li>• <i>County HHS has a Facebook page with this information.</i></li> <li>• County EM has a Facebook page.</li> <li>• County EM sends information to county Highway department and to municipalities for use on social media and websites.</li> <li>• The county sends letters to daycares and adult</li> </ul>

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Summary of Mitigation Strategies							
Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
						Stinnett, Stone Lake & Trego	living facilities in April to prepare for severe weather. <ul style="list-style-type: none"> <li>• Shell Lake PD has a Facebook page tied to Twitter.</li> </ul>
	Encourage the continued use of local facilities open to the elderly or those with disabilities needing a place to escape the extreme temperatures.	Covered by annual budget	Aging Dept., EM Dept., Health Dept. & City of Shell Lake	Ongoing	Medium	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Saron, Spooner, Springbrook, Stinnett, Stone Lake & Trego	Emergency Management has a shelter map.
<b>Storms: Hail</b>	Place hail storm safety materials on the website and publicize during severe weather week.	Covered by annual budget	EM Dept.	Ongoing	Medium	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver	Done in April each year and also using social media more. Done as part of the Skywarn program.



Summary of Mitigation Strategies							
Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefiting	Comments
						Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	
	Make information available regarding the purchase of crop insurance	Covered by annual budget	UW Ext.	Ongoing	Low	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	Done on an as-needed basis.

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Summary of Mitigation Strategies							
Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
<b>Storms: Lightning</b>	Place lightning safety materials on the website and publicize during severe weather week.	Covered by annual budget	EM Dept.	Ongoing	Medium	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	Done in April each year.
	Explore options for properly grounding electrical equipment in all critical facilities.	~\$5,000	City of Shell Lake	Ongoing	Low	City of Shell Lake	<ul style="list-style-type: none"> <li>The city will plan for and/or install upgrades as the budget allows.</li> <li>Critical facilities identified include 2 well houses, 8 lift stations, city shop, water treatment plant.</li> <li>New facilities will be part of the engineering plan.</li> </ul>
	Provide information regarding the use of fire-resistant materials, lightning rods, surge protectors and other grounding equipment.	Covered by annual budget	EM Dept. and Local Fire Departments	Ongoing	Low	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of	County EM has provided lightning information annually during Spring's severe weather awareness campaigns. Area utilities have also sent out

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Summary of Mitigation Strategies							
Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
						Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	information with Fall's hazardous weather awareness campaigns.  Fire departments have provided information about fire-resistant materials, lightning rods, etc.
<b>Storms: Thunderstorm</b>	Increase citizen understanding of thunderstorm warning and watch advisories.	Covered by annual budget	EM Dept	Ongoing	Medium	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook,	Place thunderstorm safety materials on the website and publicize during severe weather week.  Done in April each year.  County EM offers Skywarn training annually for citizens and will go to businesses/ nursing homes upon request.

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
						Stinnett, Stone Lake & Trego	
<b>Storms: Tornadoes and High Winds</b>	Encourage builders and owners of manufactured and mobile homes to use tie-downs with ground anchors and personal shelters.	Covered by annual budget	EM Dept	Ongoing	Medium	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	<p>Will provide information via website link.</p> <p>Can make personal shelters from new septic tanks buried under homes with trap doors.</p> <p>Mobile home park in VI Birchwood has closed and ordinance does not allow a new one.</p> <p>The county will put on their website so when municipalities link, it is there.</p> <p>Done with Spring awareness campaign.</p>
	Identify sites available to local citizens in a tornado and develop an implementation plan when a tornado is imminent.	As grant funding is available	City of Shell Lake, EM Dept, Health Dept. & ARC	Ongoing	Medium	City of Shell Lake and Village of Birchwood	<i>Tn</i> Stinnett has storm shelter in Town Hall basement. Open 24/7 with propane back-up generator. CI Shell Lake - PD will open government facilities. PD does PA rounds in severe weather. VI Birchwood – people can go to the fire hall.
	Promote tornado awareness, including safety measures such as understanding the meaning of tornado warnings and watches	Covered by annual budget	EM Dept	Ongoing	Medium	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood &	Done during tornado awareness week in April and by sponsoring Skywarn classes as requested.

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefiting	Comments
						Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	Information will be included on the website for homes, schools and business safety measures.  VI Birchwood does a monthly sire test for storm sirens and posts the date/time all over town.
<b>Storms: Winter</b>	Promote winter hazards awareness, including home and travel safety measures (including home and auto emergency kits).	Covered by annual budget	EM Dept	Ongoing	Medium	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona,	Done during winter weather awareness week in November and will be added to the website.  Done annually and in November during awareness week.

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Summary of Mitigation Strategies							
Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
	Explore options for snow removal and dump plan near the hospital.	Covered by annual budget	City of Shell Lake and WI DNR	2020	Medium	Spoooner, Springbrook, Stinnett, Stone Lake & Trego City of Shell Lake	The hospital is in the city but there is no green space to put the snow. In winter, snow piles up and blocks access for supply delivery and the Emergency Department. Flooding occurs between hospital and clinic.  Is being updated with new 3 building plan. Slope and grade will be fixed to fix flooding and glare ice problem. New footprint will include dump site. Will be completed Nov. 2020.
<b>Utility Failure</b>	Bury above-ground power lines in selected areas. These areas are highly dense with mature trees. Power disruption to customers is common, especially in storms.	Unknown (but in the millions of dollars for all projects)	Barron Electric Cooperative	As grant funding available	High	Towns of Long Lake, Birchwood, Spooner and Evergreen	<ul style="list-style-type: none"> <li>▪ Holy Island (Town of Long Lake, sections 23 &amp; 26) affects approximately 50 members</li> <li>▪ Spooner Lake (Town of Spooner, sections 22, 26, 27 &amp; 35) affects approximately 130 members</li> <li>▪ Cable Lake (Town of Evergreen/Sect. 13 and Town of Spooner/Sect. 18) affects about 70 members</li> <li>▪ Spider Lake - Birchwood North (BN) &amp; Birchwood</li> </ul>

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
							South (BS) townships, beginning in BN, section 29 feeding east to Spider Lake in BS, section 11. Will affect approximately 101 members.
	Add emergency power generators to buildings in Birchwood, Minong and Shell Lake for emergency heat, shelter and feeding.	\$80,000/shelter or \$360,000 total	EM Dept.	As grant funding available	Medium	Cities of Spooner and Shell Lake and Villages of Birchwood and Minong	<ul style="list-style-type: none"> <li>• There are very few emergency generators in the county so that when there is a power failure, there are no shelters.</li> <li>• The Highway Shop has a generator and can serve as the EOC and/or a shelter.</li> <li>• The hospitals have emergency generators for their use.</li> </ul>
	Add emergency power generators to all of the volunteer fire halls in the county.	TBD					
	The Spooner City Hall/Police Department would like to install an emergency power generator	\$80,000	EM Dept	As funding available	High	City of Spooner	
	The Office of Tourism would like to install a generator to support emergency operations.	\$5,000	Tourism with EM Dept.	As funding available	Medium	Washburn County	
	Include back-up generator in new building bid specs.	Unknown	CI Shell Lake	2024	High	CI Shell Lake	
	Ensure that adequate facilities with back-up power exist within the county to allow critical government services (e.g., EOCs) and public sheltering in a power outage.	Cost vary by location and infrastructure required	Administration	Ongoing	High	Co Washburn	Co PH has done a generator survey in the county. Highway shop is only county building w/ generator that can meet all of its power all needs.
	Work with Xcel Energy to ensure that there is adequate power and	Unknown	Utilities, CI Shell Lake	Ongoing	Medium	CI Shell Lake	The new HHS building (along with the airport and other new

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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
	infrastructure to support it coming into Shell Lake.						buildings in Shell Lake) will draw more power.
	Electric co-ops will continue to evaluate electric lines.	Unknown	Utilities	2024, as budgets allow	High	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Saron, Spooner, Springbrook, Stinnett, Stone Lake & Trego	
	Add emergency power generators to support the water and sewage systems.	Approximately \$10,000/generator	Utilities, Cities of Shell Lake and Spooner	As grant funding available	Medium	Cities of Shell Lake and Spooner	<ul style="list-style-type: none"> <li>• Spooner has 2 mobile and 3 stationary back-up generators for water and sewage. Updated lift station to include generator (by EOC) so will work in an emergency.</li> <li>• One generator would support the EOC (and a new hospital being built across the road because the lift station supporting</li> </ul>



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Hazard Type	Mitigation Measures	Costs of Project	Responsible Management	Project Timetable	Project Priority	Community(ies) Benefitting	Comments
							this critical infrastructure currently has no permanent emergency generator. Got a generator for lift station that supported City Hall.
<b>Pipeline Failure</b>	Continue pre-incident preparedness (i.e., planning, training, exercising) and equipping first responders for the consequences of a pipeline breach.	Unknown	Washburn County, municipal first response agencies	Ongoing	High	Washburn Co.; CIs of Spooner & Shell Lake; VIs of Birchwood & Minong; TNs of Barronett, Bashaw, Bass Lake, Beaver Brook, Birchwood, Brooklyn, Casey, Chicog, Crystal, Evergreen, Frog Creek, Gull Lake, Long Lake, Madge, Minong, Sarona, Spooner, Springbrook, Stinnett, Stone Lake & Trego	Pipeline safety training is done annually in April for PD, FD, EMS, EM, utilities and contractors.  Enbridge will be invited to Fire Association meetings.

\* - Denotes those mitigation strategies that support continued compliance with the National Flood Insurance Program (NFIP)  
 EM Dept = Washburn County Emergency Management Department  
 LWCD = Washburn County Land and Water Conservation Department  
 DPW = Department of Public Works  
 WDOC = Wisconsin Department of Commerce  
 FSA = Farm Services Agency  
 EDA = US Economic Development Administration  
 CDBG = Community Development Block Grant  
 ARC = American Red Cross  
 DNR = Wisconsin Department of Natural Resources  
 UW Ext. = University of Wisconsin Extension Service  
 WEM = Wisconsin Emergency Management  
 FEMA = Federal Emergency Management Agency  
 USGS = United States Geological Survey  
 GIS = Geographic Information System  
 FMA = Flood Mitigation Program  
 EOC = Emergency Operations Center

## Appendix F: HAZUS Vulnerability Assessment

### Identify Hazards

Washburn County covers 810 square miles and contains 1,557 census blocks. There are over 7,000 households with a population of 16,036. Washburn County consists of 2 cities, 2 villages, and 21 towns. There are an estimated 10,233 buildings in the region with a total building replacement value (excluding contents) of 1,555 million dollars (2006 dollars). Approximately 99.5% of the buildings (and 78.3% of the building value) are associated with residential housing. (2000 Census Bureau Data).

Washburn County is located in the northwestern portion of Wisconsin. It is bordered by Barron County to the south, Douglas County to the north, Sawyer County to the east, and Burnett County to the west.

The following flooding sources were studied by detailed methods for their entire shorelines within the county: Red Cedar Lake, Bear Lake, Trego Lake, Matthews Lake, Spooner Lake, McKenzie Lake, Middle Lake, Middle McKenzie Lake, Long Lake, and Mud Lake.

### Principal Flood Problems:

Low-lying areas adjacent to the lakes studied by detailed methods are periodically inundated by floodwaters, especially in the spring when the snow melts.

From Washburn's Flood Insurance Study prepared in 1998.

