

2021

WAUKESHA COUNTY

ALL HAZARD MITIGATION PLAN

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Emergency Preparedness

Note: *This version has been adapted and formatted for Microsoft Word and Adobe PDF. The original version is maintained at <https://waukeshacounty.isc-cemp.com>.*

This version includes links, which refer the reader to the online planning system.

**WAUKESHA COUNTY, WISCONSIN
HAZARD MITIGATION PLAN**

PREPARED BY:

**WAUKESHA COUNTY HAZARD MITIGATION STEERING COMMITTEE
WAUKESHA COUNTY OFFICE OF EMERGENCY MANAGEMENT
WAUKESHA COUNTY COMMUNITIES**

ADOPTED: August 1, 2022

BY THE WAUKESHA COUNTY BOARD OF SUPERVISORS

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I. Introduction and Overview

The Waukesha County Hazard Mitigation Plan is intended to provide strategies for reducing susceptibility to future damage to public and private infrastructure in the county. The procedures utilized in preparing this plan are based on guidance provided by FEMA and WEM and should therefore be considered consistent with the requirements and procedures in the Disaster Mitigation Act of 2000.

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

Section 409 states that the county is obligated to try to reduce 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 the 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 Waukesha 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 Waukesha 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 Waukesha County Hazard Mitigation Plan provides background information on Waukesha 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.

II. Plan Adoption

Promulgation and Adoption

Promulgation and Adoption will be added upon FEMA approval and formal adoption by each participating jurisdiction.

No	Jurisdiction	Date of Signed HMP Ordinance/Resolution Received by County Emergency Management	FEMA Approved	Documentation
01	Waukesha County	August 1, 2022	Yes	Waukesha County Ordinance

III. Plan Development & Planning Process

All citizens and businesses of Waukesha County are the ultimate beneficiaries of this hazard mitigation plan update. The plan reduces the risk for those who live in, work in, and visit the County. It provides a viable planning framework for the foreseeable hazards that may impact the County. Participation in the development of the plan by key stakeholders in the County helped ensure that outcomes will be mutually beneficial. The resources and background information in the plan are applicable countywide, and the plan’s goals and recommendations can lay the groundwork for the development and implementation of local mitigation activities and partnerships.

This section provides the efforts undertaken to develop/update the Plan, and a detailed description of the process.

The Previous Plan

2011 and 2016 Hazard Mitigation Plan

The Waukesha County All Hazard Mitigation Plan was updated, approved, and adopted in 2011 and 2016. It contains information relative to the hazards and vulnerabilities facing Waukesha County, Wisconsin. The jurisdictions participating in this previous Plan included those incorporated jurisdictions within the County.

As a requirement of the Disaster Mitigation Act of 2000, this plan is updated every five years.

Ongoing Planning Efforts

The Waukesha County Emergency Management has completed and regularly updates the Waukesha County Hazard Analysis. This Hazard Analysis identifies all likely natural and technological hazards that might or have occurred within the County.

Why Update

Title 44 of the Code of Federal Regulations (44 CFR) stipulates that hazard mitigation plans must present a schedule for monitoring, evaluating, and updating the plan. This provides an opportunity to reevaluate recommendations, monitor the impacts of actions that have been accomplished, and determine if there is a need to change the focus of mitigation strategies. A jurisdiction covered by a plan that has expired is not able to pursue elements of federal funding under the Robert T. Stafford Act for which a current hazard mitigation plan is a prerequisite.

The Updated Plan and the Key Differences

The previous plan has been improved for Waukesha County using the best available data and from feedback by key stakeholders. All participating municipalities were fully involved in the preparation of the plan. The updated plan includes an updated hazard analysis. Mitigation initiatives were reviewed and amended, as appropriate. Emphasis was placed on reducing redundancy and to include those initiatives that were deemed feasible, practical and implementable.

Key changes include, but are not limited to:

- The update recommends **108** new mitigation initiatives and **85** updated mitigation actions that are either in-progress or are ongoing.
- The plan also documents **26** completed mitigation actions since the last update.

Plan Organization

This plan includes all federally required elements of a disaster mitigation plan:

- A description of the planning process
- The public involvement strategy
- A list of goals and objectives
- A countywide hazard risk assessment
- Countywide mitigation initiatives
- A plan maintenance strategy

This plan has been set up in two volumes so that elements that are jurisdiction-specific can easily be distinguished from those that apply to the whole planning area:

- **Volume 1** includes all federally required elements of a disaster mitigation plan that apply to the entire planning area. This includes the description of the planning process, public involvement strategy, goals and objectives, countywide hazard risk assessment, mitigation strategy, and a plan maintenance strategy. The following appendices at the

end of Volume 1 include information or explanations to support the main content of the plan:

- Appendix A - Notice of Endorsement & Adoption
 - Appendix B - Public Outreach & Participation
 - Appendix C - Mitigation Project Examples
 - Appendix D - Federal Funding Sources and Programs
 - Appendix E - Benefit-Cost Analysis Guidance
 - Appendix F - Acronyms and Definitions
- **Volume 2** includes all federally required jurisdiction-specific elements, in annexes for each participating jurisdiction.

All planning partners will adopt Volume 1 in its entirety and their respective jurisdiction-specific annex within (Volume 2).

Plan Use

The Plan should be used to help County and participating City officials plan, design, and implement programs and projects that will help reduce the jurisdictions vulnerability to natural, technological, and man-made hazards. The Plan should also be used to facilitate inter-jurisdiction coordination and collaboration related to all hazard mitigation planning and implementation within the County and at the Regional level. Lastly, the Plan should be used to develop or provide guidance for local emergency response planning. If adopted, this Plan will achieve compliance with the Disaster Mitigation Act of 2000 (DMA 2000).

Plan Purpose

The primary focus of the Plan is to evaluate the County's potential exposure to natural and manmade disasters and identify appropriate mitigation strategies.

The purposes of this Plan are to:

- Fulfill Federal and local mitigation planning responsibilities
- Promote pre- and post-disaster mitigation measures with short/long range strategies to minimize suffering, loss of life, impact on traditional culture, and damage to property and the environment
- Eliminate or minimize conditions that would have an undesirable impact on the people, culture, economy, environment, and well-being of the County at large.
- Enhance elected officials', departments', and the public's awareness of the threats to the community's way of life, and of what can be done to prevent or reduce the vulnerability and risk.

Scope

Although DMA 2000 only requires local governments to address natural hazards, the County decided it was imperative to address all hazards, including technological and political hazards.

Legal Authority

Federal legislation has historically provided funding for disaster relief, recovery, and some hazard mitigation planning. The Disaster Mitigation Act of 2000 (DMA 2000) is the latest legislation to improve this planning process (Public Law 106-390). The new legislation reinforces the importance of mitigation planning and emphasizes planning for disasters before they occur. As such, DMA 2000 establishes a pre-disaster hazard mitigation program and new requirements for the national post-disaster Hazard Mitigation Grant Program (HMGP).

Section 322 of DMA 2000 specifically addresses mitigation planning at the state and local levels. It identifies new requirements that allow HMGP funds to be used for planning activities, and increases the amount of HMGP funds available to states that have developed a comprehensive, enhanced mitigation plan prior to a disaster. States and communities must have an approved mitigation plan in place prior to receiving post-disaster HMGP funds. Local and tribal mitigation plans must demonstrate that their proposed mitigation measures are based on a sound planning process that accounts for the risk to and the capabilities of the individual communities.

FEMA prepared an Interim Final Rule, published in the Federal Register on February 26, 2002 (44 CFR Parts 201 and 206), which establishes planning and funding criteria for states and local communities. For disasters declared after November 1, 2004 a local government must have a Local Hazard Mitigation Plan (LHMP) approved per section 201.6, in order to receive Federal HMGP project grants.

The Planning Area: Participating Jurisdictions and Organizations

The Waukesha County Hazard Mitigation Plan is a multi-jurisdictional plan that encompasses all incorporated and unincorporated jurisdictions within the County.

All participating jurisdictions in Waukesha County were actively involved in the planning process.

- The steering committee included representation from the different jurisdictions in the County.
- Invitations and meeting notices were sent to representatives from participating jurisdictions
- Jurisdictional representatives were given the opportunity to comment real-time with the plan development process via the online planning system
- Additional follow-up contacts were made with local jurisdictions and their representatives, as needed. In the Summer and Fall of 2021, a request to review mitigation actions/projects was issued to the various jurisdictions and their representatives.

The planning area was defined to consist of all of Waukesha County. All partners to this plan have jurisdictional authority within this planning area. Adopting resolutions for all of the jurisdictions are in Appendix A: Notice of Endorsement & Adoption. Specific plan participation activities for each jurisdiction are documented in [Volume II](#).

Participating Jurisdictions			
No	Jurisdiction	Involvement	Authority to Regulate Development
01	Waukesha County	Meetings; Mitigation Steering Committee Leadership; Mitigation Actions/Projects	Yes
02	Brookfield City	Meetings; Mitigation Actions/Projects	Yes
03	Delafield City	Meetings; Mitigation Actions/Projects	Yes
04	Muskego City	Meetings; Mitigation Actions/Projects	Yes
05	New Berlin City	Meetings; Mitigation Actions/Projects	Yes
06	Oconomowoc City	Meetings; Mitigation Actions/Projects	Yes
07	Pewaukee City	Meetings; Mitigation Actions/Projects	Yes
08	Waukesha City	Meetings; Mitigation Actions/Projects	Yes
09	Big Bend Village	Meetings; Mitigation Actions/Projects	Yes
10	Butler Village	Meetings; Mitigation Actions/Projects	Yes
11	Chenequa Village	Meetings; Mitigation Actions/Projects	Yes
12	Dousman Village	Meetings; Mitigation Actions/Projects	Yes
13	Eagle Village	Meetings; Mitigation Actions/Projects	Yes
14	Elm Grove Village	Meetings; Mitigation Actions/Projects	Yes
15	Hartland Village	Meetings; Mitigation Actions/Projects	Yes
16	Lac La Belle Village	Meetings; Mitigation Actions/Projects	Yes
17	Lannon Village	Meetings; Mitigation Actions/Projects	Yes
18	Menomonee Falls Village	Meetings; Mitigation Actions/Projects	Yes
19	Merton Village	Meetings; Mitigation Actions/Projects	Yes
20	Mukwonago Village	Meetings; Mitigation Actions/Projects	Yes
21	Nashotah Village	Meetings; Mitigation Actions/Projects	Yes
22	North Prairie Village	Meetings; Mitigation Actions/Projects	Yes
23	Oconomowoc Lake Village	Meetings; Mitigation Actions/Projects	Yes
24	Pewaukee Village	Meetings; Mitigation Actions/Projects	Yes
25	Summit Village	Meetings; Mitigation Actions/Projects	Yes
26	Sussex Village	Meetings; Mitigation Actions/Projects	Yes
27	Vernon Village	Meetings; Mitigation Actions/Projects	Yes
28	Wales Village	Meetings; Mitigation Actions/Projects	Yes
29	Waukesha Village	Meetings; Mitigation Actions/Projects	Yes
30	Brookfield Town	Meetings; Mitigation Actions/Projects	Yes
31	Delafield Town	Meetings; Mitigation Actions/Projects	Yes
32	Eagle Town	Meetings; Mitigation Actions/Projects	Yes
33	Genesee Town	Meetings; Mitigation Actions/Projects	Yes
34	Lisbon Town	Meetings; Mitigation Actions/Projects	Yes
35	Merton Town	Meetings; Mitigation Actions/Projects	Yes
36	Mukwonago Town	Meetings; Mitigation Actions/Projects	Yes
37	Oconomowoc Town	Meetings; Mitigation Actions/Projects	Yes
38	Ottawa Town	Meetings; Mitigation Actions/Projects	Yes
39	Lake Country Fire Dept	Meetings; Mitigation Actions/Projects	Yes
40	Eagle Springs Lake Management District	Meetings; Mitigation Actions/Projects	Yes
41	Western Lakes Fire District	Meetings; Mitigation Actions/Projects	Yes

The Steering Committee

Hazard mitigation planning enhances collaboration and support among diverse parties whose interests can be affected by hazard losses. A steering committee was formed to oversee all phases of the plan. The members of this committee included key members from the participating jurisdictions, planning partner staff, and other stakeholders from within the planning area. The table below lists the committee members.

Hazard Mitigation Steering Committee Membership				
No	Jurisdiction	Name	Title	Department/Organization
01	Waukesha County	Lisa Panas	Captain	Waukesha County Sheriff's Department
02	Waukesha County	Rob Rauchle	Highway Manager	Waukesha County DPW - Highway Operations
03	Waukesha County	Gary Bell	Director	Waukesha County Emergency Preparedness
04	Waukesha County	Jason Fruth	Planning and Zoning Manager	Waukesha County Department of Parks & Land Use
05	Waukesha County	Paul Decker	Chairman	Waukesha County Board of Supervisors
06	Waukesha County	Gail Goodchild	Coordinator	Waukesha County Office of Emergency Management
07	Waukesha County	Kevin Kober	Deputy Emergency Management Coordinator	Waukesha County Office of Emergency Management
08	Waukesha County	Alex Freeman	Planner	Waukesha County Office of Emergency Management
09	Town of Brookfield	Tom Hagie	Village Administrator	Town of Brookfield
10	Town of Delafield	Matt Fennig	Fire Chief	Lake County Fire and Rescue
11	Town of Eagle	Scott Kugel	Deputy	Eagle Fire Department
12	Town of Genesee	*Joseph Osterman	Administrator	Town of Genesee
13	Town of Genesee	*Tim Klink	Chairperson	Town of Genesee
14	Town of Mukwonago	Jeff Stien	Chief	Mukwonago Fire Department
15	Town of Oconomowoc	*James Wallis	Chief	Town of Oconomowoc Police
16	Town of Ottawa	Cheryl Rupp	Chairperson	Town of Ottawa
17	Village of Big Bend	Donald Gaglione	Chief	Big Bend Police Department
18	Village of Butler	Patricia Tiarks	President	Village of Butler Village Board
19	Village of Chenequa	Dan Neumer	Chief	Chenequa Village Police Department
20	Village of Dousman	Jack Nissen	President	Dousman Village Village Board
21	Village of Dousman	Tim Meyer	Deputy Chief	Fire Department
22	Village of Eagle	Bruce Hein	Chief	Western Lakes Fire District/ Dousman Fire District
23	Village of Elm Grove	David DeAngelis	Manager	Village of Elm Grove
24	Village of Hartland	Torin Misko	Chief	Village of Hartland Police Department

25	Village of Lac La Belle	George Stumpf	Administrator	Village of Lac La Belle
26	Village of Lannon	Dan Bell	Chief	Village of Lannon Police Department
27	Village of Menomonee Falls	Eugene Neyhart	Captain	Village of Menomonee Falls Police Department
28	Village of Merton	Bruce Blawat	Trustee	Village of Merton Village Board
29	Village of Mukwonago	Jeff Stien	Chief	Mukwonago Fire Department
30	Village of Nashotah	Matt Fennig	Chief	Lake County Fire & Rescue
31	Village of North Prairie	Rhoda Bagley	Clerk	Village of North Village Board
32	Village of Oconomowoc Lake	Andrew Helwig	Chief	Village of Oconomowoc Lake Police Department
33	Village of Pewaukee	Mark Garry	Deputy Chief	Village of Pewaukee Police Department
34	Village of Pewaukee	Scott Gosse	Administrator	Village of Pewaukee Clerk's Office
35	Village of Summit	Brian Wraalstad	Sergeant	Village of Summit Police Department
36	Village of Sussex	Kris Grod	Chief	Village of Sussex Fire & EMS
37	Village of Vernon	Alex Felde	Chief	Village of Vernon Fire Department
38	Village of Wales	Gail Tamez	Clerk	Village of Wales Village Hall
39	Village of Waukesha	*Kathy Nickolaus	Clerk	
40	City of Brookfield	Robert Scott	Emergency Manager	City of Brookfield Emergency Management
41	City of Delafield	Tom Hafner	Administrator/Director	City of Delafield/City of Delafield Public Works
42	City of Muskego	*Rick Rens	Chief	
43	City of New Berlin	Jim Burns	Emergency Manager	City of New Berlin Emergency Management Department
44	City of Oconomowoc	James Pfister	Chief	City of Oconomowoc Police Department
45	City of Pewaukee	Kevin Bierce	Chief	City of Pewaukee Fire Department
46	City of Waukesha	Dan Baumann	Captain	City of Waukesha Police Department
47	City of Waukesha	Joe Hoffman	Deputy Chief	City of Waukesha Fire Department
48	City of Waukesha	Shawn Reilly	Mayor	City of Waukesha Mayor's Office
49	Eagle Springs Lake Management District	Peter Jensen	Administrator	Eagle Springs Lake Management District

***Individuals with asterisks have either retired, taken new positions, or may no longer be involved in the community. These marked individuals are included in this table because they were involved in the original planning process.**

Additional Jurisdiction Representatives:

A list of the jurisdiction representatives is found in [Volume II](#).

Organization/Agency Coordination and Participation

Opportunities for involvement in the planning process must be provided to neighboring communities, local and regional agencies involved in hazard mitigation, agencies with authority to regulate development, businesses, academia, and other private and nonprofit interests (44 CFR, Section 201.6(b)(2)). This task was accomplished by the planning team as follows:

Steering Committee Involvement — Agency representatives were invited to participate on the Steering Committee.

Key Stakeholder Interviews -- The stakeholder interviews obtained input from many local stakeholders with insight into hazards and potential projects. See [The Steering Committee](#) for a list of stakeholders interviewed. Agency representatives (see list of agencies below) were also contacted and interviewed/consulted regarding specific flooding, planning and zoning, transportation, and community-related questions.

Agency Notification — Agencies and organizations throughout the County were invited to participate in the plan development process from the beginning and were kept apprised of plan development milestones. Specifically, meeting invitations were sent via the listserve which includes key agency and organizational leaders within the County.

The following agencies/organizations were informed of key planning meetings and were invited to participate in the hazard mitigation questionnaire. Private citizens and businesses were also encouraged to participate in the hazard mitigation questionnaire (373 completed questionnaires and over 622 residents enter the survey), but because the questionnaire promised confidentiality, a complete list of participating businesses and organizations is not available. Agency/organization representatives (except for those on the Waukesha Cooperation Council) were also invited to participate via the online planning system and were given the opportunity to review, comment and suggest revisions to the plan.

- Waukesha Cooperation Council (a list serve of all chief elected officials in Waukesha County)
- Waukesha County Emergency Management
- Waukesha County Department of Public Works
- Waukesha County Highway Operations Division
- Waukesha County Planning and Zoning
- Waukesha County Public Health
- Waukesha County Health and Human Services
- Waukesha County Transit Services
- Waukesha County Environmental Health
- Waukesha Fire Department
- Waukesha County Sheriff's Department
- Waukesha County Board
- Waukesha County LEPC
- Menomonee Falls Police Department
- Village of Pewaukee Police Department

- Village of Pewaukee Fire
- Lake Country Fire
- Western Lakes Fire District
- Mukwonago Fire Department
- City of Muskego Police Department
- Waukesha City Police Department
- Waukesha City Fire Department
- Village of Dousman Fire Department
- Vernon Fire Department
- Pewaukee Fire Department
- Oconomowoc City Fire Department
- Village of Lannon Police Department
- Village of Big Bend Police Department
- New Berlin Emergency Management
- New Berlin Police Department
- Oconomowoc Fire Department
- Menomonee Falls Fire Department
- Sussex Fire Department

Input from Neighboring Jurisdictions -- Emergency managers from surrounding counties were granted access to the online planning system, and were invited to review and provide any additional feedback to the plan. To date, no comments were received. The following is a list of neighboring jurisdictions invited to review the plan: Kenosha County, Walworth County, Milwaukee County, Jefferson County, Ozaukee County, Racine County, Washington County.

Pre-Adoption Review

Key agencies and stakeholders were provided an opportunity to review and comment on this plan, primarily through the hazard mitigation plan website and Online Planning System. Each agency was sent an e-mail message (or invite to the Online Planning System) informing them that draft portions of the plan were available for review.

Stakeholder Invitation to Review and Comment on Plan

Mitigation Stakeholders,

Waukesha County Emergency Management requests that stakeholders and the designated Point of Contact for each jurisdiction (if applicable) review the hazard mitigation plan and their respective section (i.e., Volume 2: Waukesha County Hazard Mitigation Plan 2021: Municipalities) of the Waukesha County Multi-Jurisdictional Hazard Mitigation Plan, as applicable. As part of this review, you will have an opportunity to provide key updates/changes.

Instructions to complete this review process are included in the attached PDF document. Please follow the step-by-step instructions. **Most stakeholders and jurisdictions have already provided the necessary information required.** We want to ensure you have an opportunity to make any necessary changes or improvements. For the POCs of each jurisdiction, **if you are satisfied with your Jurisdictional Annex, simply go to Step 8 (see attached PDF document) and provide a comment indicating that you “Approve your jurisdictional annex”.** If you are not comfortable using the system, you may also email daiko.abe@i-s-consulting.com and ggoodchild@waukeshacounty.gov that you approve your jurisdiction’s section of the plan.

The review process is facilitated through the online planning system. Each participating jurisdiction has their own section in the plan.

LINK to the Online Planning System: <https://waukeshacounty.isc-cemp.com>

If you are new to the hazard mitigation planning process, and do **not** have log-in credentials, please contact the following individual, and we will invite you to the planning system:

Daiko Abe, Integrated Solutions Consulting
Email: daiko.abe@i-s-consulting.com
Office: 847.565.8791 (direct)

Please complete the review no later than: December 13, 2021

We will also be having a final planning meeting on **December 13, 2021 at 1 p.m.** This meeting will be held virtually. The meeting information is below:

Waukesha County Hazard Mitigation Plan Meeting

Mon, Dec 13, 2021 1:00 PM - 2:00 PM (CST)

Please join my meeting from your computer, tablet or smartphone.

<https://global.gotomeeting.com/join/799852621>

You can also dial in using your phone.

(For supported devices, tap a one-touch number below to join instantly.)

United States: +1 (872) 240-3311

- One-touch: <tel:+18722403311..799852621#>

Access Code: 799-852-621

Stakeholder and Public Involvement

Updating this Plan involved assistance in identifying and evaluating hazards and mitigation initiatives from five (5) key groups: core planning team, steering committee, local planning team/community representatives, general public, and other stakeholders.

Broad public participation in the planning process helps ensure that diverse points of view about the planning area's needs are considered and addressed. The public must have opportunities to comment on disaster mitigation plans during the drafting stages and prior to plan approval (44 CFR, Section 201.6(b)(1)). The Community Rating System expands on these requirements by making CRS credits available for optional public involvement activities. The strategy for involving the public in this plan emphasized the following elements:

- Use a questionnaire to determine the public's perception of risk and support of hazard mitigation
- Attempt to reach as many planning area citizens as possible using multiple media.
- Identify and involve planning area stakeholders.

Stakeholder and the Steering Committee

The core planning team consisted of key members from Waukesha County Emergency Management. The core planning team also served on the steering committee and helped to guide the process. The Core Planning Team met bi-weekly.

Stakeholders are the individuals, agencies and jurisdictions that have a vested interest in the recommendations of the hazard mitigation plan, including planning partners. The effort to include stakeholders in this process included stakeholder participation on the Steering Committee. Stakeholders were encouraged to attend and participate in all committee meetings.

The Steering Committee agreed to meet three (3) times or as needed throughout the course of the plan's development. Meetings were facilitated at each Steering Committee meeting, which addressed a set of objectives based on the work plan established for the plan. Every jurisdiction was followed up through the process for any additional information. The final planning meeting was held on December 13, 2021 to review the plan. Each representative of every jurisdiction was invited to use the online planning system for them to review their respective section in [Volume II](#).




Image: Hazard Mitigation Planning Workshop

The Steering Committee and Jurisdictional Stakeholders met on the following dates:

- **Webinar** | Tuesday, June 22, 2021: 10:00 a.m. – 11:00 a.m.
- **Webinar** | Monday, June 28, 2021: 1:00 p.m. – 2:00 p.m.
- **Hazard Mitigation Planning Workshop** | Tuesday, August 24, 2021 (1:00 p.m.-3:30 p.m.) | Waukesha County Emergency Management, 1621 Woodburn Rd., Waukesha, WI 53188
- **Hazard Mitigation Planning Workshop** | Wednesday, August 25, 2021 (9:00 a.m.-11:30 a.m.) | Waukesha County Emergency Management, 1621 Woodburn Rd., Waukesha, WI 53188
- **Final Planning Meeting** | Mon, December 13, 2021: 1:00 p.m. - 2:00 p.m.

Meeting agendas and sign-in sheets can be found in Appendix B of this document. All Steering Committee meeting times and locations were sent via e-mail with follow-up phone calls, as needed.



**2021 Waukesha County
Hazard Mitigation Plan**
Local Jurisdiction Workshops

What: These in-person workshops will give your jurisdictional planning team an opportunity to work with planning staff from Waukesha County Emergency Management to identify local hazards and areas of concern, review previously identified mitigation actions, develop future mitigation projects, prioritize mitigation projects moving forward, and provide input/update for your jurisdiction's section of the *2021 Waukesha County Mitigation Plan*.

Why: Participating in updates to the hazard mitigation plan is a *FEMA Requirement* to be eligible for some federal disaster funding before and after disasters. By bringing your local planning team to one of these workshops, you will be fulfilling that requirement.

Who: *EVERY* jurisdiction within Waukesha County should attend one workshop; recommended attendees from local jurisdictions include representatives from the following disciplines:

<ul style="list-style-type: none"> ▪ Building Code Enforcement ▪ Municipal Administration & Management ▪ Elected Officials ▪ Fire & Law Enforcement ▪ Floodplain Administrator ▪ Legal ▪ Treasurer/Tax Assessor 	<ul style="list-style-type: none"> ▪ Parks & Recreation ▪ Planning/Community Development/GIS ▪ Public Works/Transportation (Roads & Bridges) ▪ Sanitation/Storm Water Management/Utility Districts ▪ School Districts & Universities
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When & Where (*ATTEND ONLY ONE*):

- Hazard Mitigation Planning Workshop | Tuesday, August 24, 2021 (1:00 p.m.-3:30 p.m.) | Waukesha County Emergency Management, 1621 Woodburn Rd., Waukesha, WI 53188
- Hazard Mitigation Planning Workshop | Wednesday, August 25, 2021 (9:00 a.m.-11:30 a.m.) | Waukesha County Emergency Management, 1621 Woodburn Rd., Waukesha, WI 53188

To Register Go To: <http://www.isc-registration.com/waukesha.html>

Please contact Gail Goodchild, Emergency Management Coordinator at ggoodchild@waukeshacounty.gov or (262) 446-5077, for assistance with registration, and/or with any questions.

Public Participation and Questionnaire and Key Findings

The general public must be given an opportunity to be involved in the planning process. As such, a number of public outreach activities were organized to ensure public participation and input was obtained. This section describes those efforts.

Public Open House

A public meeting was held on August 24, 2021. The meeting provided the public an opportunity to review the potential hazards that could occur within the County and gave the planning team an opportunity to request input for the various mitigation measures intended to eliminate or reduce the negative impact of those hazards. See [Appendix B](#) for meeting details.

Hazard Questionnaire

A hazard mitigation and preparedness questionnaire was developed to gauge household preparedness for all hazards and the level of knowledge of tools and techniques that assist in reducing risk and loss. This questionnaire was designed to help identify areas vulnerable to one or more hazards. The answers to its questions helped guide the Steering Committee in prioritizing hazards of impact and in selecting goals, objectives and mitigation strategies.

373 questionnaires were completed during the course of this planning process, and 622 residents entered the survey. The average completion time for the questionnaire was 16 minutes and 42 seconds. The complete questionnaire and a summary of its findings can be found in [Appendix B](#).

Link: [Appendix B: Hazard Mitigation Questionnaire and Results](#)

Specifically, the questionnaire results were used to help the planning team and steering committee to separate perception versus actual threats to life safety and property.

For example, one of the questions asked: “Do you believe that your household and/or place of business might ever be threatened by the following hazards?” Top hazards reported by the public included:

- Severe Winter Storm/Heavy Snowfall
- Tornadoes

While these hazards pose a significant risk the county, the steering committee designated flooding and dam failure as the hazard with the highest risk rating after considering frequency, magnitude and vulnerability.

Interestingly, open-ended responses from the questionnaire resulted in validation that flooding posed a major risk to the County. One question asked: “If you have experienced any damage(s) or injury(ies) from a disaster, please list the hazard(s) that caused the damages/losses and/or injuries.” The top hazard identified by participants was flooding.

The questionnaire helped to provide validation for mitigation actions identified in the plan. For example, some open-ended comments on how the county could better prepare residents suggested the use of the following:

- Cell phone alerts
- More information on hazards to the general public

Additionally, when the participants were asked what hazards should be mitigated, this provided additional guidance to the steering committee in an effort to align county and municipal priorities with those of the general public.

18. Based on YOUR PERCEPTION of your jurisdiction's hazards, to what degree of emphasis would you expect your jurisdiction to mitigate the following hazards? Mitigation definition: The purpose of mitigation planning is to identify policies and actions that can be implemented over the long term to reduce risk and future losses. Mitigation forms the foundation for a community's long-term strategy to reduce disaster losses and break the cycle of disaster damage, reconstruction, and repeated damage. No Mitigation Needed = No mitigation on this hazard is expected or needed Low Priority = This hazard should be mitigated, but is not a high priority compared to other hazards Medium Priority = It is important to mitigate this hazard High Priority = It is a high priority to emphasize mitigation for this hazard

	No Mitigation Needed	Low Priority	Medium Priority	High Priority	Responses
Severe Temperatures					
Count	103	125	111	34	373
Row %	27.6%	33.5%	29.8%	9.1%	
Earthquakes					
Count	221	125	11	15	372
Row %	59.4%	33.6%	3.0%	4.0%	
Severe Winter Storm/Heavy Snowfall					
Count	11	39	152	173	375
Row %	2.9%	10.4%	40.5%	46.1%	
Tornado and High Winds					
Count	10	46	151	169	376
Row %	2.7%	12.2%	40.2%	44.9%	
Forest and Wildfires					
Count	102	186	62	25	375
Row %	27.2%	49.6%	16.5%	6.7%	
Fog					
Count	178	143	47	7	375
Row %	47.5%	38.1%	12.5%	1.9%	
Thunderstorms					
Count	46	113	145	71	375
Row %	12.3%	30.1%	38.7%	18.9%	
Drought and Dust Storms					
Count	148	170	49	7	374
Row %	39.6%	45.5%	13.1%	1.9%	
Flooding					
Count	53	125	134	62	374
Row %	14.2%	33.4%	35.8%	16.6%	

	No Mitigation Needed	Low Priority	Medium Priority	High Priority	Responses
Flash Flooding Count	56	102	144	71	373
Row %	15.0%	27.3%	38.6%	19.0%	
Dam Failure Count	182	118	47	25	372
Row %	48.9%	31.7%	12.6%	6.7%	
Utility Failure Count	12	42	144	176	374
Row %	3.2%	11.2%	38.5%	47.1%	
Total Total Responses					376

Public Comment on Draft Plan:

The following announcement was shared on the County's website.

WAUKESHA COUNTY, WISCONSIN HAZARD MITIGATION PLAN

PREPARED BY:
WAUKESHA COUNTY HAZARD MITIGATION STEERING COMMITTEE
WAUKESHA COUNTY OFFICE OF EMERGENCY MANAGEMENT
WAUKESHA COUNTY COMMUNITIES

Public Review Comment Instructions:

This plan was developed using the County's online planning system, and the most complete and updated version of the plan resides on the system. County and municipality stakeholders and representatives have been granted access to the system and can make comments and provide feedback, as appropriate. (<https://waukeshacounty.isc-cemp.com>)

This version was adapted and modified to provide a PDF version of the plan for those who do not have access to the online planning system.

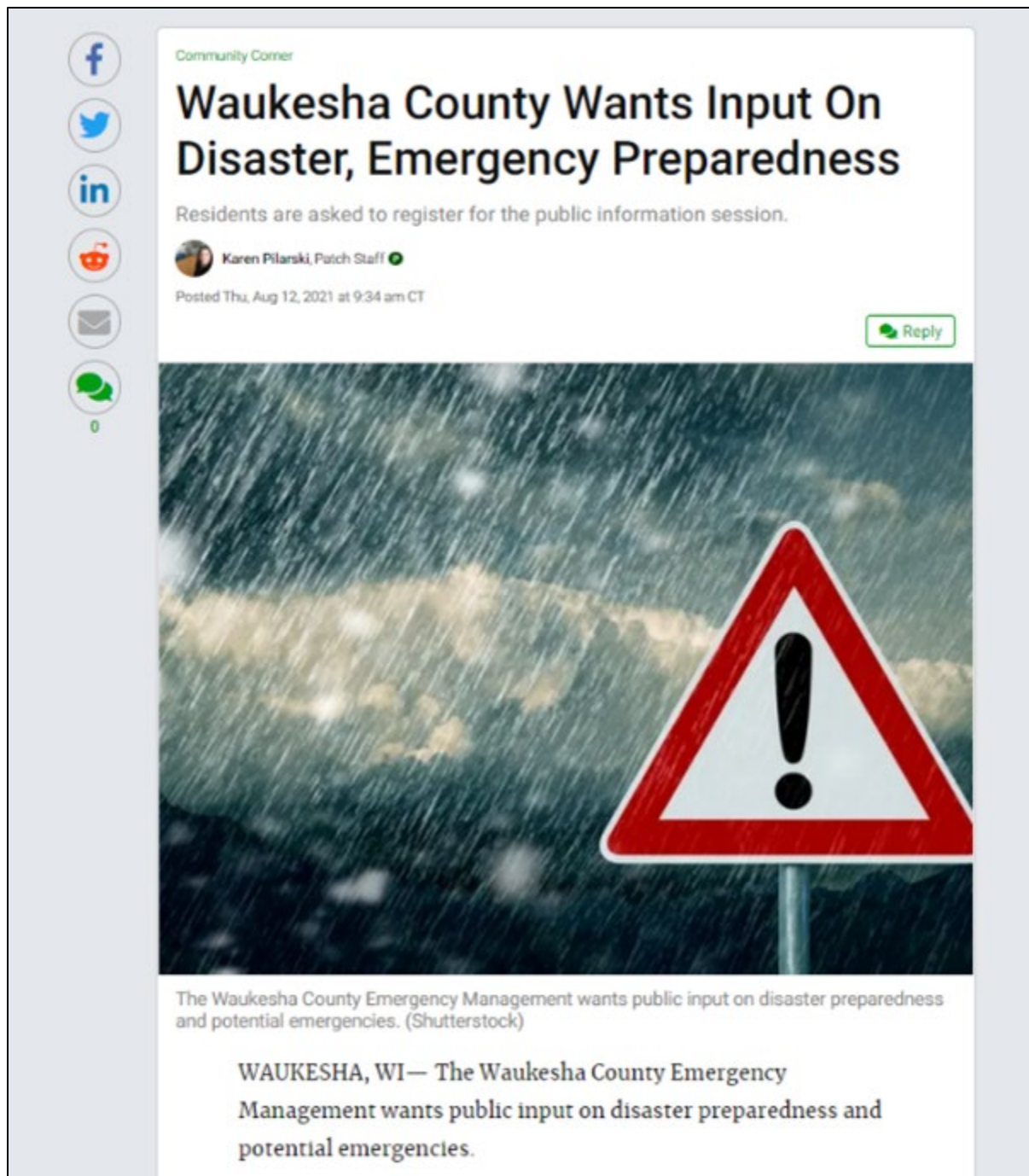
Pursuant to Requirement §201.6(b): In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

- (1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
- (2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process

Feedback and Comments can be directed to:

Gail Goodchild, MPA WCEM
Emergency Management Coordinator
Waukesha County Emergency Management
1621 Woodburn Rd
Waukesha, WI 53188

Telephone: (262) 446-5077
Fax: (262) 548-7313
ggoodchild@waukeshacounty.gov



Online Planning System and Workgroup Management Tool

Online Planning System

Local Planning Team members were invited to participate via the online planning system (<https://waukeshacounty.isc-cemp.com>), known as the Waukesha County Knowledge Management System (KMS).

One of the key features of the Online Planning System was the ability to provide real-time access to the Plan and to allow stakeholders to comment on key sections. Steering committee members and Local Planning Team members were given access to the system. The comments tool was used to encourage collaboration. The comments tool allowed the user to make comments on any page within the manual and mark the comment as an observation or feedback. Comments for pages were visible to all administrators and users who had editing privileges for the specific page.

To make a comment, users were instructed to click on the Comment link on the bottom of the content page and a pop-up box would appear. The person used the drop-down box to designate whether the comment was a Feedback or an Observation. After entering the comment, they clicked the Send Comments button to submit.

The comment would appear after the page refreshes (if user is allowed to view comments). An email notification was sent to users who were designated to receive comment notification.

As the Director of Emergency Management, the City of New Berlin approves this jurisdictional annex.

Observation from Jim Burns on 2021/12/09 06:18 | [delete](#) | [archive](#)

Documentation of Participation

Local jurisdiction and Local Planning Team Participation was documented as described in the tables below:

Table. Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist						
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
	Yes or No (# of participants)	Yes or No	Yes or No	Yes or No	Yes or No	Yes or No

2021 Plan Participation and Involvement					
Name	Webinar	Workshop/Meeting(s) Attendance	Registered and Accessed the KMS (Online Planning System)	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities
[Individual Planning Team Member]	Date of Participation	Date of Participation	Yes or No	Yes or No	Description of Activity

Web site

The Waukesha County Web site was utilized to make the Hazard Mitigation Plan available to key stakeholders. The link on the Web site "Hazard Mitigation Plan Information" took users directly to the online planning system housing the hazard mitigation plan.

Review of Existing Programs and Plans

Local comprehensive plans, ordinances, and other pertinent planning documents were reviewed by the planning consultant and discussed with the steering committee when available and pertinent. During stakeholder interviews and meetings, participants were asked to identify and consider related plans and ordinances. The results of these discussions were integrated into the appropriate assessment section or recommended strategies which were reviewed by the steering committee, communities, and other stakeholders. A few examples of other planning efforts considered and integrated into this plan include the State Hazard Mitigation Plan and recent studies conducted by the County and its respective departments.

Plan Name	How the Document was Used
2021 Wisconsin Hazard Mitigation Plan	Risk assessment data
National Climatic Data Center	Historical data for natural hazards
2016 Waukesha County Hazard Mitigation Plan	Served as the primary framework for the 2021 update
2020-22 Waukesha County Department Strategic Plans	Provided valuable data for the Community Profile
2019-2021 Growth Strategy	Community/Business Profile data

Hazard mitigation planning must include review and incorporation, if appropriate, of existing plans, studies, reports, and technical information (44 CFR, Section 201.6(b)(3)). This Plan

provides a review of the laws and ordinances in effect within the planning area that can affect hazard mitigation initiatives.

Additionally, there have been plans and ordinances completed by individual Waukesha County departments or municipalities that are directly and/or indirectly related to the County's overall mitigation efforts. Some of these initiatives were used as reference materials for this plan, and include the following:

Waukesha County Code of Ordinances

<http://www.waukeshacounty.gov/page.aspx?SetupMetalId=11982&id=11986>

- Chapter 14 - Parks and Land Use
- Chapter 15 - Public Works
- Appendix A - Basic Zoning Ordinance
- Appendix B - Shoreland and Floodland Protection
- Appendix D - Shoreland and Floodland Subdivision Control

City of Brookfield Municipal Code

<http://www.codepublishing.com/wi/brookfield/>

- Title 15 - Building and Construction
- Title 16 - Subdivisions
- Title 17 - Zoning

City of Brookfield Ordinances

<http://www.ci.brookfield.wi.us/Archive.asp?AMID=83>

- Temporary Moratorium on Land Divisions of Platted Residential Lots
- Plus other ordinances with regard to specific lots.

City of Delafield Municipal Code

<http://http://www.municode.com/Resources/gateway.asp?pid=12542&sid=49>

Chapter 8 - Public Works

Chapter 13 - Municipal Utilities

Chapter 14 - Building Code

Chapter 17 - Zoning Code

Chapter 18 - Subdivision Control Code

Chapter 20 - Floodplain Zoning Code

Chapter 23 - Construction Site Erosion Control and Storm Water Management

City of Muskego Municipal Code

<http://http://www.ci.muskego.wi.us/Government/MunicipalCodes/tabid/391/Default.aspx>

Chapter 14 - Floodplain Zoning Ordinance

Chapter 17 - Zoning Ordinance

Chapter 18 - Land Division Ordinance

Chapter 19 - Minimum Housing Code

Chapter 29 - Erosion Control

Chapter 30 - Building Code

Chapter 34 - Storm Water Management

Chapter 38 - Non Metallic Mining

City of New Berlin Municipal Code

<http://www.ecode360.com/?custId=NE1873>

Chapter 65 - Water Resource Management

Chapter 80 - Building Construction

Chapter 110 - Erosion Control

Chapter 198 - Property, Abandoned and Obsolete

Chapter 226 - Storm Water Runoff

Chapter 235 - Subdivision of Land

Chapter 275 - Zoning

City of Oconomowoc Municipal Code

http://library6.municode.com/default-test/home.htm?infobase=19978&doc_action=whatsnew

City of Oconomowoc Zoning Code

<http://http://www.ci.oconomowoc.wi.us/Zoningordinance/tableofcontents.htm>

Sub-chapter 17-1 - Establishment of Zoning Districts

Sub-chapter 17-2 - Land Use Regulations

Sub-chapter 17-3 - Density and Intensity Regulations

Sub-chapter 17-4 - Bulk Regulations

Sub-chapter 17-5 - Natural Resource Protection Regulations

Sub-chapter 17-6 - Landscape and Buffer-Yard Regulations

City of Pewaukee Ordinances

http://www.cityofpewaukee.us/pewaukee_ordinances_02.php

Chapter 10 - Land, Streets, Right of Ways

Chapter 14 - Building Code

Chapter 16 - Municipal Water and Wellhead Protection

Chapter 17 - Zoning

Chapter 18 - Land Division

Chapter 19 - Storm Water/Erosion Control

City of Waukesha Code Book

<http://http://www.ci.waukesha.wi.us/web/guest/codebook>

Chapter 16 - Building

Chapter 22 - Zoning

Chapter 23 - Subdivision and Platting

Chapter 24 - Floodland Zoning

Chapter 32 - Storm Water Management and Erosion Control

Village of Chenequa Code

<http://www.chenequa.wi.us/village1.html>

Chapter 3 - Land

Chapter 5 - Building Code

Chapter 6 - Zoning Code

Village of Elm Grove Code of Ordinances

<http://www.ecode360.com/?custId=EL1841>

Chapter 106 - Building Construction

Chapter 305 - Land Division

Chapter 330 - Floodplain Zoning

Chapter 335 - Zoning

Village of Hartland Municipal Code

<http://www.municode.com/resources/gateway.asp?sid=49&pid=13361>

Chapter 18 - Building and Building Regulations

Chapter 46 - Land Development

Chapter 50 - Land Subdivision

Chapter 76 - Storm Water Management

Village of Menomonee Falls Code of Ordinances

<http://www.municode.com/resources/gateway.asp?pid=13290&sid=49>

Chapter 18 - Building and Building Regulations

Chapter 38 - Environment

Chapter 58 - Manufactured Homes and Trailers

Chapter 59 - Non-Metallic Mining Reclamation

Chapter 94 - Subdivisions and Other Divisions of Land

Chapter 122 - Zoning

Village of Mukwonago Municipal Code

http://www.villageofmukwonago.com/municipal_code.htm

Chapter 18 - Buildings and Building Regulations

Chapter 45 - Land Division

Chapter 50 - Mobile Homes and Trailers

Chapter 62 - Planning

Chapter 100 - Zoning

Village of Nashotah Municipal Code

<http://www.municode.com/resources/gateway.asp?pid=12609&sid=49>

Chapter 14 - Building Code

Chapter 16 - Shoreland-Wetland Zoning

Chapter 17 - Zoning Code

Chapter 18 - Subdivision and Platting

Chapter 23 - Storm Water Runoff

Village of North Prairie Municipal Code

<http://www.northprairie.net/Municipal%20Codes,%20Ordinances%20and%20Polices.html>

Chapter 14 - Building and Building Regulations

Chapter 22 - Manufactured Homes

Village of Oconomowoc Lake Zoning Code and Land Division Ordinances

<http://www.oconlake.com/zonefile.html>

Chapter 17 - Zoning Code

Chapter 18 - Subdivision and Platting

Village of Sussex Municipal Code and Newly Enacted Ordinances

<http://www.village.sussex.wi.us/Ordinances.php>

Chapter 14 - Stormwater Runoff

Chapter 17 - Zoning Code

Chapter 18 - Land Development Code

Chapter 26 - Non-metallic Mining Reclamation

Chapter 27 - Environmental Enhancement and Protection

Chapter 30 - Building Code

Ordinance No 711 - Floodplain Management

Ordinance No 716 - Land Suitability - Floodlands

Town of Brookfield Zoning Code

<http://www.townofbrookfield.com/buildinginspection.html>

Chapter 17 - Zoning Code

Town of Delafield Municipal Code

http://www.townofdelafield.org/towninfo_codes.htm

Chapter 14 - Building and Mechanical Code

Chapter 17 - Zoning Code

Chapter 18 - Land Division and Development Control

Town of Mukwonago Municipal Code

http://www.townofmukwonago.us/Town_Ordinances.htm

Chapter 14 - Buildings and Building Regulations

Chapter 82 - Zoning

Town of Ottawa Ordinances

<http://www.townofottawa.com/ordinances.asp>

Chapter 14 - Building Code

Chapter 18 - Land Division and Development

Town of Vernon Municipal Code

<http://www.ecode360.com/?custId=VE2182>

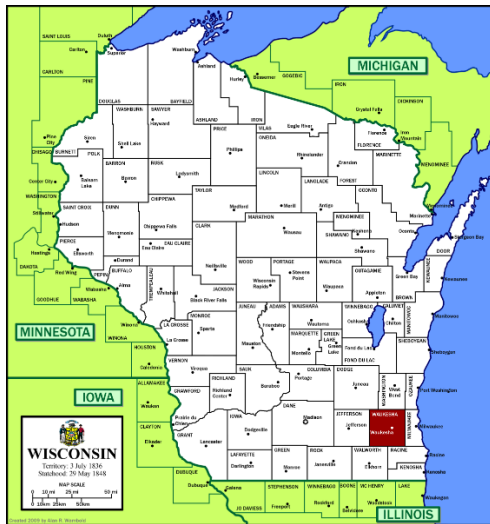
Chapter 125 - Building Construction

Chapter 144 - Commercial and Industrial Development

Chapter 200 - Land Division and Development Control

Chapter 276 - Storm Water Utility

IV. Community Profile



The Community Profile is an important component of the Hazard Mitigation Plan and should be utilized to provide valuable intelligence and situational awareness. The Community Profile is an overview of the political governance, economy, geography, climate, population, community assets, future development and trends, and commercial and industrial make-up of Waukesha County.

The Community Profile provides Waukesha County with a solid foundation for developing a common operational picture for all programmatic, planning, and operational needs.

Physical and Natural Characteristics of Waukesha County

This section describes the geology, topography, climate, hydrology, soil, wetlands, vegetation and land use considerations for Waukesha County.

General Community Introduction

A drive through Waukesha County uncovers evidence of the great glaciers that once covered the area. Lush rolling hills, abundant lakes and limestone quarries are just some of the natural wonders. Many of Waukesha County's parks feature the lakes and hills created by the glacier.

Waukesha County was home to prehistoric Native Americans, including the Effigy Mound Builders and Potawatomi people and was prized by fur traders in the 1700s. When settlers from the east arrived in the mid-1800s, they found four to six-foot earthen mounds in the shape of birds and turtles, along with conical and linear mounds. Three conical mounds are visible today in front of the City of Waukesha Library. Increase Lapham, considered the founder of the U.S. Weather Bureau, surveyed the mounds. The highest point in Waukesha County is named for him.



As far back as the 1700s, the native people told fur traders about the area's mineral springs. In 1868 Col. Richard Dunbar promoted what he believed were healing properties of Waukesha's water, which launched Waukesha County's "Springs Era". Through 1910, people traveled cross-country to drink the water. Accounts tell us that up to 25 passenger trains arrived daily. Elaborate "springhouses" were built above the natural springs. Today's visitors can see the last of the original springhouses on the Moor Downs Golf Course, Frame Park and Springs Park.

Farming and manufacturing were also influential in the development of Waukesha County. Waukesha limestone was used for many local buildings and shipped beyond county borders to build public and private structures. Manufacturing foundries created useful products for farming, railroad, automotive, and other industries. These industries were aided by major rail lines connecting Waukesha to the rest of the United States.

In the late 1800s, many cities experienced devastating fires that destroyed early wood frame buildings. Waukesha County's quarries provided the stone for rebuilding, and railroads transported the stone to Chicago and other cities with fire damage.

Some of the famous people that called Waukesha County home include Les Paul, the inventor of the electric guitar and 1930's Broadway stars Alfred Lunt and Lynn Fontanne.

Once dubbed "Cow County USA", Waukesha County has developed a diverse industrial base. Some of the world's leading manufacturers and businesses have corporate facilities located in the area.

Plan Area

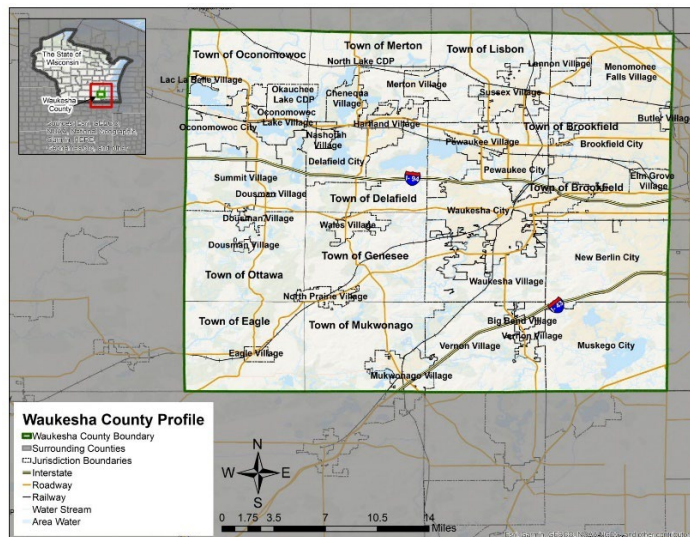
Waukesha County covers approximately 576 square miles or 371,600 acres with rivers, streams and creeks accounting for about 31 square miles of the total. Since 2019, Waukesha County is home to approximately 404,198 people.

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

Niagara Cuesta runs through Waukesha County. The upland on the back slope of the Niagara cuesta is a region of very moderate relief, with glacial deposits forming the greatest irregularities. The erosion of the largest streams, like the Milwaukee River, results in a maximum relief of only 100 to 120 feet by cutting into the glacial drift and the rock.

Waukesha County is bordered on the east by Milwaukee, on the south by Walworth County and Racine County, on the west by Jefferson County and on the north by Dodge and Washington Counties.

In Wisconsin, there are three types of sub-county, full-service local government units: towns, which are unincorporated, and villages and cities, which are incorporated. Waukesha County contains the Cities of Brookfield, Delafield, Muskego, New Berlin, Oconomowoc, Pewaukee and Waukesha; the Villages of Big Bend, Butler, Chenequa, Dousman, Eagle, Elm Grove, Hartland, Lac La Belle, Lannon, Menomonee Falls, Merton, Mukwonago, Nashotah, North Prairie, Oconomowoc Lake, Pewaukee, Summit, Sussex, Vernon, Wales, Waukesha, and the Towns of Brookfield, Delafield, Eagle, Genesee, Lisbon, Merton, Mukwonago, Oconomowoc, and Ottawa.



Geology

The combined thickness of unconsolidated glacial deposits, alluvium, and marsh deposits overlying bedrock exceeds 100 feet throughout most of the county. Thicknesses are greatest where glacial materials fill the bedrock valleys and in areas of topographic highs formed by end moraines. The most substantial glacial deposits, from 300 to 500 feet thick, are located in the northwestern part of the County in the lakes area and in portions of the Towns of Mukwonago and Vernon. The thinnest glacial deposits, 20 feet thick or less, are found along an approximately six-mile-wide band traversing the county in a northeasterly direction from the Village of Eagle to the Villages of Lannon and Menomonee Falls.

Bedrock topography was shaped by preglacial and glacial erosion of the exposed bedrock. The consolidated bedrock underlying Waukesha County generally dips eastward at a rate of about 10 feet per mile. The bedrock surface ranges in elevation from about 900 feet above mean sea level, at Lapham Peak, to approximately 500 feet above mean sea level in the eastern portion of

the County. The bedrock formations underlying the unconsolidated surficial deposits of Waukesha County consist of Precambrian crystalline rocks; Cambrian sandstone; Ordovician dolomite, sandstone, and shale; and Silurian dolomite. The uppermost bedrock unit throughout most of the County is Silurian dolomite, primarily Niagara dolomite, underlain by a relatively impervious layer of Maquoketa shale, which acts as an aquitard – minimizing groundwater movement into the underlying materials. In some of the pre-Pleistocene valleys in the southwestern and central portions of the County, however, the Niagara dolomite is absent and the uppermost bedrock unit is the Maquoketa shale. (Waukesha Land and Water Resource Management Plan, 2006)

Topography

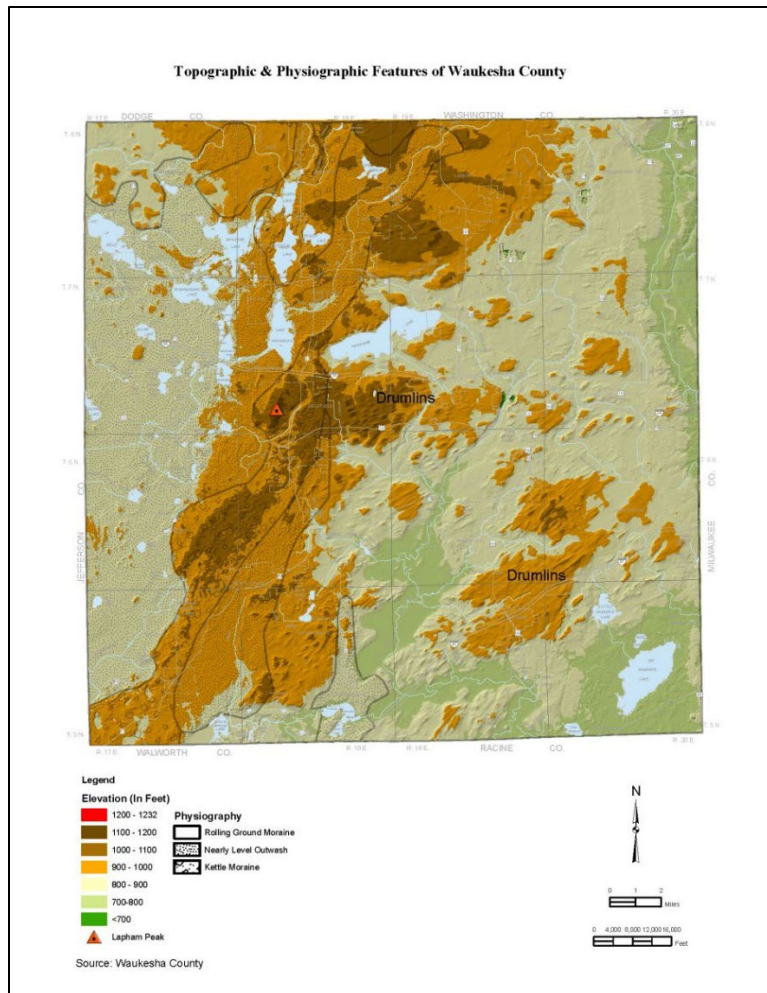
Wisconsin lies in the upper Midwest between Lake Superior, the upper peninsula of Michigan, Lake Michigan and the Mississippi and Saint Croix Rivers. Its greatest length is 320 miles and its greatest width is 295 miles for a total area of 56,066 square miles. Glaciation has largely determined the topography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

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

Topographic elevation in Waukesha County ranges from approximately 730 feet above mean sea level in the extreme eastern portions of the county along tributaries of the Menomonee River in Brookfield, Elm Grove and Menomonee Falls to 1,233 feet at Lapham Peak in the Town of Delafield, a variation of over 500 feet. Most of the high points in the county are located along the Kettle Moraine in three distinct areas: the southern half of the Town of Delafield near Lapham Peak, the southwestern quarter of the Town of Lisbon, and between State Highways 59 and 67 in the Towns of Genesee and Ottawa.

Four major stages of glaciation, the last of which was the Wisconsin stage, ending approximately 10,000 years ago in the state, have largely determined the physiography, topography, and soils of Waukesha County. The dominant physiographic and topographic feature in Waukesha County is the Kettle Moraine, an interlobate glacial deposit formed between the Green Bay and Lake Michigan lobes of the continental glacier that moved in a generally southerly direction from its origin in what is now Canada. The Kettle Moraine, which is oriented in a general northeast-southwest direction across western Washington, Waukesha, and Walworth Counties, is a complex system of kames, or crudely stratified conical hills; kettle holes formed by glacial ice blocks that became separated from the ice mass and melted to form

depressions and small lakes as the meltwater deposited material around the ice blocks; and eskers, long, narrow ridges of drift deposited in abandoned drainage ways. The remainder of the county is covered by a variety of glacial landforms and features, including various types of moraines, drumlins, kames, outwash plains, and lake basin deposits. (Waukesha Land and Water Resource Management Plan, 2006)



Climate

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

The average annual temperature varies from 36 degrees F in the north to about 56 degrees F in the south with statewide extreme records of 114 degrees F (Wisconsin Dells, 7/13/1936) and minus 55 degrees F (Couderay, 2/2/1996 & 2/4/1996). During more than one-half of the winters, temperatures fall to minus 40 degrees F or lower and almost every winter temperatures of minus 30 degrees F or colder are reported from northern stations. Summer temperatures above

90 degrees F average two to four days in northern counties and about 14 days in southern districts, including Waukesha County. During marked cool outbreaks in the summer months, the central lowlands occasionally report freezing temperatures.

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

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

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

The average growing season is defined as the number of days following the last 32 degrees F freeze in the spring through the beginning of fall. Waukesha County's growing season averages 145 days. Shallow lakes normally freeze in late November and remain frozen until late March or early April.

Waukesha County experiences a broad range of highs and lows in temperature and precipitation during the course of a year. Average daily high temperatures range from a low of 24.3 degrees in January to a high of 82.6 degrees in July. The yearly average for precipitation is 35 inches and the average snowfall is 43 inches. There are about 190 sunny days per year in the county of Waukesha. (<https://www.waukeshacounty.gov/about>)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Average High (degrees F)	28	32	43	56	68	78	82	80	73	60	45	31
Average Low (degrees F)	11	14	24	35	45	55	60	59	50	38	28	15

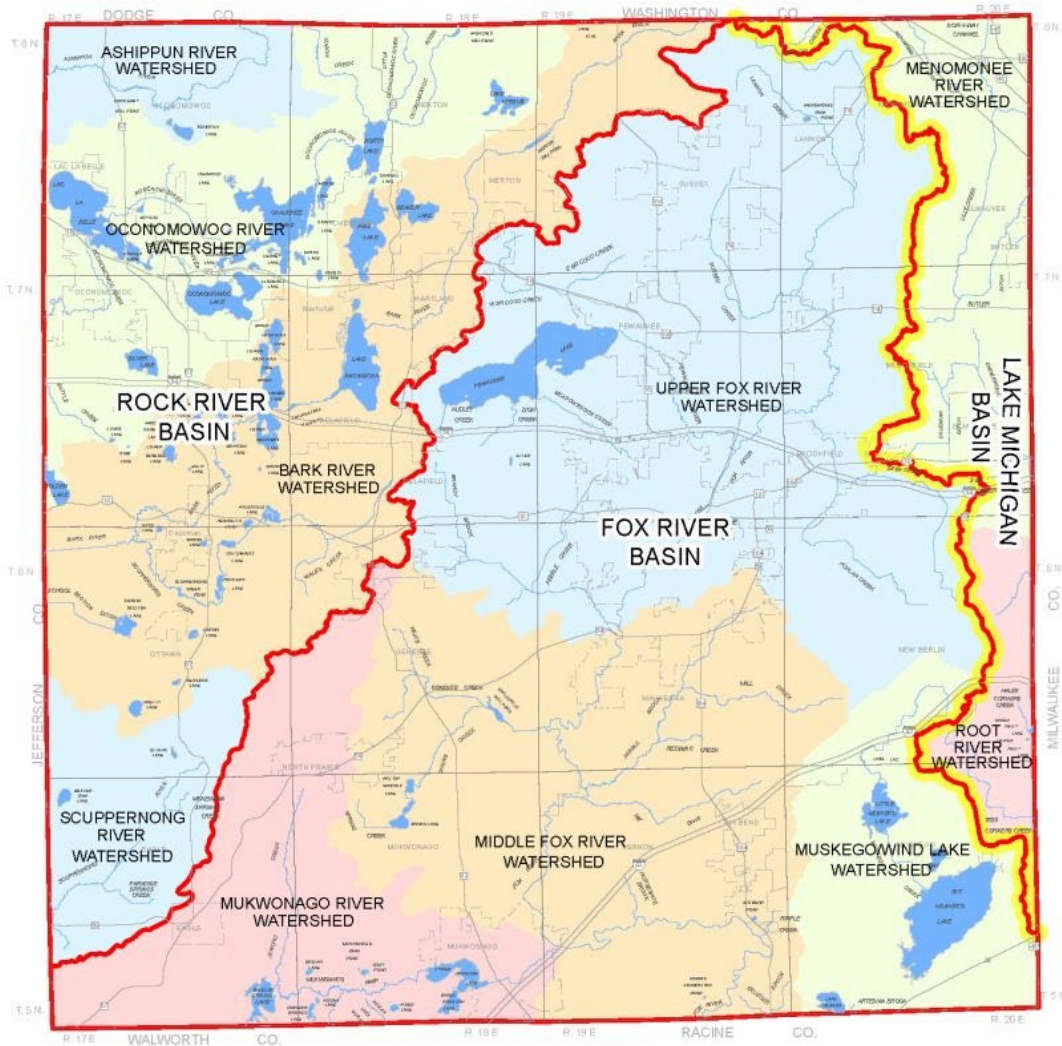
Average Precipitation (inches)	1.46	1.42	1.77	3.39	3.5	4.37	3.86	4.57	3.39	2.6	2.48	1.81
Average Snowfall (inches)	12	8	6	2	0	0	0	0	0	0	2	10

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 that flows through northern Illinois, eastern Wisconsin, drains into Lake Michigan. The subcontinental divide traverses the county in a north-south direction in the eastern tier of communities, separating the county between the Mississippi River and the Great Lakes-St. Lawrence River drainage systems.

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 that back up the floodwaters. Excessive rains of the thunderstorm type sometimes produce tributary flooding or flash flooding along the smaller streams and creeks.

Watersheds of Waukesha County



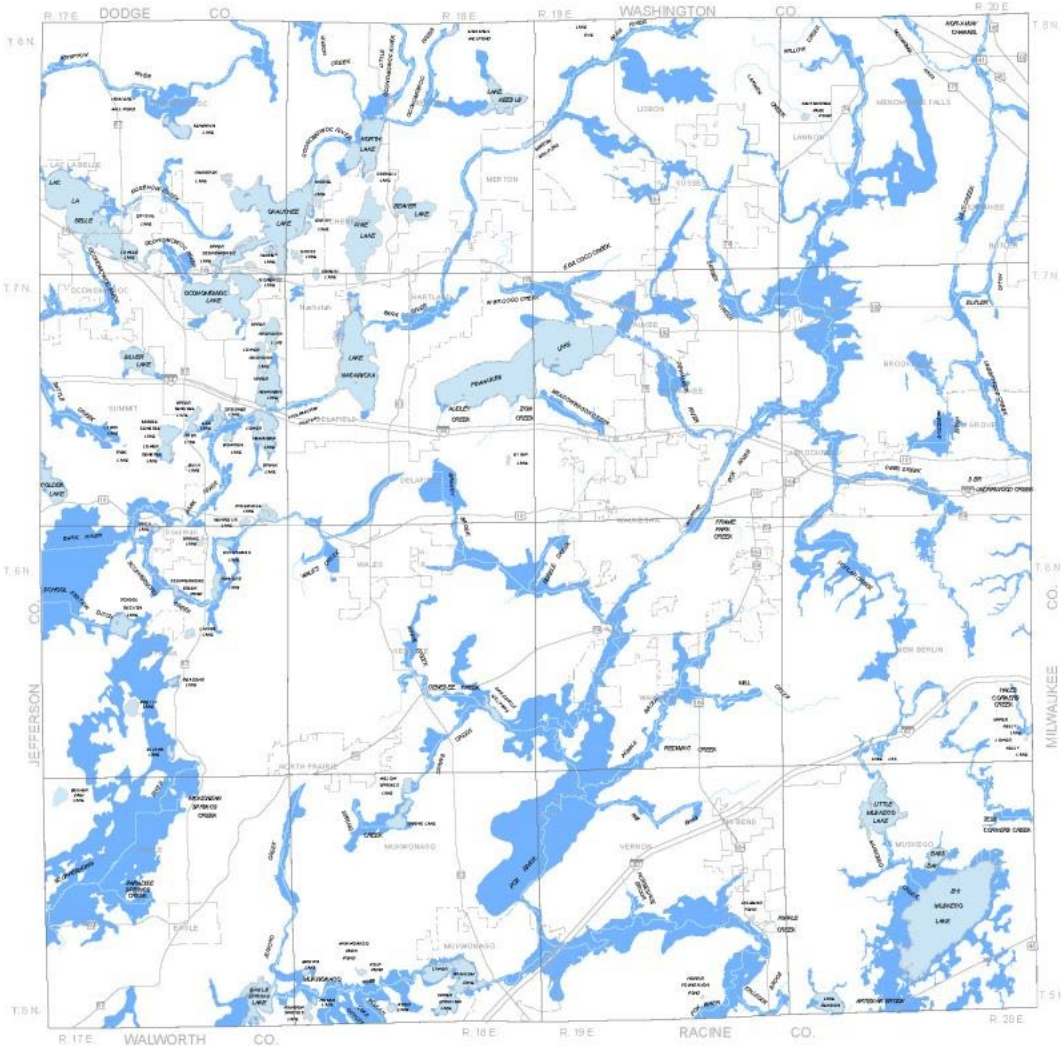
Legend

-  River Basin Boundaries
-  Subcontinental Divide



Source: SEWRPC, DNR & Waukesha County

General Floodlands of Waukesha County



Legend
Floodlands



Source: SEWRPC, FEMA & Waukesha County

Groundwater

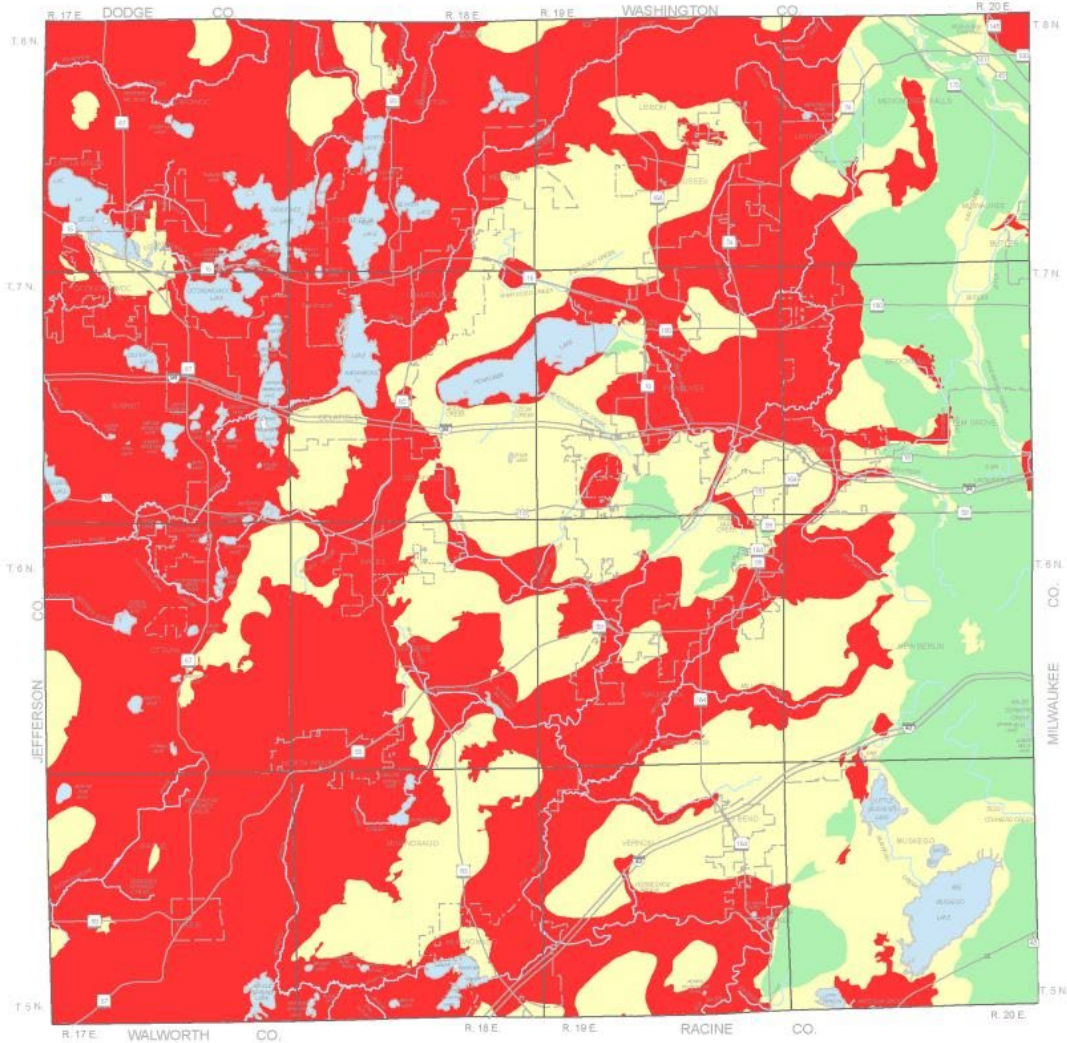
Groundwater reservoirs are recharged by direct precipitation. Spring is a prime time for recharge because evapotranspiration is low and melting snow and rainfall infiltrate and percolate the water table on unfrozen ground. Fall is another prime time for a high recharge. During the summer, groundwater 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 (DeVaul, 1967.) The winter period normally lacks infiltration because of frozen ground.

Groundwater is a vital natural resource of Waukesha County, which not only sustains lake levels and wetlands and provides the perennial base flow of the streams but also is a major source of water supplies. In general, the county has an adequate supply of groundwater to support its growing population, agriculture, commerce and a viable, diverse industry. However, overproduction and water shortages may occur in areas of concentrated development and intensive water demand, especially in the sandstone aquifer and in selected areas served by the shallow aquifers. The amount, recharge, movement and discharge of the groundwater is controlled by several factors, including precipitation, topography, drainage, land use, soil and the lithology and water-bearing properties of rock units ranging in age from Quaternary to Precambrian. In 2002, the Southeastern Wisconsin Regional Planning Commission (SEWRPC) published Technical Report 37 entitled, Groundwater Resources of Southeastern Wisconsin. The Report provided baseline information regarding groundwater availability and use in southeastern Wisconsin.

Groundwater occurs within three major aquifers that underlie the county. From the land's surface downward, they are: 1) the sand and gravel deposits in the glacial drift; 2) the shallow dolomite strata in the underlying bedrock and 3) the deeper sandstone, dolomite, siltstone and shale strata. Because of their proximity to the land's surface and hydraulic interconnection, the first two aquifers are commonly referred to collectively as the "shallow aquifer" while the latter is referred to as the deep aquifer. Within most of the county, the shallow and deep aquifers are separated by the Maquoketa shale, which forms a relatively impermeable barrier between the two aquifers. That shale layer is absent in the far western portion of the county.

Recharge to groundwater is derived almost entirely from precipitation. Much of the groundwater in shallow aquifers originates from precipitation that has fallen and infiltrated within a radius of about 20 or more miles from where it is found. The deeper sandstone aquifers are recharged by downward leakage of water through the Maquoketa Formation from the overlying aquifers or by infiltration of precipitation in western Waukesha County where the sandstone aquifer is not overlain by the Maquoketa Formation and is unconfined. On average, precipitation annually brings about 32 inches of water to the surface area of the county. It is estimated that approximately 80 percent of that total is lost by evapotranspiration. Of the remaining water, part runs off in streams and part becomes groundwater. It is likely that the average annual groundwater recharge to shallow aquifers is 10 to 15 percent of annual precipitation.

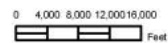
Groundwater Contamination Potential in Waukesha County



Legend

- High Contamination Potential
- Medium Contamination Potential
- Low Contamination Potential

Source: SEWRPC & Waukesha County



Water Wells

According to the Private Water Supply Wells Program described on the county website, Waukesha County has over 40,000 private wells. Regular testing and cleaning is held upon each individual municipality to ensure the drinking water supply is safe for consumption. It is noted that most of the private wells are not tested for coliform bacteria and other contaminants on the recommended annual basis.

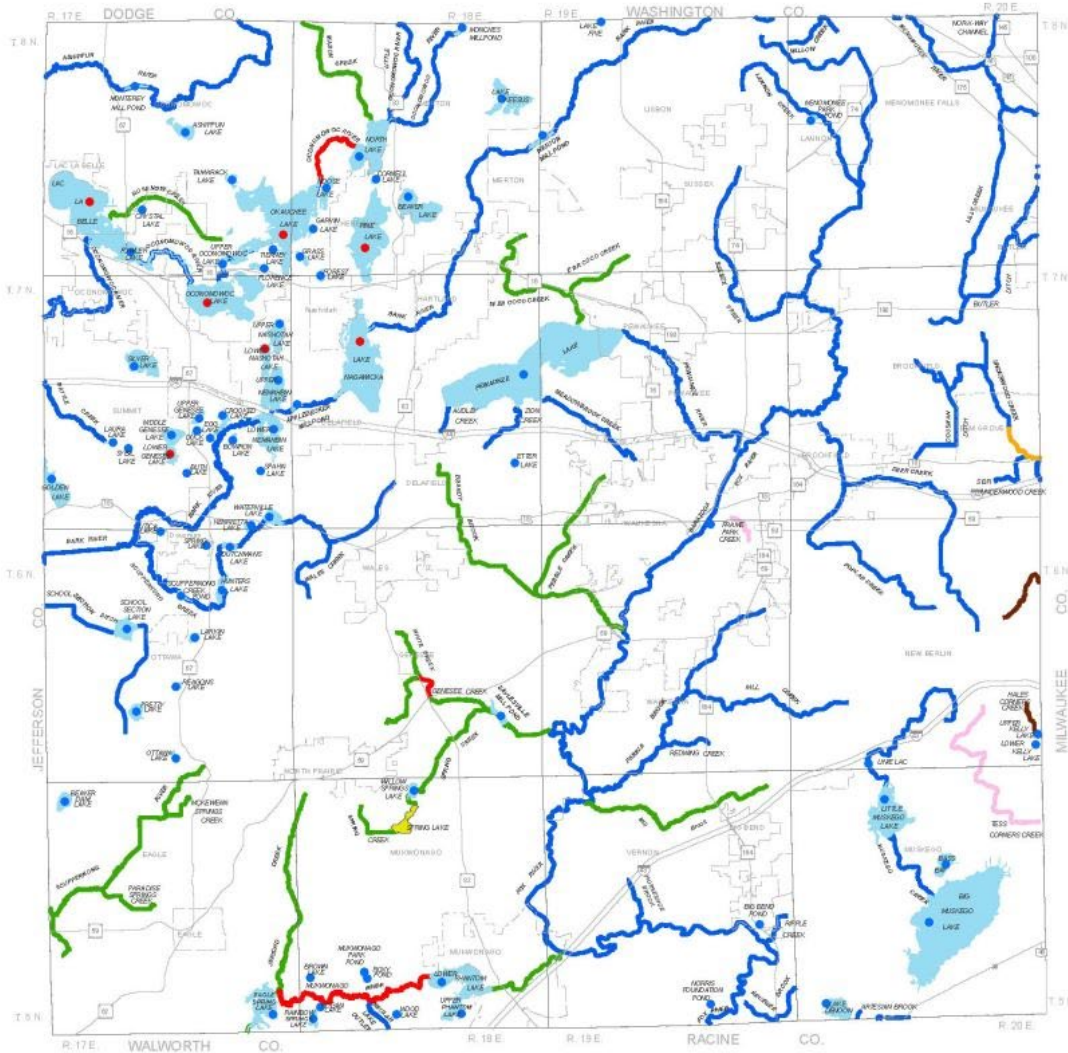
Surface Water

Surface water resources constitute an extremely valuable part of the natural resource base of Waukesha County. Surface waters are a focal point of water-related recreational activities and provide an attractive setting for properly planned residential development. Surface waters, particularly the major lakes, also provide substantial economic benefits. Expenditures by boaters and other recreational users of surface waters benefit the owners of restaurants, grocery and convenience stores, service stations and sporting goods stores in the county. Lakeshore properties, which generally have high-assessed valuations, also serve to enhance the property tax base of the county. In addition, when viewed in the context of open space areas, surface waters greatly enhance the aesthetic and scenic characteristics of the natural environment. Because surface water quality is highly susceptible to deterioration from pollutant runoff, both urban and rural land uses must be carefully managed to achieve a balance between the level and extent of use and the maintenance of water quality.

Major inland lakes are defined as those with a surface area of 50 acres or larger, a size capable of supporting reasonable recreational use with minimal degradation of the resource. Waukesha County contains all or portions of 33 major lakes with a combined surface area of approximately 14,000 acres or 21.9 square miles, which is also about 3.8 percent of the total area of the county. This represents about 38 percent of the combined surface area of the 101 major lakes in the seven-county Southeastern Wisconsin Region, more than any other county in the Region. Thirty of the major lakes are located entirely within the county, while three major lakes (Lake Denoon, Golden Lake and Lake Five) are located only partly within the county. Seven lakes in the county have a surface area exceeding 640 acres or one square mile. In addition to the major lakes, there are 45 other water bodies with lake characteristics referenced in the DNR publication, "Wisconsin Lakes", PUBL-FM-800 91.

For flood control and water quality planning purposes, the Southeastern Wisconsin Regional Planning Commission has divided the Region into 11 major watersheds, four of which are located wholly or partially in Waukesha County. The subcontinental divide traverses the county in a north-south direction in the eastern tier of communities, separating the county between the Mississippi River and the Great Lakes-St. Lawrence River drainage systems. Two of the major watersheds, the Menomonee River and Root River watersheds, lie east of the subcontinental divide and are part of the Great Lakes-St. Lawrence River drainage system. The other two watersheds, the Fox (Illinois) and Rock River watersheds, lie west of the sub-continental divide and are part of the Mississippi River drainage area. The watershed covering the largest area of Waukesha County is that of the Fox River, encompassing about 58 percent of the total area of the county. Major streams are perennial streams, which maintain, at a minimum, a small contiguous flow throughout the year except under unusual drought conditions. Waukesha County contains approximately 268 miles of perennial streams. The longest major streams are the Fox (Illinois) and Bark Rivers, with 46.1 and 31.8 stream miles, respectively, in the county. (Draft Comprehensive Development Plan – Waukesha County)

Surface Water Resources of Waukesha County



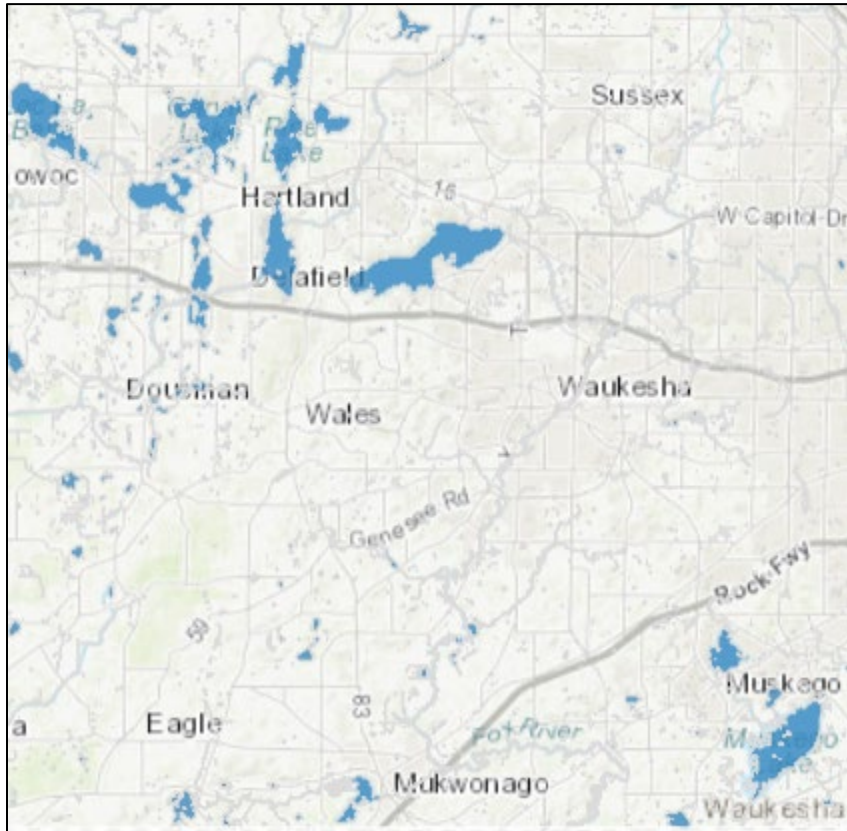
WATER RESOURCE CLASSIFICATION CODES

- Outstanding Resource Water (ORW)
- Exceptional Resource Water (ERW)
- Lake Supports Fish and Aquatic Life (FAL)
- Lake Supports Cold Water Species (Cold)
- Cold Water Streams (Cold)
- Fish and Aquatic Life (FAL)
- Special Variance Waters
- Limited Forage Fish (LFF)
- Limited Aquatic Life (LAL)

Source: WDNR, SEWRPC & Waukesha County



Water Body Area in Waukesha County



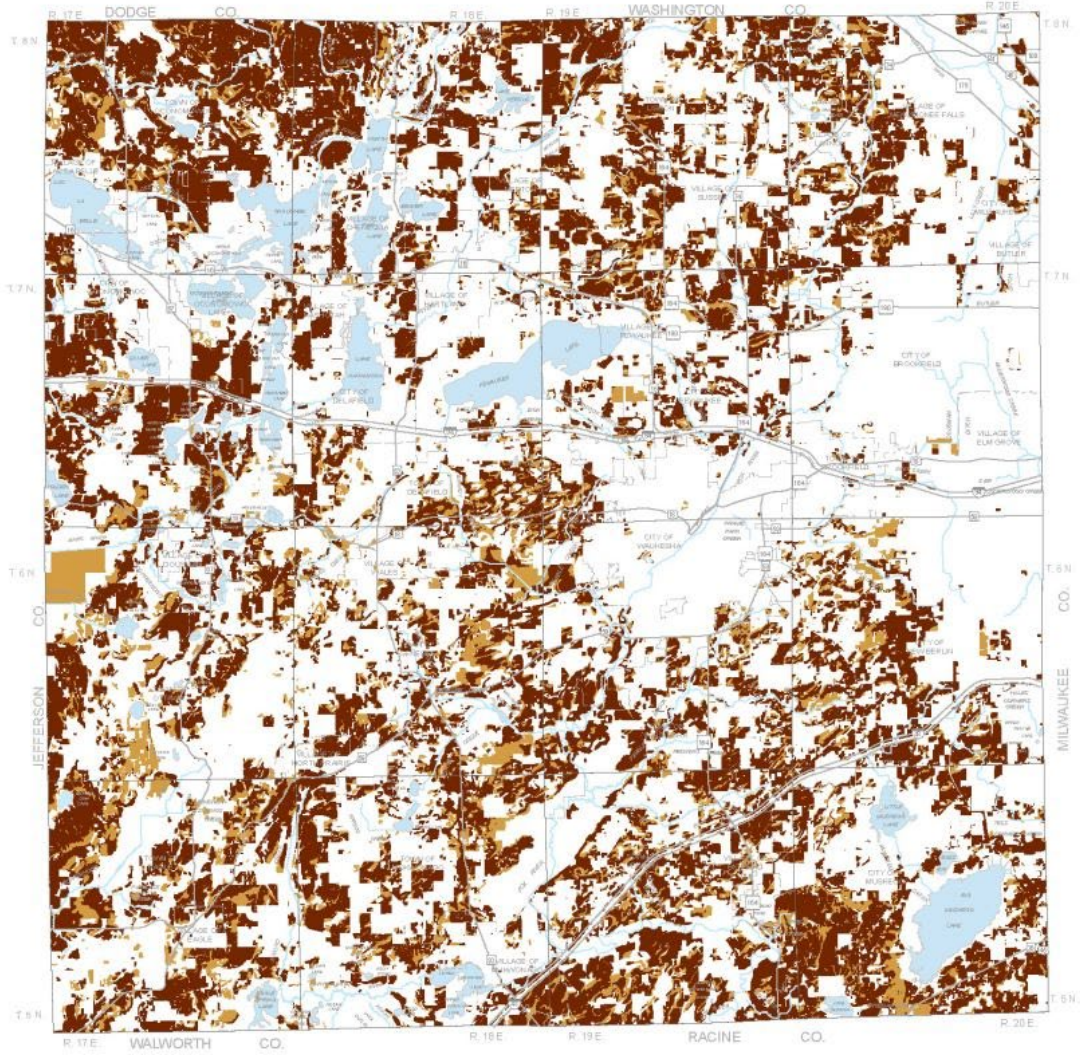
Source: Waukesha County Land Information System Division

Soil Types

Soils vary dramatically across the landscape. In Waukesha County nearly 150 different soil map units have been identified. Soils also vary in their individual susceptibility to erosion depending on a number of factors including parent material, vegetative cover, and position on the landscape. (Waukesha Land and Water Resource Management Plan, 2006)

The soils in Waukesha County range from very poorly drained organic soils to excessively drained mineral soils. General grouping of these soils into soil associations is useful for comparing the suitability of relatively large areas of the county for various land uses. A soil association is defined as a landscape with a distinctive proportional pattern of soils, typically comprised of one or more major soil types and at least one minor soil type, as identified by the S. Department of Agriculture, Natural Resources Conservation Service, and named after the major soils. Nine soil associations are found in the county.