### **HAZUS-MH Hazard Analysis**

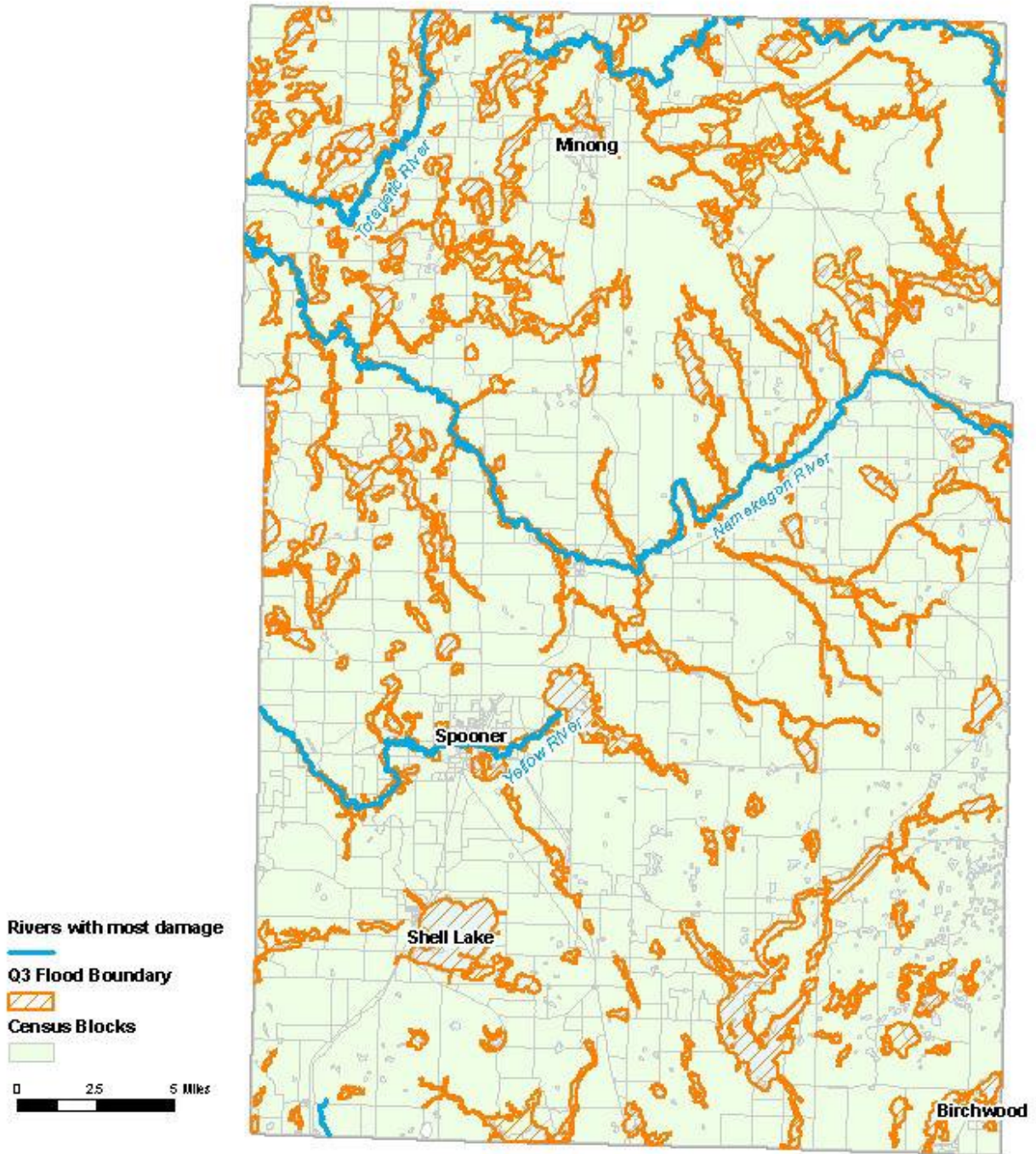
Flood analysis for Washburn was performed using HAZUS-MH MR3 released in July 2007. The bundled aggregated general building stock was updated to Dun & Bradstreet 2006. Building valuations were updated to R.S. Means 2006. Building counts based on census housing unit counts are available for RES1 (single-family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

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

HAZUS-MH was used to generate the flood depth grid for a 100-year return period calculated by clipping the USGS 30m DEM to the Q3 boundary.

Figure 1 depicts the flood boundary from the HAZUS-MH analysis. The majority of flooding appears to occur along the Namekagon River, Yellow River, and Totagatic River.

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



**HAZUS-MH Aggregate Loss Analysis**

HAZUS-MH was used to estimate the damages for a 100-year flood event in Washburn County. An estimated 174 buildings will be damaged totaling in \$44.9 million in building losses and \$78.9 million in total economic losses. The total estimated number of damaged buildings, total building losses, and estimated total economic losses are shown in Table 1.

HAZUS-MH estimates 9 census blocks with losses exceeding \$1 million. The distribution of losses is shown in Figure 2.

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

**Table 1: Washburn County Total Economic Loss - 100-Year Flood**

General Occupancy	Estimated Total Buildings	Total Damaged Buildings	Total Building Exposure X 1000	Total Economic Loss X 1000	Building Loss X 1000
Agricultural	0	0	\$13,008	\$974	\$326
Commercial	39	0	\$214,538	\$11,375	\$2,968
Education	0	0	\$15,357	\$336	\$62
Government	7	0	\$20,300	\$315	\$48
Industrial	2	0	\$49,525	\$3,399	\$1,202
Religious/Non-Profit	4	0	\$24,725	\$1,197	\$193
Residential	10,181	174	\$1,217,283	\$61,258	\$40,127
<b>Total</b>	<b>10,233</b>	<b>174</b>	<b>\$1,554,736</b>	<b>\$78,854</b>	<b>\$44,926</b>

The reported building counts should be interpreted as degrees of loss rather than as exact numbers of buildings exposed to flooding. These numbers were derived

## Appendix F: HAZUS Vulnerability Assessment

from aggregate building inventories which are assumed to be dispersed evenly across census blocks. HAZUS-MH requires that a predetermined amount of square footage of a typical building sustain damage in order to produce a damaged building count. If only a minimal amount of damage to buildings is predicted, it is possible to see zero damaged building counts while also seeing economic losses.

**Figure 2: Washburn Total Economic Loss – 100 Year Flood**

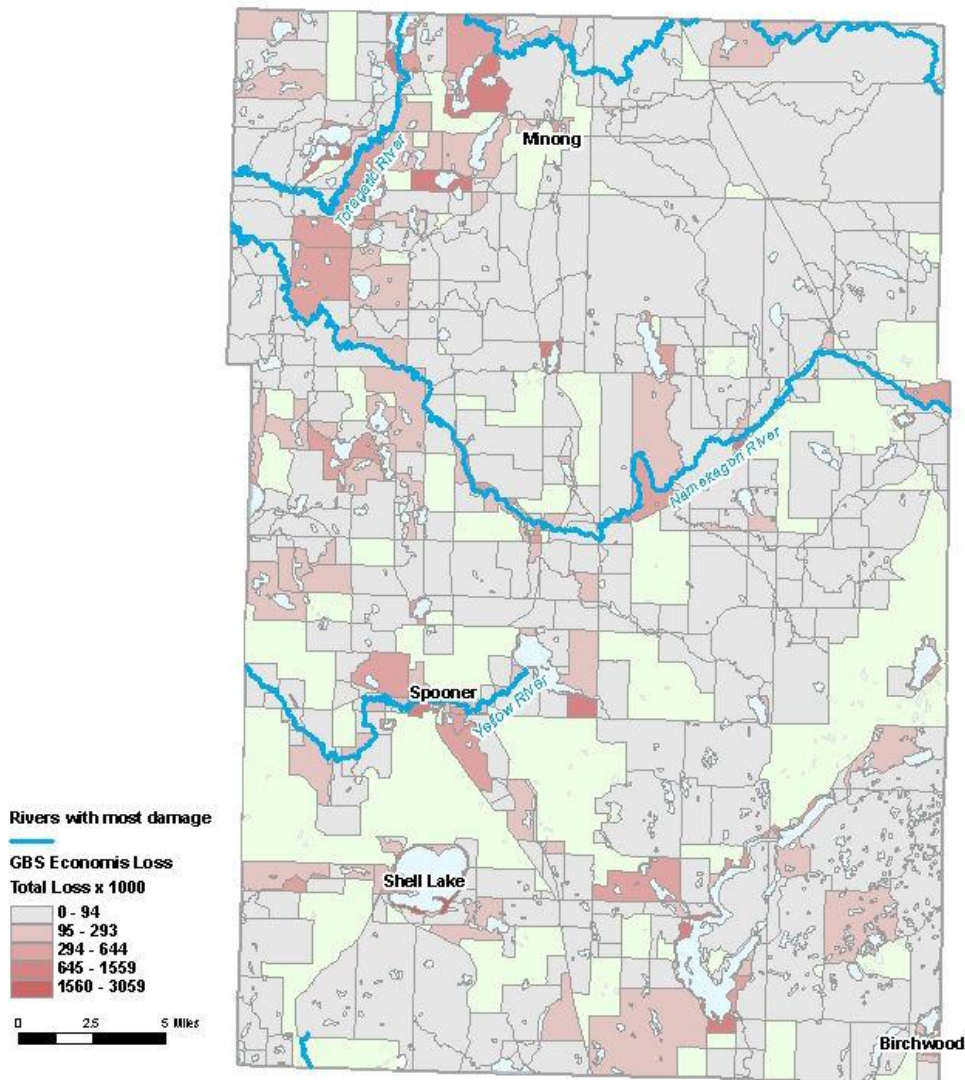


Figure 3a: Flood Damage Exposure in Shell Lake



Figure 3a shows census blocks overlaid with the flood boundary and orthophoto of Shell Lake Rapids. Census block 551299506002029 has an estimated building loss of \$428 thousand and a combined replacement cost of \$1.03million. HAZUS-MH estimates that 6 residential buildings are within the calculated flood boundary for this block. However, the orthophoto shows only 1 building that is at risk within the Q3 flood boundary.