Agricultural Use and Classification of Soils for Waukesha County

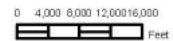


Legend

- NRCS Prime Agricultural Soils Group
(includes prime if drained or protected from flooding)
- Soils of Statewide Importance
(not in NRCS Prime group)

Note: Agricultural land use data from 2000 SEWRPC inventory. All subdivisions and condominium plats recorded up to March 2005 have been removed.

Source: NRCS, SEWRPC & Waukesha County



Wetlands

Because wetlands provide many benefits to the environment, several municipal, state and federal ordinances/regulations protect wetland areas. The basic concept associated with these laws is that wetland areas on any property cannot be disturbed without a permit. Wetlands store floodwaters 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:

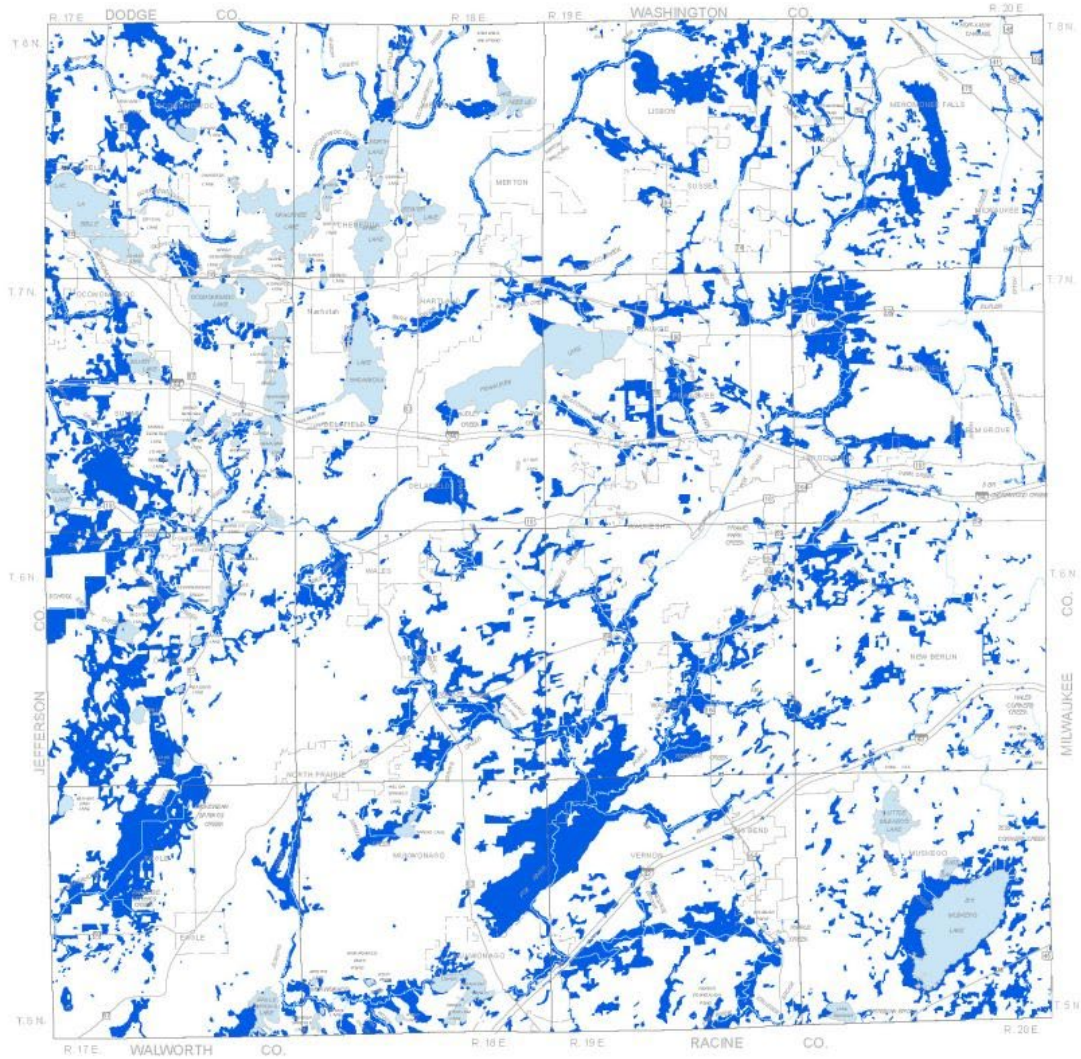
- The presence of water at, near, or above the surface (hydrology).
- Water is present long enough to sustain aquatic plant life (hydrophytic vegetation).
- Soils indicative of wet conditions (hydric soils).

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.

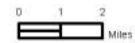
According to the Wisconsin Department of Natural Resources, Waukesha County has approximately 54,913 acres of wetlands (approximately 15.4% of its total area). This is 1% of the total statewide acreage of wetlands.

General Wetlands of Waukesha County



Legend

 Wetlands



Source: SEWRPC & Waukesha County

Land Use

The land in Waukesha County consists of farmland, shoreland and forests as well as commercial, residential and industrial land. The total land area is 556 square miles. The total water area is 25 square miles.

According to the Waukesha County Land Information System Division, in 2015, land use was divided as follows:

Urban

- Residential – 86,007 acres
- Commercial – 6,780 acres
- Communications and Utilities – 902 acres
- Landfills & Dumps – 889 acres
- Industrial – 5,945 acres
- Transportation – 31,760 acres
- Government – 5,840 acres
- Recreational – 9,359 acres
- Unused Urban – 7,806 acres

Non-Urban

- Surface Water – 18,069 acres
- Wetlands – 57,518 acres
- Woodlands – 31,826 acres
- Agricultural – 76,028 acres
- Unused Rural – 23,391 acres

Unused or Open – 36,711 acres

Natural Areas:

A comprehensive inventory of natural areas within the county was conducted by the Southeastern Wisconsin Regional Planning Commission in 1994 as part of the natural areas and critical species habitat protection and management plan being prepared by the commission. The inventory systematically identified all remaining high quality natural areas and critical species habitat then existing within the region.

Natural areas were classified based upon the natural area classification system developed by the Wisconsin Department of Natural Resources. Three classification categories are used: NA-1, natural areas of statewide or greater significance, which contain nearly complete and relatively undisturbed plant and animal communities which are believed to resemble closely those of presettlement times; NA-2, natural areas of countywide or regional significance, which contain native biotic communities judged to be of lower than NA-1 significance, either because of evidence of a limited amount of human disturbance or because of limited size; and NA-3, natural areas of local significance, which have been substantially altered by human activities but which provide refuge for native plant and animal species that no longer exist in the surrounding

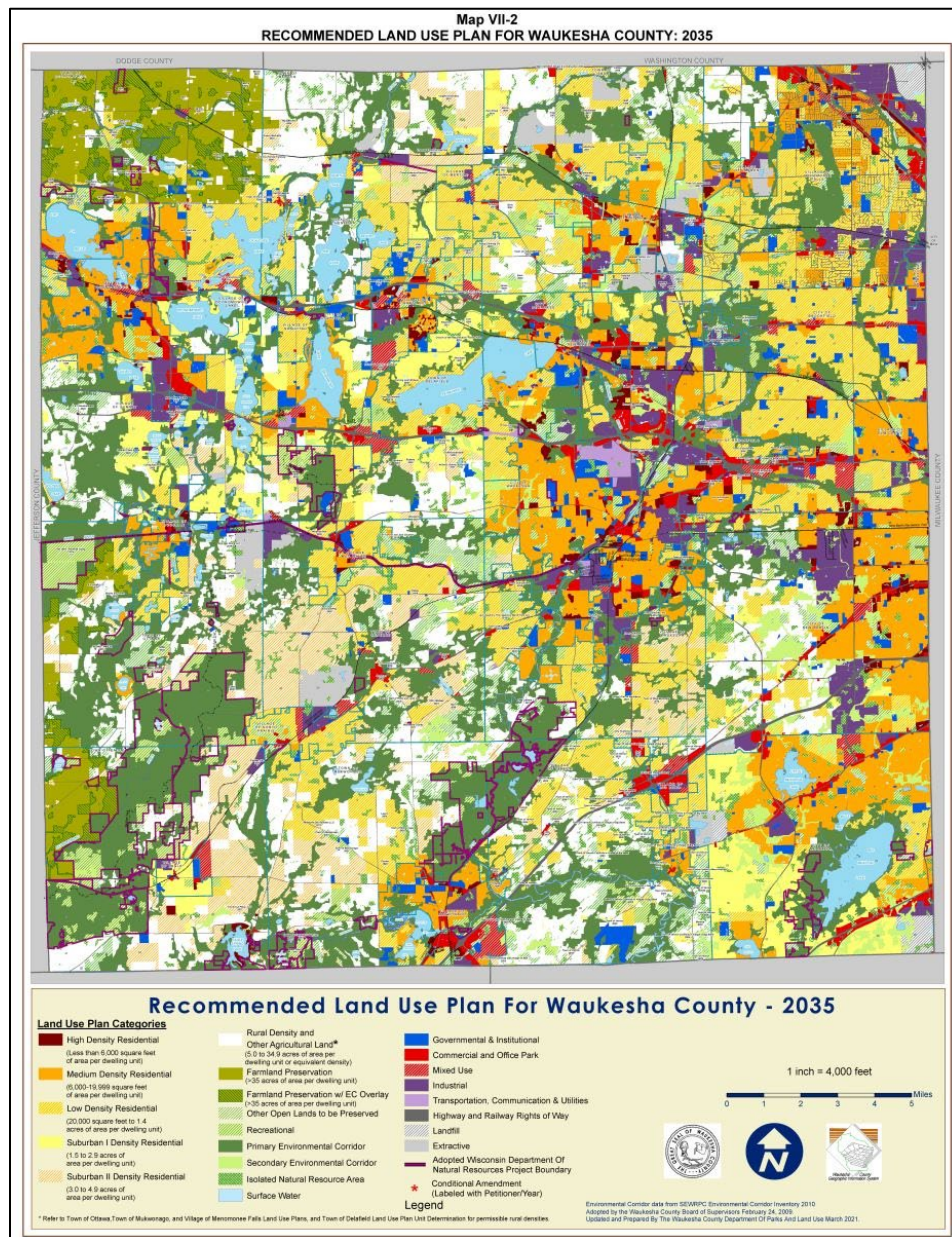
area because of land uses and associated activities. A total of 105 natural areas, encompassing about 13,710 acres, or about 4 percent of the county, were identified by the Regional Planning Commission in Waukesha County in 1994. Of the 105 identified sites, nine were classified as NA-1 sites and encompass about 1,775 acres, 30 were classified as NA-2 sites and encompass about 4,890 acres, and 66 were classified as NA-3 sites and encompass about 7,045 acres.

The inventory also identified a total of 77 critical species habitat sites within Waukesha County, including 22 critical bird habitat sites, one critical mammal habitat site, and 54 critical plant habitat sites. Of the total sites, 12 critical bird habitat sites, one critical mammal habitat site, and 23 critical plant habitat sites were located outside an identified natural area, for a total of 36 critical species habitat sites located outside natural areas.

Waukesha County's state and county many natural areas include:

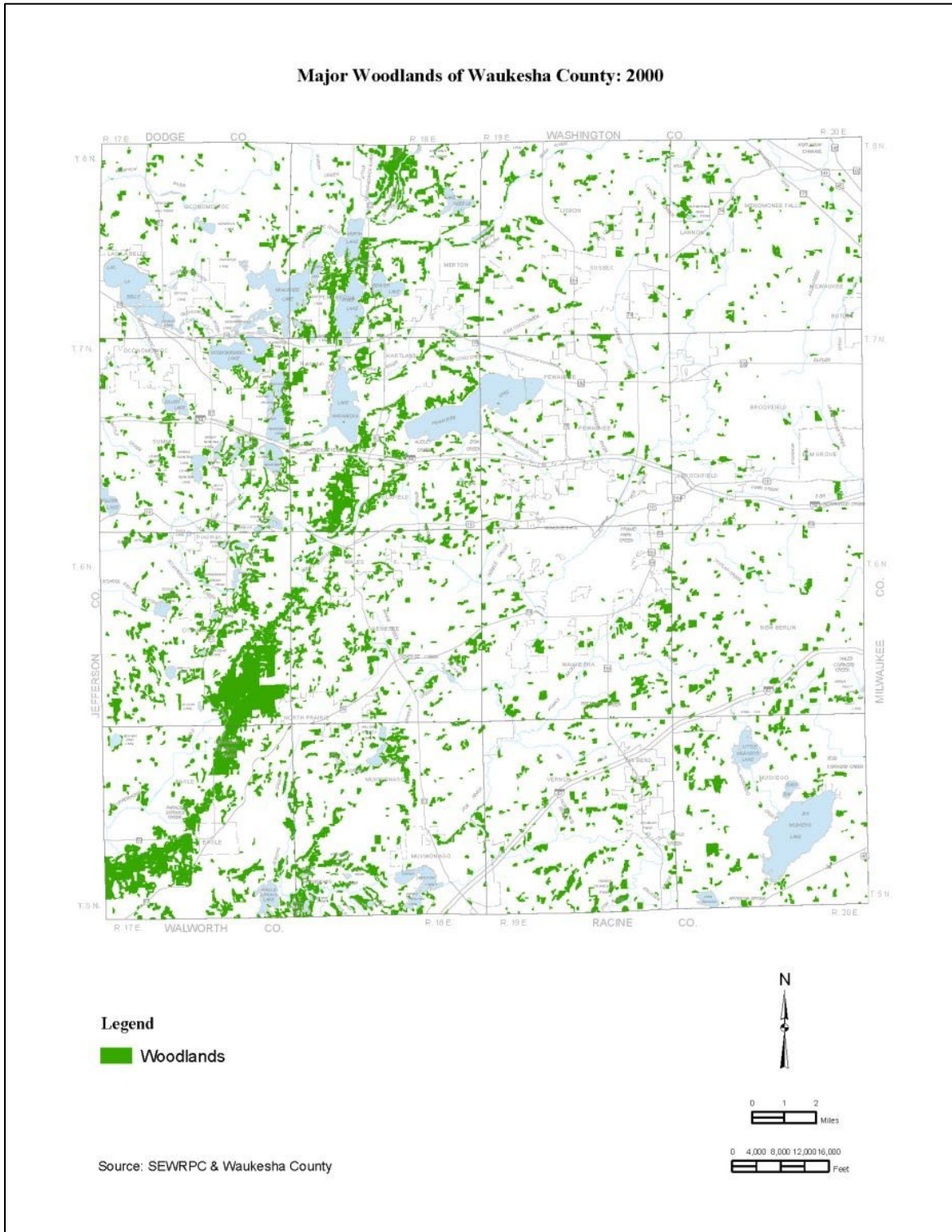
- **Fox Brook Park**, located in the City of Brookfield, is a 173- acre park site consisting of 128 acres of wetlands, which will be preserved and protected as a natural habitat and open space area. This habitat allows for many species of birds; goldfinches and indigo buntings to name a few.
- **Fox River Park** is a 262-acre park and represents an outstanding area for providing a feeling of wilderness and solitude. The abundance of wildlife provides great opportunities for nature study and the exploration of the natural world. Many wildflowers and bird species can be viewed along the trails that wind through the park.
- **Menomonee Park** is located within the Villages of Menomonee Falls and Lannon. Menomonee Park totals 394 acres of rolling field, high-quality maple woods, cattail marsh, wetlands, and a 16-acre quarry lake.
- **Minooka Park** is located approximately 2 miles southeast of the City of Waukesha at the corner of Racine Avenue and Sunset Drive. This 580-acre park is the largest park in the Waukesha County Park System
- **Mukwonago Park** is a 222-acre park site that includes a high ridge formed during the last glacial period, which stretches nearly the length of the park. The oak opening ridge is covered with presettlement vegetation including Burr Oak, Shagbark Hickory and ground cover of prairie plants.
- **Muskego Park** - The State of Wisconsin Scientific Area Preservation Council named the 60 acres of hardwoods that inhabit the park a State Scientific Area. This area is to preserve valuable plant communities, teach conservation practices and study the area's natural history. Many trails wind through Muskego Park Hardwoods offering a tranquil atmosphere and home to abundant wildlife.
- **Naga-Waukee Park and Golf Course** are located north of I-94, spanning the lands between the shores of Nagawicka Lake and Pewaukee Lake. This 416-acre parcel consists of a regional park, a championship 18-hole golf course and 2 lake access sites. The diverse topographical features were created during the glacial age, which enhances the beauty of the site.
- **Nashotah Park** is located between the communities of Oconomowoc and Hartland, 1/2 mile north of U.S.H. 16 on the west side of C.T.H. C. This 443-acre park is nestled among rolling hills, woodlands, wetlands and grasslands, offering habitat for deer, waterfowl and a variety of songbirds.

- **Old World Wisconsin** in Eagle is one of the country's finest outdoor living history museums and offers 576 acres to explore with over 55 historic structures moved from around the state of Wisconsin, telling the history of Wisconsin's earliest settlers.
- **Kettle Moraine State Forest – Southern Unit** is more than 20,000 acres of glacial hills, kettles, lakes, prairie restoration sites, pine woods and hardwood forests making this a popular area for a wide variety of visitors. The 3,500-acre Scuppernong River Habitat Area is the largest wet prairie east of the Mississippi River.
- **Kettle Moraine State Forest – Lapham Peak Unit.** The Kettle Moraine and Lapham Peak were formed 10,000 years ago when a glacier covered much of Wisconsin. More than 1,000 acres of this hilly terrain are within the Lapham Peak boundaries. Lapham Peak has a variety of sights and activities to offer. (<http://www.waukeshacountywi.com>)



Vegetation

Sugar maple, basswood and elm dominate in the east and northwest portions of the county. In the central part of the county there is a large area of oak savanna. In the south part of the county there are a few areas of sugar maple.



Demographics and Infrastructure

Waukesha County contains the Cities of Brookfield, Delafield, Muskego, New Berlin, Oconomowoc, Pewaukee and Waukesha; the Villages of Big Bend, Butler, Chenequa, Dousman, Eagle, Elm Grove, Hartland, Lac La Belle, Lannon, Menomonee Falls, Merton, Mukwonago, Nashotah, North Prairie, Oconomowoc Lake, Pewaukee, Summit, Sussex, Vernon, Wales, and Waukesha; and the Townships of Brookfield, Delafield, Eagle, Genesee, Lisbon, Merton, Mukwonago, Oconomowoc, and Ottawa.

Human Settlement Patterns

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

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

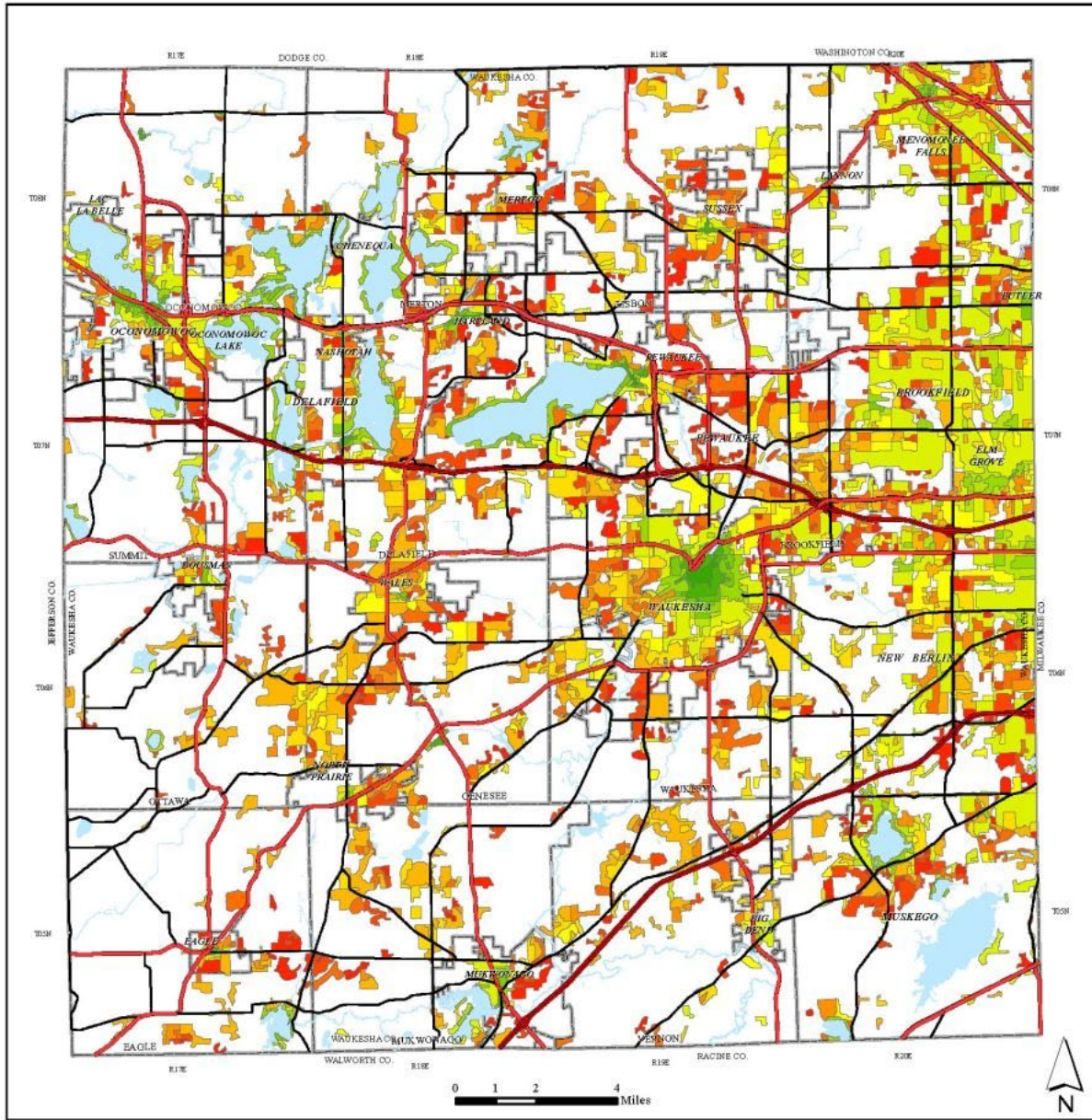
Waukesha County was home to prehistoric Indians, including the Effigy Mound Builders and Potawatomi people and was prized by fur traders in the 1700s. When settlers from the east arrived in the mid-1800s, they found four to six-foot earthen mounds in the shape of birds and turtles, along with conical and linear mounds. Three conical mounds are visible today in front of the City of Waukesha Library. Increase Lapham, considered the founder of the U.S. Weather Bureau, surveyed the mounds. The highest point in Waukesha County is named for him. (www.waukeshacounty.gov)

In January of 1846, the Territorial Legislature voted to separate Waukesha County from Milwaukee. There was a strong popular desire for an Indian name. Waukt-shaw was suggested as being the Potawatomi form of the fox because the waters of the lower part of the county drain into Fox River of Illinois, which is named for the Fox tribe of Indians, not for the animal.

In April of 1846, Waukesha County was formed with sixteen townships. Supervisors representing each of the sixteen towns were elected to organize a county board, elect officers and provide for and build necessary county buildings.

HISTORIC GROWTH RING ANALYSIS IN WAUKESHA COUNTY: 1850-2000

Historic Urban Growth in Waukesha County: 1850-2000



Legend

Civil Division Boundary	Historic Urban Growth	1940	1985
Interstate	Year	1950	1990
US	1850	1963	1995
State	1900	1970	2000
County	1920	1975	1980

Source: SEWRPC and Waukesha County
 Civil Divisions as of 5/31/08
 Prepared by Waukesha Co.
 Dept. of Parks and Land Use

Population

In recent decades, Waukesha County has experienced rapid development. The development has been accompanied by a population increase of 35% in 27 years. In 1980, the county was home to nearly 280,326 people; in 2001, there were 360,767 and according to the 2010 U.S. Census Bureau estimate, there are 389,981 people residing in Waukesha County. According to the U.S. Census 2019 estimations, the population of Waukesha County had an increase in population by 3.7% from April 2010 to July 2019. The population now is around 404,198, but the projected population growth shows that by 2035 Waukesha County will have nearly 450,000 residents. The estimated report also states there are 167,951 households, the median household income is \$282,300, and the per capita income is \$46,043 in Waukesha County. (U.S. Census). Compared to the state of Wisconsin, Waukesha County's population growth is slightly faster with an almost 1% faster growth from 2010-2017 (Waukesha County by the Numbers).

Race and Ethnicity: According to the U.S. Census 2019 estimations, the overwhelming majority of people in Waukesha County reported are as white. People of Hispanic or Latino origin totaled 6.4% and Black or African American people totaled 4.6% of the population. The other demographics of people, such as Asians, Native Americans, or those of two or more races only accounted for almost 10% of the total County population. (Data USA).

Figure: Projected Growth Trends by Race and Ethnicity, 2010-2020

Waukesha County Projected Growth in Diverse Populations, 2010-2020



Source: ESRI Market Profile and Business Analyst Online

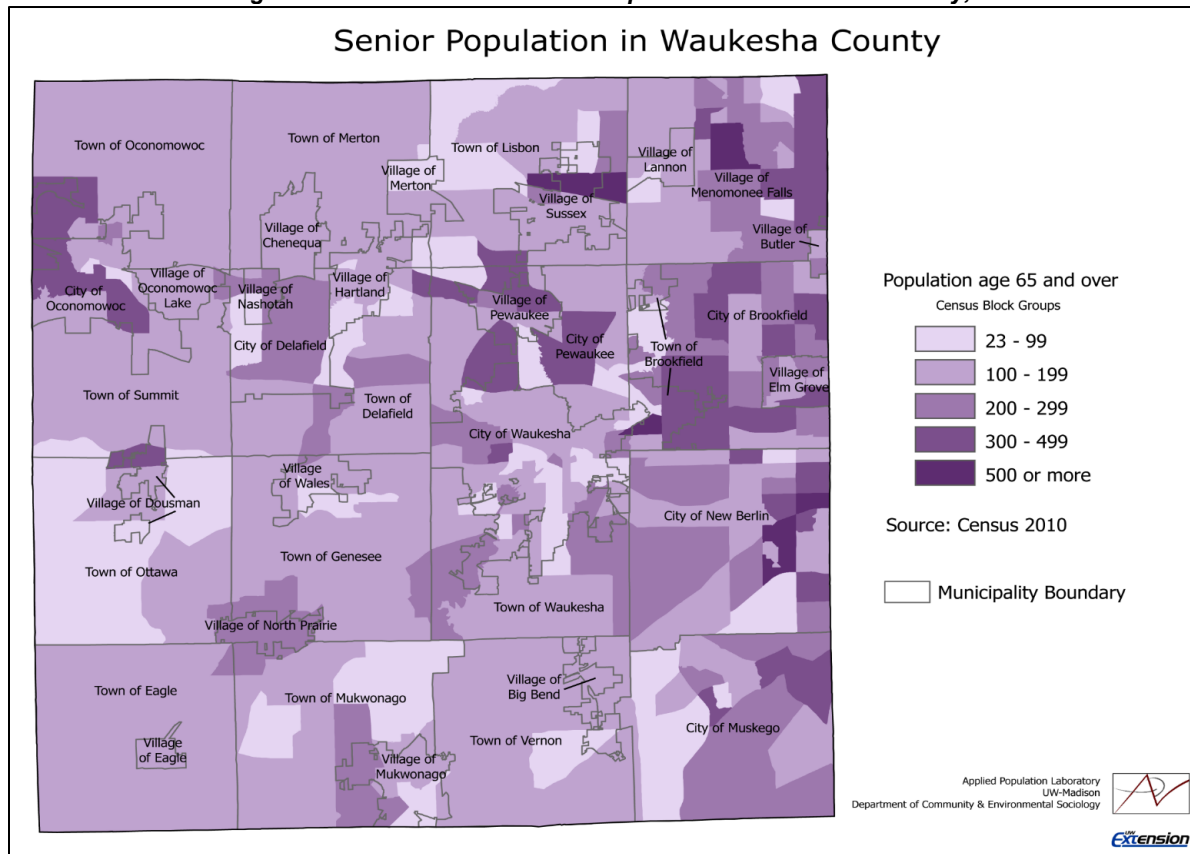
Source: Waukesha County Department of Health and Human Services, Environmental Scan, 2015

Home Ownership and Home Rent: According to the 2019 American Community Survey 5-Year Estimates, roughly 76% of the households in Waukesha County were rental households, with that percentage much higher for Latino and African Americans. Based on 2019 City Data, there are roughly 32,312 housing units with a mortgage and 39,328 without in Waukesha County.

Poverty: The poverty rate has increased in Waukesha County and according to the 2019 American Community Survey 5-Year Estimates, over 5% of children under the age of 18 are living in poverty. This percentage, however, is considerably lower than the national average of 18%. According to the same data, close to 60% of those living in poverty are white, followed by Latino/Hispanic with 17%, and African American with 10% living in poverty.

Population Age: The median age in Waukesha County, according to the 2019 American Community Survey 5-Year Estimates, is 42 years of age, which is older than the national average of 38 years. Wisconsin counties. Around 19% of the entire population in Waukesha County are 65 years and older. The portion of people 65 years and older is greater than the portion of people under the age of 18 by 14 %, however people under the age of 18 is only 3% more. Projected age group trends state that people over the age of 85 will count for the majority of the population by the year 2050 (Waukesha County by the Numbers).

Figure: Concentration of Senior Population in Waukesha County, 2010



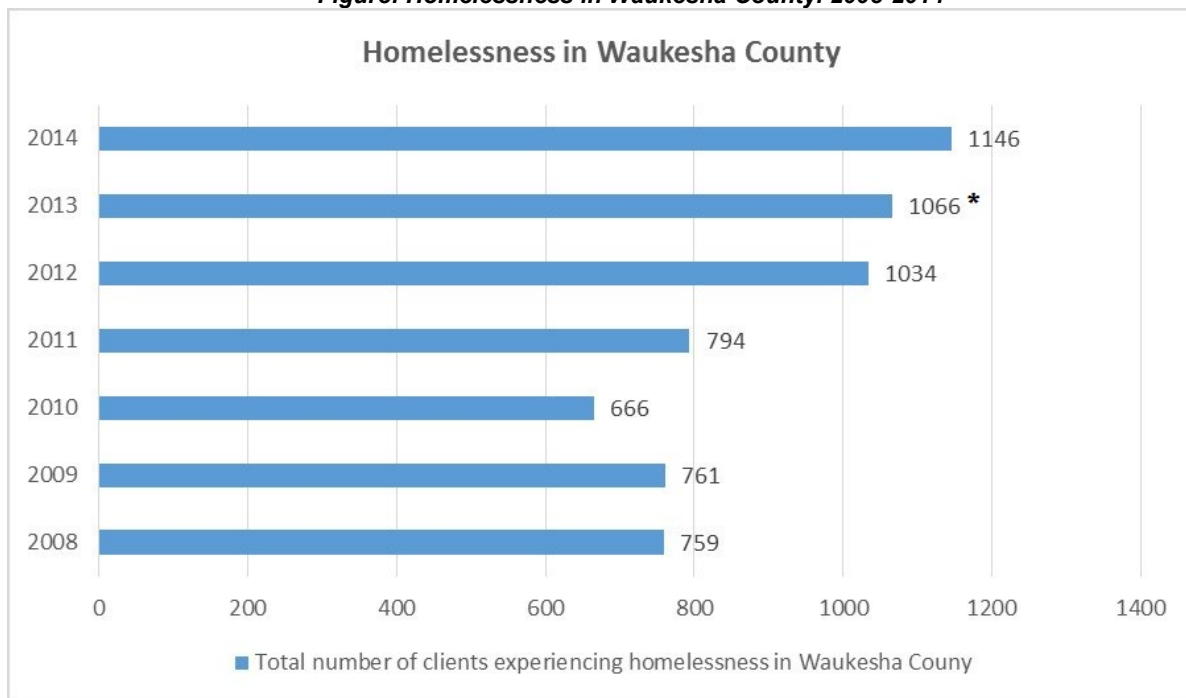
Source: Waukesha County Department of Health and Human Services, Environmental Scan, 2015

Alcohol and Drug Use: The residents in Waukesha County, based on CDC Behavioral Risk Factor Surveillance System Survey Questionnaires from 2013 to 2019, adult residents consume

alcohol less than the average amount per 30 days. Also, 44.5% of residents smoked 100 cigarettes in their lives which follows the national average of cigarette use trends. A previous Community Health Assessment in 2014 indicated that alcohol and other drug use was the third-highest health priority for both men and women in the County. Older data also suggested a slight decline in alcohol use among youth.

Homeless: According to the Environmental Scan, Waukesha County had 1,078 clients who were experiencing homelessness in 2013 and children made up 23% of the total homeless population in the County. From 2010 to 2014 there has been a 72% increase in homelessness in the County. There are resources for those who are homeless, such as the Continuum of Care community group which delivers services and housing and others such as Rapid Rehousing, Eviction Prevention, Transitional Housing, and Supportive Services for Veteran Families.

Figure: Homelessness in Waukesha County. 2008-2014



Transportation and Population: According to City Data, about 84% of the population in Waukesha County rely on driving a car alone as their means of transportation. However, less than 1% of the population relies on all other forms of transportation, such as carpooling, public transportation, bus system, taxicabs, or bicycling (City Data). These transportation trends mirror that of the other counties in the state of Wisconsin since 2019 (Waukesha County by the Numbers).

Transit-dependent population characteristics include seniors (ages 75 and older), people in low-income households, disabled individuals and households with no vehicles. Based on a report on transportation access and equity in Wisconsin, transportation agencies such as Waukesha Metro, the Waukesha County Aging, Disability Resource Center, and Interfaith Caregiving Network offer transportation services for medical appointments, shopping, employment and other personal needs for Transit-dependent groups in the Waukesha County. Such

transportation services are used for. These programs are essential, especially in the more rural parts of Waukesha County that do not have the population density to support a bus system.

The following table below illustrates functional access needs populations in Waukesha County that are most likely to be dependent upon transit. According to the Environmental Scan, in 2010, higher concentrations of people dependent on transit lived in the Cities of Waukesha, New Berlin, Brookfield and the Village of Menomonee Falls. Isolated areas of need exist in smaller concentrations of population located within the City of Oconomowoc and the Villages of Dousman and Hartland.

Table: Trends in Transit-Dependent Population Groups in Waukesha County

Transit-Dependent Population Group	1990		2000		2010	
	Number	% of Total Population/Households	Number	% of Total Population/Households	Number	% of Total Population/Households
Seniors (75 & older)	12,240	4	19,980	6	25,286	6
Persons in Low-income Households	31,395	10	32,997	9	48,177	12
Disabled Persons	5,164	2	12,978	4	32,258	8
Households with No Vehicle Available	3,969	4	5,689	4	5,956	4
Total County Population	304,715	-	360,767	-	389,891	-
Total Number of Households	105,990	-	135,229	-	151,161	-

Source: Waukesha County Department of Health and Human Services, Environmental Scan, 2015

Transportation Network

Waukesha County has over 2,917 miles of federal, state, county and local roads within the county and over 373,000 registered automobiles, trucks, semi-trailers and motorcycles. Four freeways, Interstate Highway 43, Interstate Highway 94, State Highway 16 and U.S. Highway 41/45 serve Waukesha County. In addition, the county is served by State Highways 36, 59, 67, 74, 83, 100, 145, 164, 175 and 190. The County Trunk System includes over 391 miles of roads. Over 78 percent of road miles in Waukesha County are local village, town or city roads.

This street and highway system within the county serves several important functions; including providing movement of vehicular traffic; providing access for vehicular traffic to abutting land uses; providing for the movement of pedestrians and bicycles and serving as a location for utilities and stormwater drainage facilities.

An arterial is a high-volume street that functions to conduct traffic between communities and activity centers and to connect communities to interstate highways. Arterial streets are defined as streets and highways which are principally intended to provide a high degree of travel mobility, serving them through the movement of traffic and providing transportation service between major sub-areas of an urban area or through an area. In a rural area, an arterial is a high-volume street that functions to conduct traffic between communities and activity centers

and to connect communities to interstate highways. Together, arterial streets should form an integrated, area-wide system. The most heavily traveled arterial streets and highways in the County are Interstate Highway 94, Bluemound (US Highway 18), Capitol Drive (State Trunk Highway 190), Moorland Road (County Trunk Highway O), Cleveland Avenue (County Highway D), Interstate Highway 43, State Highway 164, U.S. Highway 41/45, State Highway 16, State Highway 59, County Highway F, County J (Pewaukee Road) and State Highway 74.

In addition to their functional classification, arterial streets and highways are also classified by the unit of government that has the responsibility, or jurisdiction, over the facility. The Wisconsin Department of Transportation (WisDOT) has jurisdiction over the state trunk highway system, Waukesha County has jurisdiction over the county trunk highway system and each local government unit has jurisdiction over local arterial streets within their community. The state trunk highway system, which includes interstate highways, U.S.-numbered highways and state highways, generally carry the highest traffic volumes, provide the highest traffic speeds, have the highest degree of access control and serve land uses of statewide or regional significance. State trunk highways serve the longest trips, principally carrying traffic traveling through Waukesha County and between Waukesha County and surrounding counties. County trunk highways should form an integrated system together with the state trunk highways and principally serve traffic between communities in the county and land uses of countywide importance. Local arterial streets and highways would serve the shortest trips, serve locally-oriented land uses, carry the lightest traffic volumes on the arterial system, carry traffic at lower speeds, have the least access control and predominately serve traffic within a community. (Draft Comprehensive Development Plan – Waukesha County)

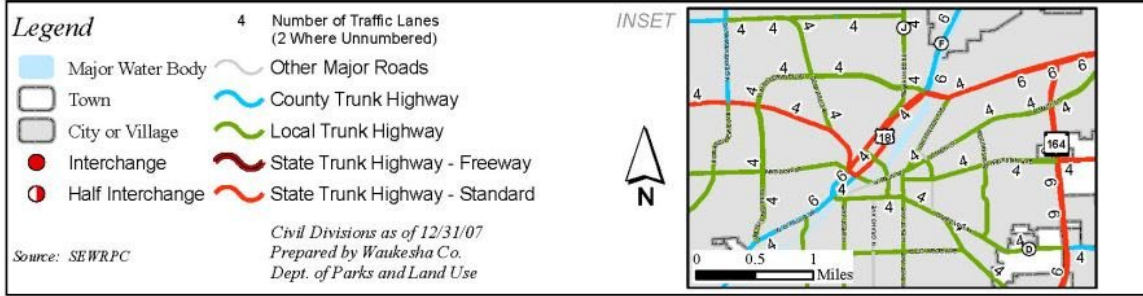
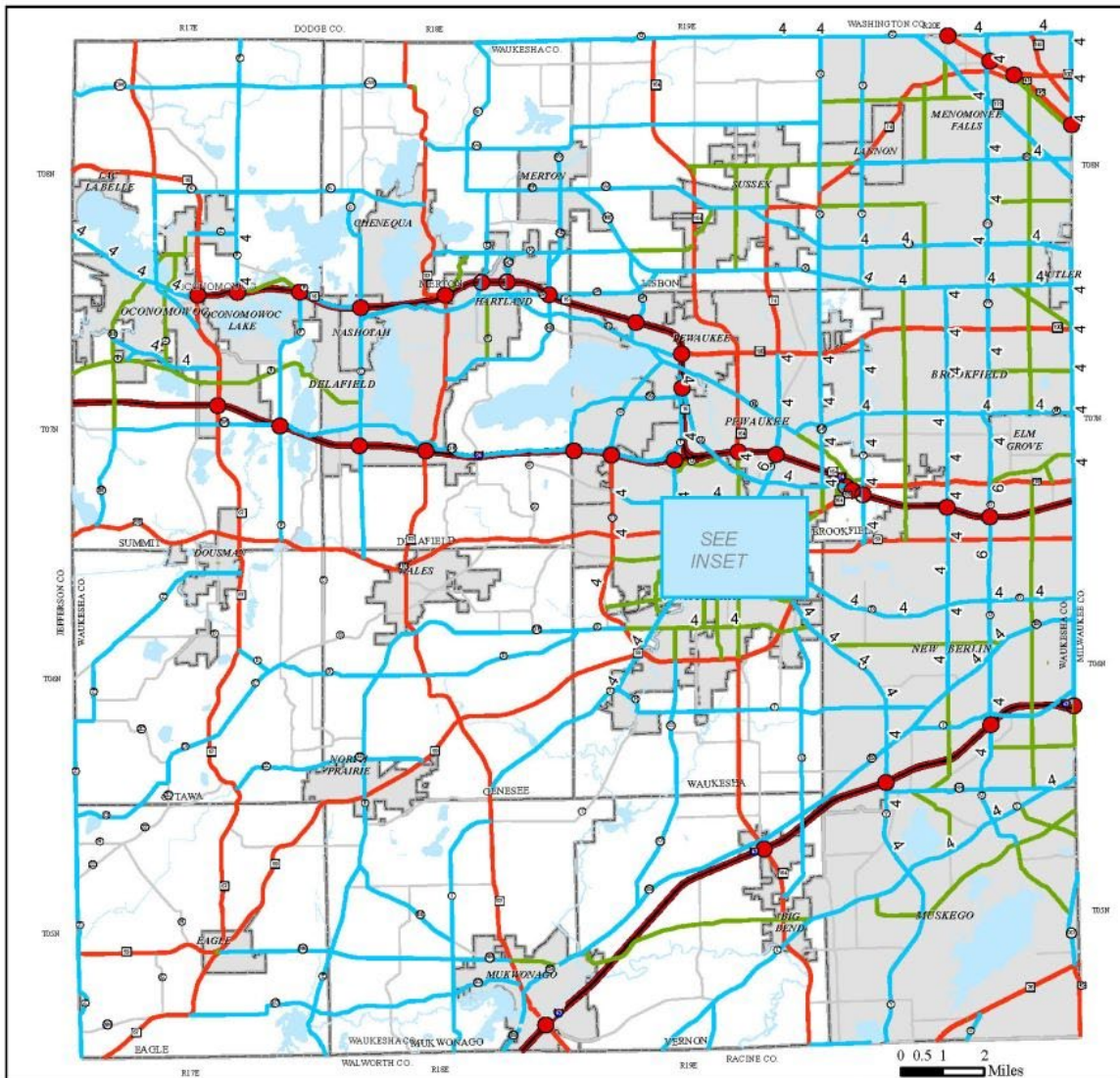
Waukesha County has a good transportation network. Waukesha County has maintained these roads along with others to provide a safe and efficient transportation system. With continued maintenance, these roads will continue to serve the population effectively.

According to the Waukesha County Environmental Scan, over 389,000 people in the County were Transit Dependent. This population includes seniors, people in low-income households, disabled individuals, and households with no vehicles.

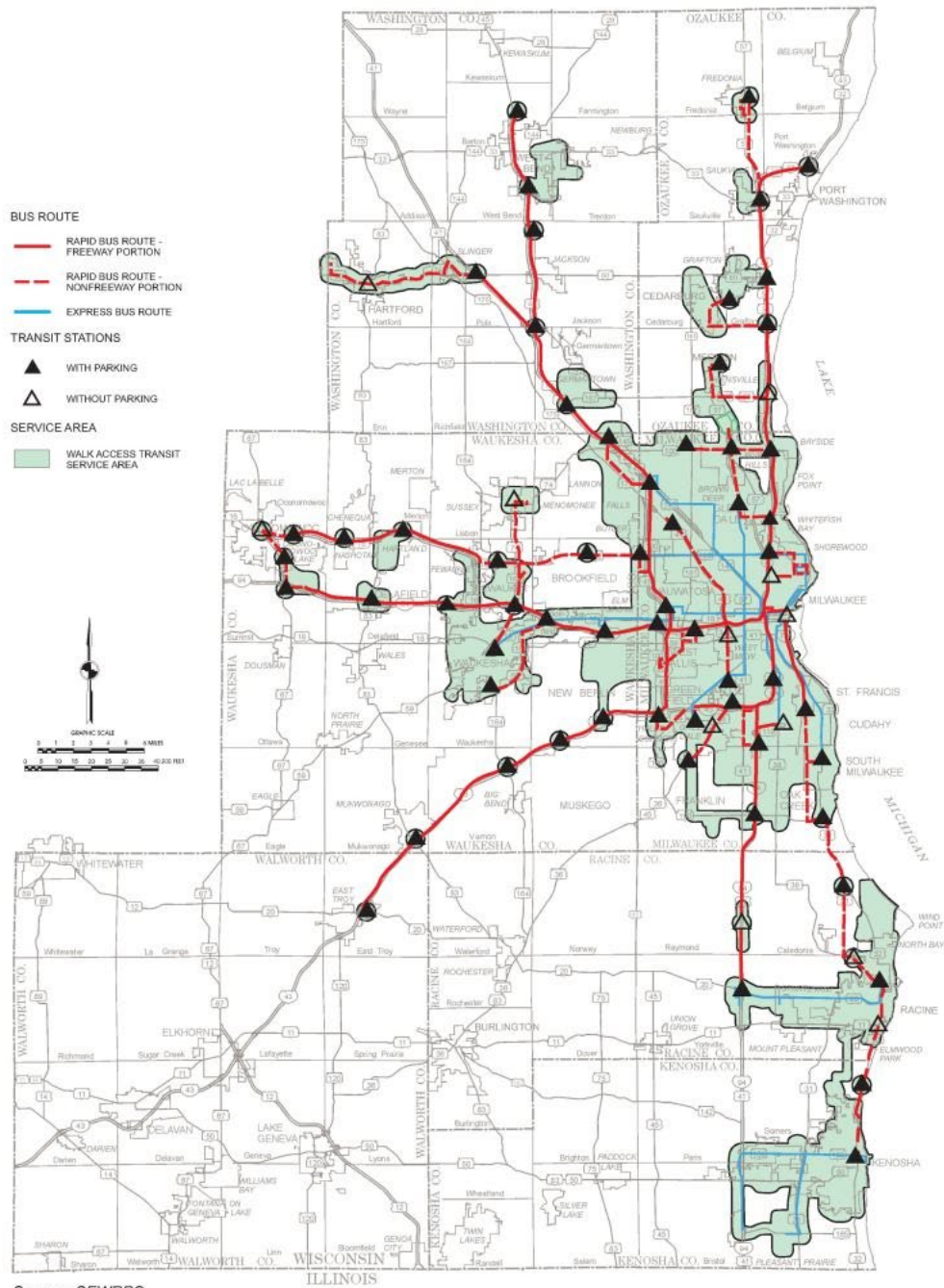
For the general public, principal transportation services include the Waukesha Metro Transit and the Waukesha County Transit System.

There are several specialized transportation services available for special populations, such as disabled or elderly riders.

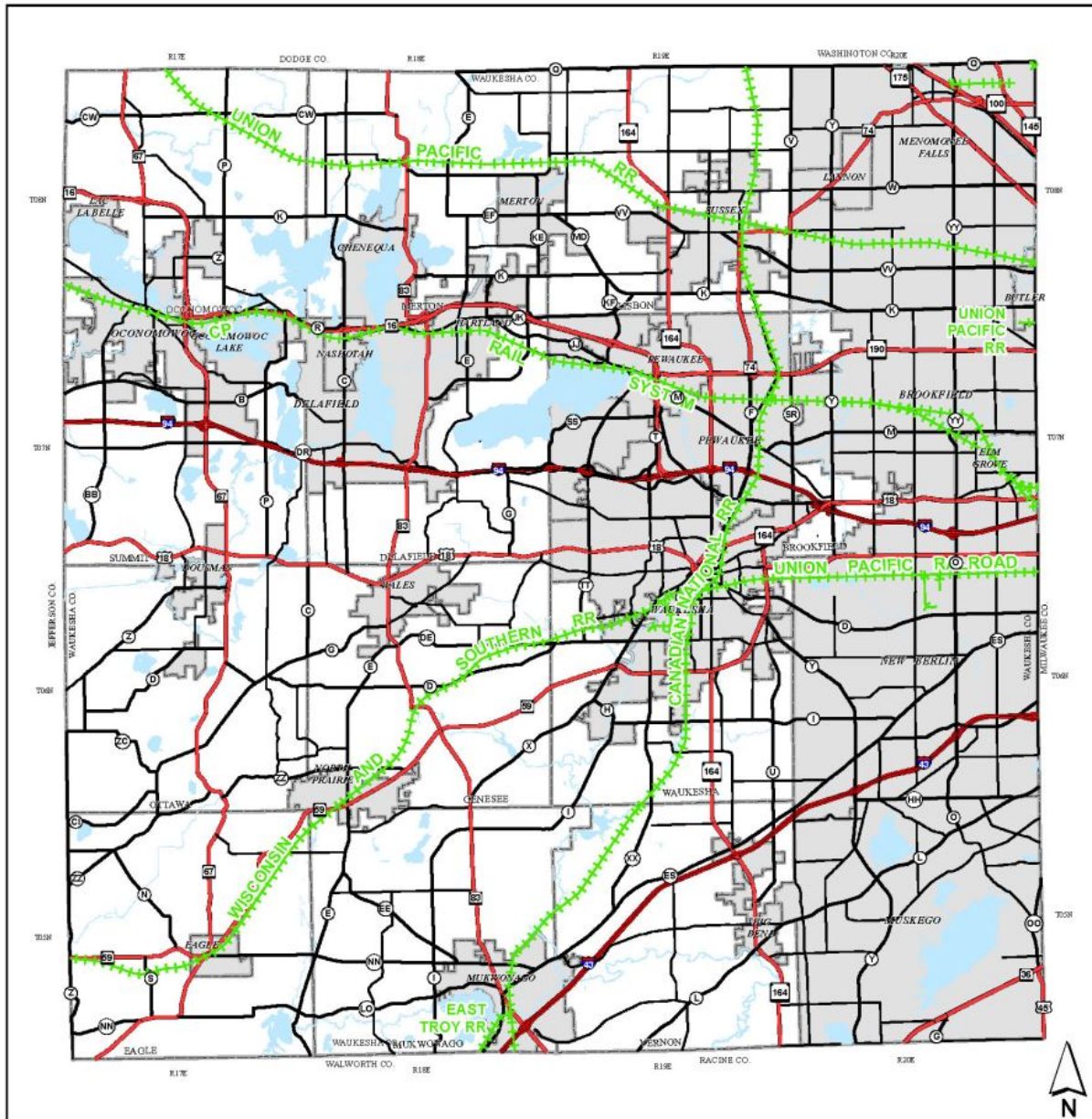
Waukesha County Recommended Functional Improvements to the Arterial Street & Highway System Under the 2035 Regional Transportation System Plan



Recommended Public Transit Element of the 2035 Regional Transportation System Plan for Waukesha County



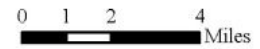
Existing Railroad Routes in Waukesha County: 2007



Legend

- Interstate
- US
- State
- County
- Local Major
- Major Water Body
- Town
- City or Village
- Railroads

Source: Waukesha Co. Parks and Land Use



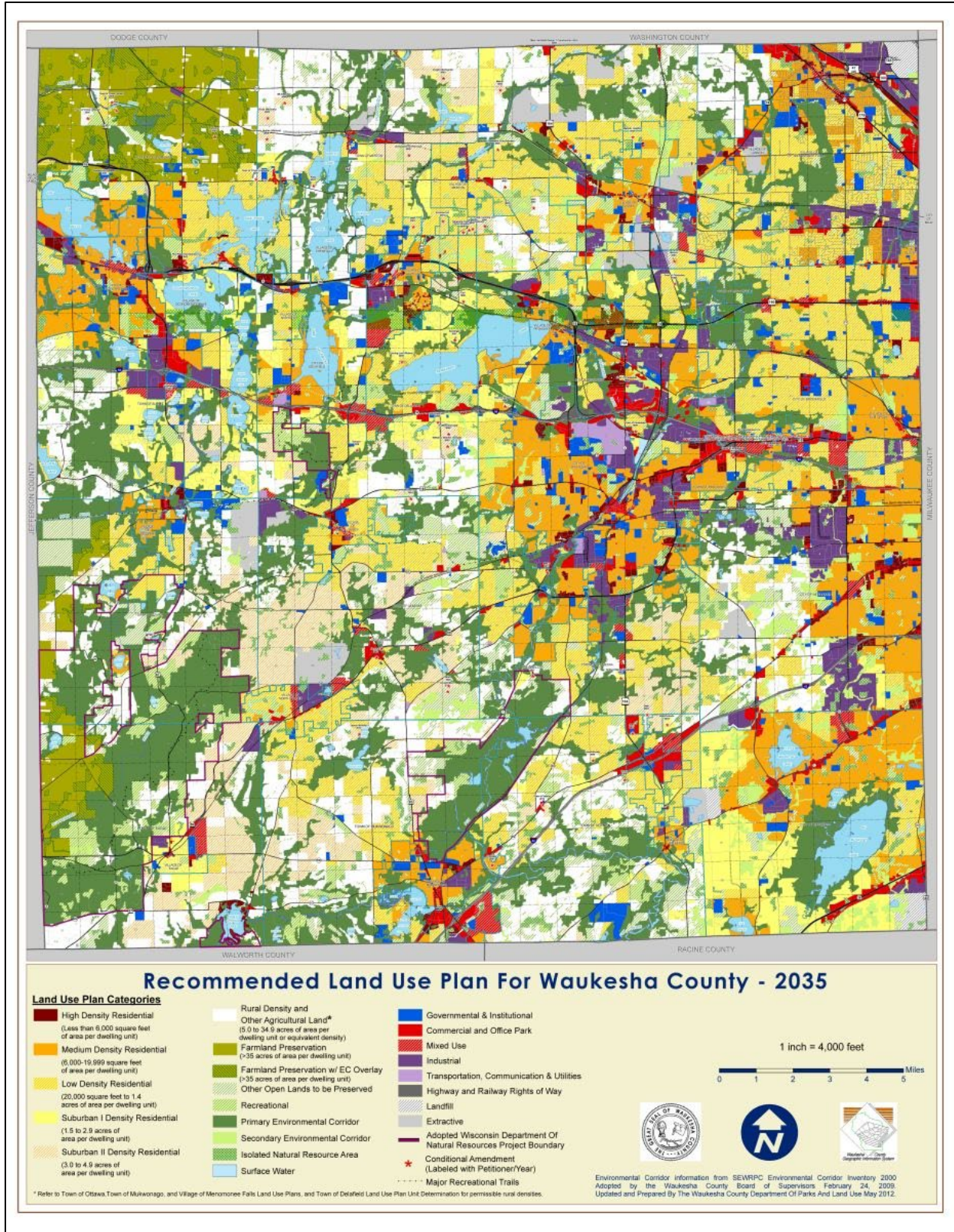
Civil Divisions as of 04/30/07
 Prepared by Waukesha Co.
 Dept. of Parks and Land Use

Land Use and Development Trends

Waukesha County is a mixed-use community. It is in the highly-populated southeastern corner of the state. Waukesha County has some natural areas that will not be developed and some rural farming areas. At the other extreme, its close proximity to Milwaukee County means that many people who work in the City and/or County of Milwaukee live in Waukesha County and commute. Some light manufacturing and other industrial businesses have chosen to locate in Waukesha County because of its well-developed transportation network and close proximity to the urban amenities offered in Milwaukee. There is also, of course, all of the retail and service industry that is required to provide goods, support and services required by the county's residents. The county was growing on pace with the rest of the southeastern corridor until the economic "Great Recession" that began in 2008, which has dampened growth. As of the time of this plan, it is expected that growth trends will mirror the recovery of the general national, state and regional economy, which is difficult to predict at this time.

Future Land Use Recommendations:

Based on the SEWRPC Planning Report No. 48, A Regional Land Use Plan for Southeastern Wisconsin: 2035, the recommended land use plan anticipates a 51% increase or 190,978 acres in urban land use within the County by 2035. The plan also anticipates an increase of recreational land use from 8416 acres in 2000 to 15,548 acres and an increase of urban residential land use about 70 percent, from 76,075 acres in 2000 to about 129,346 acres, and commercial land use is to increase to about 8,897 acres all by the year 2035. Governmental and institutional land use is planned will increase from 4,900 acres in the year 2000 to 8,354 acres in the year 2035. Given the foreseen increase of urban development the plan envisions, non-urban land use is anticipated to decrease from about 241,112 acres in 2000 to the planned 180,567 acres by the year 2035.



Archaeological and Historical Resources

Historic structures, sites, and districts are sometimes targeted for hazard mitigation strategies due to their unique, often irreplaceable, social value.

The Wisconsin Historical Society has a listing of archaeological sites that have been identified in Waukesha County; this list is available to governmental agencies upon request. The National Register of Historic Places also includes a listing of 168 locations in Waukesha County. As mitigation projects are considered, the county is committed to ensuring that archaeological and historical sites are preserved.

Historic Site Name	Address	Municipality
Andrews, Sewall, House	103 Main St.	Mukwonago
Arcadian Bottling Works	900 N. Hartwell Ave.	Waukesha
Arlington Apartments	309 Arlington St.	Waukesha
Baer, Albert R., House	W166 N8990 Grand Ave.	Menomonee Falls
Bailie, Ralph C., House	530 North Ave.	Hartland
Bank of Hartland	112 E. Capitol Dr.	Hartland
Barfoth-Blood Mound Group (47 WK 63)	Address Restricted	Wukwonago
Barnes, Andrew, House	N89 W16840 Appleton Ave.	Menomonee Falls
Barney House	W264 S3641 Saylesville Rd.	Waukesha
Barrett, Everett P., House	120 S. Porter Ave.	Waukesha
Beaumont Hop House	Address Restricted	Hartland
Becker and Schafer Store Building	1002--1004 White Rock Ave.	Waukesha
Big Bend Mound Group No. 2	Address Restricted	Big Bend
Bishopstead	153 W. Oakwood Dr.	Delafield
Blair, Sen. William, House	434 Madison St.	Waukesha
Block C Historic District	Roughly bounded by W. Main St., Gaspar St. and Broadway	Waukesha
Booth, J. C., House	About 1 mi. SW of Saylesville on Saylesville Rd.	Waukesha
Buchner, John P., House	609 E. Broadway Ave.	Waukesha
Buckley, Patrick J., House	1101 Buckley St.	Waukesha
Burr Oak Tavern	315--317 E. Capitol Dr.	Hartland
Camp, Thomas, Farmhouse	W204 N8151 Lannon Rd.	Menomonee Falls
Caples' Park Historic District	Roughly bounded by E. Newhall Ave., S. Hartwell Ave., Windsor Dr. and Oxford Rd., and S. East Ave.	Waukesha
Carroll, William, House	142 W. Main St.	Waukesha
Castleman, Dr. Alfred L., House	975 S. Waterville Rd.	Summit
Chandler, Walter S., House	151 W. College Ave.	Waukesha
Chandler--Blair House	1942 Madison St.	Waukesha
Chapel of St. Mary the Virgin	2 mi. SW of Nashotah on Nashotah House Rd.	Nashotah
Chicago and Northwestern Railroad Passenger Depot	319 Williams St.	Waukesha
Clarke, George Lawrence Jr., House	12810 W. Hampton Ave.	Butler
Cobb, George N., House	S of Oconomowoc at 1505 N. Golden Lake Rd.	Oconomowoc

College Avenue Historic District	Fountain St., S. East and College Aves.	Waukesha
Cook, Alexander, House	600 E. North St.	Waukesha
Cutler Mound Group	Cutler Park	Waukesha
Cutler, Morris, House	401 Central Ave.	Waukesha
Dansk Evangelical Lutheran Kirke	400 W. Capitol Dr.	Hartland
Davis, Cyrus, Farmstead	W204 N7776 Lannon Rd.	Menomonee Falls
Davis, Cyrus--Davis Brothers Farmhouse	W204 N7818 Lannon Rd.	Menomonee Falls
Delafield Fish Hatchery	Main St.	Delafield
Dewey Mound Group	Address Restricted	Big Bend
Dousman Inn	15670 Blue Mound Rd.	Brookfield
Downtown Historic District	Roughly bounded by Broadway, Grand Ave., Clinton and South Sts.	Waukesha
Dwinnell, George, House	442 W. College Ave.	Waukesha
East Broadway Historic District	Roughly, Broadway from Fisk Ave. to Morningside Dr.	Waukesha
East Capitol Drive Historic District	337--702 E. Capitol Dr.	Hartland
Elliot, Dr. F. C., House	501 Dunbar Ave.	Waukesha
Fabacker, Joseph, House	341 NW. Barstow St.	Waukesha
First Baptist Church	247 Wisconsin Ave.	Waukesha
First Congregational Church	214 E. Capitol Dr.	Hartland
First Congregational Church	100 E. Broadway	Waukesha
First German Reformed Church	413 Wisconsin Ave.	Waukesha
First Methodist Church	121 Wisconsin Ave.	Waukesha
Frame, Andrew, House	507 N. Grand Ave.	Waukesha
Freewill Baptist Church	W19750 W. National Ave.	New Berlin
Friederich Farmstead Historic District	N96 W15009 County Line Rd.	Menomonee Falls
Genesee Town Hall	Genesee St.	Genesee Depot
Goodwin-McBean Site (47 WK 184)	Address Restricted	Big Bend
Grace, Perry, House	307 N. West Ave.	Waukesha
Grand View Health Resort	500 Riverview Ave.	Waukesha
Gredler-Gramins House	20190 Davidson Rd.	Brookfield
Hadfield Company Lime Kilns	N of Waukesha	Waukesha
Hadfield, Joseph Jackson, House	710--712 N. East Ave.	Waukesha
Hartland Railroad Depot	301 Pawling Ave.	Hartland
Haseltine Cobblestone House	N of Big Bend on Big Bend Dr.	Big Bend
Hawks Inn	428 Wells St.	Delafield
Hemlock, David, J., House	234 Carroll St.	Waukesha
Henze, LeRoy A., House	N89 W15781 Main St.	Menomonee Falls
Hinkley, Ahira R., House	NE of Eagle off WI 59	Eagle
Hoeltz, Herbert, House	N87 W15714 Kenwood Blvd.	Menomonee Falls
Hoos, Elizabeth, House	W164 N9010 Water St.	Menomonee Falls
Hoos--Rowell House	W164 N8953 Water St.	Menomonee Falls

Hornburg, Harold, House	213 Warren Ave.	Hartland
Howitt, John, House	407 N. Grand Ave.	Waukesha
Jackson House	235 North Ave.	Hartland
James Store Building	129--131 W. Broadway	Waukesha
James, Samuel D., House	726 N. East Ave.	Waukesha
Johnston, William, Lime Kiln	E of Genesee Depot	Saylesville
Jones, Robert O., House	501 W. College Ave.	Waukesha
Kelliher, Michael, House	407 N. Grand Ave.	Waukesha
Koehler, Frank, House and Office	N88 W16623 Appleton Ave.	Menomonee Falls
Koepsel House	Old World Wisconsin, off WI 59	Eagle
Lafin Avenue Historic District	W. Lafin and Garfield Aves.	Waukesha
Lain-Estburg House	229 Wisconsin Ave.	Waukesha
Lepper, M. F., House	N88 W16596 Main St.	Menomonee Falls
Lincoln High School	N88 W16913 Main St.	Menomonee Falls
Mace, Garwin A., House	W166 N8941 Grand Ave.	Menomonee Falls
Mace, Garwin, Lime Kilns	LimeKiln Park	Menomonee Falls
Madison Street Historic District	Jct. of Madison, Randall, and Third Sts.	Waukesha
Main Street Historic District	Main and Appleton Sts.	Menomonee Falls
Mann, William G., House	346 Maple Ave.	Waukesha
McCall Street Historic District	McCall and James Sts., and N. East and Hartwell Aves.	Waukesha
McCall Street Historic District (Boundary Increase)	Roughly, Charles and James Sts. from College Ave. to McCall St. and Hartwell Ave. from College to Grove St.	Waukesha
Menomonee Falls City Hall	N88 W16631 Appleton Ave.	Menomonee Falls
Menomonee Golf Club	N73 W13430 Appleton Ave.	Menomonee Falls
Merten, Charles, House	929 Rosemary St.	Waukesha
Miller-Davidson House	On County Line Rd., E of U.S. 41	Menomonee Falls
Moore, Dr. Volney L., House	307 E. Main St.	Waukesha
Moreland Boulevard Pump House and Reservoir	413 Moreland Blvd.	Waukesha
Morey--Andrews House	704 Westowne Ave.	Waukesha
Morey--Lewis House	1312 Pleasant View Ave.	Waukesha
Morey--Markham House	1017 Westowne Ave.	Waukesha
Morey--Seidens House	2020 Easy St.	Waukesha
Mukwonago High School	308 Washington Ave.	Mukwonago
National Guard Armory 127th Regiment Infantry Company G	103 E. Jefferson at Main St.	Oconomowoc
National Hotel	235 W. Main St.	Waukesha
Needham, Enoch Gardner and Mary Caroline Koch, House	12713 W. Greenfield Ave.	New Berlin
Nelson, Charles E., Sr., House	520 N. Grand Ave.	Waukesha
Newhall Avenue Pump House and Reservoir	445 W. Newhall Ave.	Waukesha
Nickell, William, A., House	511 Lake St.	Waukesha

Northwestern Hotel	322 Williams St.	Waukesha
Oconomowoc City Hall	174 E. Wisconsin Ave.	Oconomowoc
Oconomowoc Depot	115 Collins St.	Oconomowoc
Oconomowoc Public Library and Museum	212 N. Lake Rd.	Oconomowoc
Okauchee House	34880 Lake Dr.	Okauchee
Old Waukesha County Courthouse	101 W. Main St.	Waukesha
Pabst, Gustave, Estate	36100 Genesee Lake Rd.	Summit
Pearl and Grand Avenue Historic District	Pearl Avenue generally bounded by Grand Avenue and Franklin Street and portions of Pleasant and Division streets	Mukwonago
Peck, Clarence, Residence	430 and 434 N. Lake Rd.	Oconomowoc
Peck, Walter L., House	38928 Islandale Dr.	Oconomowoc
Peterson Site (47 WK 199)	Address Restricted	Big Bend
Philadelphia Toboggan Company Carousel No. 15	Janesville Rd.	Muskego
Pix Theater	264 West Main Street	Waukesha
Pokrandt Blacksmith Shop	128 E. St. Paul Ave.	Waukesha
Pratt, Hannah, House	501 Barney St.	Waukesha
Pratt, John A., House	N88 W15634 Park Blvd.	Menomonee Falls
Putney Block	301 W. Main St., 816 and 802 Grand Ave.	Waukesha
Putney, Frank H., House	223 Wisconsin Ave.	Waukesha
Reformed Presbyterian Church of Vernon	W234 S7710 Big Bend Rd.	Vernon
Rest Haven Hotel	915 N. Hartwell Ave.	Waukesha
Saint Joan of Arc Catholic Church	N50 W34851 Wisconsin Ave., NW of jct. with US 16	Oconomowoc
Sanger, Casper M., House	507 E. College Ave.	Waukesha
Saylesville Historic District	Saylesville Road from west bank of Genesee Creek to S52 W28731 Saylesville Road	Genesee
Schauwitzer, Carl and Therese, House	S84 W17698 Woods Rd.	Muskego
Schuttler, Henry and Mary, House	371 E. Lisbon Rd.	Oconomowoc
Sign of the Willows	122 E. Capitol Dr.	Hartland
Silurian Mineral Springhouse	Post Office Circle	Waukesha
Sloan, William P., House	912 N. Barstow St.	Waukesha
Smith, Camillia, House	603 N. West Ave.	Waukesha
St. Anthony's Catholic Church and Cemetery	N74 W13604 Appleton Ave.	Menomonee Falls
St. James Catholic Church and Cemetery	W220 N6588 Town Line Rd.	Menomonee Falls
St. John Chrysostom Church	1111 Genesee St.	Delafield
St. John's Military Academy	Genesee St.	Delafield
St. Joseph's Catholic Church Complex	818 N. East Ave.	Waukesha
St. Mary's Catholic Church	N89 W16297 Cleveland Ave.	Menomonee Falls
St. Matthias Episcopal Church	111 E. Main St.	Waukesha
Statesan Historic District	Boys School Rd.	Menomonee Falls
Sussex Lime Kiln	E of SR 164	Sussex

Ten Chimneys	S42 W31610 Depot Rd.	Genesee
Third Street Bridge	Roosevelt Dr.	Menomonee Falls
Totten-Butterfield House	515 N. Grand Ave.	Waukesha
Trapp Filling Station	252--256 W. Capitol Dr.	Hartland
Turck, Christian, House	Off WI 59 in Old World Wisconsin	Eagle
United Unitarian and Universalist Church	216 Main St.	Mukwonago
Van Buren, Sarah Belle, House	128 Hill St.	Hartland
Village Park Bandstand	Village Park on Garfield Dr.	Menomonee Falls
Visitation Convent Complex	13105 Watertown Plank Rd.	Elm Grove
Ward District No. 3 Schoolhouse	WI 67 and Betts Rd.	Eagle
Warren, Stephen, House	235 E. Capitol Dr.	Hartland
Waukesha County Airport Hangar	24151 W. Bluemound Rd.	Waukesha
Waukesha Post Office	235 W. Broadway Ave.	Waukesha
Waukesha Pure Food Company	550 Elizabeth St.	Waukesha
Welch, C. A., House	1616 White Rock Ave.	Waukesha
West, Deacon, Octagon House	370 High St.	Pewaukee
Weston's Antique Apple Orchard	19760 W. National Ave.	New Berlin
White Elm Nursery	621 W. Capitol Dr.	Hartland
White Rock Mineral Spring Company	1702 White Rock Ave.	Waukesha
Wick, Michael, Farmhouse and Barn	N72 W13449 Good Hope Rd.	Menomonee Falls
Wisconsin Avenue Historic District	Wisconsin	Waukesha
Wisconsin Industrial School for Boys	621 and 627 W. College Ave.	Waukesha
Yanke, Louis, Saloon	200 Madison Ave.	Waukesha
Zimmer, Johann, Farmhouse	W156 N9390 Pilgrim Rd.	Menomonee Falls
Zion Evangelical Lutheran Church	403 W. Capitol Dr.	Hartland

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.

The above list is not inclusive of all sites of historic and cultural significance.

Community Capabilities

Even in communities where the potential risks from hazards are acknowledged, and support for disaster-related policies are high, a jurisdiction's preparedness, response, and recovery abilities may still be limited. One reason may be due to the lack of capacity and limited capabilities of that community. While the two terms, capacity and capability, are oftentimes used interchangeably in the disaster literature, it is useful to conceptually delineate the two terms.

Capacity, in reference to disaster management planning, can be broadly defined as the number of resources available to an organization to execute or carry out certain functions to promote the safety and well-being of a community. Although very similar to capacity, capability, with regards to disaster management, can be defined as the actual ability of an institution or individual to perform actions necessary to anticipate, prevent, prepare for, cope with, respond to, or recover from the impact of a hazard. The purpose of delineating the two concepts is simply to show that having capacity, or the essential resources in hand, does not necessarily translate into being capable of executing those actions. Capacity simply expresses the potential to act accordingly based on the availability of resources, which can be both tangible and intangible. Capability, then, could be considered the sum total of the knowledge, support, and experience required to perform or accomplish a certain task. With respect to disaster management, it is important to have both capacity and capability.

This section discusses "Public Safety" related capabilities within Waukesha County.

Public Safety Support

This section provides Public Safety information regarding: Medical, Fire Service, Ambulance Service, Law Enforcement, and Special Teams

Medical

The Waukesha County Office of Emergency Management, municipal and county emergency services responders, hospital emergency staff and various departments have developed medical and mass casualty plans. These plans will be used in the event of a disaster. Waukesha County communities are served by a complete range of health facilities and health professionals.

Waukesha County has five operating hospitals and two small community hospitals that provide care to county residents. Additionally, the county's healthcare and community support infrastructure are made up in part of approximately 510 Public Health Personnel, 17,100 workers critical to the provision of inpatient health care, 1,200 outpatient and home health providers, and 2,900 providers in Long Term Care facilities

The following hospitals are in Waukesha County:

- Ascension Elmbrook Hospital – 132 beds
- Aurora Medical Center Summit – 99 beds
- Froedtert Community Hospital New Berlin – 8 beds
- Froedtert Community Hospital Pewaukee – 8 beds
- Froedtert Menomonee Falls Hospital - 242 beds
- ProHealth Care Waukesha Memorial - 237 beds
- ProHealth Care Oconomowoc Memorial - 48 beds

Additionally, Waukesha County is part of the Southeast Wisconsin Healthcare Emergency Readiness Coalition (HERC) Region 7, which is comprised of nine counties in Southeast Wisconsin, and whose mission is to utilize an efficient, coordinated approach to providing healthcare in a critical incident that extends beyond normal operations of its stakeholders. The HERC region contains 33 hospitals and emergency departments with a total of 2,754 staffed medical/surgical beds, providing for a robust regional surge capacity. Regional capabilities also

include 11 specialty hospitals with 136 staffed medical/surgical beds and five mental health facilities with 149 psychiatric beds.

The Waukesha County Communications Center (WCC) is the primary Public Safety Answering Point (PSAP) for Waukesha County, handling all wireless 911 calls for the county, as well as most landline 911 calls and non-emergency calls, and providing dispatch services for police and fire in the majority of Waukesha County communities. The communications center is staffed by 49 Telecommunicators and 7 Communications Center Supervisors and overseen by an Operations Manager. The Communications Center falls under the County's Department of Emergency Preparedness whose structure is illustrated below. Co-located with the Communications Center is the County's Emergency Operations Center, which is utilized by Waukesha County Emergency Management as a support and coordination hub during large-scale incidents. The new EOC was officially opened in 2017, has a capacity of 68 people, and is rated to withstand severe weather conditions up to and including an EF2 tornado.

Other active PSAPs in Waukesha County include:

- City of Muskego Police
- City of Oconomowoc Police
- City of Waukesha Police
- Village of Elm Grove
- Village of Mukwonago

Fire Service

Thirty-seven municipalities and an area of 581 sq. miles are served. Approximately 1,400 personnel staff the 23 fire departments in Waukesha County. Response infrastructure and apparatus include approximately 50 fire stations, 60 fire engines, 22 trucks and 71 ambulances. There are 20 municipal fire departments, 3 private departments, 6 volunteer departments, 14 combination fire departments and 3 career departments. This information should be considered a snapshot of current capabilities. Of the 1,417 personnel, 372 are career personnel, 843 are paid volunteers, and 199 are administrative, EMS, or auxiliary staff.

A-level hazardous materials (Hazmat) response is sponsored by the State of Wisconsin and is provided by Milwaukee Regional Response Team #4. The City of Waukesha Fire Department provides B-level hazardous materials (Hazmat) response for the county. Some county departments also feature specialized skills such as water rescue/dive, high angle rescue and confined space entry.

Ambulance Service

The following departments in Waukesha County provide ambulance services:

Emergency Medical Technician:

- Big Bend (Village of) Fire Department
- Butler Volunteer Fire Department, Inc.
- Merton Community Fire Department, Inc.

Advanced Emergency Medical Technician:

- Eagle Fire Department
- North Prairie Fire Department

EMT-Intermediate:

- Tess Corners Volunteer Fire Department
- Waukesha (Village of) Fire Department

Paramedic:

- Brookfield (City of) Fire Department
- Brookfield (Town of) Fire Department
- Elm Grove Emergency Medical Service
- Menomonee Falls (Village of) Fire Department
- Pewaukee (City of) Fire Department
- Sussex Fire Department
- Vernon Fire Department EMS
- Waukesha (City of) Fire Department

Paramedic with Critical Care Endorsement:

- Flight for Life Transport System
- Lake Country Fire and Rescue
- Lisbon Fire Department
- Mukwonago Fire Department
- New Berlin (City of) Fire Department
- Western Lakes Fire District

<https://www.dhs.wisconsin.gov/ems/provider/waukesha.htm>

Law Enforcement

The sheriff is the chief law enforcement officer in the county and is responsible for the protection of life and property within the boundaries of Waukesha County. The Sheriff's Office provides law enforcement service to unincorporated areas of the county or to those jurisdictions that do not maintain full-time police service. The department also provides security for the County Courthouse and the twelve Circuits Court branches and five Court Commissioners. The Department also staffs and maintains a 469-bed County Jail and a 330-bed Huber Law work-release facility. In addition, the department provides the following specialized services:

- Drug Enforcement
- Canine Support
- Identification
- Crime Prevention
- Tactical Enforcement
- Underwater Search and Rescue
- Computer Forensic/High Tech Crimes

- Polygraph
- Civil Process Service
- Accident Reconstruction
- Crime Scene Documentation
- Clerical Services

Today the department is comprised of more than 330 sworn and non-sworn personnel and provides direct police services to over 400,000 residents. (<http://www.waukeshacounty.gov>)

A large number of local law enforcement departments are also responsible for protecting and serving the citizens of the many municipalities within the county. Some are large, municipal departments with full-time officers, many with special pieces of training such as Dive, Investigations and Tactical/SWAT and functions such as bicycle units, school resource officers, neighborhood watch, gangs/special crimes, Drug Abuse Resistance Education (D.A.R.E.), Crime Stoppers, Neighborhood Watch etc. Other departments are smaller and may have part-time staffing but all proudly serve as law enforcement professionals. Municipalities with departments are listed below:

- City of Brookfield <http://www.cityofbrookfield.com>
- City of Delafield <http://www.cityofdelafield.com>
- City of Muskego <http://www.ci.muskego.wi.us>
- City of New Berlin <http://www.newberlin.org/>
- City of Oconomowoc <http://www.ci.oconomowoc.wi.us>
- City of Pewaukee <http://www.cityofpewaukee.us>
- City of Waukesha <http://www.ci.waukesha.wi.us>
- Village of Big Bend <http://www.villageofbigbend.com>
- Village of Butler <http://www.butlerpolice.org>
- Village of Chenequa <http://www.chenequa.wi.us>
- Village of Eagle <http://www.eaglepolicedepartment.com>
- Village of Elm Grove <http://www.elmgrovewi.org>
- Village of Hartland <http://www.villageofhartland.com>
- Village of Lannon <http://www.villageoflannon.com>
- Village of Menomonee Falls <http://www.menomonee-falls.org>
- Village of Mukwonago <http://www.villageofmukwonago.com>
- Village of Nashotah <http://www.nashotah-wi.gov>
- Village of North Prairie <http://www.northprairie.net>
- Village of Oconomowoc Lake <http://oconlake.com>
- Village of Pewaukee www.villageofpewaukee.com
- Town of Brookfield <http://www.townofbrookfield.com>
- Town of Mukwonago <http://www.townofmukwonago.us>
- Town of Oconomowoc <http://www.topdonline.com>
- Town of Summit <http://www.summittown.org>

Special Teams

- Citizens and Organizations Active in Disasters (COAD) is an association of individuals and organizations in Waukesha County and Milwaukee County interested in disaster preparedness and response.
- The Sheriff's Department's Underwater Search and Rescue (Dive Team) consists of a Captain and a Lieutenant (Both Certified Divers), seven Certified Divers and two surface

operators. All divers are highly trained and have completed certification in Open Water diving, Rescue diving, Ice diving, Navigation and Deep Water diving. Several are also certified as Equipment Specialists and Master Divers. The demand for this team is approximately 20 dives per year including training. The Dive Team has assisted other agencies with a variety of tasks including, search and recovery operations, helping to recover a drowning victim and assisting in the recovery of evidence.

(www.waukeshacounty.gov)

- The City of Waukesha Fire Department provides Level B or Type II hazardous materials response in the County.
- There are four tactical teams in the County. All are multi-jurisdictional including the Sheriff's Tactical Enforcement Unit.
- The city of Waukesha has a Special Services Team for confined space and elevated rescue.
- The Suburban Critical Incident Team is a multijurisdictional Tactical unit that serves nine municipalities in Waukesha County. The team is made up of 35 tactical operators and 15 negotiators/Investigators.

V. Risk Assessment

Waukesha County recognizes that a community's All Hazard Risk Assessment is the fundamental building block of the four core functions of emergency management: prepare, respond, recover, and mitigate. In today's hazard environment, emergency management is the crux of solving the complex challenges that face our communities during an emergency or following a disaster. The disaster activity over the past several years has re-emphasized the importance for communities to invest in creating thorough strategies to develop comprehensive emergency plans and to test, train, and exercise all emergency operations.

The objective of the risk methodology is to devise a process to compare and evaluate which natural, technological, and political hazards are the greatest threats to the County and where mitigation actions should be focused to provide the best value to Waukesha. The All-Hazard Risk Assessment describes, analyzes, and assesses the risks facing Waukesha County from three categories of hazards: Natural, Technological, and Political. Natural hazards are those events that are a result of our surrounding environment, such as wildfires, flooding, or hurricanes. Technological hazards are events that are a result of the failure of infrastructure and systems that we have become dependent on for daily activities, such as transportation networks or utilities. Political hazards are those events that are a result of local, national, or international societal interactions, such as terrorism or civil disturbances.

Each hazard category will elaborate upon and define the different types of hazards that are associated with each, identify historical events that have occurred locally and/or regionally, define the hazard profiles, parameters, and characteristics; assess possible vulnerabilities; determine probable scenarios; and model select hazards. The hazards investigated were identified through extensive research that utilized input from Waukesha County, Federal Emergency Management Agency (FEMA), Department of Homeland Security (DHS), hazard experts, historical occurrences, Geographic Information System databases, and hazard-specific data such as Flood Insurance Maps.

Scope of Analysis

The following is a list of the hazards investigated in this study.

Natural Hazard	Technological Hazards	Political Hazards
Drought & Dust Storms	Utility Failure	Civil Disturbances
Earthquakes	Hazard Materials Release	Labor Disputes
Flooding & Dam Failure	Rail Transportation Incident	Protests
Fog		Terrorism:
Forest & Wildfires		Explosive Devices (bombs)
Severe Temperatures		Airline Attacks
Hail		Chemical/Biological/Nuclear Attacks
Lightning		Hostage Taking
Thunderstorms		Infrastructure Attacks
Tornadoes & High Winds		Active Assailant Attacks
Winter Storms		Home Grown Violent Extremists

Note: Political Hazards were added as part of the 2021 update/review process

Many of the hazards in the Risk Assessment do not pose a significant risk because of their low probability of occurring or minimal impact; however, these hazards are still addressed in this report. Hazards that were determined to not occur in Waukesha County (e.g. hurricanes) were removed from the Risk Assessment. Several hazard types (e.g. hazardous materials release) transcend hazard categories (i.e., natural, technological, and political).

Hazard Loss Modeling

To supplement the impact analysis and risk determination, a hazard loss model and analysis were performed for select scenarios of each hazard category. The scenarios selected were based on historical occurrences of disasters, availability of data, and the severity of the hazard risk. The hazard loss analysis process utilized Hazards U.S. Multi Hazard (HAZUS-MH) modeling, Geographic Information Systems (GIS) analysis, and historical disaster data and information to conduct quantitative analysis to estimate the loss due to the selected natural, technological and political hazard events. HAZUS-MH is a powerful risk assessment software program for analyzing potential losses from floods and earthquakes. In HAZUS-MH, current scientific and engineering knowledge is coupled with the latest (GIS) technology to produce estimates of hazard-related damage before, or after, a disaster occurs. The analysis reports obtained from the HAZUS-MH model includes the following:

- Estimation of the losses to structures and contents
- Estimation of the losses to structure use and function
- Projection of human losses
- Estimation of the primary direct and indirect loss

HAZUS-MH and GIS analysis was used to determine which individual assets were vulnerable to the largest potential losses; by adding the structure loss, content loss, and function loss for each asset to determine the total loss. This process produced the following:

- Calculation of the losses to each asset
- Calculation of the estimated damages for each hazard event
- Creation of a map that shows a composite of the areas of the highest loss

Many of the human-induced hazards provide some unique implications for loss estimation because these events can take place with different magnitudes, in any location, at any time, and under various circumstances. Because the characteristics of many of the human-induced events are not definitive, a generalized loss analysis was conducted. The HAZUS-MH model was utilized when the human-induced hazard has geographic characteristics. When HAZUS-MH data was not relevant to the particular event, the best available historical data was used to provide a generalized loss estimate. The following scenarios were assessed and analyzed utilizing GIS data and HAZUS-MH modeling.