Figure 3b: Flood Damage Exposure in Springbrook

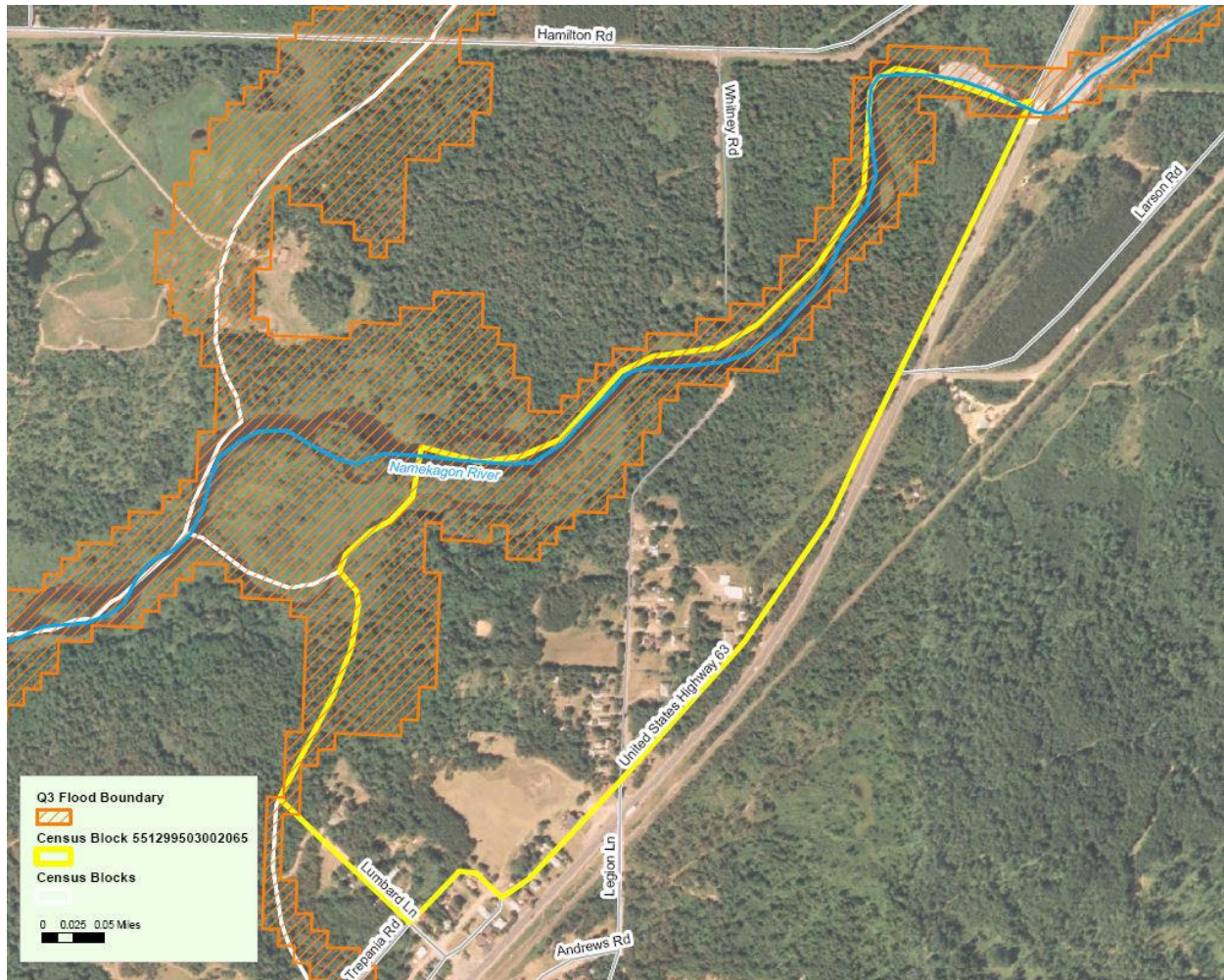


Figure 3b shows census blocks overlaid with the flood boundary and orthophoto in Springbrook. Census block 551299503002065 has an estimated building loss of \$398 thousand with a combined replacement cost of \$759 thousand. HAZUS-MH estimates that 2 residential buildings are within the flood boundary for this block. However, the orthophoto shows that none of the buildings in the census block are located within the Q3 floodplain boundary.



**HAZUS-MH Essential Facility Loss Analysis**

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

The HAZUS-MH analysis identified 1 School that may be subject to flooding. A list of the essential facilities within Washburn County is included in Tables 2 and 3. Maps of essential facilities potentially at risk of flooding are shown in Figure 4.

**Table 2: Washburn Essential Facility Loss - 100-Year Flood**

Class	Building Count	At Least Moderate Damage	At Least Substantial Damage	Loss of Use
Care Facilities	4	0	0	0
EOC	0	0	0	0
Fire Stations	5	0	0	0
Police Stations	9	0	0	0
Schools	12	1	0	1
<b>Total</b>	<b>30</b>	<b>1</b>	<b>0</b>	<b>1</b>

**Table 3: Washburn Damaged Essential Facilities**

Facility Name
Wisconsin Indianhead Tech College*

\* Essential Facilities that may be outside of the 100 year flood boundary according to orthophoto interpretation or address verification.

Figure 4: 100-Year Flood Boundary Overlaid with Essential Facilities



Essential facility locations were imported from the best available statewide sources. Some instances have been observed where HAZUS-MH reports a site within the flood plain that cannot be confirmed by the corresponding orthophoto, as in Figure 4a. The essential facility damages reported by HAZUS-MH may be overstated

### **HAZUS-MH Shelter Requirement Analysis**

HAZUS-MH estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. HAZUS-MH also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 407 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 165 people (out of a total population of 16,036) will seek temporary shelter in public shelters.

**HAZUS-MH State Property Loss Analysis**

The flood boundaries were overlaid with State of Wisconsin property boundaries as provided by the Department of Natural Resources within Washburn County. Table 4 provides the names of state properties that overlay with the HAZUS-MH flood boundary. Figures 5a and 5b show examples of the inundated areas.

**Table 4: Washburn State Property Flood Inundation**

State Property	Percent Inundated	Acres Inundated
Beaver Brook Wildlife Area	22%	417
Rem-Bear Lake	95%	248
Bean Brook Fishery Area	16%	230
State Owned Islands	78%	142
Totogatic Wildlife Area	32%	139
Statewide Spring Ponds	48%	77
Mckenzie Creek Fishery Area	62%	69
Rem-Spooner Lake	70%	58
Rem-Namekagon River	32%	50
Statewide Habitat Areas	46%	47
Wild Rivers State Trail	10%	44
Whalen Creek Fishery Area	22%	41
Ernie Swift Youth Camp	41%	36
Sawyer Creek Fishery Area	4%	32
Shell Creek Fishery Area	96%	23
Mackey Creek Fishery Area	96%	17
Flat Creek Wildlife Area	8%	12
Statewide Public Access	29%	10
Totogatic River Fishery Area	97%	10
Statewide Natural Area	2%	10
Gov. Tommy G. Thompson Hatchery	9%	10
Shell Lake Rearing Station	43%	7
Namekagon River Public Access	52%	5
Tuscobia State Trail	6%	2
Minong Station	16%	2

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

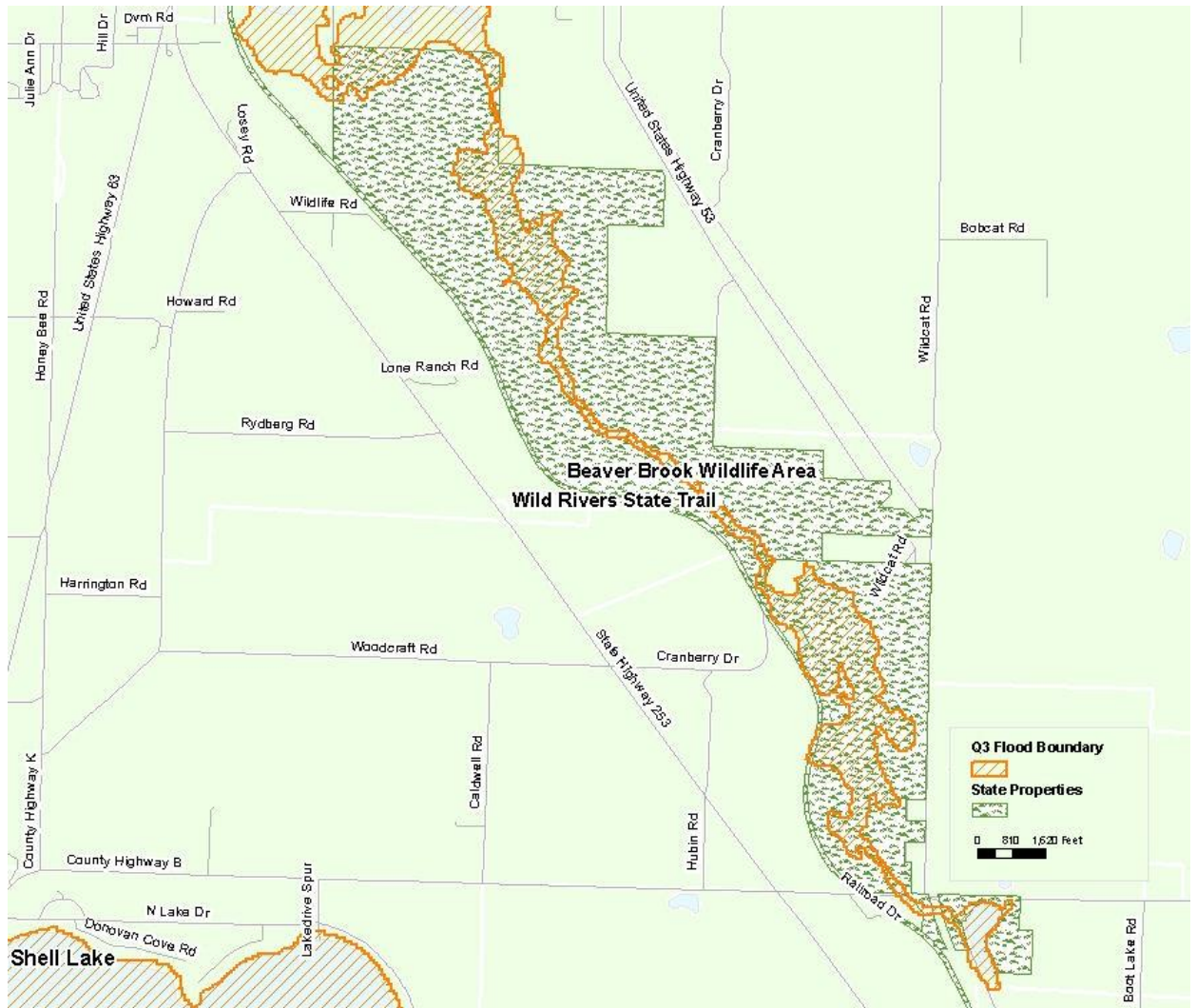
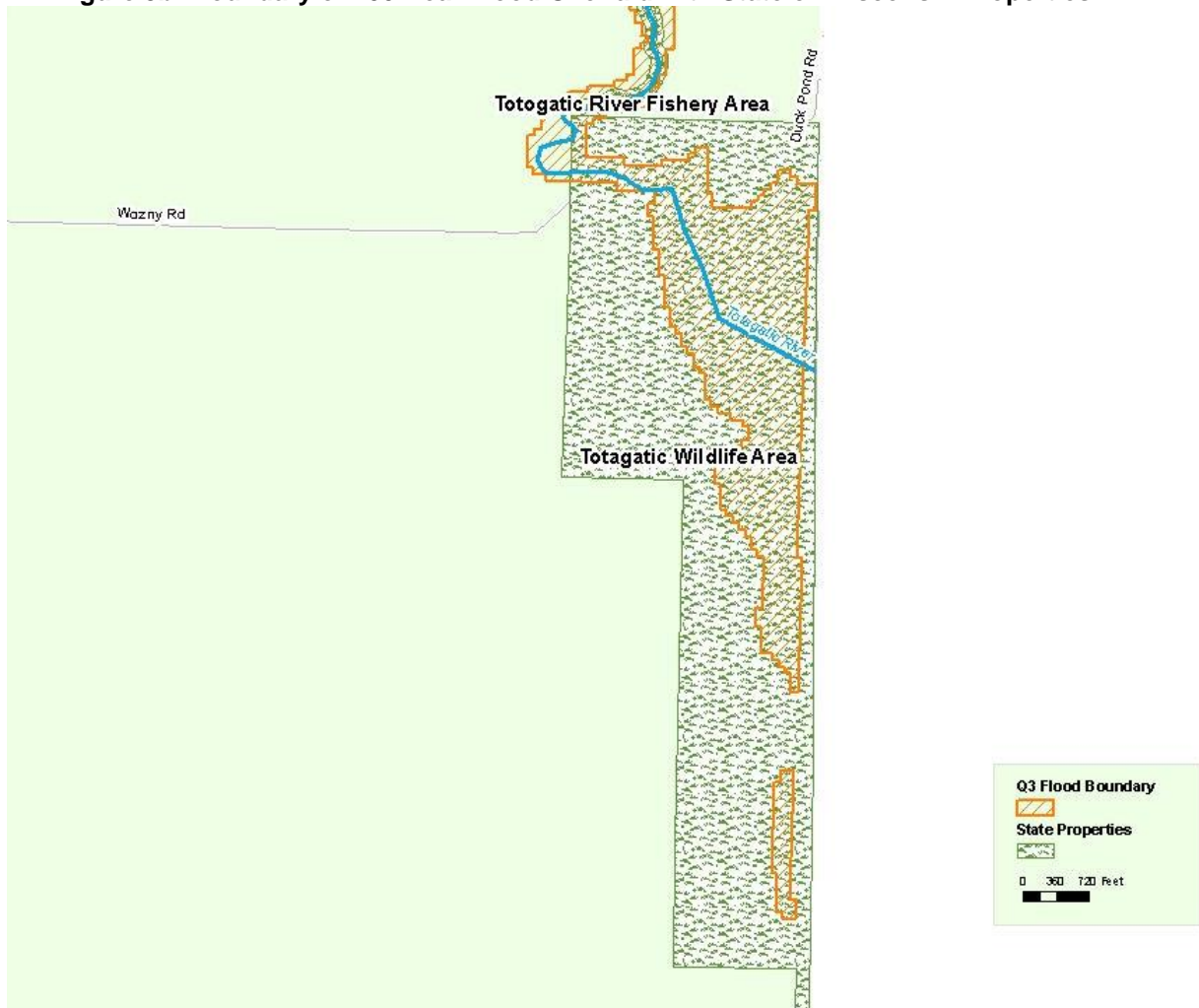


Figure 5b: Boundary of 100-Year Flood Overlaid with State of Wisconsin Properties



Attachment 1: Northwest Wisconsin Flood Impact Study

In November 2018, the Northwest Regional Planning Commission (NWRPC) released the *Northwest Wisconsin Flood Impact Study*, which is an analysis of a 2016 flooding event in the northwest area of Wisconsin. The report was prepared using federal funds and is publicly available.<sup>142</sup> The content of this attachment is a synopsis of the material contained within the study. Readers should reference the links provided for more detailed information and analysis as well as to read the study in its entirety.

The *Northwest Wisconsin Flood Impact Study* replicated the process model developed under a 2013 project for Taylor County, Wisconsin. This process model used FEMA's HAZUS software to estimate potential flood losses and to identify structures, businesses, economic assets and community infrastructure impacted by a historic flood event. HAZUS is a nationally applicable standardized methodology that contains models for estimating potential losses from earthquakes, floods, and hurricanes, allowing for the identification of vulnerable areas that may require planning consideration. Understanding flood risk will allow communities to assess the level of readiness and preparedness to deal with a flood disaster before it occurs. Model results will provide decision makers with the information and tools needed to decide on how to allocate resources for most effective and efficient response and recovery.

During the period of July 11-12, 2016, multiple rounds of severe thunderstorms impacted seven counties in Northwest Wisconsin including Ashland, Bayfield, Burnett, Douglas, Iron, Sawyer and Washburn, and the Bad River Band of the Lake Superior Chippewa Tribe. The area was struck by historic severe storms and flooding that caused severe flood events throughout the region. Damage to homes and businesses across the region was substantial, with over

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<sup>142</sup> <http://www.nwrpc.com/CivicAlerts.aspx?AID=178>

\$2.6 million in losses reported. Damage to public infrastructure was even more significant, with \$38 million reported.

During a 24-hour period the region received historically heavy rainfall, with 8 to 12 inches of precipitation falling in some areas. Some of the most intense rainfall occurred in a swath extending from northern Burnett County, northeasterly through northern Iron County. Heavy rains quickly caused rivers to rise to, in some cases, historic levels. A U.S. Geological Survey (USGS) stream gage on the Bad River near Odanah (Ashland County) rose from 300 cubic feet per second to a record peak streamflow of 40,000 cubic feet per second in only 15 hours. In addition to the heavy rainfall, a bow echo windstorm moved across northern Iron County and caused tremendous damage at Saxon Harbor. The marina and campground were devastated by the floodwaters of Oronto Creek, a steep-gradient Lake Superior tributary which had been rerouted during harbor construction in 1965.

The heavy rainfall caused flash flooding across the region, which caused widespread and severe damage to roads and infrastructure, homes, businesses, and public facilities. Travel across much of northwestern Wisconsin was not advised due to inundated roadways and washouts. The timing of these storms also coincided with the peak of tourist season in the region. Tragically, there were four lives lost as a result of the storm.

With many of the major transportation corridors closed, long detours were necessary to navigate through the impacted region affecting residents and commerce. While highway crews were busy addressing road and bridge impacts, local emergency managers were busy assessing losses at harbors and marinas on Lake Superior.

The Bad River Nation was also severely impacted by the storm. More than 46 homes within reservation boundaries were affected by



Appendix F: HAZUS Vulnerability  
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flooding, ten of which were completely destroyed. In the wake of the storm, the reservation was completely cut off from regular access to food, water, and medical supplies. The fish hatchery and wild rice operations of the Bad River Tribe also sustained major damage. Region-wide, the flood event impacted over 350 homes and left behind tens of millions of dollars in public sector damage.

In response to the disaster, the State of Wisconsin Emergency Operations Center was elevated to a Level 1 (full activation). On July 12, 2016, a state of emergency was declared for the affected counties and state agency resources were directed to support response and recovery efforts. On August 9, 2016, a Presidential Disaster Declaration for public assistance was granted for the counties of Ashland, Bayfield, Burnett, Douglas, Florence, Iron, Sawyer and Washburn; and the Bad River Band of the Lake Superior Chippewa. The severe flooding also impacted the agricultural industry in northwest Wisconsin, resulting in crop losses and reduced yields. Consequently, an agricultural disaster declaration was designated on September 29th, 2016 for the counties of Ashland, Bayfield, and Iron, as well as the five neighboring counties of Douglas, Price, Sawyer, Vilas and Washburn.

The study indicated that six homes and businesses in Washburn County were affected or had minor damage; nine sustained major damage; and one was destroyed for a total of \$500,000. Total losses for damage to public infrastructure in the county were \$3M.

**Table 1: 2016 Northwest Wisconsin Flood, Damage to homes/businesses**

County	Affected/Minor Damage	Major Damage	Destroyed	Total
Ashland	140	2	0	\$500,000
Bad River Band	30	6	10	\$1,104,000
Bayfield	20	10	0	\$150,000
Douglas	2	0	0	\$500
Iron	13/1	12/2	0	\$235,000/\$40,000
Sawyer	112	0	0	\$100,000
Washburn	6	9	1	\$500,000
<b>TOTAL</b>	<b>323/1</b>	<b>39/2</b>	<b>11</b>	<b>\$2,629,500</b>

## Appendix F: HAZUS Vulnerability Assessment

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Transportation infrastructure was heavily damaged when flood waters rose above the surface of roads and bridges. Many primary and secondary arterial roadways and culverts were washed out in the wake of the elevated water level experienced over a short time period. One of the region's most critical economic assets, Saxon Harbor, was completely destroyed and the major roadways bisecting northern Wisconsin were completely shut down. Business disruption and impacts to commerce were also significant as many communities were left completely isolated due to road closures. These counties had not anticipated, nor were they prepared to respond to, an event of this historic magnitude.

The study used hydrologic analysis, with the objective being to calculate rainfall-runoff characteristics for watersheds and to identify discharge values in streams. The results of this analysis concluded that 1,022 structures would be impacted under the 100-year scenario and 1,318 structures under the 500-year scenario. A 100-year flood has an annual exceedance probability of 1%, meaning it's likely to occur once every 100 years. The annual exceedance probability of a 500-year flood is 0.2%, meaning an event at this magnitude is likely to occur once every 500 years. Region-wide, loss estimates under the 100-year scenario were \$15.2M and \$24.0M under the 500-year scenario. The model estimates that 12 critical community assets/facilities would be impacted under the 100-year scenario and 17 under the 500-year scenario.

**Table 5: ESTIMATED LOSSES BY COUNTY, 100-YR FLOOD EVENT**

County	Structures Impacted	Estimated Building Losses	Estimated Content Losses	Estimated Inventory Losses	Debris Generated (tons)
ASHLAND	92	\$ 582,162	\$ 456,098	\$ 47,840	1,002
BAYFIELD	78	\$ 796,776	\$ 340,749	\$ -	1,139
BURNETT	138	\$ 2,034,886	\$ 923,344	\$ 31,034	1,508
DOUGLAS	67	\$ 644,579	\$ 632,320	\$ -	506
IRON	45	\$ 399,383	\$ 579,651	\$ 113,681	682
SAWYER	396	\$ 7,640,836	\$ 5,867,389	\$ 204,919	6,001
WASHBURN	206	\$ 3,129,779	\$ 1,865,586	\$ 41,355	2,205
<b>GRAND TOTAL</b>	<b>1022</b>	<b>\$ 15,228,401</b>	<b>\$ 10,665,137</b>	<b>\$ 438,829</b>	<b>13,043</b>

Appendix F: HAZUS Vulnerability  
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**Table 6: ESTIMATED LOSSES BY COUNTY, 500-YR FLOOD EVENT**

County	Structures Impacted	Estimated Building Losses	Estimated Content Losses	Estimated Inventory Losses	Debris Generated (tons)
ASHLAND	114	\$ 875,091	\$ 738,537	\$ 124,599	1,408
BAYFIELD	114	\$ 1,610,034	\$ 611,690	\$ 207	1,848
BURNETT	180	\$ 2,767,118	\$ 1,449,384	\$ 39,815	1,993
DOUGLAS	100	\$ 1,120,682	\$ 733,852	\$ -	943
IRON	48	\$ 249,664	\$ 196,964	\$ 9,924	443
SAWYER	475	\$ 11,874,777	\$ 8,857,823	\$ 318,409	12,054
WASHBURN	287	\$ 5,500,003	\$ 3,629,578	\$ 188,619	3,493
<b>GRAND TOTAL</b>	<b>1,318</b>	<b>\$ 23,997,369</b>	<b>\$ 16,217,828</b>	<b>\$ 681,573</b>	<b>22,182</b>

Roughly 80% of the potentially affected structures are single family homes. Estimated impacts to businesses were notable in both return periods, with more than 8% of potentially affected structures classified as either commercial or industrial. Most businesses potentially impacted tend to be small businesses, although some larger businesses were also identified. Potential impacts to general government services include wastewater treatment facilities, town halls, Wisconsin Department of Natural Resource (DNR) facilities, and park/recreation assets. Critical assets which are potentially impacted include electrical substations and dams.

100- and 500-year flood loss estimates for Washburn County, as determined by the NWRPC study, are shown in the tables below.