They are provided in the relevant section of this report.

Hazard Risk Determination

The determination of the risks associated with each hazard was not based on empirical values but instead based on a function of the probability of the event occurring and its potential impact. This approach was necessary due to the complexities of a uniformed all-hazard approach and the numerous direct and indirect factors for a unique community like Waukesha County. To remain consistent, a color-coded scale was utilized to provide a descriptive assessment of each risk. An example of the risk scale is provided. Each hazard risk assessment will go through a review process involving the Waukesha County Steering Committee.

[Hazard Summary](#)

Hazard Analysis

The following sections identify those hazards that have occurred or could occur in Waukesha 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.

Wisconsin Emergency Management (WEM) completed and regularly updates the State Hazard Mitigation Plan, which was last revised in 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 Waukesha County Emergency Management Coordinator develops and annually updates a listing of all hazards that have occurred or could occur within the county. This listing includes the definition, frequency of occurrence and actions to mitigate the hazard. In general, the threat of most hazards is consistent throughout the county. The only hazard where there were differences identified within the county was for flooding and for that hazard, specific locations are identified.

Due to the geographic location of Wisconsin and/or Waukesha County, volcanoes, landslides, hurricanes, and tsunamis were not considered to be a risk and will not have mitigation strategies associated with them.

Wisconsin Emergency Management (WEM) Hazard Matrix						
No.	Hazard	Location (if the risk is not equal for the entire jurisdiction)	Frequency/Probability (i.e. Future Probability)	Magnitude/Extent (i.e. Strength or Magnitude)	Vulnerability (i.e. Consequence and Impact)	Overall Risk Rating
01	Droughts and Dust Storms	Droughts will primarily impact the agricultural community of Waukesha County.	Medium	Low	Low	Low
02	Earthquakes	Countywide	Low	Low	Medium	Low
03	Flooding and Dam Failure	Historically, flooding has most significantly affected communities such as the villages of Elm Grove and Pewaukee; the cities of Brookfield, New Berlin, Muskego and Waukesha; and the unincorporated portions of Waukesha County.	High	High	High	High
04	Fog	Countywide	Medium	Low	Low	Low
05	Forest and Wildfires	As illustrated on the plan's wildfire maps, the highest risk areas are the areas where wildland is in close proximity to urban settlements. Communities adjacent to and surrounded by wildlands (e.g. areas of grassland, woodlands, bushland, scrubland) are most at risk of wildfires.	Low	Low	Low	Low
06	Hail	Countywide	High	Medium	Low	Medium
07	Lightning	Countywide	High	Medium	Low	Medium
08	Severe Temperatures	Countywide	Medium	Medium	Low	Medium
09	Thunderstorms	Countywide	High	Medium	Low	Medium
10	Tornadoes and High Winds	The highest risks associated with	Medium	Medium	High	Medium

		tornadoes and severe winds are within the urban areas of the County. The larger cities—Waukesha, New Berlin, Brookfield, Muskego, Oconomowoc, and Pewaukee and the Village of Menomonee Falls will suffer the greatest losses if a tornado touches down in one of these communities.				
11	Winter Storms	Countywide	Medium	Medium	Medium	Medium
12	Hazardous Materials Release	Near transit hubs, rail, or large industrial facilities that store or produce hazardous materials	Medium	Medium	Medium	Medium
13	Utility Failure	The highest risks associated with power failures and utility failures are in communities with hospitals, nursing homes, care facilities, elderly housing facilities and other housing/care facilities occupied by vulnerable populations.	Medium	Medium	Low	Medium
14	Rail Transportation Incident	Countywide; Specifically near major rail lines and routes.	Low	Low	Low	Low

The following represents the in-depth Hazard Analysis that informed the WEM Hazard Matrix. The methodology is described below. The hazard assessment tool can be accessed here: [Waukesha County Hazard Assessment Tool](#)

Probability of Occurrence

The probability of occurrence of a hazard is indicated by a probability factor based on the likelihood of annual occurrence:

- High—Significant hazard event is likely to occur annually (Probability Factor = 3)
- Medium—Significant hazard event is likely to occur within 25 years (Probability Factor = 2)
- Low—Significant hazard event is likely to occur within 100 years (Probability Factor = 1)

- Unlikely—There is little to no probability of significant occurrence, or the recurrence interval is greater than every 100 years (Probability Factor = 0)

The assessment of hazard frequency is generally based on past hazard events in the area. The table below summarizes the probability assessment for each hazard of concern for this plan.

Hazard Event	Population Exposed (High, Medium, Low)	Impact Factor	Multiplied by Weighting Factor (3)
Dam Failure	Low	1	3
Droughts and Dust Storms	High	3	9
Earthquakes	High	3	9
Extreme Cold	High	3	9
Extreme Heat	High	3	9
Flooding	Medium	2	6
Fog	Medium	2	6
Forest and Wildfires	Low	1	3
Hail	Medium	2	6
Hazardous Materials Release	Medium	2	6
Lightning	Low	1	3
Rail Transportation Incident	Low	1	3
Thunderstorms	High	3	9
Tornadoes and High Winds	Medium	2	6
Utility Failure	Medium	2	6
Winter Storms	High	3	9
Political Hazard	Low	1	3
People—Values were assigned based on the percentage of the total population exposed to the hazard event. The degree of impact on individuals will vary and is not measurable, so the calculation assumes for simplicity and consistency that all people exposed to a hazard because they live in a hazard zone will be equally impacted when a hazard event occurs. It should be noted that planners can use an element of subjectivity when assigning values for impacts on people. Impact factors were assigned as follows: [Weighted Factor: 3]			

Catastrophic Factor—The potential that an occurrence of this hazard could be catastrophic.

- High—High potential that this hazard event could be catastrophic (Impact Factor = 3)
- Medium—Medium potential that this hazard event could be catastrophic (Impact Factor = 2)
- Low—Low potential that this hazard event could be catastrophic (Impact Factor = 1)
- Unlikely—Virtually no potential that this hazard event could be catastrophic (Impact Factor = 0)

Hazard Event	Potential for Catastrophe (High, Medium, Low)	Impact Factor	Multiplied by Weighting Factor (3)
Dam Failure	Low	1	3
Droughts and Dust Storms	Unlikely	0	0

Earthquakes	Low	1	3
Extreme Cold	Low	1	3
Extreme Heat	Unlikely	0	0
Flooding	High	3	9
Fog	Unlikely	0	0
Forest and Wildfires	Low	1	3
Hail	Unlikely	0	0
Hazardous Materials Release	Low	1	3
Lightning	Unlikely	0	0
Rail Transportation Incident	Low	1	3
Thunderstorms	Unlikely	0	0
Tornadoes and High Winds	High	3	9
Utility Failure	Low	1	3
Winter Storms	Medium	2	6
Political Hazard	Medium	2	6

Property Damages—Values were assigned based on the expected total property damages incurred from the hazard event. It is important to note that values represent estimates of the loss from a major event of each hazard based on historical data for each event or probabilistic models/studies.

- High—More than \$5,000,000 in property damages is expected from a single major hazard event, or damages are expected to occur to 15% or more of the property value within the jurisdiction (Impact Factor = 3)
- Medium—More than \$500,000 but less than \$5,000,000 in property damages is expected from a single major hazard event, or expected damages are expected to occur to more than 5% but less than 15% of the property value within the jurisdiction (Impact Factor = 2)
- Low—Less than \$500,000 in property damages is expected from a single major hazard event or less than 5% of the property value within the jurisdiction (Impact Factor = 1)
- No impact—Little to no property damage is expected from a single major hazard event (Impact Factor = 0)

Hazard Event	Property Damages from Major Event (High, Medium, Low)	Impact Factor	Multiplied by Weighting Factor (2)
Dam Failure	High	3	6
Droughts and Dust Storms	No Impact	0	0
Earthquakes	High	3	6
Extreme Cold	Low	1	2
Extreme Heat	No Impact	0	0
Flooding	High	3	6
Fog	No Impact	0	0
Forest and Wildfires	Medium	2	4
Hail	Medium	2	4
Hazardous Materials Release	Medium	2	4
Lightning	Low	1	2

Rail Transportation Incident	Low	1	2
Thunderstorms	Low	1	2
Tornadoes and High Winds	High	3	6
Utility Failure	Low	1	2
Winter Storms	Medium	2	4
Political Hazard	Low	1	2

Property Exposed—Values were assigned based on the percentage of the total property value exposed to the hazard event:

- High—25% or more of the total assessed property value is exposed to a hazard (Impact Factor = 3)
- Medium—10% to 24% of the total assessed property value is exposed to a hazard (Impact Factor = 2)
- Low—9% or less of the total assessed property value is exposed to a hazard (Impact Factor = 1)
- No impact—None of the total assessed property value is exposed to a hazard (Impact Factor = 0)

Hazard Event	Property Exposed (High, Medium, Low)	Impact Factor	Multiplied by Weighting Factor (1)
Dam Failure	Low	1	1
Droughts and Dust Storms	No Impact	0	0
Earthquakes	High	3	3
Extreme Cold	No Impact	0	0
Extreme Heat	No Impact	0	0
Flooding	Medium	2	2
Fog	No Impact	0	0
Forest and Wildfires	Low	1	1
Hail	Medium	2	2
Hazardous Materials Release	Medium	2	2
Lightning	High	3	3
Rail Transportation Incident	Low	1	1
Thunderstorms	High	3	3
Tornadoes and High Winds	Medium	2	2
Utility Failure	Medium	2	2
Winter Storms	High	3	3
Political Hazard	Low	1	1

Economic Factor—An estimation of the impact, expressed in terms of dollars, on the local economy is based on a loss of business revenue, worker wages, and local tax revenues or on the impact on the local gross domestic product (GDP).

- High—Where the total economic impact is likely to be greater than \$10 million (Impact Factor = 3)

- Medium—Total economic impact is likely to be greater than \$100,000 but less than or equal to \$10 million (Impact Factor = 2)
- Low—Total economic impact is not likely to be greater than \$100,000 (Impact Factor = 1)
- No impact—Virtually no significant economic impact (Impact Factor = 0)

Hazard Event	Impact on Economy (High, Medium, Low)	Impact Factor	Multiplied by Weighting Factor (1)
Dam Failure	Medium	2	2
Droughts and Dust Storms	Low	1	1
Earthquakes	Medium	2	2
Extreme Cold	Low	1	1
Extreme Heat	Low	1	1
Flooding	High	3	3
Fog	No Impact	0	0
Forest and Wildfires	Low	1	1
Hail	Low	1	1
Hazardous Materials Release	Medium	2	2
Lightning	low	1	1
Rail Transportation Incident	Medium	2	2
Thunderstorms	Low	1	1
Tornadoes and High Winds	Medium	2	2
Utility Failure	Medium	2	2
Winter Storms	Medium	2	2
Political Hazard	Low	1	1

Future Development Trend Factor - The potential that future development will have on increasing the risk of this hazard.

- High—Future development trends will significantly increase the risk of this hazard (Impact Factor = 3)
- Medium—Future development trends will increase the risk of this hazard, but not significantly (Impact Factor = 2)
- Low—Future development trends will minimally increase the risk of this hazard (Impact Factor = 1)
- Unlikely—Future development trends will not increase the risk of this hazard (Impact Factor = 0)

Hazard Event	Impact on Future Development (High, Medium, Low)	Impact Factor	Multiplied by Weighting Factor (1)
Dam Failure	Low	1	1
Droughts and Dust Storms	Unlikely	0	0
Earthquakes	Low	1	1
Extreme Cold	Unlikely	0	0
Extreme Heat	Unlikely	0	0
Flooding	Medium	2	2
Fog	Unlikely	0	0

Forest and Wildfires	Low	1	1
Hail	Unlikely	0	0
Hazardous Materials Release	Unlikely	0	0
Lightning	Unlikely	0	0
Rail Transportation Incident	Unlikely	0	0
Thunderstorms	Unlikely	0	0
Tornadoes and High Winds	Unlikely	0	0
Utility Failure	Unlikely	0	0
Winter Storms	Unlikely	0	0
Political Hazard	Unlikely	0	0

Each category was assigned a weighting factor to reflect its significance, consistent with those typically used for measuring the benefits of hazard mitigation actions: a weighting factor of 3 for both population exposed to the hazard and its potential for catastrophe; a weighting factor of 2 for property damages probable due to a major hazard event; and a weighting factor of 1 for property exposed to the hazard, its impact on the economy and future development. The following tables summarize the impact ratings for each hazard.

Hazard Summary Table

Hazard Event	Probability Factor	Sum of Weighted Impact Factors	Total (Probability x Impact)
Flooding	3	28	84
Tornadoes and High Winds	2	25	50
Winter Storms	2	24	48
Thunderstorms	3	15	45
Hail	3	13	39
Hazardous Materials Release	2	17	34
Extreme Cold	2	15	30
Utility Failure	2	15	30
Lightning	3	9	27
Earthquakes	1	24	24
Droughts and Dust Storms	2	10	20
Extreme Heat	2	10	20
Dam Failure	1	16	16
Forest and Wildfires	1	13	13
Political Hazard (Terrorism & Civil Disturbance)	1	13	13
Fog	2	6	12
Rail Transportation Incident	1	11	11

Drought and Dust Storms

There are various forms of drought that occur in Wisconsin: meteorological, 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. Meteorological drought occurs when the normal levels of precipitation have a

significant drop. These types of drought may, but do not necessarily, occur together. Socioeconomic droughts are rare in Wisconsin and result when water shortages seriously interfere with human activity.

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 Waukesha 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 Waukesha County. This assertion is further bolstered by the fact that there is very little irrigation done within the county and that the soils in Waukesha 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.

Drought and Dust Storms Hazard Profile

Hazard Profile

Drought is characterized as an extended period of time with persistent dry weather conditions in a geographic area that typically has rainfall. In essence, droughts are water deficits that have harmful consequences for people, animals and plants. Droughts can also negatively impact the environment by depleting the moisture from soil ruining crop production; water levels can decrease in streams, rivers, lakes and reservoirs; and wildfires can result from extended or severe droughts. Other climatic factors such as high temperatures, high winds, and low humidity can significantly worsen a drought's severity. A drought can however be defined in several different ways depending on the geographical region and situation:

- Meteorological drought: When the normal level of precipitation has a significant measurable drop.
- Agricultural drought: When the level of soil moisture drops below the suitable range for agricultural growth.
- Hydrological drought: When the surface water and underground water supply falls below normal.
- Socioeconomic drought: When water shortages seriously interfere with human activity.
- What constitutes as a drought in one region may not qualify in another.

The understanding that a deficit of precipitation has different impacts on groundwater, reservoir storage, soil moisture, snowpack and streamflow led to the development of the Standardized Precipitation Index (SPI) in 1993. The SPI quantifies the precipitation deficit for multiple time scales. These time scales reflect the impact of drought on the availability of the different water resources. Soil moisture conditions respond to precipitation anomalies on a relatively short scale. Groundwater, streamflow, and reservoir storage reflect longer-term precipitation anomalies. For these reasons, the SPI is calculated for 3-, 6-, 12-, 24- and 48-month time scales.

The SPI calculation for any location is based on the long-term precipitation record for a desired period. This long-term record is fitted to a probability distribution, which is then transformed into a normal distribution so that the mean SPI for the location and desired period is zero. Positive SPI values indicate greater than median precipitation and negative values indicate less than

median precipitation. Because the SPI is normalized, wetter and drier climates can be represented in the same way and wet periods can also be monitored using the SPI.

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

SPI Values	Description
2.0	Extremely Wet
1.55 - 1.99	Very Wet
1.0 - 1.49	Moderately Wet
-0.99 - 0.99	Near Normal
-1.0 to -1.49	Moderately Dry
-1.5 to -1.99	Severely Dry
-2.0 and less	Extremely Dry

Palmer Drought Index

The Palmer Index, developed by Wayne Palmer in the 1960s, uses temperature and rainfall information to formulate dryness. It has become the semi-official drought index. The index is effective in determining long-term drought conditions of several months. The index sets normal conditions at 0 with drought conditions in negative values. The index can also be reversed showing the excess of precipitation where the normal conditions are at 0 and positive values for the amount of rainfall. The advantage of the Palmer Index is that it is standardized to local climate, so it can be applied to any part of the country to demonstrate relative drought or rainfall conditions.

The National Integrated Drought Information System (NIDIS) provides alerts when conditions are favorable for drought. The following table provides information on the different alerts for the National Weather Service:

Alert	Criteria	Palmer Drought Index
D0 Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered.	-1.0 to -1.9
D1 Moderate Drought	Some damage to crops, pastures, streams, reservoirs, or wells is low, some water shortages developing or imminent, and voluntary water-use restrictions are requested.	-2.0 to -2.9
D2 Severe Drought	Crop or pasture losses are likely, water shortages common and water restrictions imposed.	-3.0 to -3.9
D3 Extreme Drought	Major crop and pasture losses with widespread water shortages or restrictions.	-4.0 to -4.9
D4 Exceptional Drought	Exceptional and widespread crop and pasture loss, shortages of water in reservoirs, streams, and wells creating water emergencies.	-5.0 or less

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 the 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 have 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.

Hazard Considerations

The following is a list of potential impacts and planning considerations for a drought event.

Area Impacted:

- Regional and Statewide

Duration of the event:

- Droughts can occur over a period of weeks, months and years.

Essential Service Disruption:

- Water shortages force government officials to order water restrictions

Special Needs:

- Agriculture (farming and ranching) community most affected.
- Rural populations

Direct Damage:

- Farming/Ranching business interruption due to agricultural losses
- Lower water levels in reservoirs, lakes, and ponds
- Government officials forced to spend millions in an emergency or non-budgeted funds to ensure adequate groundwater supplies for residents.

Economic Damage:

- Agricultural losses – fields, crops, pastures and livestock can be devastated for months and even years resulting in severe economic hardship in these industries.
- Loss to industries directly dependent on agricultural production (e.g., machinery and fertilizer manufacturers, food processors, dairies, fishery, timber, etc.)
- Reduction of economic development
- Rural population loss

Environmental Damage:

- Migration and concentration of wildlife
- Effect on water quality (e.g., salt concentration, increased water temperature, pH, dissolved oxygen, turbidity)
- Prolonged drought over a number of years could have long-term environmental impacts on the area, such as species endangerment and changes to agriculture.
- Increased risk of sinkhole formation.

Emergency Services:

- Inadequate water supply to effectively manage fire

Social Factors:

- Practicing water conservation that protects the environment while supplying residents with adequate amounts of drinking and irrigation water supplies
- Increased respiratory ailments and disease caused by wildlife concentrations
- Reduced quality of life and changes in lifestyle (population migrations, social values, disruption of cultural beliefs, etc.)

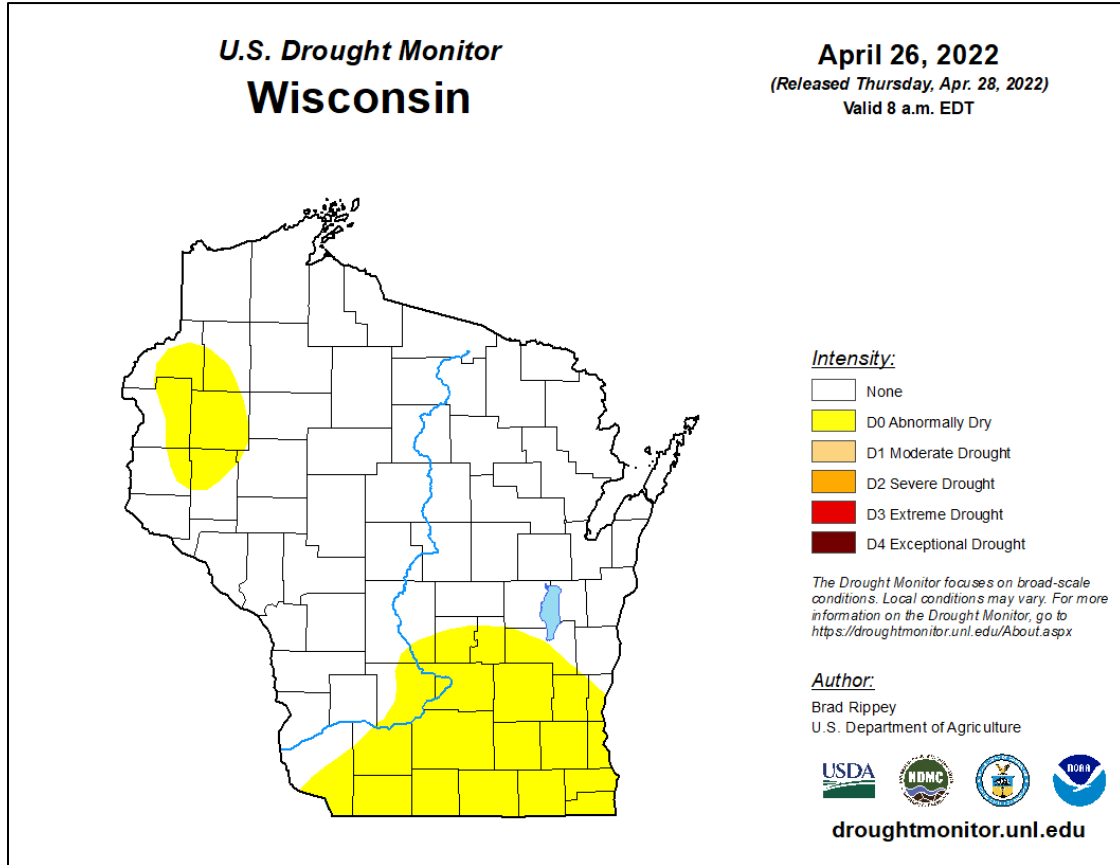
Location and Extent

Droughts can be devastating for the host community. Direct impacts of drought can include reduced crop, rangeland, and forest productivity; increased fire hazards; reduced water levels; increased livestock and wildlife mortality rates; damage to wildlife and fish habitat; increased problems with insects and diseases to forests and reduced growth. Indirect results can lead to financial hardships for farmers and increased prices for food and timber, unemployment, reduced tax revenues because of reduced expenditures, increased crime, foreclosures on bank loans to farmers and businesses, migration, and disaster relief programs.

In addition to the impacts of drought on farming and agriculture, a drought can be related to other hazards. Extreme weather can complicate droughts because high temperatures increase the amount of evapotranspiration that occurs in plants. Increased evapotranspiration results in higher water loss rates and increases plant damage. The probability of landscape plants loss and extreme crop losses can be increased during a drought if high temperatures are also experienced.

Dead and dry vegetation caused by droughts also provides fuel for wildfires. Heavy accumulation of fuels, lack of strategic management programs, and inadequate fire-fighting infrastructure has further complicated Waukesha County's risk to wildland-urban interface fires. Drought-related wildfires should be monitored closely by the County to ensure the protection of commercial, industrial, agricultural, and residential regions. Additionally, with the onset of Climate Change, the County may begin to see more severe droughts.

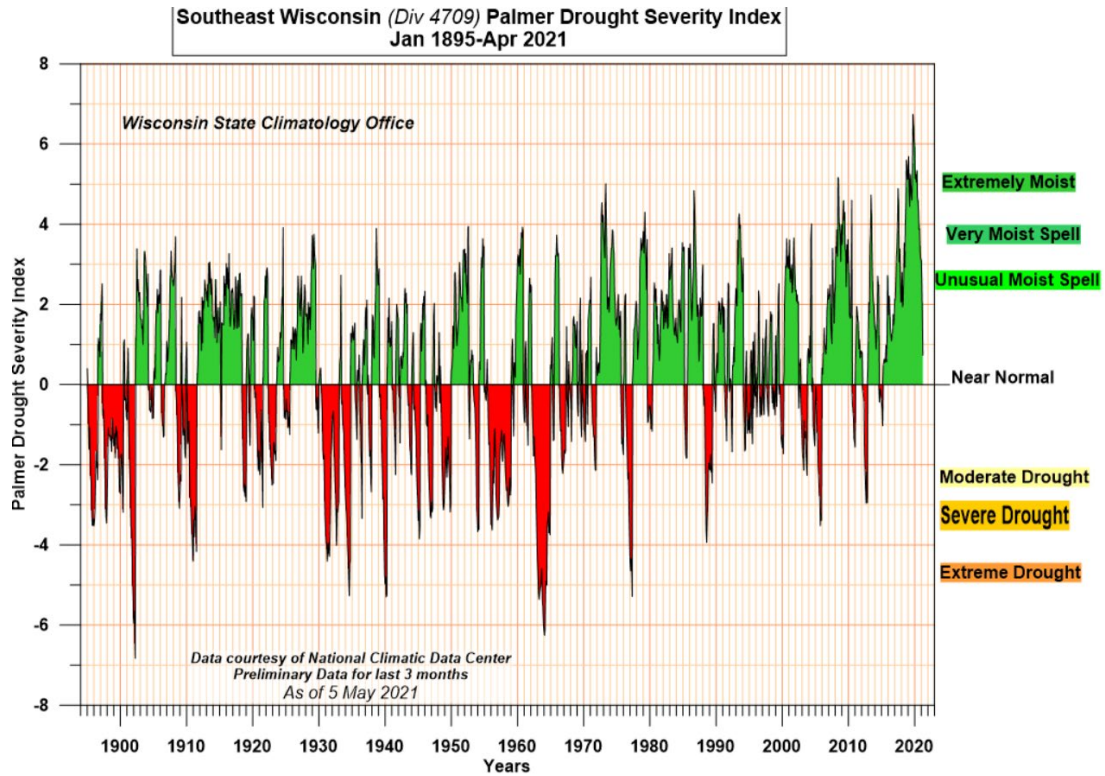
Wisconsin Drought Index



Frequency and Probability

Drought is a relatively common phenomenon in Wisconsin and has occurred statewide in 1895, 1910, 1939, 1948, 1958, 1976, 1988, 1992, 2003, 2005, 2012, 2015, and 2016. The 1976 drought received a Presidential Emergency Declaration with damage to 64 Wisconsin counties, including Waukesha. Estimated losses of \$624 million primarily affected the agricultural sector. Reports show that Waukesha 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 for the years between January 1895 and February 2021 in Southeastern Wisconsin, which includes Waukesha County follows:



Source: <http://www.aos.wisc.edu/~sco/clim-watch/graphics/pdsi-ts-09-1.gif>

The Governor declared a drought emergency for 42 counties in the state of Wisconsin in July 2012. This declaration, the first since August 2003, allowed farmers access to additional water for crop irrigation. The National Weather Service has 18 recorded drought events for Waukesha County between 1 January 1950 and February 2021.

County	Date	Death	Injury	Property Damage	Crop Damage
Waukesha County	8/1/2002	0	0	0	\$4.4M
Waukesha County	8/1/2003	0	0	0	0
Waukesha County	9/1/2003	0	0	0	0
Waukesha County	10/1/2003	0	0	0	0
Waukesha County	11/1/2003	0	0	0	0
Waukesha County	12/1/2003	0	0	0	0
Waukesha County	7/1/2005	0	0	0	0
Waukesha County	8/1/2005	0	0	0	0
Waukesha County	9/1/2005	0	0	0	0
Waukesha County	10/1/2005	0	0	0	0
Waukesha County	11/1/2005	0	0	0	0
Waukesha County	7/1/2007	0	0	0	\$50K
Waukesha County	6/26/2012	0	0	0	0
Waukesha County	7/1/2012	0	0	0	0
Waukesha County	8/1/2012	0	0	0	0
Waukesha County	9/1/2012	0	0	0	0
Waukesha County	10/1/2012	0	0	0	0
Waukesha County	11/1/2012	0	0	0	0
Waukesha County	7/2014	0	0	0	0
Waukesha County	8/2014	0	0	0	0

Waukesha County	11/2014	0	0	0	0
Waukesha County	7/2015	0	0	0	0
Waukesha County	8/2015	0	0	0	0
Waukesha County	11/2015	0	0	0	0
Waukesha County	6/2016	0	0	0	0
Waukesha County	7/2016	0	0	0	0
Waukesha County	8/2016	0	0	0	0
Waukesha County	11/2016	0	0	0	0

Considering past occurrences, it can be surmised that Waukesha County has a medium probability of drought occurrence in the future and the likelihood of damage due to drought is considered medium for agricultural losses and low for other types of losses.

Vulnerability

Hazard Impacts

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. Drought is also a major risk factor for wildfire.

Drought 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.

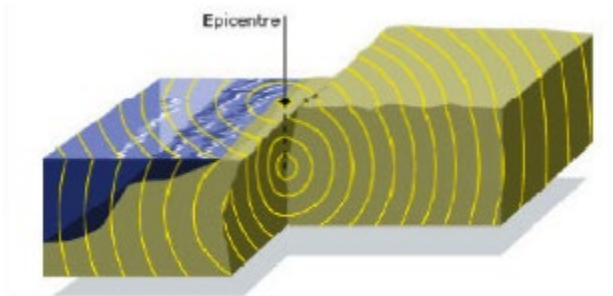
Prolonged drought can also impact the groundwater reserves. This can reduce the ability of the municipal water services and rural individuals on wells to draw adequate fresh water. This may especially impact rural homeowners who tend to have wells that are not drilled as deeply as municipal wells. In Waukesha County, the populations that live 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.

The impacts of many droughts are not felt in urban areas where their impacts are usually limited to the inconvenience of ordinances and regulations to conserve water. However, in rural communities droughts can be devastating. Losses from droughts are typically underestimated and inaccurate. Indirect losses from impacts such as farm foreclosures are not often accounted for, and direct crop or livestock losses are typically difficult to evaluate due to fluctuations in the commodity markets.

Hazard Assessment	
Drought and Dust Storms	
Frequency/Probability (i.e. Future Probability)	Medium
Magnitude/Extent (i.e. Strength or Magnitude)	Low
Vulnerability (i.e. Consequence and Impact)	Low
Overall Risk Rating	Low

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).



Source: http://news.bbc.co.uk/2/shared/bsp/hi/pdfs/earthquake_guide.pdf

Earthquakes Hazard Profile

Hazard Profile

Earthquakes (also known as 'seismic events') are sudden slippages or movements in a portion of the earth's crust accompanied by a series of vibrations. The ground-shaking is caused by the sudden release of accumulated strain by an abrupt shift of rock along a fracture or fault in the earth, by volcanic or magmatic activity, or by other sudden stress changes in the earth's crust. The hypocenter of an earthquake is the location beneath the earth's surface where the rupture of the fault begins. The epicenter of an earthquake is the location directly above the hypocenter on the surface of the earth.

Earthquakes occur on faults. A fault is a fracture or zone of fractures between two blocks of rock. Faults allow the blocks to move relative to each other. This movement occurs rapidly during an earthquake. Faults may range in length from a few millimeters to thousands of kilometers. Most faults produce repeated displacements or repeated earthquakes over long time periods. During an earthquake, the rock on one side of the fault suddenly slips with respect to the other. The fault surface can be horizontal or vertical or some arbitrary angle in between. Geologists use the angle of the fault with respect to the surface (known as the dip) and the direction of slip along the fault to classify faults.

Faults that move along the direction of the dip plane are dip-slip faults and are described as either normal or reverse (thrust), depending on their motion. Faults that move horizontally are known as strike-slip faults and are classified as either right-lateral or left-lateral. Faults that show both dip-slip and strike-slip motion are known as oblique-slip faults. Normal faults are dip-slip faults in which the block above the fault has moved downward relative to the block below. This type of faulting occurs in response to extension and is often observed in the Western United States Basin and Range Province and along oceanic ridge systems. A thrust fault is a dip-slip fault in which the upper block, above the fault plane, moves up and over the lower block. This type of faulting is common in areas of compression, such as regions where one plate is being subducted under another as in Japan. When the dip angle is shallow, a reverse fault is often described as a thrust fault. A strike-slip fault is a fault on which the two blocks slide past one

another. The San Andreas Fault is an example of a right-lateral fault. A left-lateral strike-slip fault is one on which the displacement of the far block is to the left when viewed from either side. A right-lateral strike-slip fault is one on which the displacement of the far block is to the right when viewed from either side.

Aftershocks are earthquakes that follow the largest shock of an earthquake sequence. They are smaller than the mainshock and within 1-2 rupture lengths distance from the mainshock. Aftershocks can continue over a period of weeks, months, or years. In general, the larger the mainshock, the larger and more numerous the aftershocks, and the longer they will continue.

Earthquakes and seismic activity have a very rapid and unpredictable onset. Current technology cannot predict an earthquake and is limited to real-time seismic surveillance. The duration of an earthquake is related to its magnitude but not in a perfectly strict sense. There are three ways to think about the duration of an earthquake. The first is the length of time it takes for the fault to fully rupture. The second is the length of time shaking is felt at any given point. Earthquakes can last from seconds to minutes. The third way to think about duration is the aftershock period after the main seismic event. Aftershocks can continue over a period of weeks, months, or years. In general, the larger the mainshock, the larger and more numerous the aftershocks, and the longer they will continue.

Richter Scale

Earthquake strength has traditionally been measured using the Richter scale, developed by Charles Richter in 1935. The Richter scale went through numerous adjustments since its conception, and was eventually replaced by the “Moment Magnitude Scale” for earthquakes larger than 3.5; however, most still refer to both scales as the Richter scale. The Richter magnitude scale, used as an indicator of the force of an earthquake, measures the magnitude, intensity, and energy released by an earthquake with seismographs. Each whole-number increase in magnitude represents a tenfold increase in measured amplitude; as an estimate of energy, each whole number step in the magnitude scale corresponds to the release of about 31 times more energy than the amount associated with the preceding whole number value. It is important to note that the Richter Magnitude Scale is not used to express damage.

Magnitude	Earthquake
< 2.0	Micro earthquakes, not felt.
2.0 - 2.9	Minor earthquakes, generally not felt, but are recorded.
3.0 - 3.9	Minor earthquakes, often felt, but rarely causes damage.
4.0 - 4.9	Light earthquakes, noticeable shaking of indoor items, rattling noises, and significant damage is unlikely.
5.0 - 5.9	Moderate earthquakes, can cause major damage to poorly constructed buildings over small regions, and possible slight damage to well-designed buildings.
6.0 - 6.9	Strong earthquakes, can be destructive in areas up to about 99 miles across in populated regions.
7.0 - 7.9	Major earthquakes, can cause serious damage over larger regions.
8.0 - 8.9	Great earthquakes, can cause serious damage in regions several hundred miles across.
9.0 - 9.9	Great earthquakes, devastating in areas several thousands of miles across.
10 <	Massive earthquakes, never recorded, widespread devastation across vast regions.

Source: United States Geological Survey

Modified Mercalli Intensity Scale

The effect of an earthquake on the Earth's surface is called the intensity. The intensity scale consists of a series of certain key responses such as people awakening, movement of furniture, damage to chimneys, and finally - total destruction. The Modified Mercalli (MM) Intensity Scale is the common intensity scale used in the United States. This scale is composed of 12 increasing levels of intensity that range from imperceptible shaking to catastrophic destruction. It does not have a mathematical basis; instead, it is an arbitrary ranking based on observed effects. The Modified Mercalli Intensity value assigned to a specific site after an earthquake has a more meaningful measure of severity to the non-scientist than the magnitude because intensity refers to the effects actually experienced at that place. The following is an abbreviated description of the 12 levels of Modified Mercalli Intensity:

Level of Intensity	Observed Earthquake Effects
I	Not felt except by a very few under especially favorable conditions.
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.
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 motor cars rocked noticeably.
V	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
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.
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.
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.

Source: United States Geological Survey

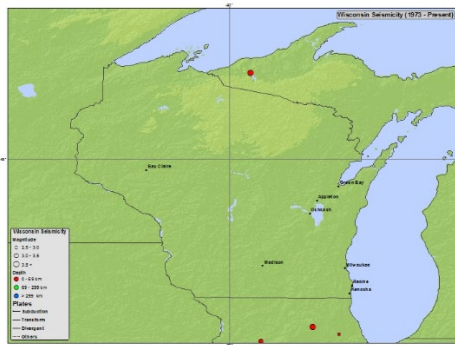
Location and Extent

Physical Characteristics

There are a few fault lines that run through Wisconsin. These include the Douglas Thrust Fault in the NW corner of the state, the Pine Fault found in Burnett and Polk Counties, the Lake Owens Thrust Fault that extends into western Ashland County, and the Dutchman Creek Fault near Green Bay. There are additional fault lines in southern Wisconsin from near Madison to the suburbs of Milwaukee and further south from New Diggings to Milton.

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

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



Frequency and Probability

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. An earthquake on May 6, 1947, apparently centered just south of Milwaukee near the shore of Lake Michigan, caused only minor damage. There were no reports of injuries. The tremor shook buildings and rattled windows in many communities in a 7770 square kilometer area of southeastern Wisconsin. The shock was felt in a 160-kilometer wide strip from Sheboygan to the Wisconsin - Illinois border and extended from the lakeshore to Waukesha, 40 kilometers inland.

Most earthquakes that do occur in Wisconsin are very low in intensity and can hardly be felt. These very minor earthquakes are fairly common, occurring every few years. Events of moderate magnitude have occurred in locations in Illinois and Michigan. Those and other stronger earthquakes centered in other parts of the country have been felt primarily in Southern Wisconsin.

Date	Location	Latitude North	Longitude West	Maximum Intensity	Magnitude
10/12/1899	Kenosha	42° 34'	87° 50'	II	3
3/13/1905	Marinette	45° 08'	87° 40'	V	3.8
4/22/1906	Shorewood	43° 03'	87° 55'	II	3
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

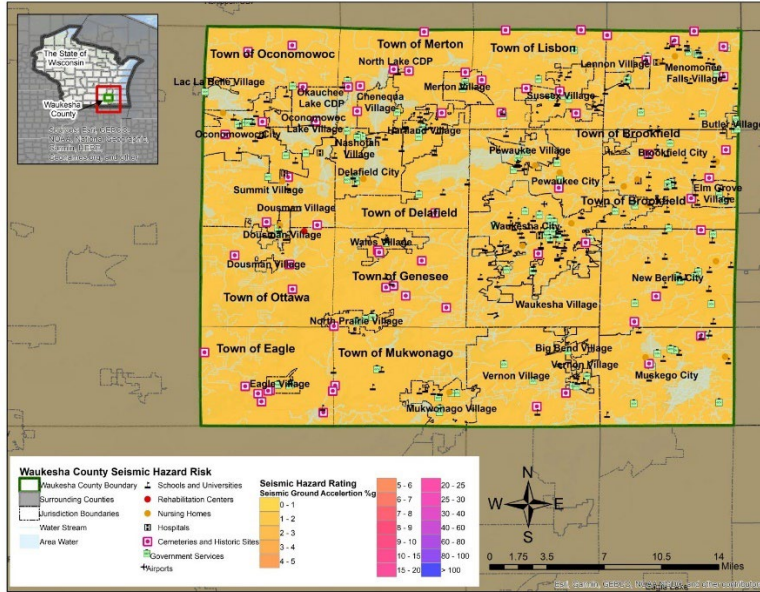
5/31/1916	Madison	43o 05'	89o 21'	II	3
7/7/1922	Fond du Lac	43o 47'	88o 29'	V	3.6
10/18/1931	Madison	43o 05'	89o 23'	III	3.4
12/6/1933	Stoughton	42o 54'	89o 15'	IV	3.5
11/7/1938	Dubuque	42o 30'	90o 43'	II	3
11/7/1938	Dubuque	42o 30'	90o 43'	II	3
11/7/1938	Dubuque	42o 30'	90o 43'	II	3
2/9/1943	Thunder Mountain	45o 11'	88o 10'	III	3.2
5/6/1947	Milwaukee	43o 00'	87o 55'	V	4
1/15/1948	Lake Mendota	43o 09'	89o 41'	IV	3.8
7/18/1956	Oostburg	43o 37'	87o45'	IV	3.8
7/18/1956	Oostburg	43o 37'	87o45'	IV	3.8
10/13/1956	South Milwaukee	42o 55'	87o52'	IV	3.8
1/8/1957	Beaver Dam	42o 32'	98o48'	IV	3.6
2/28/1979	Bill Cross Rapids	45o 13'	89o46'	--	<1.0 MoLg
1/9/1981	Madison	43o 05'	87o55'	II	--
3/13/1981	Madison	43o 37'	87o45'	II	--
6/12/1981	Oxford	43o 52'	89o39'	IV-V	--
2/12/1987	Milwaukee	42o 95'	87o84'	IV-V	--
2/12/1987	Milwaukee	43o 19'	87o28'	IV-V	--
6/28/2004	Troy Grove, IL	41o 46'	88o91'	IV	4.2

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

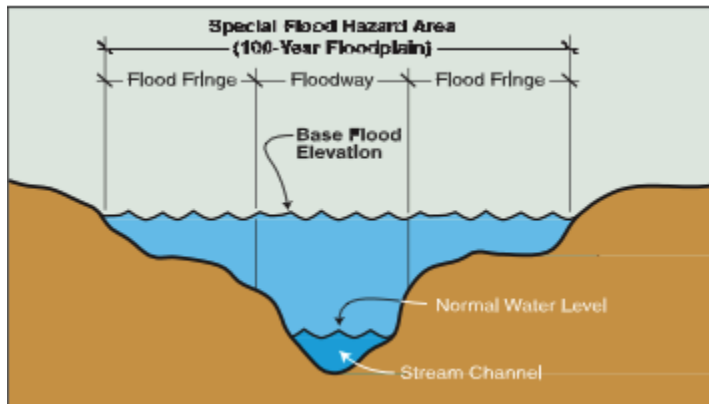
Vulnerability

Any impact in the community from an 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.



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.