Appendix F: HAZUS Vulnerability Assessment

**HAZUS 100-YEAR FLOOD LOSS ESTIMATES - WASHBURN COUNTY**

Municipality	Structures Impacted	Estimated Building Losses	Estimated Content Losses	Estimated Inventory Losses	Debris Generated (tons)
C. OF SHELL LAKE	50	\$ 603,169.00	\$ 468,019.00	\$ 6,639.00	527
C. OF SPOONER	10	\$ 29,239.00	\$ 141,682.00	\$ -	281
T. OF BARRONETT	1	\$ 87.00	\$ 2,004.00	\$ 464.00	121
T. OF BASHAW	2	\$ 41,527.00	\$ 12,650.00	\$ -	34
T. OF BASS LAKE	1	\$ -	\$ -	\$ -	7
T. OF BIRCHWOOD	1	\$ 138,917.00	\$ 69,137.00	\$ -	37
T. OF CASEY	5	\$ 42,281.00	\$ 15,693.00	\$ -	25
T. OF CHICOG	6	\$ 40,935.00	\$ 39,467.00	\$ -	31
T. OF CRYSTAL	8	\$ 30,235.00	\$ 11,488.00	\$ -	253
T. OF EVERGREEN	4	\$ 18,615.00	\$ 7,277.00	\$ -	24
T. OF MINONG	12	\$ 128,102.00	\$ 178,247.00	\$ -	71
T. OF SPOONER	6	\$ 27,356.00	\$ 10,653.00	\$ -	32
T. OF SPRINGBROOK	1	\$ -	\$ -	\$ -	5
T. OF STONE LAKE	1	\$ -	\$ -	\$ -	3
T. OF TREGO	64	\$ 1,849,403.00	\$ 792,291.00	\$ -	523
V. OF BIRCHWOOD	13	\$ 160,202.00	\$ 67,720.00	\$ -	120
V. OF MINONG	21	\$ 19,711.00	\$ 49,258.00	\$ 34,252.00	111
<b>GRAND TOTAL</b>	<b>206</b>	<b>\$ 3,129,779.00</b>	<b>\$ 1,865,586.00</b>	<b>\$ 41,355.00</b>	<b>2,205</b>

**HAZUS 500-YEAR FLOOD LOSS ESTIMATES - WASHBURN COUNTY**

Municipality	Structures Impacted	Estimated Building Losses	Estimated Content Losses	Estimated Inventory Losses	Debris Generated (tons)
C. OF SHELL LAKE	64	\$ 1,176,475.00	\$ 1,513,642.00	\$ 146,416.00	784
C. OF SPOONER	13	\$ 101,451.00	\$ 192,011.00	\$ -	306
T. OF BARRONETT	1	\$ 571.00	\$ 3,132.00	\$ 3,037.00	121
T. OF BASHAW	4	\$ 52,899.00	\$ 16,408.00	\$ -	91
T. OF BASS LAKE	3	\$ 41,358.00	\$ 12,012.00	\$ -	38
T. OF BIRCHWOOD	1	\$ 166,181.00	\$ 80,020.00	\$ -	37
T. OF CASEY	7	\$ 52,944.00	\$ 19,359.00	\$ -	38
T. OF CHICOG	6	\$ 104,648.00	\$ 66,486.00	\$ -	35
T. OF CRYSTAL	13	\$ 40,996.00	\$ 17,181.00	\$ 1,216.00	461
T. OF EVERGREEN	4	\$ 59,972.00	\$ 22,873.00	\$ -	24
T. OF LONG LAKE	1	\$ -	\$ -	\$ -	7
T. OF MINONG	28	\$ 534,049.00	\$ 306,735.00	\$ -	240
T. OF SPOONER	10	\$ 143,252.00	\$ 60,687.00	\$ -	64
T. OF SPRINGBROOK	2	\$ 13,103.00	\$ 9,964.00	\$ -	7
T. OF STINNETT	2	\$ -	\$ -	\$ -	8
T. OF STONE LAKE	1	\$ 1,503.00	\$ 591.00	\$ -	3
T. OF TREGO	79	\$ 2,710,953.00	\$ 1,116,618.00	\$ -	901
V. OF BIRCHWOOD	15	\$ 262,634.00	\$ 104,403.00	\$ -	146
V. OF MINONG	33	\$ 37,014.00	\$ 87,456.00	\$ 37,950.00	182
<b>GRAND TOTAL</b>	<b>287</b>	<b>\$ 5,500,003.00</b>	<b>\$ 3,629,576.00</b>	<b>\$ 188,619.00</b>	<b>3,493</b>

As a result of this event, and as a component of the project, the NWRPC has also developed a mapping application to allow viewing of the results found in their analysis of the flood event.<sup>143 144</sup> The application provides users with access to nearly all of the data developed in this project, including:

- HAZUS-derived Flood Depth (100-year and 500-year flood events)
- Occupancy classified building footprints within ¼ mile of the HAZUS flood boundary, with corresponding structural and content losses
- Location of critical facilities/infrastructure within the study region.
- Impacted road segments due to flood event
- Probable culvert locations (derived using LiDAR and USDA Agricultural Conservation Planning Framework software)

Critical community facilities include those that provide essential emergency services to the community and should be functional after a flood. These facilities include hospitals, police stations, fire stations, emergency medical services and educational institutions. Critical infrastructure is defined as the transportation and utility infrastructure that provides communities with communications, water, power, mobility and other necessities for both continuity of governance and economic health.

The application includes several widgets which allow users to add their own spatial/tabular data to the map, make measurements, change base maps (e.g. aerial photos, topography, street maps), print, search for specific locations or addresses, and share the map on social media (or embed in their own websites). A user guide was also developed for people unfamiliar with use of a web-based mapping application.<sup>145</sup> Technical information about the application

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<sup>143</sup> <http://nwrpcmaps.nwrpc.com/edaiflood100/>

<sup>144</sup> <http://nwrpcmaps.nwrpc.com/edaiflood500/>

<sup>145</sup> <https://www.nwrpc.com/DocumentCenter/View/1491>



## Appendix G: Community Input

Washburn County believes in the importance of gathering public input from interested parties in the community. To achieve this goal, the Emergency Management Office took every opportunity available to utilize various methods to publicize the opportunity for people to participate in the planning process and to gather input from interested parties. The table that follows outlines the major opportunities that were created to discuss the plan. The table includes dates of workgroup meetings, meetings with public officials and media opportunities.

DATE	SUMMARY OF OPPORTUNITY
Q3 2018	The project brochure was put in public areas informing people of the project and mitigation in general.
16 Sep 18	Initial press release to the public inviting people from the general public to become part of the PDM workgroup. Release was printed in two newspapers and was posted online at the Washburn County website. (scans follow)
2 Oct 18	Survey on mitigation ideas, development, etc. sent to all municipalities and applicable county departments. The letter with the survey (see below) requests that municipalities discuss the survey and mitigation at their meetings, which per the WI Open Meetings Law, is noticed to the public, with the agenda, prior to the meeting. Meetings are open to the public and minutes are also publicly posted after the meeting.
24 Jan 19	Washburn County PDM Workgroup Meeting
24 Jan 19	Northwest Regional Planning Commission Meeting with a presentation and discussion on hazard mitigation topics.
24 April 19	Washburn County Towns Association Meeting
25 Apr 19	Washburn County PDM Workgroup Meeting
Q3 2019	Provided the draft plan to the workgroup for review and comment.

## Appendix G: Community Input

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Q4 2019	Municipalities provided with draft copy of the plan for review and adoptions.
25 Feb 20	Legal Public Notice released notifying the public of the open comment period on the draft plan.
25 Feb 20	Press release notifying the public of the end of the plan and the open comment period. Printed in community papers (see scan following).
Q1 20	Provided the draft plan to contiguous county emergency management directors for review and comment.
Q1-3 20	Adoption meetings at municipalities, which per the WI Open Meetings Law, are noticed to the public, with an agenda, prior to the meetings. Meetings are open to the public and minutes are also publicly posted after the meeting. Adoptions are in Appendix C.

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



For More Information, Contact Carol Buck (715-468-4730)

For Immediate Release

### **Washburn County Receives A Hazard Mitigation Planning Update Grant**

**(Shell Lake, WI)** Washburn County, like the rest of the State of Wisconsin, is vulnerable to a variety of disasters. According to the National Oceanographic and Atmospheric Administration (NOAA), 2017 was the costliest year ever for weather and climate disasters in the United States, totaling \$215 billion in disasters or, to look at it another way, \$5.9 million dollars every week! Closer to home, Wisconsin has also incurred billions of dollars of disaster-related damages in the last couple of decades. These losses can be reduced through mitigation activities. A 2017 study has estimated that mitigation saves society an average of \$6 for every \$1 spent through federal agency grant programs by breaking 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 Washburn County to manage its vulnerability to disaster, Carol Buck, Washburn County Emergency Management Director, applied for and received a hazard mitigation planning update grant. This goal of this grant is to update an approvable plan, which will serve as a roadmap that outlines potential cost-effective hazard mitigation activities, some of which might be available for future grant funding.

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

## Appendix G: Community Input

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

FEMA has recognized the importance of having members of the community involved in the process and Buck 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 Carol Buck at 715-468-4730.

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## Appendix G: Community Input

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Date: 2 October 2018  
To: Town, Village or City Leader  
County Department Manager  
From: Carol Buck, EM Director  
Re: Hazard Mitigation Plan Update



Washburn County, like the rest of the State of Wisconsin, is vulnerable to a variety of disasters. According to the National Oceanographic and Atmospheric Administration (NOAA), 2017 was the costliest year ever for weather and climate disasters in the United States, totaling \$215 billion in disasters or, to look at it another way, \$5.9 million dollars every week! Closer to home, Wisconsin has also incurred billions of dollars of disaster-related damages in the last couple of decades. These losses can be reduced through mitigation activities. A 2017 study has estimated that mitigation saves society an average of \$6 for every \$1 spent through federal agency grant programs. 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 Washburn County to manage its vulnerability to disaster Washburn County Emergency Management applied for and received a hazard mitigation planning update grant. This goal of this grant is to complete an approvable updated 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.

## Appendix G: Community Input

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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 **by November 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 municipality 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 (715) 468-4730 or by email at [cbuck@co.washburn.wi.us](mailto:cbuck@co.washburn.wi.us). Thank you!

Appendix G: Community Input

1400-1600

SIGN-IN

Event: WASHBURN PDM Date: 24 JAN 19 Location: SHELL LAKE

Name (Please Print)	Department	Email
LENORA BORCHAROT	EPTec	LENORA B @ EATEC Inc. com
CAROL BUCK	WASHBURN Co. Emergency mgmt	chuck@co.washburn.wi.us
Frank Scalzo	Washburn Co. Highway	fscalzo@co.washburn.wi.us
DAVE WILSON	Shell Lake city	DAVEW@shelllake.org
Ben Garrett	DNR	Benjamin.Garrett@wisconsin.gov
Rick COVILLETT	LEPC	rcck47@gmail.com
Cheri Nickell	Public Health	anickell@co.washburn.wi.us
Lolita Olson	Admin	lolson@co.washburn.wi.us
WILLIAM MARY	SPOONER Admin	Wmary@cityofspooner.org
DARREN VIK	SPOONER F.D.	spoonerfiredept@centurytel.net
Nils Odgren	Land Info	nodgren@co.washburn.wi.us
Michelle Boutwell	Washburn City Zoning	mboutwell@co.washburn.wi.us

Appendix G: Community Input

SIGN-IN

12:30-14:00

1 of 2

Event: NWRPC MTG Date: 24 JAN 19 Location: SHELL LAKE

Name (Please Print)	Department	Email
CAROL Buck	Emergency Mgmt	cbuck@co.washburn.wi.us
Randy Books	& WEN-NW	randy.books@wisconsin.gov
Anita Smith	WEM	anita.smith@wi.gov
Lolita Olson	Admin	lolson@co.washburn.wi.us
Cheri Nickel	Public Health	cnickel@co.washburn.wi.us
Dave Vold	Washburn Co Lakes & Rivers Assoc.	natland2002@yahoo.com
Madeline Roberts	Extension Washburn	madeline.roberts@ces.uwex.edu
William Marx	City / Spooner	wmarx@cityofspooner.orb
PHIL SYLLA	WASHBURN Co Lakes & Rivers Assoc	philsgylla@gmail.com
Paul Deveen	Land Info	
Nils Odgren	Land Info	
Danielle Danford	Washburn Co. Register News	danielledanford@ leaderregister.com
LENORA BORCHARDT	WCEM/EATEC	
Jacob Druffner	DNR	jacob.druffner@wisconsin.gov
RICHARD COQUILLETTE	LEPC	rc.coke47@gmail.com
JOHN GEIGER TREGO LAKE DIST	TREGO LAKE DIST.	thegeigers@centurytel.net



Appendix G: Community Input

**SIGN-IN**

Event: POM MTG Date: 25 APR 19 Location: WASHBURN CO.

Name (Please Print)	Agency/Department	Email/Phone Number
LENORA BORCHARDT	EPTEC	LENORBORCHARDT@HOTMAIL.COM 608-358-4067
DON PIANTE	STINETTE	634-0063
Bill Groat	STANNETT	715-558-4784
CARA Buck	EM	715-468-4730 cbuck@co.washburn.wi.us
Cheri Nickell	Public Health	cnickell@co.washburn.wi.us
Dennis Stuart	Sheriff	dstuart@co.washburn.wi.us
DAVE WILSON	city shell lake	DAVE@shelllake.org
Frank Scalzo	Washburn Co. Highway	Fscalzo@co.washburn.wi.us
Lolita Olson	Wash Co Admin	lolson@co.washburn.wi.us
Nathan Nelson	washburn county GIS	nnelson@co.washburn.wi.us
Keith Dahlstrom	Washburn County Fire Assoc	Shelllakefire@yahoo.com
Michelle Boutwell	Washburn City Zoning	715-468-4690 mboutwel@co.washburn.wi.us





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# Shell Lake: A model lake for lake protection

city's aquatic invasive species coordinator and manages the boat inspection program. Wingler reports that there are five other boat inspectors who have checked 841 boats so far this season, 51 more boats than last year. So far this year 307 daily passes and 237 annual permits have been sold.

The lake protection treasurer's report shows total expenses of \$413,077 for 2018. Included in the expenses are the lake coordinator duties, handled by Andy Eichle; portable rest room costs; Washburn County Lakes and Rivers Association dues; Wisconsin Lakes Association dues; and the annual meeting expense. The city allocates half of 1 percent of tax levy for lake protection. For 2019 that is \$5,159.

Eiche reported that the Canada goose roundup planned for this year will be done next year due to the lake not having enough geese to make it worthwhile. The city did use its permit to remove gulls from the city airport in 2018 and will fill it again this year. The permit also allows for the harvest of 25 geese.

On June 24 the lake level was 1220.31. Since 2014 the city annually exercises the valves on the diversion pipe. Eiche

held those present that it appears the city could repair and upgrade the current flow meters on the pipeline, which would be much less costly than their complete replacement. Recently the city council approved costs for an assessment of the flow valves on the pipeline to ensure it is ready if it is ever needed.

Two positions on the lake protection advisory committee were up for election at the meeting. Dave and Jamie McNulty previously filled the positions. Rowie Hansberger and Dave McNulty were elected to fill the two positions. The positions are for three-year terms.

Terry Leckel, 2nd Ward council member, had to leave the meeting for an emergency page from the Shell Lake Fire Department. Due to this the council did not have a quorum to approve the lake district budget allocation for 2020 or set the 2020 meeting date. These two items will be addressed at the next regular city council meeting on Thursday, July 8.

Shell Lake Roberts reports that, according to DNR surveys, Shell Lake is one of the best lakes in Washburn County for walleye fishing. The Mustang Flowage is the only lake with a similar walleye population. Roberts said this is due to Shell Lake having excellent natural walleye spawning habitat. Shell Lake has a natural, self-sustained walleye population. Shell Lake is also found to give large muskies, but the population is low and is only maintained through DNR stocking programs. Roberts reports this is likely due to limited natural musky habitat.

The DNR has been working to decrease the population of largemouth bass in Shell Lake, which appears to be successful. Largemouth bass are direct competitors with smallmouth bass, which is Shell Lake's most abundant fish. Roberts said Shell Lake is the best lake in Washburn County for smallmouth bass.

Roberts reports the best way to promote a healthy fishery is to increase the amount of shoreland buffer zones. The increase in shoreland buffer zones increases the spawning habitat for many sport fish species like walleye.

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Roberts reports the best way to promote a healthy fishery is to increase the amount of shoreland buffer zones. The increase in shoreland buffer zones increases the spawning habitat for many sport fish species like walleye.

## Shell Lake capital for smallmouth bass, walleye fishing

After the lake protection meeting, Craig Roberts, DNR fisheries biologist, shared information on the fish found in

## Lake level, diversion pipe discussed

Danielle Dandford | Staff writer

SHELL LAKE - The annual Shell Lake Inland Lake Protection and Rehabilitation District meeting shared updates on the health of Shell Lake, the diversion pipeline and how the city is working to preserve the lake for residents and visitors.

Rob Anderson was elected as chair of the meeting. Sally Peterson, Shell Lake mayor, and Shell Lake City Council members Ken Schultz and Brian Carlson were not present for the meeting.

Mike Ring, chair of the lake protection advisory committee, reported that Shell Lake's water is healthy, with good dissolved oxygen rates and 14 feet of water clarity. Ring noted the water gets clearer through the summer season. Lake water testing for chlorophyll, coliform and phosphorus show the lake water is very good.

Shell Lake continues to have no invasive species, which is attributed to the work done by the boat inspectors all summer long. Nathaniel Wingler is the

## State: Inactive voters return postcard to remain registered voter

MADISON - The state of Wisconsin is

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**WASHBURN COUNTY 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.?
- NO..... (If NO, skip to Question 2)
  - YES.....(If YES, please check all that apply below)

Event	When event last occurred:				
	Within past year	1-5 years ago	5-15 years ago	More than 15 years ago	Never
<b>Drought</b>		CI: Spooner TN: Evergreen TN: Trego	TN: Bass Lake TN: Gull Lake	TN: Beaver Brook	TN: Barronett (1) TN: Chicog TN: Crystal
<b>Dust Storm</b>					CI: Spooner TN: Barronett (1) TN: Bass Lake TN: Beaver Brook TN: Brooklyn TN: Chicog TN: Crystal TN: Evergreen TN: Gull Lake
<b>Earthquake</b>					CI: Spooner TN: Barronett (1) TN: Bass Lake TN: Beaver Brook TN: Brooklyn TN: Chicog TN: Crystal TN: Evergreen TN: Gull Lake
<b>Flood</b>	TN: Bass Lake TN: Frog Creek TN: Madge TN: Stone Lake – Flash flood. No extreme damage but roads had to be closed and regraded on the shoulders.	VI: Minong TN: Bass Lake TN: Brooklyn TN: Chicog TN: Crystal TN: Gull Lake TN: Minong TN: Springbrook TN: Trego	CI: Spooner TN: Bass Lake TN: Beaver Brook	TN: Bass Lake TN: Birchwood	TN: Evergreen
<b>Lakeshore Erosion</b>	TN: Gull Lake	TN: Trego			CI: Spooner TN: Bass Lake TN: Beaver Brook

## Appendix G: Community Input

					TN: Crystal TN: Evergreen
<b>Landslide/ Debris Flow</b>		TN: Brooklyn TN: Frog Creek TN: Springbrook			CI: Spooner TN: Barronett (1) TN: Bass Lake TN: Beaver Brook TN: Chicog TN: Crystal TN: Evergreen TN: Gull Lake
<b>Wildfire</b>			TN: Bass Lake	TN: Casey TN: Chicog	CI: Spooner TN: Barronett (1) TN: Beaver Brook TN: Brooklyn TN: Crystal TN: Evergreen TN: Gull Lake
<b>Windstorm/ Tornado</b>	TN: Bass Lake	CI: Spooner TN: Bass Lake TN: Birchwood TN: Chicog TN: Evergreen TN: Gull Lake TN: Madge TN: Springbrook TN: Stone Lake TN: Trego	TN: Bass Lake TN: Brooklyn TN: Frog Creek TN: Madge TN: Minong	TN: Barronett (1) TN: Bass Lake TN: Beaver Brook TN: Casey TN: Crystal TN: Madge	
<b>Severe Winter Storm</b>		CI: Spooner TN: Bass Lake TN: Beaver Brook	TN: Barronett (1) TN: Bass Lake TN: Evergreen	TN: Bass Lake TN: Brooklyn TN: Chicog TN: Crystal TN: Gull Lake	
<b>Other:</b>	TN: Trego – Heavy rain storms	TN: Trego			TN: Crystal
<b>Other:</b>	TN: Trego - Washouts				TN: Crystal

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
<b>Drought</b>		TN: Evergreen	CI: Spooner TN: Bashaw TN: Frog Creek TN: Madge	VI: Minong TN: Barronett (1) TN: Barronett (2)	CI: Shell Lake VI: Birchwood TN: Beaver Brook TN: Casey

Appendix G: Community Input

				TN: Brooklyn TN: Chicog TN: Crystal TN: Gull Lake TN: Spooner TN: Stone Lake TN: Trego	
<b>Dust Storm</b>				TN: Chicog	CI: Shell Lake CI: Spooner VI: Birchwood VI: Minong TN: Barronett (1) TN: Barronett (2) TN: Bashaw TN: Beaver Brook TN: Brooklyn TN: Casey TN: Crystal TN: Evergreen TN: Gull Lake TN: Madge TN: Spooner TN: Stone Lake TN: Trego
<b>Earthquake</b>				TN: Chicog	CI: Shell Lake CI: Spooner VI: Birchwood VI: Minong TN: Barronett (1) TN: Barronett (2) TN: Bashaw TN: Beaver Brook TN: Brooklyn TN: Casey TN: Crystal TN: Evergreen TN: Gull Lake TN: Madge TN: Spooner TN: Stone Lake TN: Trego
<b>Flood</b>	TN: Frog Creek TN: Gull Lake	TN: Birchwood TN: Chicog TN: Stone Lake - Flash	CI: Shell Lake VI: Minong TN: Beaver Brook TN: Brooklyn TN: Madge TN: Minong	TN: Barronett (1) TN: Barronett (2) TN: Bashaw TN: Crystal TN: Spooner TN: Springbrook TN: Trego	CI: Spooner VI: Birchwood TN: Casey TN: Evergreen
<b>Erosion</b>	TN: Gull Lake		CI: Spooner TN: Barronett (1) TN: Beaver Brook TN: Brooklyn	TN: Barronett (2) TN: Bashaw TN: Chicog TN: Evergreen TN: Spooner	CI: Shell Lake VI: Birchwood VI: Minong TN: Casey