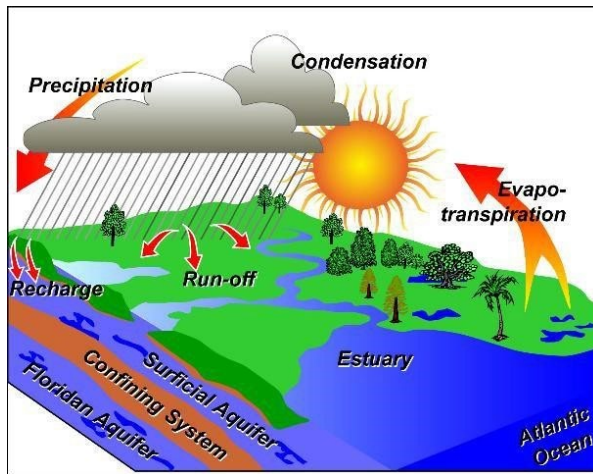


Floods are common in the United States, including Wisconsin, and are considered natural events that are hazardous only when adversely affecting people and property. Floods are common in the United States, including Wisconsin, and are considered natural events that are hazardous only when adversely affecting people and property. Floods are the most frequently recorded destructive events and account for about 30% of the world's disasters each year, according to global statistics. There are many different factors that contribute to flooding. Flooding is an overflowing of water onto land that is normally dry. It can happen during heavy rains, when ocean waves come onshore, when snow melts too fast, or when dams or levees break. Flooding may happen with only a few inches of water, or with several feet of water. Flooding can affect many different communities covering several states during a single event.

Flooding and Dam Failure Hazard Profile

Hazard Profile

Floods are the most frequently recorded destructive events and account for about 30% of the world's disasters each year, according to global statistics. There are many different factors that contribute to flooding. Flooding is an overflowing of water onto land that is normally dry. It can happen during heavy rains, when ocean waves come onshore, when snow melts too fast, or when dams or levees break. Flooding may happen with only a few inches of water, or with several feet of water. Flooding can affect many different communities covering several states during a single event.



Floods are a part of the earth's natural hydrologic cycle. The cycle circulates water throughout the environment, maintaining an overall balance between the water in the air, on the surface, and in the ground. Sometimes the hydrologic cycle gets out of balance, sending more water to an area than it can normally handle – inundating a floodplain. There are different types of floodplains, and they are based on the type of flooding that forms them. During the 20th century, floods were the number one natural disaster in the United States in terms of the number of lives lost and property damage. Development has exacerbated this

situation by creating impermeable surfaces that were once permeable - increasing the amount of stormwater runoff while also decreasing the floodplain area.

A warmer atmosphere holds more water vapor and, therefore, can result in heavier and more long-lasting rainfall events. The expected global pattern is for arid areas to get drier and moist areas to get wetter. Where precipitation is enhanced, strong storms are expected to get stronger with the result that rainfall events with a given recurrence frequency, e.g. the 25-year storm, will happen more often. Detecting the influence of changing climate on flooding trends requires isolating the effects of increased rainfall intensity and frequency from the other factors that influence the areal extent and depth of floods, including land use, changes to drainage infrastructure, and changes in the extent of impervious surfaces.

The type of flooding that threatens a community is dependent on a variety of factors including terrain, geologic conditions, watershed characteristics, natural features, and human interaction. The characteristics of flooding events differ dramatically in a controlled engineered urban community from that of the more natural rural environment.

- **Urban flooding** is a result of a community's stormwater infrastructure being exceeded by a storm or series of storms. An urban drainage system is comprised of altered natural channels and engineered ditches, storm sewers, retention ponds, and other facilities constructed to store runoff or carry it to a receiving stream or lake. Most stormwater infrastructure systems are designed to handle the amount of water expected during a 10-year storm. Larger storms typically overload the stormwater system producing shallow flooding.

- **Overbank Flooding** occurs when downstream channels receive more rain from their watershed than it can handle, or a channel is blocked by debris. Excess water overloads the channels and flows out onto the floodplain. Flood depths and duration are dependent on the watershed and riverine system. Generally, the larger the river, the deeper the flood and the longer the duration of the flood.
- **Ponding** is attributed to the high groundwater table and flat terrain. In flat areas, runoff collects in depressions and cannot drain out, creating a ponding effect. Ponding floodwaters do not move or flow away. Floodwaters will remain in the temporary ponds until they infiltrate the soil, evaporate, or are pumped out.
- **Lake Flooding** is a result of large bodies of water behaving more like small oceans – generating large waves that cause damage and shoreline erosion from severe storms.

100 Year Flood

Terms commonly used when referring to flooding are "100-year flood" and "flood plain." A "100-year flood" is defined as the flood water level that can be expected to occur or to be exceeded in a given location once every 100 years. There is a one percent chance of a flood of such magnitude or greater occurring in any given year. The DNR, working with local zoning offices, has designated flood plain areas as those places where there is the greatest potential for flooding.

A 100-year storm does not always result in a 100-year flood. Flooding magnitude varies extensively depending on region, soil conditions, weather, and a large host of manmade factors such as dams and levees among others. Several factors can independently influence the cause-and-effect relation between rainfall and streamflow:

- **Extent of rainfall in the watershed:** When rainfall data are collected at a point within a stream basin, it is highly unlikely that this same amount of rainfall occurred uniformly throughout the entire basin. During intensely localized storms, rainfall amounts throughout the basin can differ greatly from the rainfall amount measured at the location of the rain gauge. Some parts of the basin may even remain dry, supplying no additional runoff to the streamflow and lessening the impact of the storm.
- **Soil saturation before the storm:** Existing conditions prior to the storm can influence the amount of stormwater runoff into the stream system. Dry soil allows greater infiltration of rainfall and reduces the amount of runoff entering the stream. Conversely, soil that is already wet from previous rains has a lower capacity for infiltration, allowing more runoff to enter the stream.
- **Relation between the size of the watershed and duration of the storm:** Another factor to consider is the relation between the duration of the storm and the size of the stream basin in which the storm occurs. For example, a 100-year storm of 30-minutes duration in a 1-square-mile basin will have a more significant effect on streamflow than the same storm in a 50-square-mile basin. Generally, streams with larger drainage areas require storms of longer duration for a significant increase in streamflow to occur. These and other factors determine whether or not a 100-year storm will produce a 100-year flood.

The 100-year flood level can fluctuate. The 100-year flood level is statistically computed using past and existing data, and therefore as more data is collected, the level of the 100-year flood will change. For example, as a river basin is altered in a way that affects the flow of water in the

river, scientists re-evaluate the frequency of flooding. Dams and urban development are examples of some man-made changes in a basin that affect floods.

The following table provides information on the different flooding alerts for the National Weather Service:

Alert	Criteria
Flood Watch	Atmospheric conditions over a large area, varying in size from multiple counties to multiple states, support the development of heavy rain and/or thunderstorms that are capable of producing flooding. A flood watch implies a longer period of relatively lighter rains, adding up to a large amount of rain. Longer-term flooding implies a slower or steadier rise in the water levels of creeks, streams and larger rivers. Roads can also become flooded, but it is usually more gradual, allowing motorists to monitor conditions more closely.
Flood Warning	A Flood Warning is issued by the National Weather Service when heavy rain has been occurring, and flooding is either occurring or will occur within a specified time, usually within 60 minutes.
Flash Flood Watch	Implies a shorter period of heavier rain. Generally, if flooding is expected within six hours of the onset of rain, a Flash Flood Watch is most appropriate. Flash flooding by definition suggests rapidly rising water, such as a surge of water heading rapidly downstream in a creek or small river. It could also be rapidly rising water on roadways, which can cause motorists to become stranded in vehicles, or even worse, washed into creeks and small rivers due to rapid runoff.
Flash Flood Warning	Atmospheric conditions over a large area, varying in size from multiple counties to multiple states, support the development of heavy rain and/or thunderstorms that are capable of producing flash flooding: A Flash Flood Warning is issued by the National Weather Service when heavy rain has been occurring, and flash flooding is either occurring or will occur within a specified time, usually within 60 minutes.
Urban and Small Stream Flooding	Flooding of small streams, streets and low-lying areas, such as railroad underpasses and urban storm drains is occurring.

Hazard Considerations

The following is a list of potential impacts and planning considerations for a flooding event.

Area Impacted:

- People, facilities, and infrastructure located within the floodplains are susceptible to flood impacts.
- Areas with poor drainage are more susceptible to the short-term effects of flash flooding.

Duration of the event:

- Floods typically last for several days to a week, as waters rise and then recede. Typically ponding and overbank flooding can be predicted with some form of accuracy based on hydrologic conditions and weather predictions. Recovery from all flooding events would last several weeks to several months.

Essential Service Disruption:

- Disruption of essential government services (schools, operations, etc.)

Special Considerations:

- No Special Needs considered

Direct Damage:

- The cost of cleanup and structural damage repairs of personal property is often borne by the tribal government responsible, resulting as a potential significant hardship for households without flood insurance coverage.
- Hazardous Material Release – Both transportation and fixed facilities have the potential to be located within a flooded area. If this occurs, flooding can cause the release of hazardous materials, as well as facilitate the spread of these materials.
- Mold can cause further damage to building materials and is considered a public health risk. The longer you allow mold to grow, the greater the risk and the harder the cleanup.
- Loss incurred from damages of public property owned and operated by Waukesha County could be extensive within the reservation. Section 406 (d) of the Stafford Act requires a limit of disaster assistance for insurable facilities that do not carry or carry inadequate flood insurance. Section 311 of the Stafford Act requires an applicant to purchase and maintain insurance where insurance is reasonably available, as a condition for receiving disaster assistance.
- The rapid waters that are typical of overbank flooding and dam/dike failure can cause significant damage to infrastructure such as roadways, utilities, etc. Damages to infrastructure from ponding and urban flooding will be less extensive.
- Injuries and deaths can result during flooding events.
- Flash flooding can cause traffic accidents and congestion, resulting in short-term impacts on transportation infrastructure.

Economic Damage:

- Flooding of agricultural fields and pastures can last for months and result in significant damage to the farming community. Emergency protective measures implemented to protect agricultural fields and pastures are not considered improved property and therefore not reimbursed under federal programs.

Emergency Services:

- Warning for a levee/dike failure may be less; however, due to the constant inspections, monitoring and maintenance of the Dam/Dike will enable the identification of problem areas prior to failure.
- Ponding and overbank flooding are typically gradual, allowing local government to implement emergency protective measures such as sandbagging, evacuation, etc.
- Flooding often leads to the closures of roads or other transportation routes when these routes are washed away or simply underwater. This can interrupt transportation corridors and hamper emergency response vehicles.
- Disease/Epidemics – Flooding can produce ponding in areas, resulting in stagnant water. Stagnant water can be a breeding ground for diseases. Among other things,

stagnant water is necessary for the breeding of mosquitoes. This in turn influences the prevalence of the West Nile virus.

- First responders are often put at risk during flood events when they respond to calls for assistance. These risks can range from dangerous rescue operations to exposure to extreme weather.

Social Factors:

- The cost of flood insurance may be expensive and therefore can pose significant hardship for households without flood insurance coverage.

Location and Extent

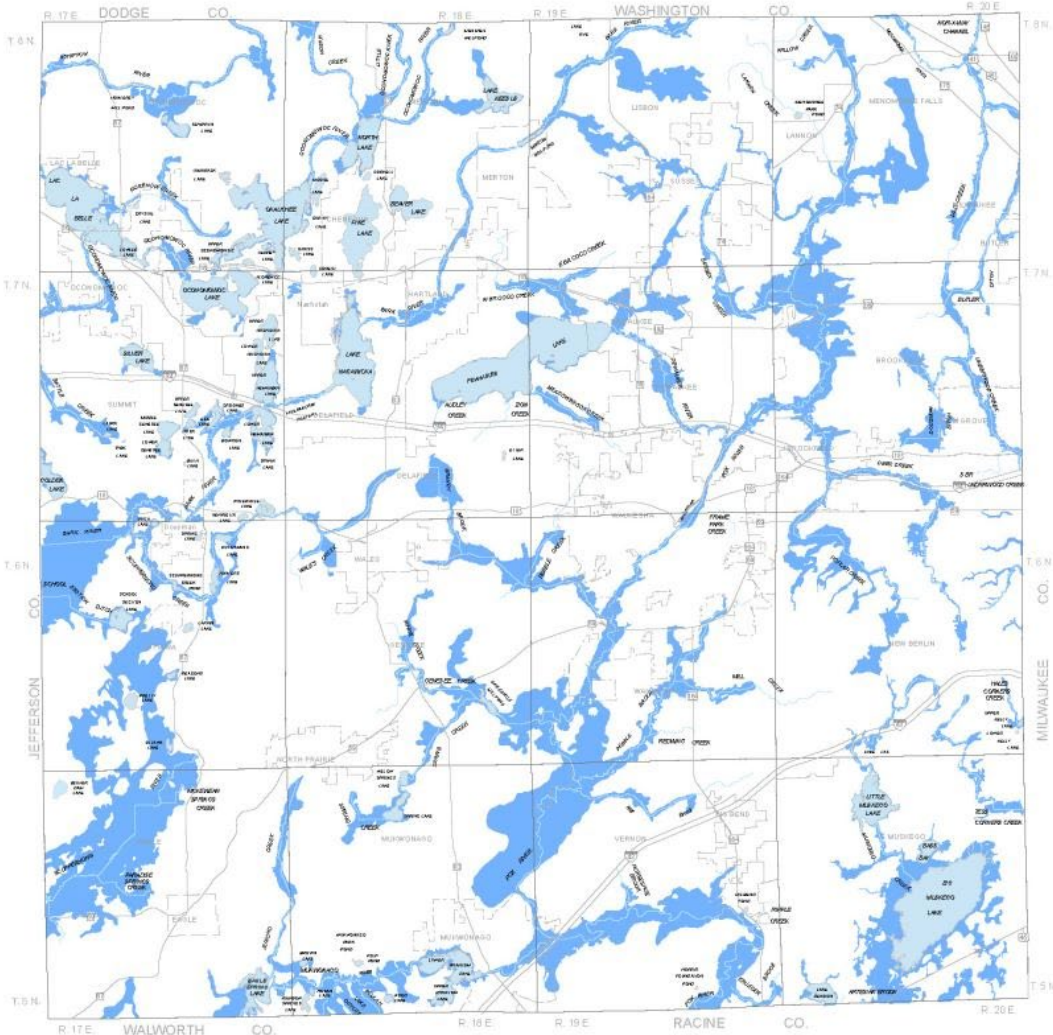
Physical Characteristics

Wisconsin is prone to experiencing flash floods, ice jam floods, local drainage floods, and high groundwater floods. Flash floods are most notable as they occur with little to no warning. Flash floods occur within 6 hours of heavy rains, ice jams, or dam failures. 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. Flash floods usually involve a rapid rise in water level, high velocity, and large amounts of debris, which can lead to significant damage including the tearing out of trees, undermining of buildings and bridges, scouring of new channels, and creation of sinkholes. The intensity of flash flooding is dependent upon the intensity and duration of rainfall, steepness of the watershed, stream gradients, watershed vegetation, natural and artificial flood storage areas, and configuration of the streambed and floodplain. Urban areas are increasingly subject to flash flooding due to the removal of vegetation, installation of impermeable surfaces, and construction of drainage systems.

Flooding on rivers usually occurs over 6 hours after an event. This event not only affects large rivers but small streams and low areas outside of the flood plains.

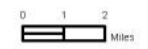
Generally, the amount of damage from flooding is a direct consequence of land use. If the ground is already saturated, stripped of vegetation, or paved, the number of run-off increases, adding to the flooding. There is also a concern regarding the loss of topsoil and erosion due to flooding. As Waukesha continues to develop, urbanization will decrease the ability of natural systems to absorb rainfall because of the increase in impervious surfaces and runoff.

General Floodlands of Waukesha County



Legend

 Floodlands



Source: SEWRPC, FEMA & Waukesha County

Dams

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 19th century, more than 700 dams have been built, then washed out or removed. Since 1967, approximately 100 dams have been removed. Almost 60% of the dams in Wisconsin are owned by a former company or private individual, 9% by the State of Wisconsin, 17% by a municipality such as a township or a county government, and 14% by other ownership types.

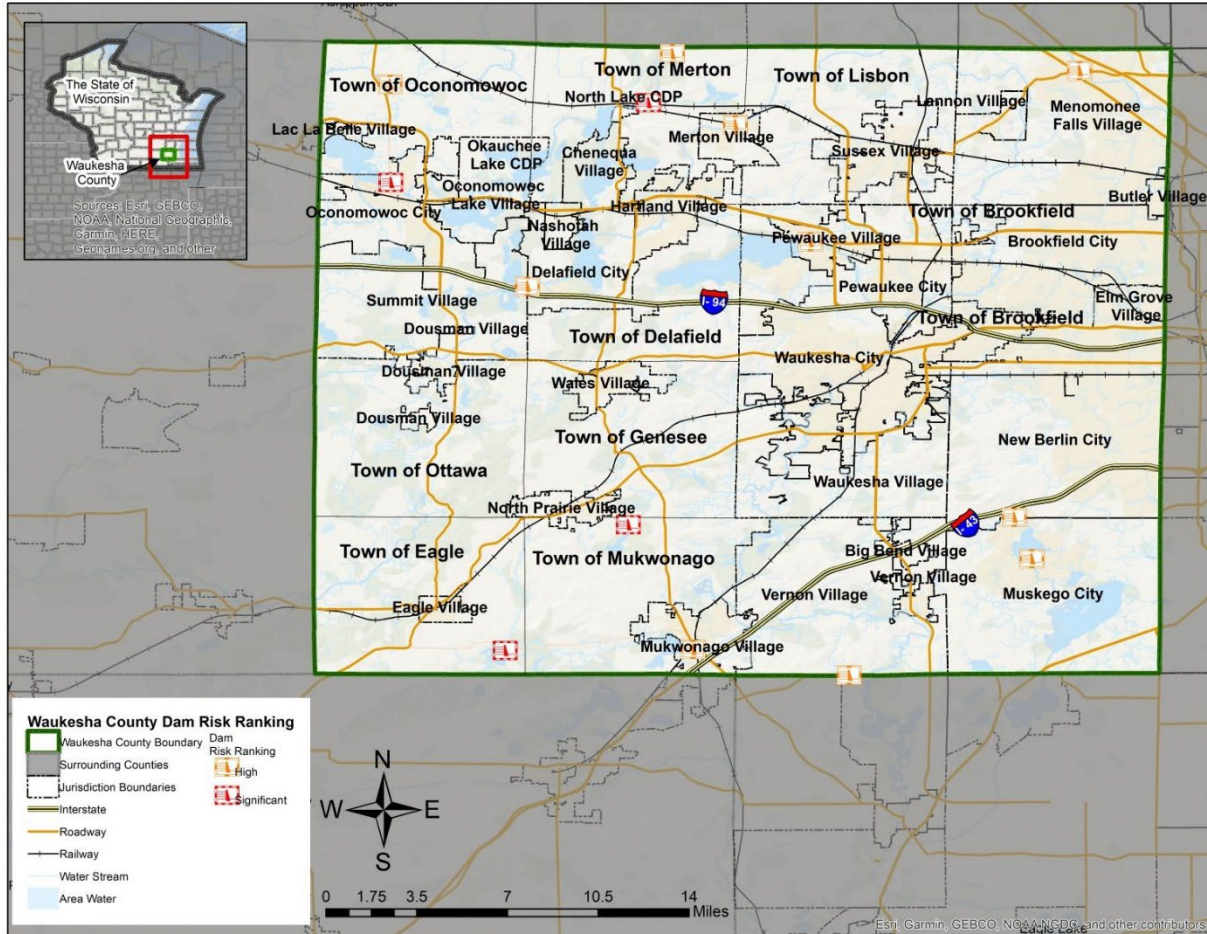
The federal government has jurisdiction over most large dams in Wisconsin that produce hydroelectricity - approximately 5% or nearly 200 dams. The Wisconsin Department of Natural Resources regulates the rest of the dams. A dam with a structural height of over 6 feet and impounding 50 acre-feet or more 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.

Waukesha County has 79 small, uncontrolled agricultural dams included in the Wisconsin Department of Natural Resources (DNR) database:

Dam Official Name	Size	Latitude	Longitude	Owner Type	Waterway Name (Downstream City)
MONTEREY	LARGE	43.1720279	-88.4994749	PRIVATE	DRAINAGE DITCH- TR FOX R.
OKAUCHEE LAKE	LARGE	43.1085361	-88.4538685	TOWN	OCONOMOWOC
WATERVILLE	LARGE	43.02112	-88.43633	PRIVATE	SCUPPERNONG CREEK
BISCHEL	LARGE	42.9970597	-88.4781377	TOWN	UPPER SCUPPERNONG CR
WAMBOLD	LARGE	42.8559601	-88.4351349	LAKE ASSOCIATION	MUKWONAGO R
SAYLESVILLE ROLLER MILL	LARGE	42.948759	-88.3232668	PRIVATE	WHITE CREEK
MERTON ROLLING MILL	LARGE	43.1494041	-88.3066177	VILLAGE	BARK
MUKWONAGO	LARGE	42.85603	-88.33244	VILLAGE	MUKWONAGO
MONCHES	LARGE	43.1890942	-88.3417375	PRIVATE	OCONOMOWOC
PEWAUKEE	LARGE	43.0842232	-88.2646316	VILLAGE	PEWAUKEE
WILLOW SPRINGS LAKE	LARGE	42.9261265	-88.3664107	LAKE ASSOCIATION	SPRING CREEK
SARATOGA MILL	LARGE	43.01355	-88.22893	CITY	FOX
DELAFIELD FISH HATCHERY	LARGE	43.06304	-88.40215	CITY	BARK
LITTLE MUSKEGO	LARGE	42.9071	-88.1411	CITY	MUSKEGO CREEK
PEACOCK	LARGE	43.11724	-88.49899	CITY	OCONOMOWOC
UPPER NASHOTAH	LARGE	43.082284	-88.4324509	LAKE ASSOCIATION	OUTLET UPPER NASHOTAH LAKE
REISCHL	LARGE	42.8422122	-88.2430921	PRIVATE	TR-FOX RIVER
HIDDEN LAKES	LARGE	42.8817102	-88.3041344	PRIVATE	TR-FOX RIVER

SALOW LAKE	LARGE	43.0448541	-88.3315677	PRIVATE	ZION CREEK
VERNON MARSH- REF.FLOWAGE	LARGE	42.9280951	-88.2862511	DNR	DRAINAGE DITCH- TR FOX R.
VERNON MARSH- MID.FLOWAGE	LARGE	42.9204792	-88.2846198	DNR	MILL BROOK
VERNON MARSH- N.FLOWAGE	LARGE	42.9234789	-88.2842347	DNR	PEBBLE BROOK
LOWER LAKE NEMAHBIN SCHOOL SECTION LAKE	LARGE	43.0561637	-88.4421597	PRIVATE	BARK
	LARGE	42.98282	-88.50884	COUNTY	SCHOOL SECTION LAKE OUTLET
OCONOMOWOC LAKE	LARGE	43.10445	-88.46946	VILLAGE	OUTLET OCONOMOWOC LAKE
FUNKS	LARGE	43.1617749	-88.3551328	PRIVATE	OCONOMOWOC RIVER
SOUTHWEST FLOWAGE	LARGE	42.88708	-88.31844	DNR	NON-NAV DITCH TO FOX RIVER
LEPPER	SMALL	43.1796589	-88.1144981	VILLAGE	MENOMONEE RIVER
FRASER	SMALL	42.8768781	-88.2064092	PRIVATE	TR FOX
MUSKEGO	SMALL	42.85222	-88.13085	CITY	MUSKEGO CREEK
BLOTT	LARGE	42.93033	-88.15086	LAKE ASSOCIAT ION	MUSKEGO CREEK
NEMAHBIN ROLLER MILL	LARGE	43.05926	-88.42266	PRIVATE	BARK
MOREY	SMALL	42.9562358	-88.3543353	PRIVATE	WHITE CREEK
BEAVER LAKE OUTLET	SMALL	43.1253972	-88.3686475	PRIVATE	OUTLET BEAVER LAKE
LAKE KEESUS	SMALL	43.1617789	-88.3274178	PRIVATE	OUTLET LAKE KEESUS
NORTH HILLS COUNTRY CLUB	SMALL	43.1586721	-88.0784026	PRIVATE	MENOMONEE
LAKE LABELLE	SMALL	43.1195256	-88.5165265	CITY	OCONOMOWOC
JENSEN	SMALL	42.9558529	-88.1995617	PRIVATE	MILL CREEK
AGNEW,DONALD P.	SMALL	43.1713657	-88.4584187	PRIVATE	TR-ASHTPPUN RIVER
CZERWINSKI, LEROY M.	SMALL	43.1778493	-88.2661951	PRIVATE	TR-BARK RIVER
GIRL SCOUTS CAMP CHINOOK	SMALL	42.9391359	-88.2496218	PRIVATE	NOT ON A STREAM
MINOOKA PARK	SMALL	42.9862514	-88.1990917	PRIVATE	TR-PEBBLE BROOK
REGAL MANORS III	SMALL	42.9683604	-88.0987427	PRIVATE	NOT ON A STREAM
SCUPPERNONG SPRINGS	SMALL	42.9344865	-88.4673018	DNR	SCUPPERNONG SPRINGS
ABENDROTH AND ASSOC. NO 1	SMALL	42.999272	-88.2551574	PRIVATE	TR-FOX RIVER
ABENDROTH AND ASSOC. NO 2	SMALL	42.9992941	-88.2551385	PRIVATE	TR-FOX RIVER
DUNLOP, DOUGLAS	SMALL	42.9212884	-88.3672788	PRIVATE	UNNAMED
HUBERTY, ROBERT L.	SMALL	42.8742883	-88.2101299	PRIVATE	TR-FOX RIVER
HASS, HOWARD	SMALL	42.981859	-88.2009633	PRIVATE	TR-PEBBLE CREEK
MCCLINTOCK SPRINGS	SMALL	42.9008751	-88.4758962	DNR	TR-SCUPPERNONG RIVER
PARADISE SPRINGS	SMALL	42.8863161	-88.4941086	DNR	TR-SCUPPERNONG RIVER
WEST ALLIS KENNEL CLUB	SMALL	42.9167323	-88.2335973	PRIVATE	MILL BROOK
GENESEE ROLLER MILL	SMALL	42.9623034	-88.3585139	PRIVATE	WHITE CREEK
DONNELLY	SMALL	42.8386733	-88.4558673	PRIV	NON-NAV
FOUNTAIN/SQUARE	SMALL	42.9905079	-88.0807048	CITY	TRIBUTARY TO ROOT RIVER
HOGAN'S DAMS		42.8582099	-88.4223737		
STONE BANK MILL DAM		43.1358619	-88.4082568		
BARK RIVER DAM		43.1001411	-88.3474471		

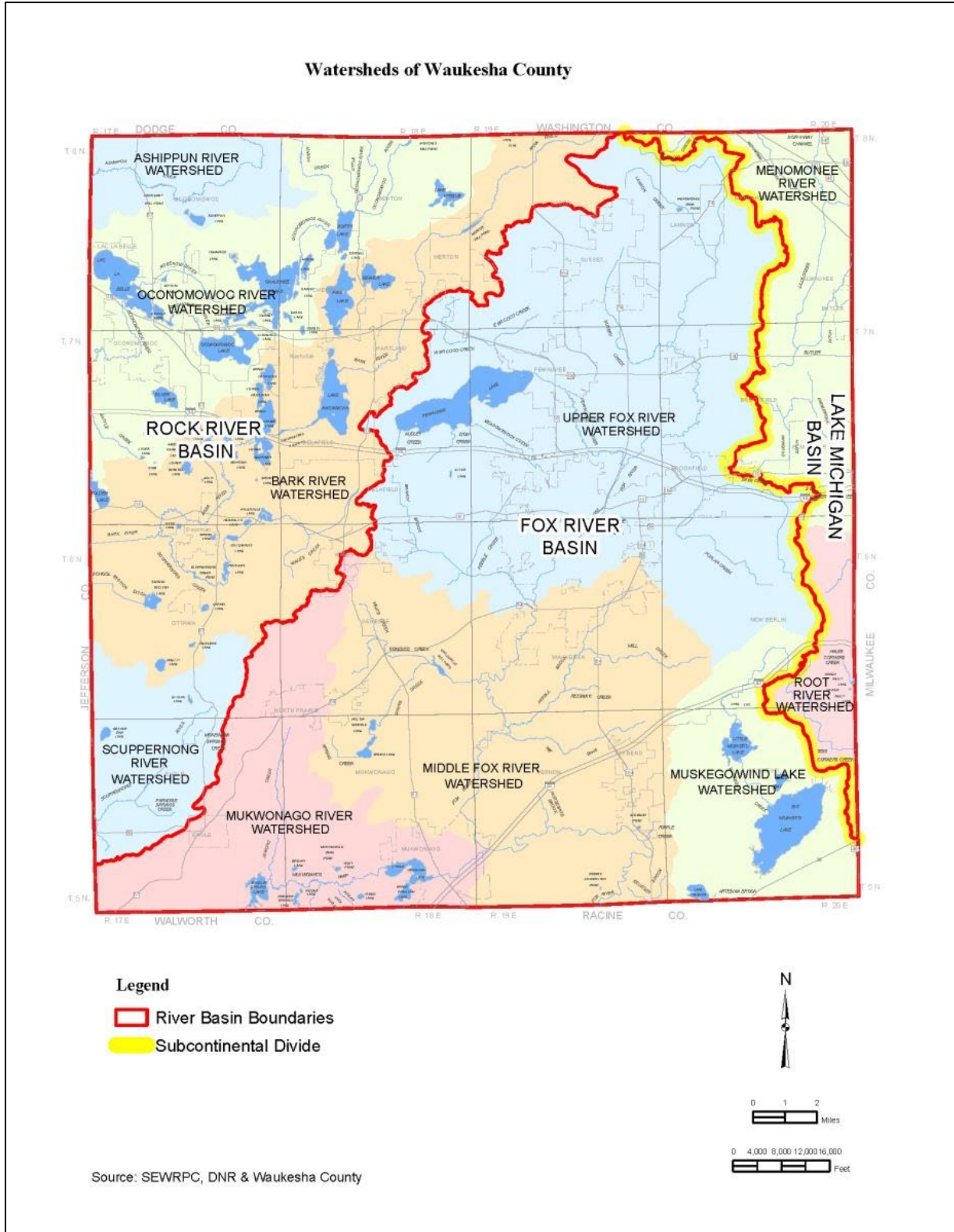
MANN DAM		43.1573792	-88.2928541		
WRIGHT'S DAM		42.9552245	-88.2229382		
COUNSEL DAM		43.179986	-88.4449451		
STEWART (JANES) DAM		42.9132236	-88.2427062		
R. ORMAND DAM		43.0663225	-88.1161648		
S. BAKER DAM		43.1936754	-88.4426433		
KELLOG'S GRIST MILL DAM		42.9180871	-88.2661026		
VAN BUREN DAM		42.9187734	-88.2995717		
HUMPHREY DAM		43.0630391	-88.4021526		
PROCTOR DAM		42.9578289	-88.359203		TRIB TO WHITE CREEK
OLD OKAUCHEE DAM		43.1115481	-88.4474149		
SCHNEIDER DAM		43.159581	-88.3707366		
DEISSNER'S DAM		43.0438871	-88.2103001		OUTLET OF PEWAUKEE LAKE
WEBER BREWING COMPANY DAM		43.0085875	-88.2387524		
YOUAMAN DAM		43.0080415	-88.2393451		TRIB TO FOX RIVER
WISCONSIN SUGAR COMPANY DAM		43.1844511	-88.1159401		
WAUKESHA STATE STREET DAM		43.0097038	-88.2374451		
SILVER LAKE		43.0729623	-88.5057114		
CALHOUN PARK	SMALL	42.9466063	-88.1281444	CITY	
E.S.Kellog Est. Dam Highway 67	SMALL	42.9249192	-88.4689061	DNR	TR SCUPPERNONG RIVER



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

One potential effect of flooding is erosion. Erosion is defined as the removal of soil by the force of waves, currents, and/or ice at a lakeshore or streambank or by the power of wind or water on open land. Erosion is a natural process that can be accelerated by natural disasters (e.g., flooding, heavy rains, strong winds, drought) or by human activity (e.g., removal of plants/trees, tilling.) Because of the many waterways in Waukesha County, there is concern about ensuring the stabilization of the shorelines.

Watersheds



Waukesha County has 10 watersheds. The maps in the Community Profile show the watershed boundaries and 100-year floodplains for the entire county. Waukesha County river systems drain to three major basins, the Rock River Basin on the western side of the county, the Fox River Basin in the center and the Lake Michigan Basin on the eastern part of the county. The Fox River Basin covers the largest area of the county, encompassing about 58 percent of the total surface area. The Rock River Basin encompasses approximately 34 percent and the Lake Michigan Basin accounts for the remaining eight percent of the county surface area. The Rock and Fox River Basins both lie west of the sub-continental divide and are part of the Mississippi River drainage area. Everything east of the sub-continental divide, including the Menomonee and Root River Watersheds, is part of the Great Lakes-St. Lawrence River drainage system. The sub-continental divide is critical to the water supply issue noted earlier and sanitary sewer planning. This is because water that is pumped from the Great Lakes system is generally required to be returned after use. For water resource planning purposes, each river basin is further divided into watersheds. There are 10 major watersheds in Waukesha County. The following sections provide additional detail on the watersheds within each basin. Most of the information presented has been compiled from DNR “State of the Basin” reports.

Rock River Basin

Ashippun River Watershed

The Ashippun River Watershed lies in Dodge, Washington and Waukesha Counties. It covers 69 square miles, of which approximately 16 square miles or 23 percent of the total watershed is located in northwestern Waukesha County. Agriculture is the primary land use and accounts for 66 percent of the land use in the Waukesha County portion of the watershed, according to the Year 2000 SEWRPC land use inventory. The water is stained light brown by tannic acid and the bottom is largely silt. The Ashippun River is classified as a warm water sport fishery.

Bark River Watershed

This 186-square mile watershed drains portions of Washington, Waukesha and Jefferson Counties and has many natural lakes, some of them large. About 47 percent of the area is in Waukesha County, 45 percent in Jefferson County and the remainder is in Washington County. Many of the watershed’s lakes are experiencing heavy development pressure or have extensive development around them. While some wetlands have been drained or filled, a significant amount of wetland remains. The greatest threat to the basin’s wetlands is rapid development in Waukesha County. The watershed is about 44 percent agricultural but significant rural subdivision development occurs in the Waukesha County portion of the watershed. Of the agricultural lands, about seven percent have high soil erosion potential. Thus, agriculture use and rural development degrade local surface water quality.

Major streams in the Waukesha County portion of the Bark River watershed include the Bark River, Scuppernong Creek and Wales Creek. The Bark River is classified as a warm water sport fishery. There are currently two municipal sewage treatment plants that discharge to the Bark River within Waukesha County, the Village of Dousman and the Delafield-Hartland facility, which discharges just downstream from Nagawicka Lake.

Oconomowoc River Watershed

The Oconomowoc River Watershed drains approximately 128 square miles encompassing portions of Dodge, Jefferson, Washington and Waukesha Counties. The Waukesha County portion of the watershed is approximately 63 square miles in size representing 49 percent of the watershed. According to the Year 2000 SEWRPC land use inventory, nearly 35 percent of the Waukesha County portion of the watershed is agricultural. There is one sewage treatment plant discharge in the Oconomowoc River from the City of Oconomowoc, approximately 2 miles downstream of Lac Labelle.

Major lakes in the Waukesha County portion of the watershed include Beaver, Fowler, Lac LaBelle, Keesus, Moose, North, Oconomowoc, Okauchee, Pine and Silver Lakes. In addition to the Oconomowoc River, major streams in the Waukesha County portion of the watershed include Battle Creek, Little Oconomowoc River, Mason Creek and Rosenow Creek. Rosenow Creek is a designated trout stream and the location of a recent stream restoration project.

Scuppernon River Watershed

The Scuppernon River is a tributary of the Bark River in Jefferson County. The watershed is bordered on the southeast by the Kettle Moraine State Forest and lies within portions of three counties: Jefferson, Walworth and Waukesha. The predominant land use is agricultural though there is significant public ownership in the state forest and two state wildlife areas with large forested tracts and wetland areas. Other wetland areas have been drained for agriculture. Substantial low-density residential and industrial development is occurring throughout the watershed. According to the Year 2000 SEWRPC land use inventory, approximately 5,723 acres or 38 percent of the Waukesha County portion of the watershed is agricultural. Another 4,416 acres or 29 percent is considered wetland and 3,429 acres or 22 percent is classified as woodland.

Major streams found in the Waukesha County portion of the watershed include the Scuppernon River and Paradise Springs Creek. The Scuppernon River rises at the edge of the interlobate moraine in the Kettle Moraine State Forest.

Fox River Basin

Upper Fox River Watershed

The Upper Fox River Watershed is a 151 square mile drainage area located almost entirely in Waukesha County, with a very small portion (1%) located in Washington County. The Upper Fox River is the principal perennial stream in the watershed. Other significant perennial streams include Brandy Brook, Deer Creek, Pebble Creek, Pewaukee River, Poplar Creek and Sussex Creek.

According to the Year 2000 SEWRPC land use inventory, nearly 24 percent of the watershed is mapped as residential land use. Other land-use categories include agricultural (23%), wetlands (13%), and transportation related (11%). Commercial and industrial land uses account for another six percent of the land area. There are many incorporated municipalities within the watershed including the Cities of Brookfield, Delafield, New Berlin, Pewaukee and Waukesha. Also included are the Villages of Hartland, Lannon, Menomonee Falls, Pewaukee, Sussex and Wales. There are three sewage treatment plants in the City of Brookfield and the City of Waukesha.

The Upper Fox River contains over 80 miles of perennial streams exhibiting a wide range of quality. At nearly 2500 acres, Pewaukee Lake is the only lake of significant size in the watershed with a maximum depth of 45 feet and an average depth of 15 feet. It is also one of the largest lakes in southeastern Wisconsin and recognized as one of the top musky lakes in the state. The lake level was naturally controlled until 1838 when a dam was constructed at the lake outlet to power a mill. This resulted in lake levels rising about six feet and the surface area of the lake doubling. Present levels are artificially controlled by a dam at the outlet of the Lake to the Pewaukee River, which then flows about 4.4 miles to its confluence with the Fox River.

Mukwonago River Watershed

The Mukwonago River Watershed covers approximately 86 square miles in Jefferson, Waukesha and Walworth Counties. Approximately 52 square miles or 61 percent of the watershed area lies within Waukesha County. The Villages of Eagle, Mukwonago, North Prairie and Wales are found within the watershed boundary. The Village of Mukwonago has a wastewater treatment plant discharging into the Mukwonago River. Rural uses cover most of the land area in the watershed. Agriculture is dominant even in the Waukesha County portion where, according to the Year 2000 SEWRPC land use inventory, agriculture accounts for approximately 36 percent of the land use. Residential land use accounts for another 19 percent of the watershed area in Waukesha County followed by woodlands (15%) and wetlands (9%). There are nearly 50 miles of perennial streams in the watershed.

The Mukwonago River is one of the cleanest streams in southeastern Wisconsin and provides important habitat for rare fish and mussels. The Mukwonago River is home to over 50 different species of fish. 10 of the state's 11 species of Sunfish (including the threatened Longear Sunfish) live in the Mukwonago River. All three species of Killifish (or Topminnows) found in Wisconsin, including the federally endangered Starhead Topminnow, live in the Mukwonago River. This is the only stream in the state where this occurs. The Mukwonago supports numerous species of Shiners and Darters, fish species that are not necessarily unique but are indicators of good water quality and habitat. The Mukwonago River contains 15 different species of freshwater mussels, including the endangered Rainbow Shell and the threatened Slippershell and Ellipse mussels. Mussels are the most threatened family of animals in North America, due principally to water quality deterioration in most of the nation's freshwater bodies. The Mukwonago River watershed features a diverse and extensive system of intact wetlands that help support its high water quality and species diversity. These wetlands are one of the important reasons explaining why the Mukwonago River is known as one of the most biologically diverse and highest quality rivers in the state.

The surrounding landscape is home to a wide array of native plants and wildlife, including sandhill cranes, tree frogs, mink, red fox, butterflies and dragonflies. The Mukwonago, for example, supports one of the last and largest stands of wild rice in Southeastern Wisconsin. Due in large part to the glacial soils found throughout most of the watershed, and combined with the fact that the watershed is relatively undeveloped, groundwater recharge rates in the watershed are significant. Much of the life described above relies heavily on the consistent inflow of groundwater for its survival. The human communities in the watershed also rely on the groundwater aquifers supplied by this recharge. Today, those aquifers are being pumped excessively potentially threatening the future economic viability of the region – maintaining groundwater recharge wherever possible is more important than ever.

Due to the factors listed above, the Wisconsin Chapter of The Nature Conservancy has designated the Mukwonago River watershed one of its four “Last Great Places” in Wisconsin. Because of its high-quality waters and wetlands, the Mukwonago River watershed was selected in the early 2000s as one of three focal sites globally to be reviewed by the international Nature Conservancy Wetlands Network. The Conservancy owns 1,718 acres at five preserves in the Mukwonago Watershed. As of March 27, 2015, the Conservancy has helped protect a total of 2,144 acres in the Mukwonago Watershed. This figure includes lands owned and managed by the Conservancy, conservation easements, government co-ops and assists.

Middle Fox River Watershed

The Middle Fox River Watershed is the largest of the Fox River Basin watersheds (248 square miles), encompassing portions of Racine and Waukesha Counties, along with small portions of Milwaukee and Walworth Counties. The Waukesha County portion of the watershed covers 86,175 acres or approximately 134 square miles. In Waukesha County, portions of the Cities of Muskego, New Berlin and Waukesha lie within the watershed, along with the Villages of Big Bend, Mukwonago, North Prairie and Wales. Agriculture dominates the rural land use, accounting for over 40 percent of the area. Other rural uses include grasslands (18%), wetlands (14%), and forests (13%). Urban areas comprise nearly four percent of the land cover in the watershed.

There are about 40 miles of major perennial streams in this watershed within Waukesha County. Genesee Creek, Mill Brook, Spring Creek and White Creek are listed as cold-water communities.

Muskego/Wind Lakes Watershed

The Muskego/Wind Lakes Watershed is actually a small portion (41 square miles) of the Middle Fox River Watershed located in Waukesha, Racine and Milwaukee Counties. The Waukesha County portion of the watershed encompasses approximately 36 square miles and includes portions of the Cities of Muskego and New Berlin. Big Muskego Lake is the largest lake in this watershed covering 2,260 acres but averaging only 2.5 feet deep. This lake is undergoing intensive management following the principles of “biomanipulation” to improve water quality not only within the lake but further downstream to Wind Lake and the Fox River.