## Appendix G: Community Input

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			TN: Crystal TN: Madge TN: Stone Lake	TN: Springbrook TN: Trego	
<b>Landslide/ Debris Flow</b>			TN: Brooklyn TN: Madge	TN: Chicog TN: Frog Creek TN: Gull Lake TN: Springbrook TN: Trego	CI: Shell Lake CI: Spooner VI: Birchwood VI: Minong TN: Barronett (1) TN: Barronett (2) TN: Bashaw TN: Casey TN: Crystal TN: Evergreen TN: Spooner TN: Stone Lake
<b>Wildfire</b>	TN: Casey TN: Chicog TN: Gull Lake	TN: Frog Creek TN: Madge TN: Spooner	VI: Birchwood TN: Barronett (1) TN: Bashaw TN: Bass Lake TN: Beaver Brook TN: Brooklyn TN: Trego	CI: Shell Lake CI: Spooner VI: Minong TN: Crystal TN: Evergreen TN: Springbrook	TN: Beaver Brook TN: Barronett (2)
<b>Windstorm/ Tornado</b>	TN: Bashaw TN: Birchwood TN: Chicog TN: Gull Lake	CI: Spooner TN: Beaver Brook TN: Stone Lake TN: Madge TN: Minong TN: Spooner TN: Trego	VI: Birchwood TN: Barronett (1) TN: Barronett (2) TN: Bass Lake TN: Brooklyn TN: Casey TN: Crystal TN: Evergreen TN: Frog Creek	CI: Shell Lake VI: Minong TN: Springbrook	
<b>Severe Winter Storm/ Ice Storm</b>	TN: Barronett (1) TN: Bashaw TN: Beaver Brook TN: Chicog	CI: Spooner TN: Gull Lake TN: Madge TN: Spooner TN: Stone Lake TN: Trego	VI: Birchwood VI: Minong TN: Bass Lake TN: Birchwood TN: Brooklyn TN: Crystal TN: Evergreen TN: Frog Creek	CI: Shell Lake TN: Barronett (2) TN: Casey TN: Springbrook	
<b>Other:</b>					TN: Crystal
<b>Other:</b>					TN: Crystal

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

CI: Shell Lake – No

## Appendix G: Community Input

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CI: Spooner – Utilities due to windstorm (downed power lines, broken poles, transformers damaged on damaged poles Streets (Erosion and pavement damage due to excessive rain)  
 VI: Birchwood - No  
 VI: Minong – No  
 TN: Barronett (1) – No  
 TN: Barronett (2) – No  
 TN: Bashaw - 2001, Culvert Cadle Road.  
 TN: Bass Lake - Roads  
 TN: Beaver Brook – Damage to roads during flooding  
     Damage to water system piping during severe frost conditions in winter  
 TN: Birchwood – 1) Roads washing away  
     2) Trees falling across roads  
 TN: Brooklyn – Yes, flooding with road wash-outs from 2016  
 TN: Crystal – Roads were damaged by flooding  
 TN: Frog Creek – Some homes, no businesses.  
 TN: Gull Lake – Yes – roads – ditches, culverts – from floods – several times on last 15 years damage to roofs caused by snow.  
 TN: Madge – Rockford Road.  
 TN: Springbrook – N/A  
 TN: Stone Lake – Roads – We had trees down over the roads and wash-outs along the sides of the road  
 TN: Trego – Heavy rains produce washouts

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

CI: Shell Lake – Residential homes on Shell Lake during a flood  
 CI: Spooner – Dam, Powerlines, Roads  
 VI: Birchwood - Wellhead, water tower, public safety buildings  
 VI: Minong – Water supply infrastructure  
 TN: Barronett (1) – N/A  
 TN: Barronett (2) – Homes  
 TN: Bashaw - Roads, culverts, bridges.  
 TN: Bass Lake - Roads  
 TN: Beaver Brook – Roads and water and sewer system in our sanitary district  
 TN: Birchwood – Roads washing out  
 TN: Brooklyn – Roads culverts  
 TN: Casey – Town hall  
 TN: Crystal – Roads somewhat vulnerable. Powerlines.  
 TN: Evergreen - There are no critical facilities or infrastructure in our town.  
 TN: Frog Creek – Town Hall.  
 TN: Gull Lake – Roads, culverts, ditches – storms and forest fires, damage to forests and homes  
 TN: Long Lake – Electric Utilities  
 TN: Madge - Roads  
 TN: Minong - Bridges  
 TN: Springbrook – All  
 TN: Stone Lake – Mainly our roads  
 TN: Trego – All Town Roads  
 TN: Chicog - From our past experiences - Highway systems, utility services. Obviously in a disaster such as wildfires and windstorms/tornadoes the town hall/fire department could be vulnerable. This is our community command center.

#### 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: Shell Lake CI: Spooner	VI: Birchwood VI: Minong TN: Bass Lake	TN: Barronett (1) TN: Bashaw		

## Appendix G: Community Input

	TN: Barronett (2) TN: Bass Lake TN: Gull Lake TN: Madge TN: Springbrook	TN: Brooklyn TN: Casey TN: Chicog TN: Crystal TN: Evergreen TN: Frog Creek	TN: Beaver Brook TN: Long Lake TN: Stone Lake TN: Trego		
<b>Protecting critical facilities (hospitals, fire stations, etc.)</b>	CI: Shell Lake CI: Spooner VI: Birchwood TN: Barronett (1) TN: Barronett (2) TN: Bashaw TN: Bass Lake TN: Beaver Brook TN: Chicog TN: Frog Creek TN: Madge TN: Springbrook TN: Stone Lake	VI: Minong TN: Bass Lake TN: Birchwood TN: Trego	TN: Casey TN: Long Lake		TN: Brooklyn TN: Crystal – N/A TN: Evergreen TN: Gull Lake – N/A
<b>Preventing development in hazard areas</b>	CI: Spooner VI: Birchwood TN: Chicog TN: Frog Creek TN: Madge	TN: Barronett (1) TN: Bass Lake TN: Casey TN: Long Lake TN: Trego	CI: Shell Lake VI: Minong TN: Barronett (2) TN: Bashaw TN: Beaver Brook TN: Birchwood TN: Brooklyn TN: Crystal TN: Stone Lake		TN: Evergreen TN: Gull Lake – N/A
<b>Enhancing the function of natural features (streams, wetlands)</b>	CI: Shell Lake CI: Spooner TN: Bass Lake TN: Chicog TN: Crystal TN: Gull Lake TN: Madge	VI: Birchwood VI: Minong TN: Barronett (2) TN: Bashaw TN: Bass Lake TN: Birchwood TN: Casey TN: Long Lake TN: Minong TN: Stone Lake TN: Trego	TN: Barronett (1) TN: Beaver Brook TN: Brooklyn TN: Evergreen TN: Springbrook		VI: Minong
<b>Protecting historical and cultural landmarks</b>	CI: Spooner VI: Birchwood TN: Bass Lake TN: Madge TN: Stone Lake TN: Trego	TN: Bass Lake TN: Casey TN: Chicog TN: Frog Creek TN: Gull Lake TN: Long Lake	CI: Shell Lake TN: Barronett (1) TN: Barronett (2) TN: Bashaw TN: Beaver Brook TN: Birchwood TN: Brooklyn	VI: Minong	TN: Crystal – N/A TN: Evergreen

Appendix G: Community Input

<p><b>Promoting cooperation among public agencies, citizens, non-profit organizations and businesses</b></p>	<p>CI: Spooner VI: Birchwood VI: Minong TN: Barronett (2) TN: Bass Lake TN: Casey TN: Chicog TN: Evergreen TN: Frog Creek TN: Gull Lake TN: Madge TN: Stone Lake TN: Trego</p>	<p>CI: Shell Lake TN: Bashaw TN: Bass Lake TN: Birchwood TN: Crystal TN: Long Lake TN: Springbrook</p>	<p>TN: Barronett (1) TN: Beaver Brook TN: Brooklyn</p>		
<p><b>Protecting and reducing damage to utilities</b></p>	<p>CI: Shell Lake CI: Spooner VI: Birchwood VI: Minong TN: Barronett (1) TN: Barronett (2) TN: Bashaw TN: Bass Lake TN: Beaver Brook TN: Casey TN: Chicog TN: Crystal TN: Evergreen TN: Frog Creek TN: Gull Lake TN: Long Lake TN: Madge TN: Springbrook TN: Stone Lake TN: Trego</p>	<p>TN: Bass Lake TN: Birchwood TN: Brooklyn</p>			
<p><b>Strengthening emergency services</b></p>	<p>VI: Birchwood VI: Minong TN: Barronett (1) TN: Barronett (2) TN: Bashaw TN: Bass Lake TN: Beaver Brook TN: Birchwood TN: Casey TN: Chicog TN: Evergreen TN: Gull Lake TN: Long Lake TN: Madge TN: Springbrook TN: Stone Lake TN: Trego</p>	<p>CI: Shell Lake TN: Bass Lake TN: Brooklyn TN: Crystal TN: Frog Creek</p>	<p>CI: Spooner</p>		

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)?



## Appendix G: Community Input

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CI: Shell Lake – In 2019/2020, Washburn County will be constructing a new health and Human Services building in conjunction with the local hospital which will be constructing a new clinic/pharmacy. The Shell Lake school district will also be construction a substantial addition to its existing structure.

CI: Spooner – NONE

VI: Birchwood - New fire hall/ambulance garage (hopefully sometime in 2019).

VI: Minong – Roads. Rebuild of business 53 through the village 1.4 miles

TN: Barronett (1) – NO

TN: Barronett (2) – NO

TN: Bashaw - None

TN: Bass Lake – NO

TN: Beaver Brook – N/A

TN: Birchwood – NO

TN: Brooklyn – NO

TN: Chicog - We are in the process of looking at and implementing an emergency escape route in a vulnerable area of our community. Blue Bird Trail is a dead end road with a large number of properties along South Twin Lake. We are looking at developing a connecting road system with Middle Road in the Town of Minong. This would involve property purchases, permitting, construction accordingly to a budget. Any and all grants available to us would be considered in this undertaking for community safety.

TN: Crystal – NO

TN: Evergreen - NO

TN: Frog Creek - NO

TN: Gull Lake – NO

TN: Madge - None

TN: Springbrook – NO

TN: Stone Lake – NO

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

CI: Shell Lake – To address our concerns regarding flooding, the city of Shell Lake installed a diversion pipeline which can be activated to managed rising waters on Shell Lake. As for immediate disasters, (i.e. tornado), the city of Shell Lake has emergency response insurance in place which would endure operations within 24 hours in any natural disaster.

CI: Spooner – NONE

VI: Birchwood - Training with the people and emergency services.

VI: Minong – Increased cooperation with other government organizations and business

TN: Barronett (1) - ?

TN: Barronett (2) - ?

TN: Bashaw - Hope for no disasters.

TN: Bass Lake - None

TN: Beaver Brook – N/A

TN: Brooklyn – Discourage development in flood plan areas.