Lake Michigan Basin

Menomonee River Watershed

The Menomonee River Watershed covers 136 square miles in portions of Washington, Waukesha and Milwaukee Counties. The Waukesha County portion of the watershed covers about 37 square miles and includes portions of the City of Brookfield as well as the Villages of Butler, Menomonee Falls, and Elm Grove. The Menomonee River originates in wetlands near the Village of Germantown in Washington County and runs southeasterly for 32 miles before meeting the Milwaukee and Kinnickinnic Rivers in the Milwaukee Harbor. Nearly all of the land area in the watershed is within incorporated municipalities. According to the Year 2000 SEWRPC land use inventory, nearly 42 percent of the Waukesha County portion of the watershed is residential. Other land uses in Waukesha County include transportation-related

(15%), wetlands (8%) and agriculture (7%). Commercial and industrial land uses each contributes another six percent of the total land uses respectively.

Ninety-six miles of streams are found within the watershed. Flooding continues to be a major concern in this watershed. Following the recent removal of the Falk Corporation Dam and concrete drop structure on the Menomonee River, seasonal runs of Lake Michigan trout and salmon create fishing opportunities in publicly-accessible areas

Root River Watershed

The Root River Watershed is located in portions of Waukesha, Milwaukee and Racine counties and encompasses 197 square miles. Only about 13 square miles are within Waukesha County covering portions of the Cities of Muskego and New Berlin. According to the SEWRPC (2000) land use inventory, residential land use accounts for 46 percent of the land use in the Waukesha County portion of the watershed. Another 15 percent is agricultural and 14 percent is related to transportation. Water quality of the 117 miles of rivers and streams in the Root River Watershed ranges from severely degraded to good.

Floodplain Regulations

Floodplain regulations have been in place in the cities, towns and villages of Waukesha County for many years. The Department of Natural Resources requires that each municipality approve regulations that meet DNR guidelines. These regulations and guidelines result from the value of Wisconsin lakes and waterways and a desire to preserve them and to protect the people who reside near them. Unregulated development can lead to the 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, Waukesha County has adopted a zoning ordinance that 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 floodplain occupants from a flood that 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 and Probability

Wisconsin has experienced several major floods during the last two decades. The 1973 and 1986 floods revealed that no flood plains or urban areas in Wisconsin can be considered safe from damages. Mill-dams have developed leaks on occasion but have not caused any flooding problems.

Waukesha County does have a history of flooding problems, especially along the Mississippi River. Waukesha County has been included in nine Presidential Disaster Declarations requests for flooding, the most recent of which are detailed below:

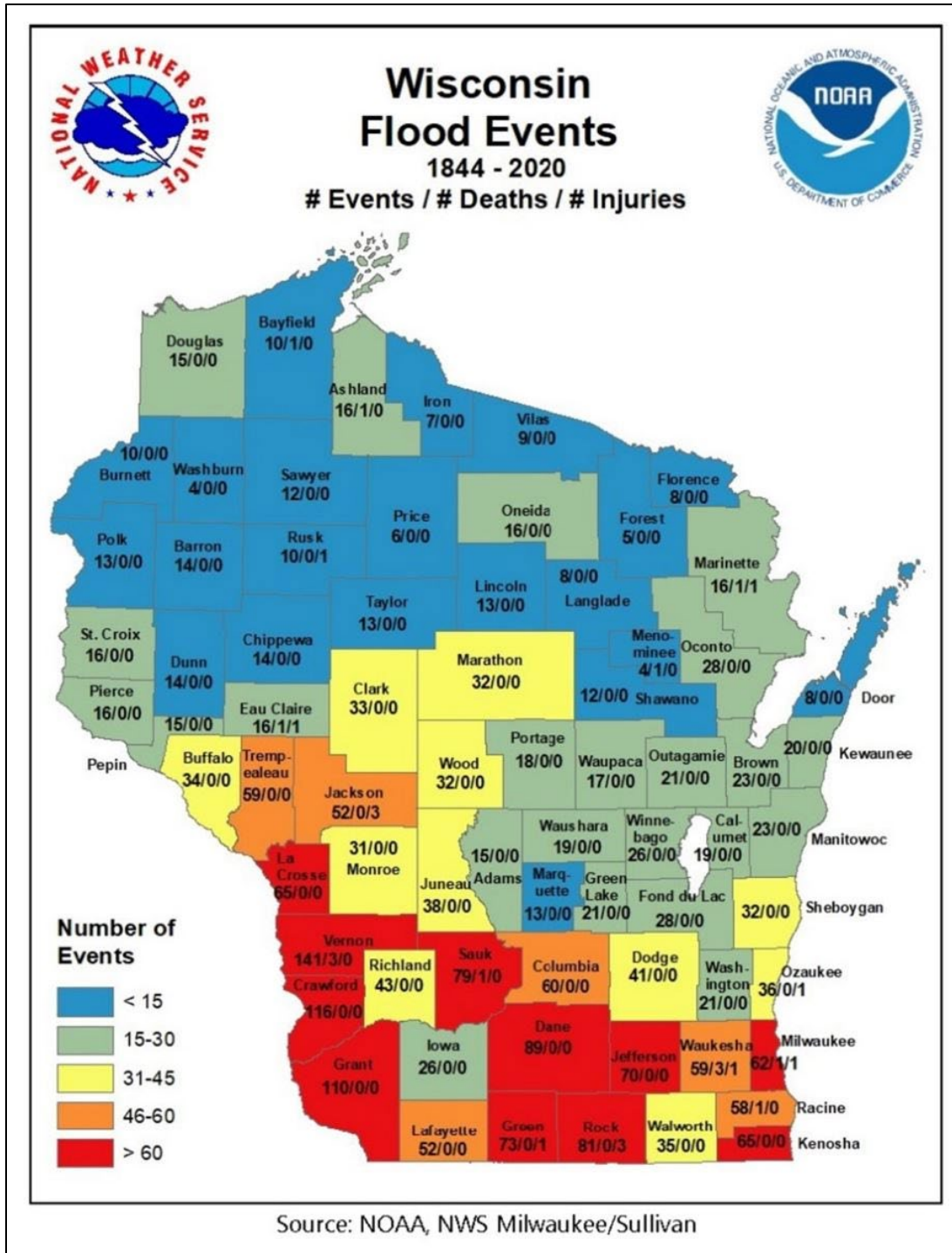
- FEMA-912-DR-WI: On August 6, 1991, the President declared a major disaster as a result of high winds and severe storms that occurred July 7, 1991.
- FEMA-1180-DR-WI: On July 7, 1997, the President declared a Major Disaster as a result of flooding that occurred on June 21-23. The declaration was granted for both Public and Individual Assistance as well as Hazard Mitigation.
- FEMA 1526-DR-WI: On June 18, 2004, the President declared a major disaster as a result of severe storms and flooding that began on May 19th. Waukesha County was eligible for both Public and Individual Assistance as well as Hazard Mitigation.
- FEMA 1768-DR-WI: On June 14, 2008, the President declared a major disaster as a result of severe storms, tornadoes and flooding. Waukesha County was eligible for both Public and Individual Assistance as well as Hazard Mitigation.

Following is a table with the 48 flood events recorded by the National Weather Service between 1 January 1950 and February 2021:

Location	Date	Type	Death	Injury	Property Damage	Crop Damage
Pewaukee	2/21/1994	Flood	0	0	0	0
Oconomowoc	8/9/1995	Urban Flood	0	0	0	0
Waukesha County	8/16/1995	Flash Flood	0	0	0	0
Waukesha County	8/19/1995	Urban Flood	0	0	0	0
Waukesha County	6/17/1996	Flood	0	0	25K	1.0M
Brookfield	6/17/1996	Flash Flood	0	0	50K	0
Menomonee Falls	6/21/1997	Flash Flood	0	0	5.4M	1.2M
Big Bend	8/5/1998	Flash Flood	0	0	40K	0
Brookfield	8/6/1998	Flash Flood	2	1	17.3M	0
Hartland	2/11/1999	Urban/sml Stream Fld	0	0	1K	0
Elm Grove	4/23/1999	Urban/sml Stream Fld	0	0	0	0
Brookfield	5/16/1999	Urban/sml Stream Fld	0	0	0	0
Waukesha County	6/13/1999	Flood	0	0	900K	0
Waukesha	7/9/1999	Urban/sml Stream Fld	0	0	0	0
Pewaukee	7/20/1999	Flash Flood	0	0	10K	0
Waukesha County	5/11/2000	Urban/sml Stream Fld	0	0	0	0
Mapleton	5/17/2000	Flash Flood	0	0	50K	0
Mukwonago	7/2/2000	Urban/sml Stream Fld	0	0	0	0
Hartland	7/2/2000	Flash Flood	0	0	200K	0
Waukesha	7/14/2000	Urban/sml Stream Fld	0	0	0	0
Waukesha	9/11/2000	Flash Flood	0	0	50K	0
Waukesha County	2/9/2001	Flood	0	0	325K	0
Menomonee Falls	6/3/2002	Urban/sml Stream Fld	0	0	0	0
Waukesha	7/27/2002	Urban/sml Stream Fld	0	0	0	0
Waukesha	8/12/2002	Flash Flood	0	0	20K	0
Waukesha	8/13/2002	Urban/sml Stream Fld	0	0	0	0
Waukesha	8/21/2002	Urban/sml Stream Fld	0	0	0	0
Waukesha County	6/1/2004	Flood	0	0	35.6M	216.0M

Oconomowoc	8/3/2004	Flash Flood	0	0	50K	0
Mukwonago	9/25/2005	Flash Flood	0	0	50K	0
Sussex	11/5/2005	Flash Flood	0	0	10K	0
Brookfield	7/9/2006	Flash Flood	0	0	2K	0
Waukesha	7/27/2006	Flash Flood	0	0	3.0M	500K
Brookfield	9/12/2006	Flash Flood	0	0	100K	0
Mukwonago	8/19/2007	Flash Flood	0	0	100K	200K
Big Bend	6/7/2008	Flash Flood	0	0		0K
Oconomowoc	6/7/2008	Flash Flood	0	0		10K
Waukesha Co Arpt	6/7/2008	Flash Flood	0	0	0K	10K
North Prairie	6/8/2008	Flash Flood	0	0	63.0M	1.0M
Wales	6/12/2008	Flash Flood	1	0	25K	0K
Downtown Waukesha	6/19/2009	Flash Flood	0	0	120K	0K
Downtown Waukesha	6/19/2009	Flash Flood	0	0	10K	0K
Elm Grove	7/15/2010	Flash Flood	0	0	5k	0K
Menomonee Falls	7/22/2010	Flash Flood	0	0	2.9M	50K
Menomonee Falls	7/22/2010	Flash Flood	0	0	2.9M	50K
Mukwonago	10/5/2013	Flash Flood	0	0	14K	0K
Elm Grove	5/12/2014	Flash Flood	0	0	0K	0K
Bethseda	5/12/2014	Flash Flood	0	0	0K	0K
Duplainville	7/12/2017	Flash Flood	0	0	0K	0K
Waukesha Co Arpt	7/12/2017	Flash Flood	0	0	5K	0K
Monterey	02/19/2018	Flood	0	0	10K	0K
Waukesha Downtown	09/15/2018	Flood	0	0	1K	0K
Georkes Corner	03/13/2019	Flood	0	0	2K	0K
Durham	9/12/2019	Flash Flood	0	0	0K	0K
New Berlin	05/17/2020	Flash Flood	0	0	15K	0K

Below is a map of Flood Events in Wisconsin from 1844 - 2020.



A careful review of the geography and history of flooding in Waukesha County leads to the conclusion that there is a very high probability of flooding in the future and a very high probability of damage and losses due to flooding. This flooding could occur due to urban stream flooding, flash flooding or, less likely, due to a dam failure.

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 to 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 an 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 functions (e.g., HVAC systems, clothes washers and driers). Homes may also be impacted by sewer back-up and, if the home is not properly cleaned after a flood, bacterial growth and mold may impact the home's air quality and cause illness among the occupants.

Businesses can suffer building and equipment damage similar to homes. Businesses may lose expensive products stored in basements 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.

As noted in the demographics section, Waukesha County has experienced rapid development in recent decades. With this increase in population, there has been an increase in physical structures (e.g., roadways, driveways, homes, parking lots, businesses), all of which increase the total area covered by impermeable surfaces. All of these impermeable surfaces have created a higher volume of run-off and a greater potential for flooding. That increased volume coupled with increased population and number of structures means that there are more lives and improved property at risk for flooding.

A recent example of Waukesha County's vulnerability to flood damages was seen after the 2008 Flooding incident. Waukesha County was one of 34 Wisconsin communities that shared \$39,220,410 in federal supplemental funds under the Community Development Block Grant (CDBG) Program to help them recover from the substantial damage sustained by county facilities, nine towns, twelve villages and seven cities. Of the \$3,024,938.10 requested, \$2,700,265.72 was approved by FEMA. The non-reimbursed figures range from a low of \$55.57 to a high of \$33,986.65 that the local units of government will have to bear. In addition, Waukesha County estimates that there are 438 low-to-middle income (LMI) households that needed additional assistance. With an average repair cost of \$7,500, that translated to an unmet need for over \$3,000,000 in housing assistance. In addition to \$2,200,000 in residential rehabilitation the funding included:

- Mukwonago Pump Station \$506,000

- Pewaukee Springdale Road \$256,000
- City of Waukesha A/D \$406,000
- Oconomowoc Community Center \$506,000
- Summit Lake Outlet Project \$506,000

Another way to look at vulnerability is to look at the number of claims against the National Flood Insurance Program (NFIP) over the last thirty years. Waukesha County has had 158 claims (including 22 properties with repetitive losses) with \$1,531,588 in building claims and \$605,118 in contents claims for a total of \$2,136,706. The Wisconsin Hazard Mitigation Plan lists Waukesha County 2nd (of 72 possible counties) when losses claimed were ranked according to claim amount. The county places 4th when ranked according to the number of claims submitted.

The Wisconsin Hazard Mitigation Plan also projects future risk for Waukesha County based on a 30-year horizon. The results show annual claims averaging \$71,224 and future risk at \$883,884. When ordered by projected future flood risk, Waukesha County ranks 2nd in Wisconsin.

It should be noted that several hazard mitigation projects have reduced the vulnerability to flooding in Waukesha County including:

- The Village of Elm Grove reduced the number from an initial 51 parcels to 40 parcels that exist in the 100-year floodplain. These 11 parcels were purchased and converted to green space with assistance from the Hazard Mitigation Grant Program (HMGP) and FEMA funding. Those properties include: the former Legion Post property (1195 Legion Drive – this property has been taken off the repetitive loss list), 1160 Legion Drive (a residential property) and the Villager Apartments (included six separate buildings). The Village also purchased 13555 Juneau Boulevard with HMGP funds. The Sleepy Hollow (hotel) site, which is included as part of the Village’s final flood management plan, was purchased without any state/federal funding.

Hazard Assessment	
Flooding and Dam Failure	
Frequency/Probability (i.e. Future Probability)	High
Magnitude/Extent (i.e. Strength or Magnitude)	High
Vulnerability (i.e. Consequence and Impact)	High
Overall Risk Rating	High

HAZUS

Waukesha County is located in southeastern Wisconsin where its total landmass is approximately 554 square miles. Waukesha County’s history signals a geography that may produce a flood at any time regardless of the season. However, the majority of the largest floods have occurred in the early spring, typically due to spring rains or snowmelt. The largest floods in the past have been to the Fox River, Bark River, Mukwonago River, and the Oconomowoc River. Since the installation of a gauging station on the Fox River in the City of Waukesha, it has recorded major floods in 1965, 1973, 1974, and 1979.

Principle sources of flooding:

1. Fox River – The Fox River flows southwesterly, stretching 225 miles from its mouth at the Illinois River to the northeastern boundary of Waukesha County. The drainage area of the Fox River encompasses 2,658 square miles.
2. Bark River – The Bark River flows southwesterly through the cities of Merton, Hartland, and Oconomowoc East
3. Mukwonago River – The Mukwonago River flows easterly through the city of Mukwonago where it drains into the Fox River.
4. Oconomowoc River – The Oconomowoc River flows southwesterly through the cities of Merton and Oconomowoc. The river has flooded in the city of Oconomowoc during the years 1943, 1959, and 1974; all of which were early spring floods.

This data was gathered from the Federal Emergency Management Agency’s (FEMA) Flood Insurance Study.

HAZUS-MH Aggregate Loss Analysis HAZUS-MH was used to estimate the damages for a **100-year flood event** in Waukesha County. For the 500-year flood event report, please click the following: [500-year flood event](#).

General Building Stock Damage

HAZUS estimates that about 239 buildings will be at least moderately damaged.

Expected Building Damage by Occupancy

Occupancy	1-10		11-20		21-30		31-40		41-50		Substantially	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Agriculture	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	3	20	10	67	1	7	1	7	0	0	0	0
Education	0	0	0	0	0	0	0	0	0	0	0	0
Government	4	40	6	60	0	0	0	0	0	0	0	0
Industrial	2	50	2	50	0	0	0	0	0	0	0	0
Religion	0	0	0	0	0	0	0	0	0	0	0	0
Residential	190	46	172	42	38	9	7	2	2	0	0	0
Total	199	-	190	-	39	-	8	-	2	-	0	-

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 423.93 million dollars. 1% of the estimated losses were related to the business interruption of the county. The residential occupancies made up 28.31% of the total loss.

Building-Related Economic Loss Estimates
(Millions of Dollars)

	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	49.58	22.24	14.05	5.32	91.19
	Content	27.04	67.24	35.89	31.01	161.17
	Inventory	0.00	1.56	4.53	0.26	6.35
	Subtotal	76.62	91.03	54.47	36.58	258.70
Business Interruption						
	Income	3.07	49.92	3.20	8.02	64.20
	Relocation	17.61	15.29	2.03	7.52	42.44
	Rental Income	8.11	10.85	0.48	2.20	21.64
	Wage	7.25	50.76	2.39	122.84	183.24
	Subtotal	36.04	126.81	8.09	140.57	311.51
All	Total	112.66	217.84	62.56	177.15	570.21

Expected Damage to Essential Facilities

	Total	# of Facilities		
		At Least Moderate	At Least Substantial	Loss of Use
Emergency Operations Center	3	0	0	0
Fire Stations	53	2	0	1
Hospitals	9	0	0	0
Police Stations	30	0	0	0
Schools	187	0	0	0

HAZUS also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 1,091 households will be displaced due to the flood. Displacement includes households evacuated from within or very near the inundated area. Of these, 123 people (out of a total population of 389,891) will seek temporary shelter in public shelters.

CIKR/Essential Facilities that may be most susceptible to flooding in the County

Note: Future updates will focus on specific mitigation activities for each facility that are most susceptible to flooding in the County.

Facility Name	Address
Care-Age of Brookfield Healthcare and Rehabilitation	1755 N Barker Rd, Brookfield, WI 53045
Lindengrove - New Berlin Campus	13755 W. Fieldpointe Dr., New Berlin, WI 53151

Hartland Volunteer Fire Department	150 Lawn Street, Hartland, WI 53029
Elm Grove Volunteer Fire Department	13600 Juneau Blvd., Elm Grove, WI 53122
Elm Grove Police Department	13600 Juneau Blvd, Elm Grove, WI 53122
Menomonee Falls Fire Department Station	Menomonee Avenue
Waukesha Fire Department Station 1	130 West Saint Paul Avenue
Pewaukee Police Department	235 Hickory Street, Pewaukee, WI 53072
Pewaukee High School	510 Lake St, Pewaukee, WI 53072
ASA Clark Middle School	472 Lake Street, Pewaukee WI 53072
Pewaukee Lake Elementary School	436 Lake Street, Pewaukee, WI 53072
Saint Anthony Grade School	W280N2101 Prospect Ave, Pewaukee, WI 53072
Arrowhead Union High School	700 North Ave, Hartland, WI 53029
Shady Lane Elementary School	W172 N8959 Shady Lane, Menomonee Falls, WI 53051
Queen of Apostles School	449 W Wisconsin Ave, Pewaukee, WI 53072
Waukesha County Tech College	800 Main St, Pewaukee, WI 53072

Roadways that may be most susceptible to flooding in the County

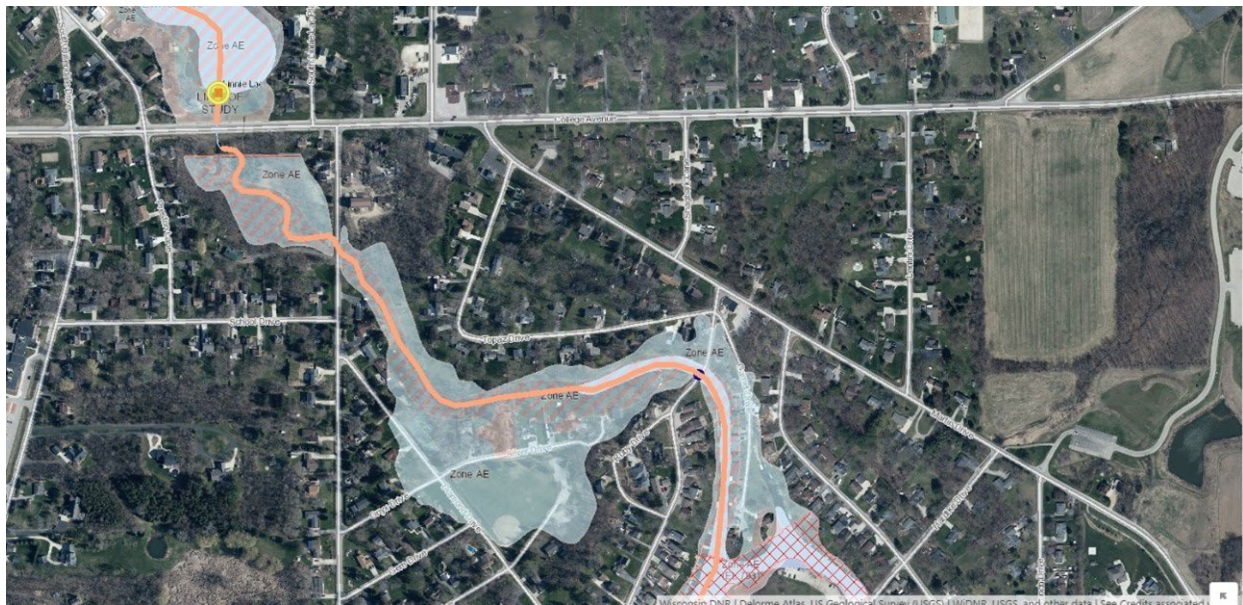
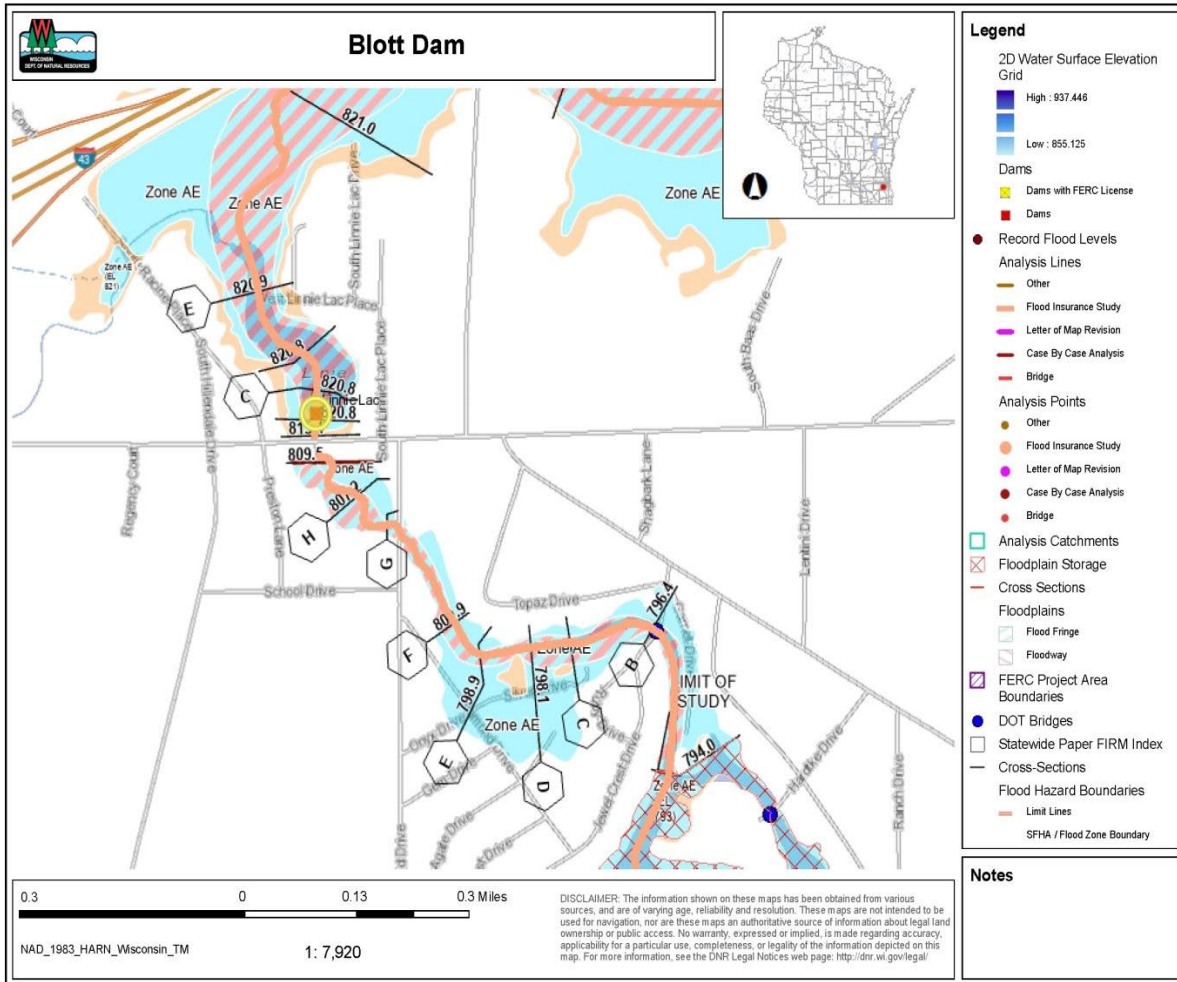
Road Name
Country Bliss subdivision in the Town of Mukwonago (S. Oak Tree Dr is the main roadway that gets flooded)
River Rd at Barker Rd in the City of Brookfield
Delafield Rd and Venice Beach Road in the Village of Summit

Dam-related Maps and Impacts:

DAM OFFICIAL NAME	DAM SIZE & TYPE	MAX STORAGE ACRE-FEET	HAZARD POTENTIAL	COUNTY
Blott	LARGE	166	High	Waukesha
Lepper	SMALL	40	High	Waukesha
Merton Rolling Mill	LARGE	168	High	Waukesha
Little Muskego	LARGE	4300	High	Waukesha
Pewaukee	LARGE	36900	High	Waukesha
Salow Lake	LARGE	230	High	Waukesha

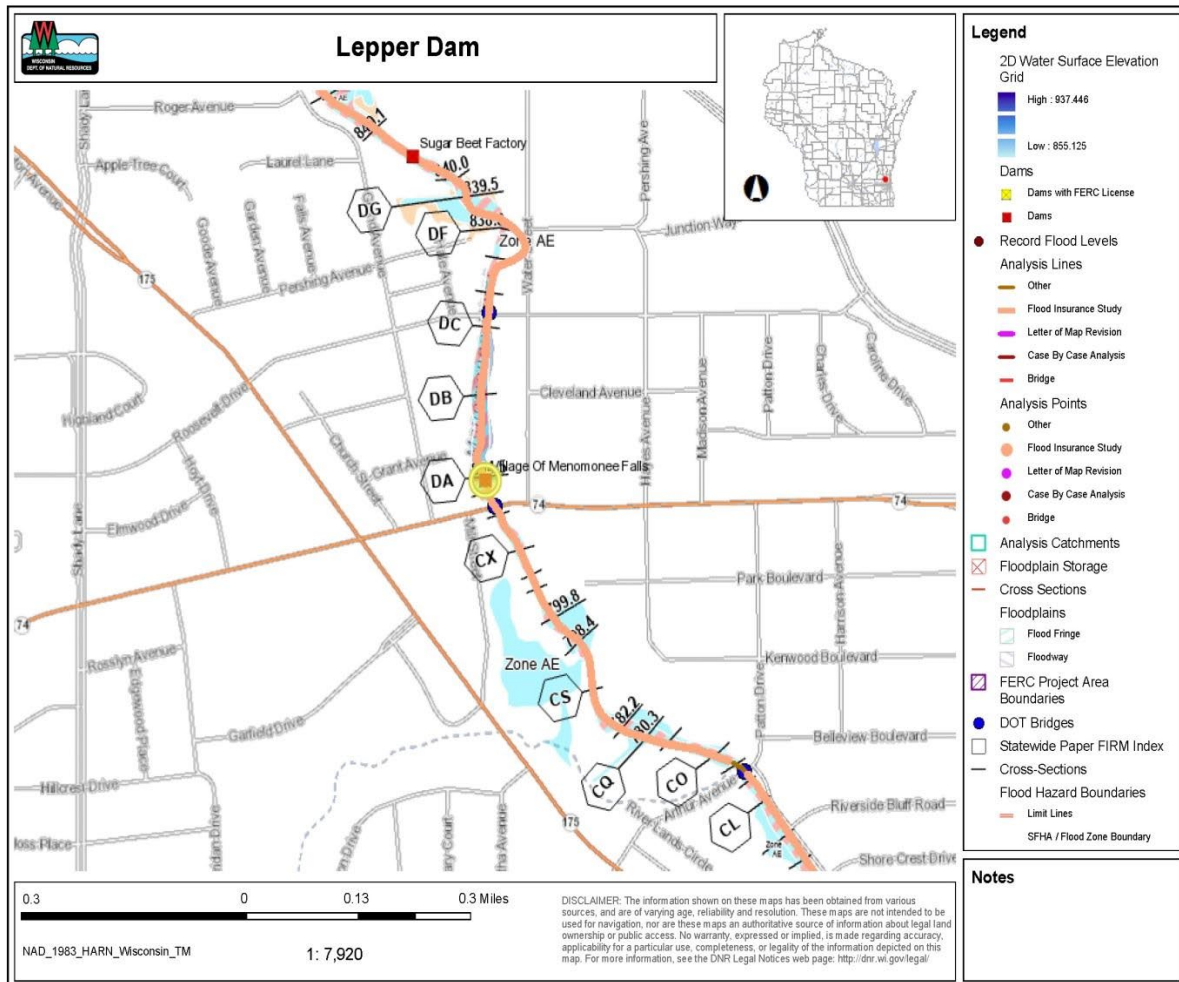
Blott Dam

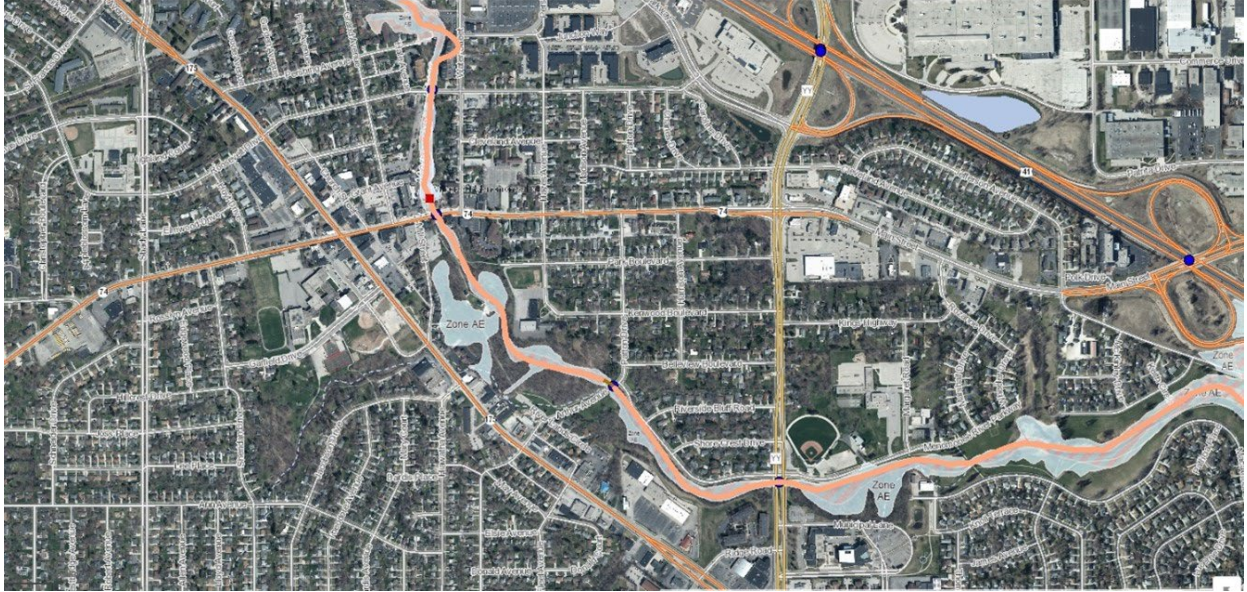
Per the 2000 John C. Blott Dam EAP, several residential homes, roads, and other buildings may potentially be impacted by a 100-year flood and dam failure. No critical facilities, such as hospitals, rescue and relief facilities, water supply facilities, or hazardous waste facilities would be inundated. The Gold Drive and Jewel Crest Drive bridges would be overtopped by a dam failure flood.



Lepper Dam

Some residential homes and roads may potentially be impacted as depicted in the maps below. Per the Dam Failure Analysis, dated Feb. 27, 2012, while the hydraulic shadow encumbers numerous properties, fifteen (15) properties were identified as having potential for economic loss. Those properties reside on Lilly Road and Appleton Avenue. There is no probable loss of life from dam failure as modeled. Downstream of the Lepper Dam in the area of analysis, the Menomonee River crosses Main St. Arthur Ave, Pilgrim Road, Lilly Road, and two recreational trails (all bridges). No significant impacts are expected at any of the bridges. Minor damage may occur to sanitary sewer facilities.

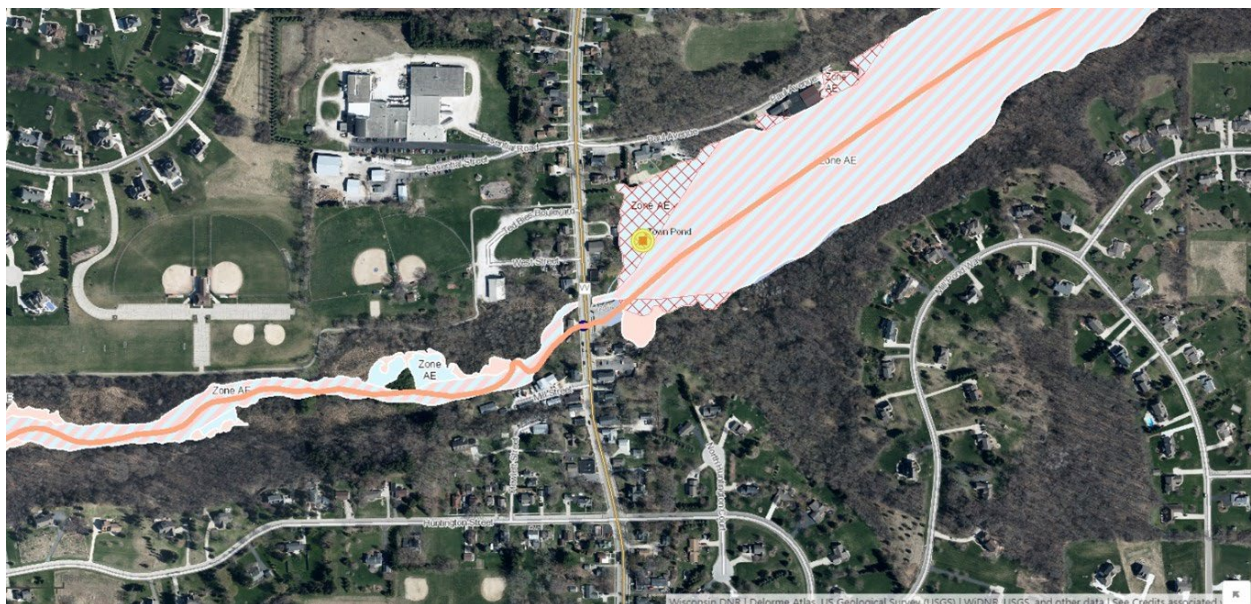
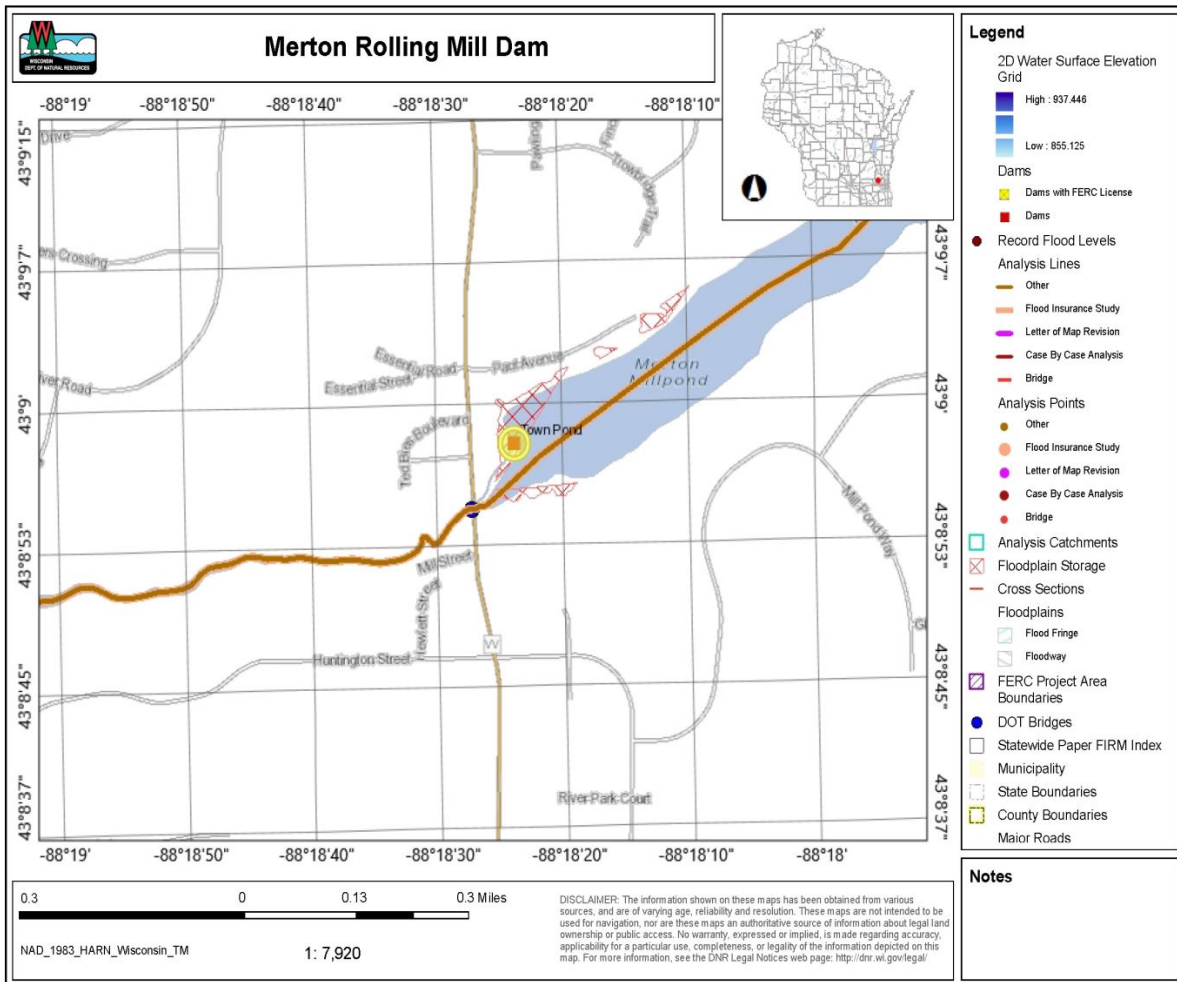




Merton Rolling Mill Dam

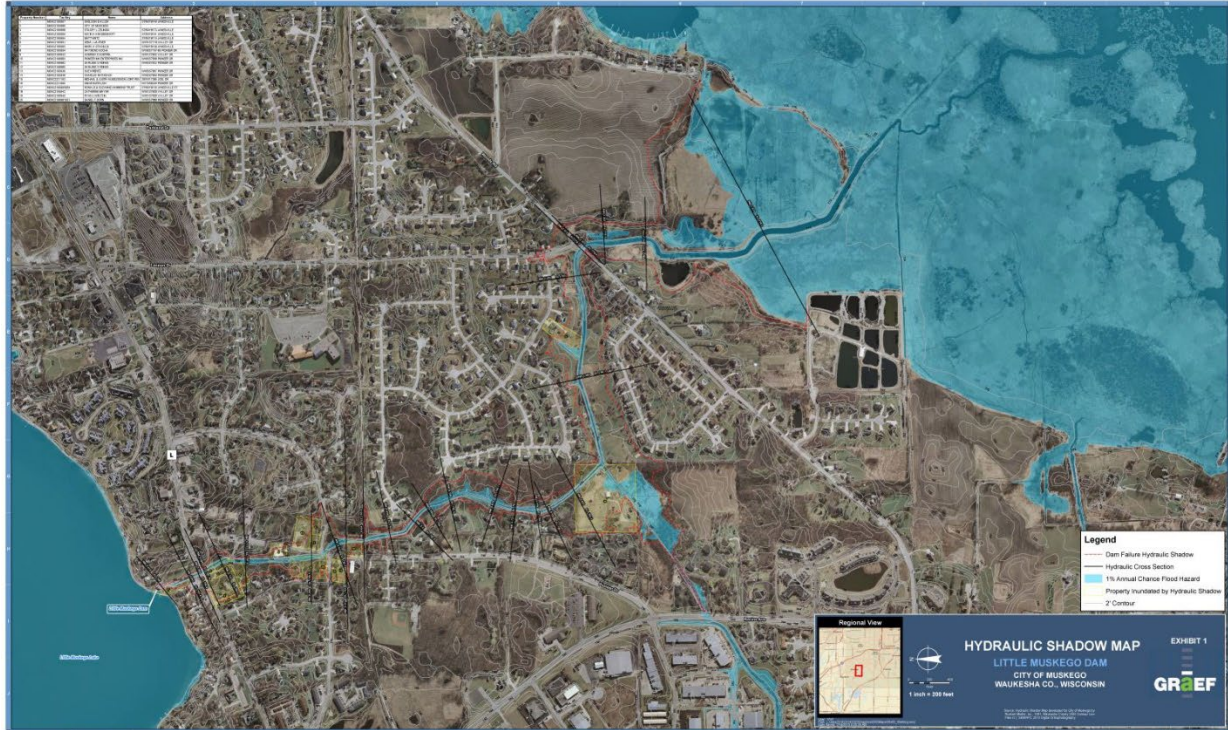
Critical downstream facilities include:

1. Mame's Shoppe Retail establishment located on Main Street
2. Accessory building located on Main Street.
3. Commercial Building/Garage located on Main Street
4. Residence located on Main Street
5. Residential detached garage located on Main Street
6. CTH VV/Main Street and Bridge
7. Gas and electric services to each of the above.
8. Street lights and power poles in CTH VV/Main Street



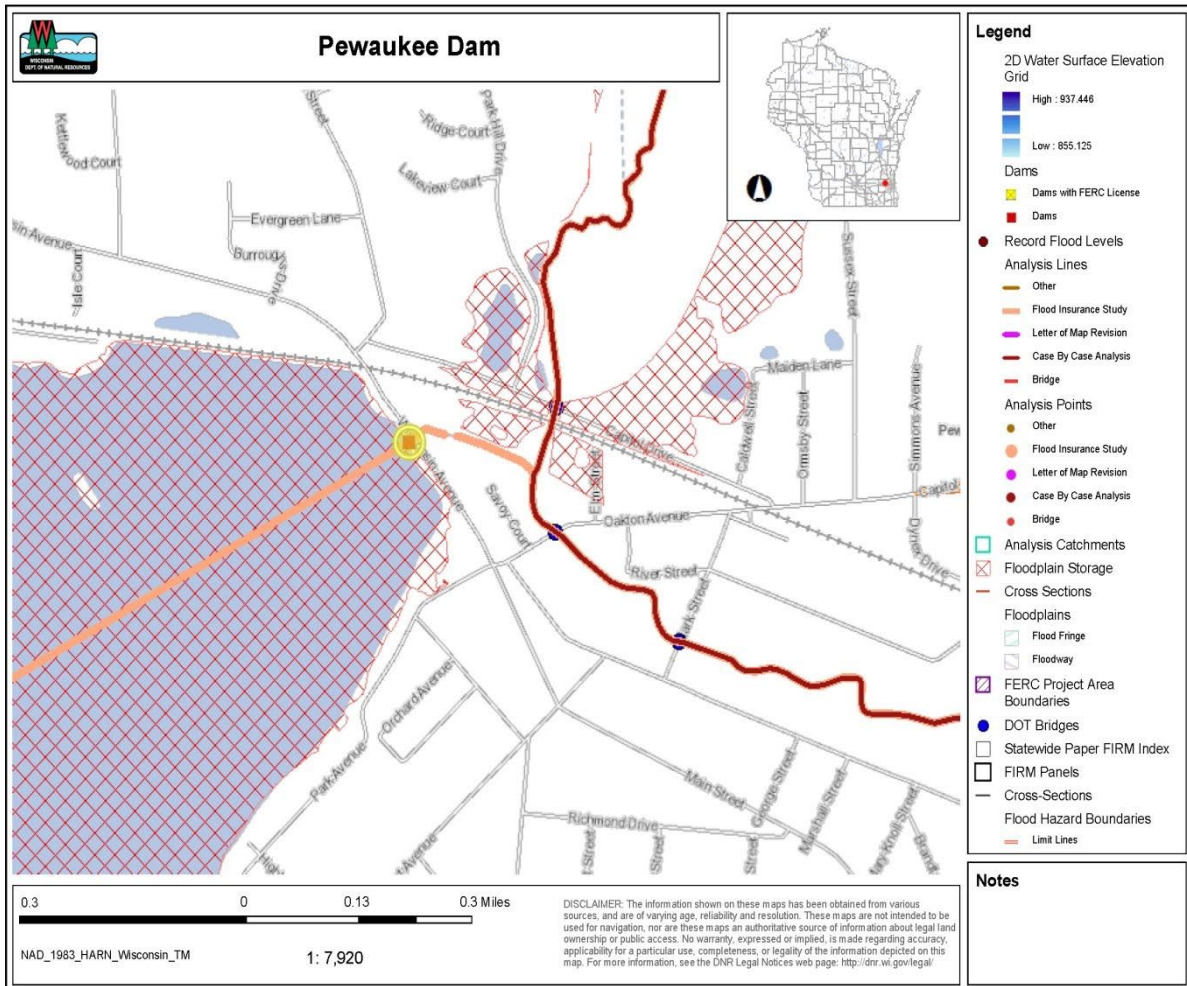
Little Muskego Dam

Homes and structures along Janesville Road may be vulnerable. Twenty (20) potential facilities/properties could be affected by a dam failure per the 2015 EAP.