TN: Chicog - With our limited resources of finances and manpower we would first resolve to what we can manage. If assistance would be required, mutual aid with first surrounding communities if they're not taxed and my first contact would be with Washburn County Emergency Management (Carol Buck).

TN: Crystal – Not at this time

TN: Evergreen - Our biggest threats are weather-related. We encourage our residents to stay aware of current conditions.

TN: Frog Creek - We have used wildfire grants to widen town roads and feel we should maintain this as much as the town can afford to give wider and safer fire breaks.

TN: Gull Lake – Proactive – erosion control and upsizing culverts – cleaning culverts, beaver control

TN: Springbrook – Only Roads

TN: Trego – Keep in contact with county fire department and DNR

## Appendix G: Community Input

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**WASHBURN COUNTY**  
*Office of Emergency Management*  
P.O. Box 429, 421 Hwy. 63  
Shell Lake, WI 54871  
(715)468-4730 Fax (715)468-4715  
E-mail: [cbuck@co.washburn.wi.us](mailto:cbuck@co.washburn.wi.us)

February 25, 2020

Dear Town, Village, City, and County Community Leaders of Washburn County:

The State of Wisconsin has endured billions of dollars in damages over the past three decades as a result of various disasters including severe weather and flooding events, major snowstorms, and powerful tornadoes. While the costs of each disaster may vary greatly, the impact is always the hardest at the local level, impacting our communities the most.

The State of Wisconsin, in partnership with FEMA, have identified opportunities to assist communities in reducing future losses through several mitigation activities. Mitigation efforts may result in a significant decline in the cost of a disaster's impact down the road. In fact, for every dollar spent on mitigation activities, approximately \$6.00 in future damages is avoided.

Hazard mitigation breaks the cycle of damage and repair by reducing or eliminating the long-term risk to human life and property caused by the potential hazards. These preventative actions may be as simple as elevating a furnace in a basement, in an effort to prevent water damage. Mitigation efforts may also take a more comprehensive approach such as relocating buildings out of the floodplain or strengthening critical facilities to prevent wind damage and provide stronger shelter.

In an effort to better mitigate Washburn County's vulnerability to disaster, Washburn County Emergency Management, applied for, received, and has now updated the Washburn County Hazard Mitigation Plan through a Pre-Disaster Mitigation (PDM) planning grant. The updated plan serves as a roadmap that outlines potential cost-effective hazard mitigation activities, some of which might be available for future grant funding. The plan highlights the risks and vulnerabilities that Washburn County faces from natural disasters and highlights mitigation strategies that may reduce future losses.

As this project nears completion, we are sending copies of the final updated plan and a draft resolution template for you to use for the re-adoption of the Washburn County Hazard Mitigation Plan. Please note:

1. **Adoption of this plan will not cost your community anything.** You will not be committing to completing any of the projects listed; instead it is a list of triaged ideas that could be accomplished should the funding and will to complete them become available.
2. **If you do not adopt this plan, your community will not be eligible to apply for and receive mitigation project funding in the future.**

We are asking that you please include adoption of this resolution on your March meeting agenda and provide a copy of the final resolution as soon as it is passed, to Washburn County Emergency Management. If you have any questions or comments regarding this plan update, please feel free to contact me at (715) 468-4730 or by email at [cbuck@co.washburn.wi.us](mailto:cbuck@co.washburn.wi.us)

We thank you in advance for your assistance with completing the Washburn County Hazard Mitigation Plan. This small investment of your time will help make our community a safer, healthier and more disaster-resistant community for years to come.

Respectfully,

Carol Buck  
Washburn County Emergency Management Director

## Appendix G: Community Input

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**WASHBURN COUNTY**  
*Office of Emergency Management*  
P.O. Box 429, 421 Hwy. 63  
Shell Lake, WI 54871  
(715)468-4730 Fax (715)468-4715  
E-mail: cbuck@co.washburn.wi.us

2/25/2020

For More Information, Contact Carol Buck, (715) 468-4730  
For Immediate Release

### **WASHBURN COUNTY DRAFT HAZARD MITIGATION PLAN UPDATE AVAILABLE FOR REVIEW**

(Shell Lake, WI) Washburn County, like the rest of the State of Wisconsin, is vulnerable to a variety of disasters. Wisconsin has incurred disaster-related damages totaling \$3 billion in the last three decades but future losses can be reduced through mitigation activities. A recent study by the Multi-hazard Mitigation Council shows that each average dollar spent on mitigation saves society in excess of six dollars. 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 actions reduce or eliminate the long-term risk to human life and property from hazards. These preventative actions can be as simple 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 Washburn County to manage its vulnerability to disasters, Washburn County Emergency Management applied for, received, and has completed a Pre-Disaster Mitigation (PDM) update planning grant. This plan update will serve as a roadmap that outlines potential cost-effective hazard mitigation activities, some of which might be available for future grant funding. The updated plan outlines the risks and vulnerabilities that the county faces from natural disaster and highlights mitigation strategies that might reduce future losses. The completed draft Hazard Mitigation Plan update is available during business hours at the County Clerk's Office, at 10 4<sup>th</sup> Ave., Shell Lake, for review and public comment from March 2<sup>nd</sup> until March 16<sup>th</sup>, 2020.

###

# Appendix G: Community Input



Washburn | Announcements

## Washburn County Draft Hazard Mitigation Plan Update

This plan update will serve as a roadmap that outlines potential cost-effective hazard mitigation activities.

Washburn County Emergency Management | News Release  
Tuesday, February 25, 2020 | Updated Feb 25, 2020 10:38 am CST



WASHBURN COUNTY -- Washburn County, like the rest of the State of Wisconsin, is vulnerable to a variety of disasters. Wisconsin has incurred disaster-related damages totaling \$3 billion in the last three decades but future losses can be reduced through mitigation activities. A recent study by the Multi-hazard Mitigation Council shows that each average dollar spent on mitigation saves society in excess of six dollars. 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.

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Call or email us  
Office: 715-2  
Toll Free: 1-800  
select distributor  
Stal  
WWW.INDUSTRIALSAP



RIVER STREET DENTAL  
Our team has been working for your needs  
Ultra violet air purification system and extra and bacteria to reduce germs have been added.  
We will wear a mask when we are not able to social distance.  
We are daily sanitizing our team and each patient that comes in to visit us.

Washburn link to online press release (copy in files)

[https://drydenwire.com/news/washburn-county-draft-hazard-mitigation-plan-update/?fbclid=IwAR3xV7MsGnNTIZ0kcDWUWAT3ranPIMBNacRs4AshXaFJw-4fo5Y\\_4cu\\_vrA](https://drydenwire.com/news/washburn-county-draft-hazard-mitigation-plan-update/?fbclid=IwAR3xV7MsGnNTIZ0kcDWUWAT3ranPIMBNacRs4AshXaFJw-4fo5Y_4cu_vrA)

## Plan outlines risks and vulnerabilities county faces from natural disaster

### Highlights mitigation strategies to reduce future losses

WASHBURN COUNTY - Washburn County, like the rest of the state, is vulnerable to a variety of disasters.

Wisconsin has incurred disaster-related damages totaling \$3 billion in the last three decades, but future losses can be reduced through mitigation activities.

A recent study by the Multihazard Mitigation Council, part of the National Institute of Building Sciences, shows that on average, each dollar spent on mitigation saves society in excess of \$6. Since 1993 more than 400 disasters have occurred in the United States, affecting communities in all 50 states, costing the country over \$500 million per week and killing over 24,000 people.

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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 Washburn County to manage its vulnerability to disasters, Washburn County Emergency Management applied for, received and has completed a pre-disaster mitigation update planning grant. This plan update will serve as a road map that outlines potential cost-effective hazard mitigation activities, some of which might be available for future grant funding.

The updated plan outlines the risks and vulnerabilities that the county faces from natural disaster and highlights mitigation strategies that might reduce future losses. The completed draft hazard mitigation plan update is available for review and public comment during business hours at the Washburn County Clerk's Office, located at 10 4th Ave. in Shell Lake, until March 16.

## Appendix G: Community Input

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**WASHBURN COUNTY**  
*Office of Emergency Management*

P.O. Box 429, 421 Hwy. 63  
Shell Lake, WI 54871  
(715)468-4730 Fax (715)468-4715  
E-mail: [cbuck@co.washburn.wi.us](mailto:cbuck@co.washburn.wi.us)

Date: July 14, 2020  
To: Town, Village, and City Leaders  
From: Carol Buck, Emergency Management Director  
Re: Hazard Mitigation Plan Final Version

Enclosed is a jump drive with the **final** version of Washburn County's 2020 Hazard Mitigation Plan Update. Each municipal Clerk's office received a copy of the draft plan; the content of the plan is basically the same except plan adoptions, additional press releases, the FEMA and WEM approval letters, and other such documents were added.

To reduce waste, you are being provided this electronic version of the final plan and may print additional copies as you need them. It is recommended that you store the jump drive in a safe, temperature-controlled environment and periodically check the contents to be sure it is accessible and viewable.

Thank you for the assistance you have provided to make our community a safer, healthier, and more disaster-resistant community for the next five-year life-span of this plan.

If you have any questions or require additional information, please feel free to contact me at (715) 468-4730 or by email at [cbuck@co.washburn.wi.us](mailto:cbuck@co.washburn.wi.us).

Carol Buck, Director

## Appendix G: Community Input

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### **GOVERNMENTAL & PUBLIC INPUT**

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

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

### **ADOPTION OF THE PLAN**

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

### **HISTORY**

Floods and storms have killed over 2,000 people in the U.S. in the last decade. Hundreds of disasters have occurred in the past 25 years, costing the country millions of dollars every week.

### **MITIGATION PLANNING FACTS**

► A 2017 study has shown that mitigation saves society an average of \$6 for every \$1 spent through federal agency grant programs.

► The rigorous building standards adopted by 20,000 communities across the country are saving the nation more than \$1.1 billion a year in prevented flood damages.

► Hazard mitigation plans and projects reduce overall risks to the population and structures while also reducing reliance on funding from actual disaster declarations.

► According to the National Oceanographic and Atmospheric Administration, 2017 was the costliest year ever for weather and climate disasters in the United States, totaling \$215 billion in disasters. That's \$5.9 million dollars every week!

**NOTES:** \_\_\_\_\_

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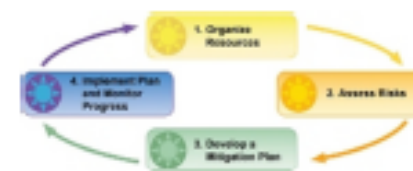
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For further information please contact:

**Washburn County  
Emergency Management**  
P.O. Box 429 / 421 Highway 63  
Shell Lake, WI 54871  
(715) 468-4730

## Pre-Disaster Mitigation Planning

*Creating Safe,  
Sustainable  
Communities*



Prepared by:  
Washburn County Emergency Management  
P.O. Box 429 / 421 Highway 63  
Shell Lake, WI 54871  
(715) 468-4730

### WHAT IS HAZARD MITIGATION?

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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

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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?

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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 Markal, Texas didn't think much about flooding. Besides, it had not flooded in Markal for 45 years. It wasn't until the heavy summer rains came that residents realized flooding can hit anyone, at any time. After the flooding finally subsided, officials knew they had to do something: mitigate.*

### REQUIRED INFORMATION

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- 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

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**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. Washburn 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