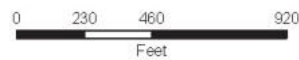
Pewaukee Dam

Per the Pewaukee Dam EAP, a major flood caused by a sudden failure of the dam gate is estimated to affect 7 homes and 18 businesses, including the Pewaukee Village Hall. During a failure, travel should be avoided on Oakton Ave between Wisconsin Avenue and Elm Street, Elm Street, Clark Street between Wisconsin Avenue and Oakton Avenue, and Hickory Street between Clark Street and STH 16.





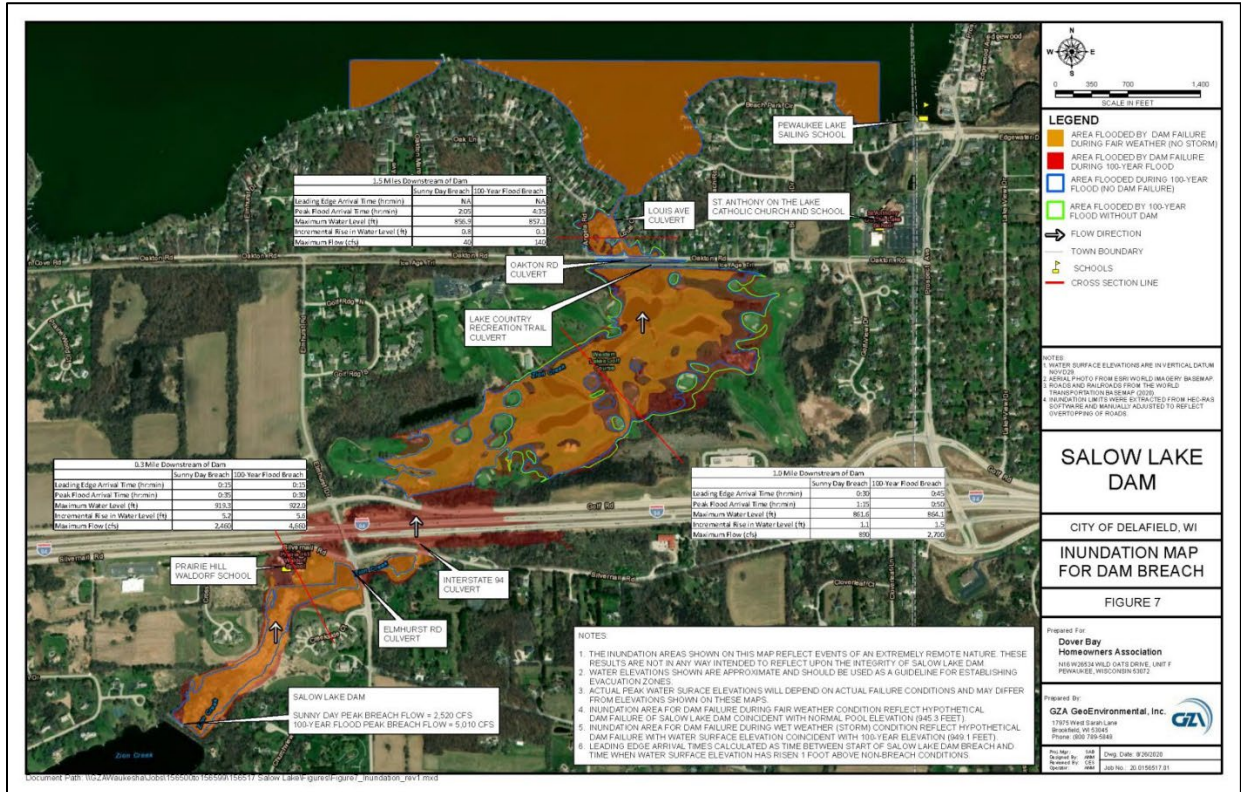
 Properties to be Notified



Appendix B-4 Evacuation Map Pewaukee Lake Dam

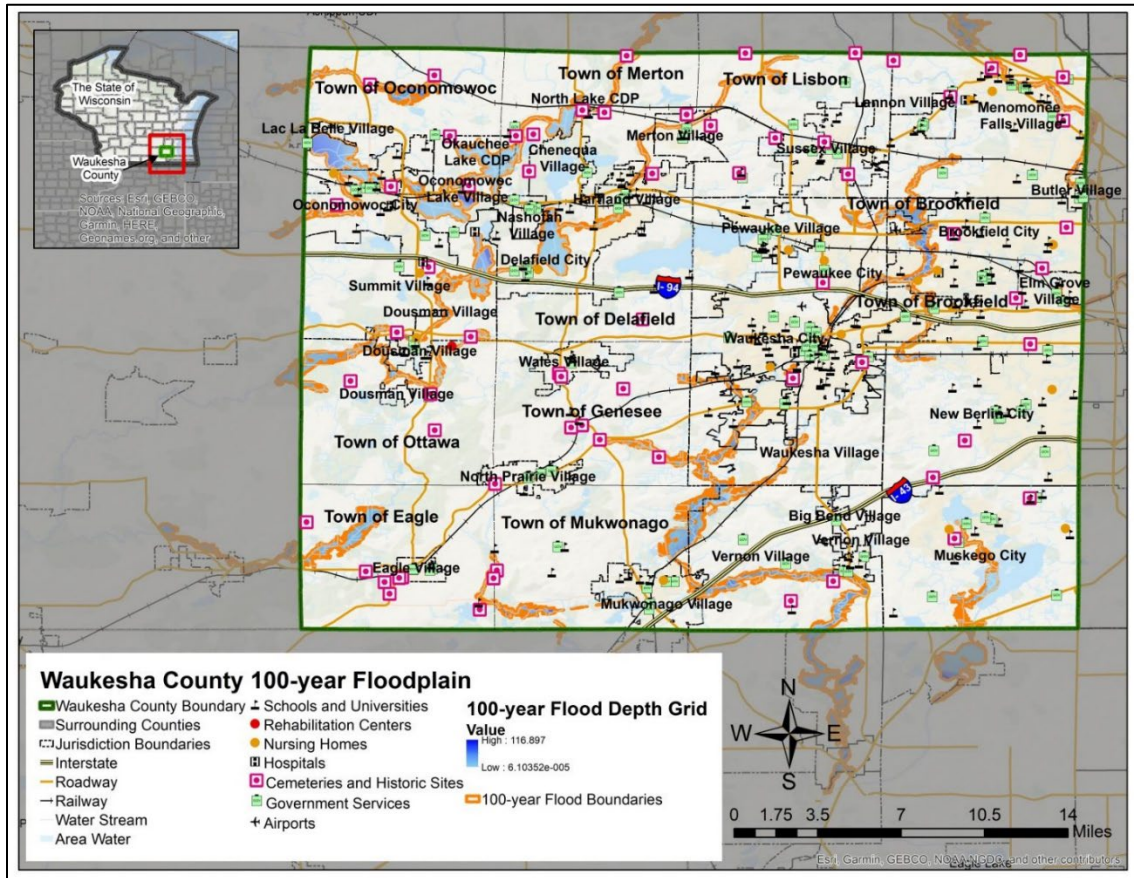
Salow Lake Dam

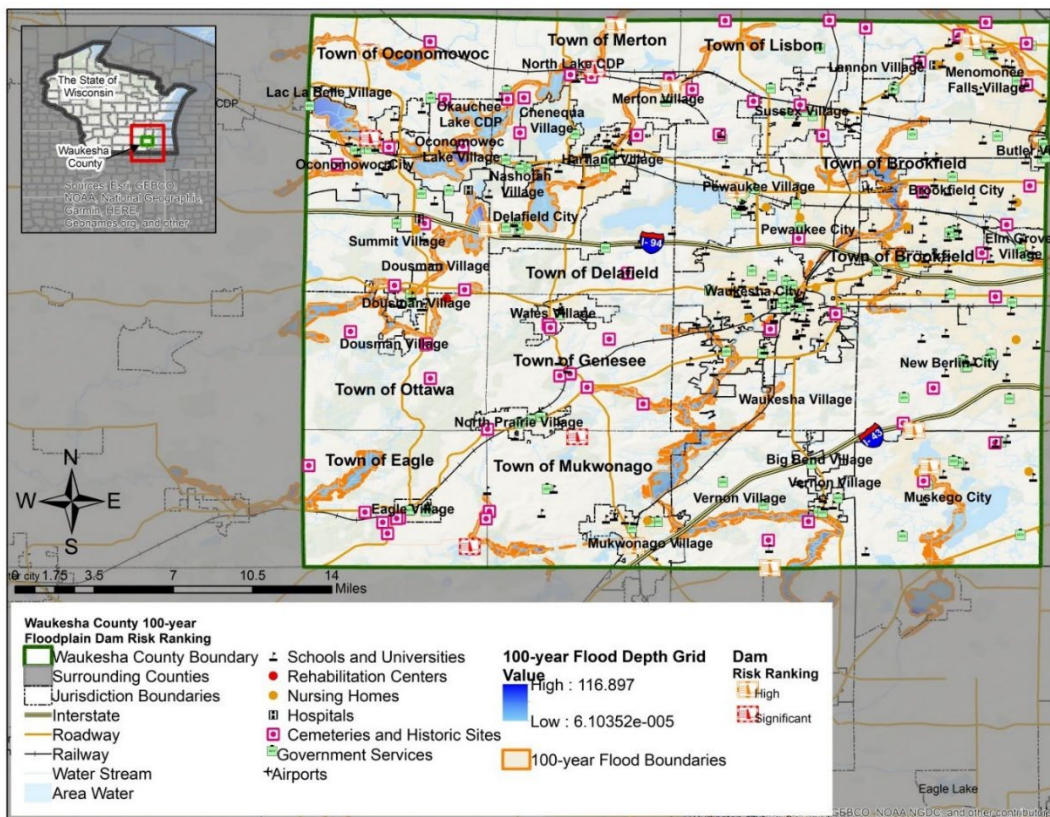
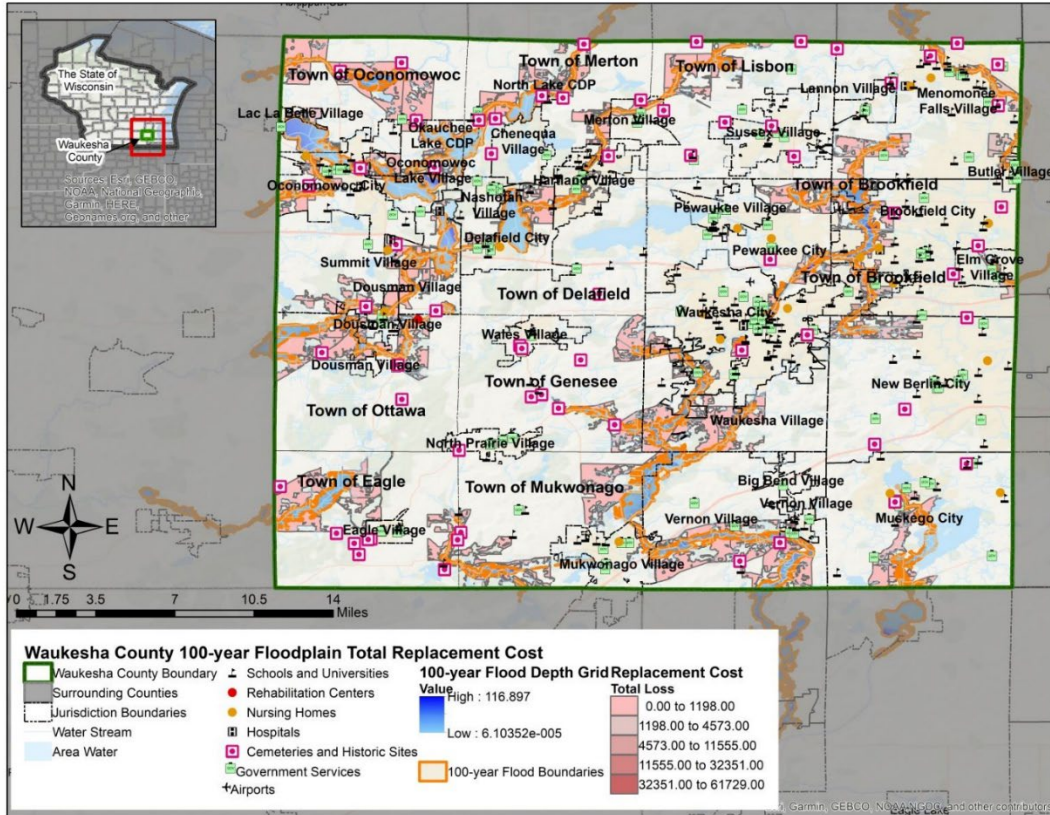
An inundation map showing the flood extents for each scenario is included in the figure below. The results indicate the culvert below Elmhurst Road near the school presents a significant constriction to high flows. Natural flooding and dam breach flooding back-up at this location. During the 100-year flood with dam breach, the flows inundate the nearby school and overtop Silvernail Road. Flows that overtop Silvernail Road inundate low areas along Interstate 94. The Zion Creek culvert below Interstate 94 also contributes to the backwater flooding in the vicinity. Both the school and Interstate 94 (below the Elmhurst Road overpass) appear to experience approximately four feet of flooding during the 100-year flood with dam breach scenario.

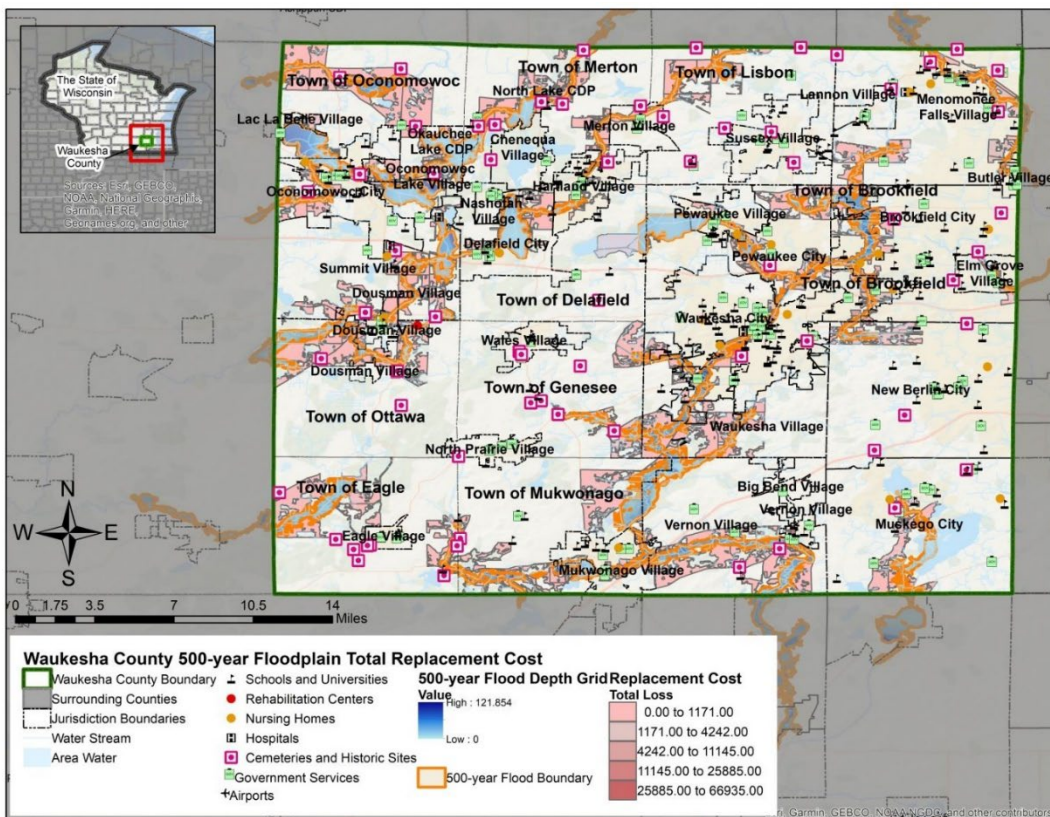
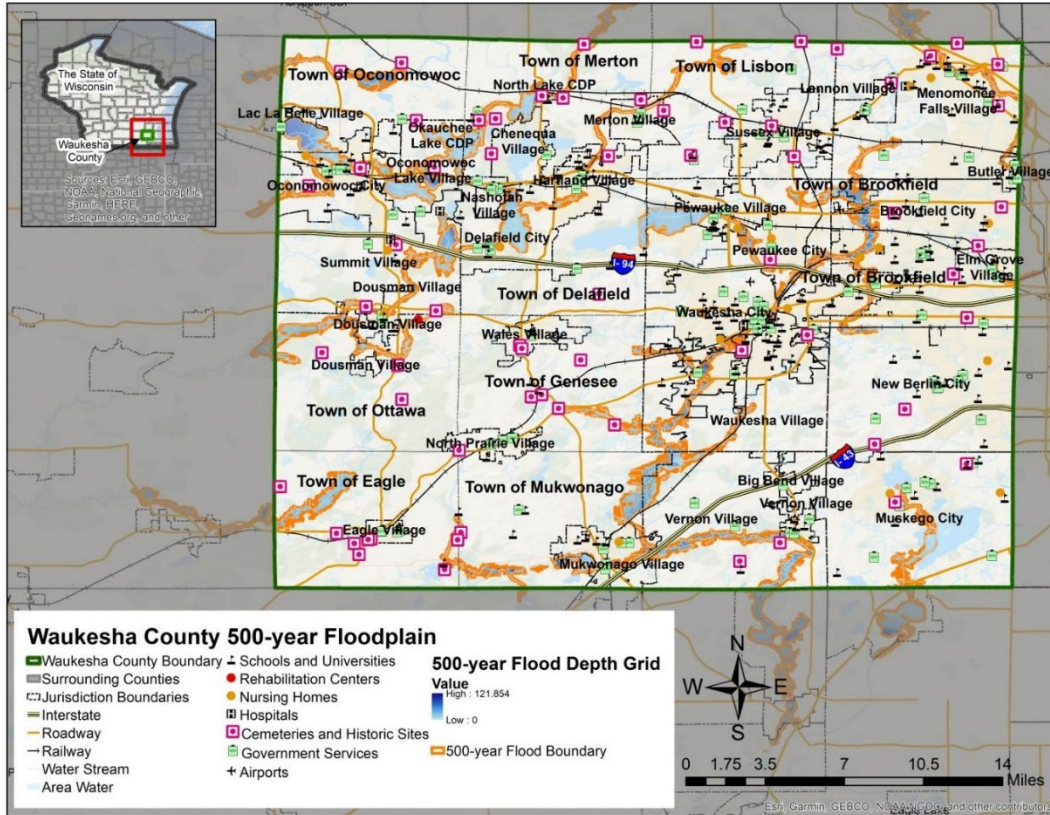


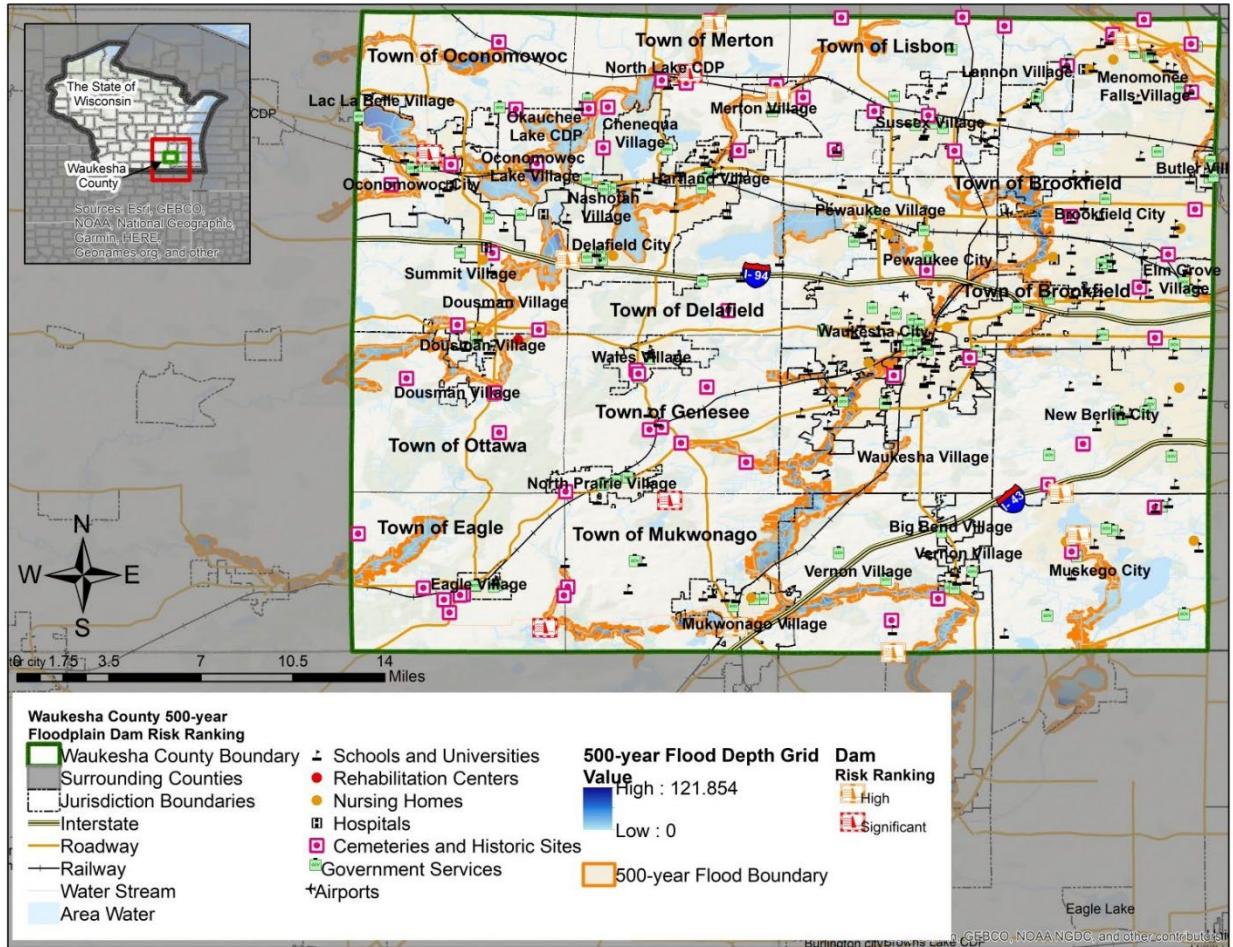


Flood-related Maps and Impacts:









National Flood Insurance Program (NFIP)

Jurisdictions:	National Flood Insurance Program (NFIP) Status:*			
	Yes	No	N/A	Community Rating System (CRS) Class
Waukesha County	Y			
City of Brookfield	Y			
City of Delafield	Y			
City of Muskego	Y			
City of New Berlin	Y			Yes; Class 6
City of Oconomowoc	Y			
City of Waukesha	Y			
Village of Big Bend	Y			
Village of Butler	Y			
Village of Dousman	Y			
Village of Elm Grove	Y			Yes; Class 5
Village of Hartland	Y			
Village of Lannon	Y			
Village of Menomonee Falls	Y			
Village of Mukwonago	Y			
Village of Pewaukee	Y			
Village of Sussex	Y			

Village of Summit	Y			
City of Pewaukee	Y			
Village of Chenequa		N (Mapped)		
Village of Merton	Y			
Village of Nashotah		N (Mapped)		
Village of Oconomowoc Lake		N (Mapped)		
Village of Wales	Y			
Village of Eagle			N/A	
Village of Lac La Belle	Y			
Village of North Prairie			N/A	

***Notes:** **Y = Participating** **N = Not Participating** **N/A = Not Mapped**

Reason for Non-Participation (Mapped Communities)

Community	Reason
Village of Nashotah	The village is currently looking into the NFIP program and weighing the pros and cons of the program for their residents.
Village of Chenequa	The Village considered NFIP, but determined that there were little to no structures that would be impacted by major flooding. So, although the jurisdiction is mapped, the village currently does not see the need.
Village of Oconomowoc Lake	State regulations currently do not allow for wet boathouses with a residence above it, so they have opted not to be part of NFIP.

NFIP Policies in Force

Community Name	Total Policy Count	Total Coverage \$	Direct Losses	Total Losses	Total Net Dollars Paid \$
BIG BEND, VILLAGE OF	1	350,000	2	2	13,455
BIG BEND, VILLAGE OF	1	100,000	0	2	17,479
BROOKFIELD, CITY OF	5	1,453,100	12	12	143,840
BROOKFIELD, CITY OF	76	22,870,500	0	39	475,736
BUTLER, VILLAGE OF	1	350,000	0	3	266,235
BUTLER, VILLAGE OF	0	-	6	6	47,894
DELAFIELD, CITY OF	9	2,660,000	0	3	12,945
DELAFIELD, CITY OF	1	350,000	3	3	17,287
DOUSMAN, VILLAGE OF	2	700,000	0	1	1,551
ELM GROVE, VILLAGE OF	31	11,067,800	0	34	463,450
ELM GROVE, VILLAGE OF	5	1,330,000	15	15	629,938
HARTLAND, VILLAGE OF	0	-	1	1	-
HARTLAND, VILLAGE OF	2	385,000	0	1	28,519
LANNON, VILLAGE OF	1	110,000	0	0	-
LANNON, VILLAGE OF	0	-	1	1	1,750
MENOMONEE FALLS, VILLAGE OF	50	15,043,700	0	18	220,348
MENOMONEE FALLS, VILLAGE OF	3	1,050,000	10	10	55,486
MERTON, VILLAGE OF	1	175,000	0	0	-

MILWAUKEE, CITY OF	0	-	0	1	625
MILWAUKEE, CITY OF	0	-	3	3	1,099
MUKWONAGO, VILLAGE OF	1	175,000	0	0	-
MUKWONAGO, VILLAGE OF	8	2,120,000	0	0	-
MUSKEGO, CITY OF	3	717,300	4	4	8,800
MUSKEGO, CITY OF	44	11,267,600	0	20	245,834
NEW BERLIN, CITY OF	61	20,457,500	0	30	361,849
NEW BERLIN, CITY OF	10	2,446,800	9	9	7,337
OCONOMOWOC, CITY OF	5	1,658,000	0	1	-
OCONOMOWOC, CITY OF	0	-	2	2	2,551
PEWAUKEE, CITY OF	21	5,815,800	0	1	2,925
PEWAUKEE, CITY OF	2	700,000	0	0	-
PEWAUKEE, VILLAGE OF	4	992,400	1	1	-
PEWAUKEE, VILLAGE OF	30	6,276,800	0	15	254,498
SAUKVILLE, VILLAGE OF	0	-	1	1	-
SUMMIT, VILLAGE OF	1	60,000	1	1	4,413
SUMMIT, VILLAGE OF	14	3,298,000	0	2	16,707
SUSSEX, VILLAGE OF	0	-	1	1	-
SUSSEX, VILLAGE OF	4	1,272,000	0	0	-
UNKNOWN	0	-	8	8	36,537
WALES, VILLAGE OF	2	700,000	0	0	-
WAUKESHA COUNTY*	82	22,682,800	0	56	721,504
WAUKESHA COUNTY*	14	3,796,900	17	17	275,675
WAUKESHA, CITY OF	7	2,088,900	5	5	2,526
WAUKESHA, CITY OF	44	12,649,100	0	23	184,675

Current as of 10/31/2021

Source: Fema.gov

Community Rating System

Community Name	CRS Entry Date	Current Effective Date	Current Class	% Discount for SFHA	% Discount for Non-SFHA	Status
Village of Elm Grove	05/1/01	05/1/12	5	25	10	Current
City of New Berlin	10/1/05	10/1/21	6	20	10	Current

Current as of 10/1/2021

Source: Fema.gov

List of Communities with Repetitive Loss Properties

The following list summarizes damages attributed to flooding in Waukesha by the National Flood Insurance Program through 2021.

Community Name	Mitigated	Type	Total Losses	Is NFIP Repetitive Loss	Is NFIP Severe Repetitive Loss
City of Brookfield	No	Single Family	2	Yes	No
City of Brookfield	No	Non-Residential	3	Yes	No

City of Brookfield	No	Single Family	2	Yes	No
City of Brookfield	Yes	Single Family	2	Yes	No
City of Brookfield	No	Single Family	3	Yes	No
City of Brookfield	Yes	Single Family	2	Yes	No
City of Brookfield	No	Single Family	2	Yes	No
City of Brookfield	No	Single Family	3	Yes	No
City of Brookfield	No	Family Housing Unit	2	Yes	No
City of Brookfield	No	Single Family	2	Yes	No
City of Brookfield	No	Single Family	3	Yes	No
City of Delafield	No	Family Housing Unit	2	Yes	No
City of Muskego	No	Single Family	3	Yes	No
City of Muskego	No	Single Family	2	Yes	No
City of Muskego	No	Single Family	2	Yes	No
City of Muskego	No	Single Family	2	Yes	No
City of New Berlin	Yes	Single Family	2	Yes	No
City of New Berlin	Yes	Single Family	3	Yes	No
City of New Berlin	No	Single Family	2	Yes	No
City of New Berlin	Yes	Single Family	2	Yes	No
City of Waukesha	No	Non-Residential	2	Yes	No
City of Waukesha	No	Single Family	2	Yes	No
UNKNOWN	No	Single Family	4	Yes	No
Village of Butler	Yes	Non-Residential	3	Yes	No
Village of Butler	No	Non-Residential	3	Yes	No
Village of Elm Grove	No	Single Family	2	Yes	No
Village of Elm Grove	Yes	Non-Residential	2	Yes	No
Village of Menomonee Falls	No	Single Family	2	Yes	No
Village of Pewaukee	No	Non-Residential	2	Yes	No
Waukesha County	No	Single Family	2	Yes	No
Waukesha County	No	Single Family	2	Yes	No
Waukesha County	No	Single Family	3	Yes	No
Waukesha County	Yes	Single Family	2	Yes	No
Waukesha County	No	Single Family	2	Yes	No
Waukesha County	No	Single Family	2	Yes	No

Fog

Fog, at its basic definition, is a cloud based on the ground rather than in the atmosphere.



Source: <http://www.fi.edu/weather/events/fog.html>

Fog Hazard Profile

Hazard Profile

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

Radiation Fog is caused by cooling close to the earth's surface. The earth gives off long-wave radiation which on a clear night travels out into space. If the temperature drops to the dew point close to the ground, radiation fog can form. Radiation fog is also known as ground fog. The fog normally disappears soon after sunrise as the sun's warmth evaporates it.

Valley Fog is one type of Radiation Fog that forms in mountain valleys during winter and can be more than 1,500 feet thick. Often, the winter sun is not strong enough to evaporate the fog during the day. When the air cools again the following night, the fog often becomes thicker, which makes it even harder for the sun to burn it off the following day. These fogs can last for several days until strong winds blow the moist air out of the valley. The tendency for cool, dense air to pool at the bottom of valleys also enhances valley fog.

- **Advection Fog** results from the movement (advection) of warm, moist air from the south over a colder landmass. During the winter this is common when snow covers much of the Midwest. The snow cools the bottom portion of the moist airmass often resulting in condensation. The thickest advection fog usually forms during nights with light winds because humid air near the ground is not mixed with the drier air above. With light winds, the fog near the ground can become thick and reduce visibilities to zero; usually, the fog burns off during the day but it can last many days if it is thick enough to block out

the sun's light. This type of fog can occur almost anywhere in the United States, especially during winter warm-ups and early spring thaws. It can be widespread and very dangerous to commuters and aircraft travel.

- **Evaporation Fog** around Wisconsin is caused by cold air crossing over warmer bodies of water. The water evaporates its moisture into the colder air which immediately condenses it into clouds and fog. This is what looks like steam over Lake Michigan, inland lakes and rivers on a cold autumn or winter day. This rising fog can be found above thermal pools in Yellowstone National Park and is what is seen when cool rain hits the hot pavement. This may also be called "steam fog" or "sea smoke" when it forms over oceans. Sometimes this fog is lifted quickly and forms rotating whirls of fog known as steam devils.
- **Upslope Fog** is common near the Rockies, including the Denver area. If the winds are out of the east, the air flows up as it rises in elevation approaching the mountains. This can cool the air to its dew point and result in widespread fog.
- **Rain Fog** is created when late afternoon or evening showers and thunderstorms during the spring and summer leave the ground soaked just as the sunsets. Though the rain usually stops overnight, the high humidity level created by the rainfall will not allow the moisture to evaporate and as a result, fog forms. This occurs especially at times when there are light winds. As the air warms up the next morning, this rain-enhanced fog will usually burn off by midday.
- **Precipitation Fog** forms when rain or snowfalls. As precipitation falls into drier air below the cloud, the liquid drops or ice crystals evaporate or sublimate directly into water vapor. The water vapor increases the moisture content of the air while cooling the air. This often saturates the air below the cloud and allows fog to form.

Location and Extent

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

- San Francisco, California has an average of 18 days of heavy fog each year.
- Cape Disappointment, Washington is the foggiest place on the western U.S. coast with an average of 106 days of heavy fog per year.
- The foggiest area on the east coast of the United States is found along the rockbound coast of Maine. Moose Peak Lighthouse on Mistake Island, at an elevation of 72 feet, averages 1580 hours of heavy fog each year. Many other locations have problems with fog, such as Eastport, Maine with 65 days annually and Portland, with 55 days of heavy fog each year.
- Inland areas with regular heavy fog include parts of the Appalachian Mountains such as a peak area in West Virginia that averages over 100 days each year. Elkins, at an elevation of 1948 feet has about 81 days annually with heavy fog.
- Milwaukee averages about 26 days with some heavy fog and this is comparable to the fog seen in Waukesha County.

Source: <http://www.jsonline.com/weather/wtmj/fogplaces.stm>

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



Frequency and Probability

The National Weather Service reports 71 fog events in the county between 1 January 1950 and October 1, 2021. The most recent fog events include:

Location	Date	Death	Injury	Property Damage	Crop Damage
Waukesha County	9/12/2009	0	0	0	0
Waukesha County	3/7/2010	0	0	0	0
Waukesha County	3/10/2010	0	0	0	0
Waukesha County	5/21/2010	0	0	0	0
Waukesha County	12/30/2010	0	0	0	0
Waukesha County	2/15/2012	0	0	0	0
Waukesha County	3/24/2012	0	0	0	0
Waukesha County	10/2/2012	0	0	0	0
Waukesha County	10/22/2012	0	0	0	0
Waukesha County	10/23/2012	0	0	0	0
Waukesha County	11/17/2012	0	0	0	0
Waukesha County	11/20/2012	0	0	0	0
Waukesha County	12/3/2012	0	0	0	0
Waukesha County	12/3/2013	0	0	0	0
Waukesha County	08/03/2018	0	0	0	0

Considering its geographical location and history, Waukesha County has a high probability of fog occurrence in the future and the likelihood of damage (i.e., death and/or injury) due to fog is considered moderate.

Vulnerability

Perhaps the largest vulnerability to fog is due to automobile traffic crashes. According to the Wisconsin Department of Transportation, dense fog is a factor in 1,200 car accidents every year, which result in approximately 700 injuries and 16 roadway fatalities.

Some notable fog-related traffic crashes in the area of southeastern Wisconsin (which includes Waukesha County) follow:

- On the morning of Friday, October 11, 2002, 50 vehicles were involved in a massive vehicle accident on Interstate 43 in Sheboygan County near Cedar Grove, Wisconsin

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

Source: http://www.stoutonia.uwstout.edu/2002-2003/stories/021024/ne_04.html



The Fog, The Deadliest Traffic Crash in Wisconsin History; Trooper Tim Austin; Wisconsin Trooper, Callan Publishing Ins., Minneapolis, MN; Spring 2003.

- Fourteen people were injured in January 1996 in a 26-car pileup on southbound I-43 near Ozaukee County Highway KK. The first driver struck said he had missed his exit because of heavy fog and had slowed down to look for another when he was hit from behind.
- In March 1990, three people were killed and 31 injured in a 52-vehicle pileup on the Tower Drive Bridge in Green Bay after dense fog and smoke from nearby paper mills created a "white wall" that reduced visibility to less than 10 feet. The accident was believed to be triggered when a tanker truck overturned and a ruptured gas tank ignited. Vehicles following too closely on the fog-shrouded bridge slammed into the tanker and

were engulfed by a sheet of flames. <http://http://www.jsonline.com/news/state/oct02/87083.asp>

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

Hazard Assessment	
Fog	
Frequency/Probability (i.e. Future Probability)	Medium
Magnitude/Extent (i.e. Strength or Magnitude)	Low
Vulnerability (i.e. Consequence and Impact)	Low
Overall Risk Rating	Low

Forest and Wildfires

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

The Wisconsin Department of Natural Resources 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.

Forest and Wildfires Hazard Profile

Hazard Profile

A wildfire is a naturally occurring event, often ignited by lightning and fueled by grasses, brush, and trees. Wildfires help to control the buildup of woody debris, improve soil conditions, reduce weedy and invasive plants, reduce plant disease, and maintain the habitat conditions thus providing a healthy ecosystem. The wildland-urban interface describes the area of transition between non-human inhabited areas and the built environment. This zone is best described as a set of conditions; according to the National Fire Protection Association, conditions include (but are not limited to): amount, type, and distribution of vegetation; flammability of structures (homes, businesses, outbuildings, decks, fences) in the area, and proximity to fire-prone vegetation and to other combustible structures; weather patterns and general climate conditions; topography; hydrology; average lot size; and road construction.

According to FEMA, a wildland-urban interface fire is a wildfire in a geographical area where structures and other human development meet or intermingle with wildland or vegetative fuels. An urban-wildland interface fire is typically ignited by human activities including campfires, uncontrolled burns, smoking, vehicles, trains, equipment use, and arsonists. People start more than four out of every five wildfires, usually through debris burns, arson, or carelessness.

Wildfire behavior is based on three primary factors: fuel, topography, and weather. The type and amount of fuel, as well as its burning qualities and level of moisture, affect wildfire potential and behavior. Topography affects the movement of air and fire over the ground surface. Slope and terrain can change the rate of speed at which fire travels. Temperature, humidity, and wind (both short and long-term) affect the severity and duration of wildfires. Weather phenomena such as El Nino and La Nina events further complicate the delicate balance of these three essential components to wildfire. The deluge of rainfall that occurs during El Nino events creates excessive vegetative growth. El Nino is followed by La Nina, which creates drought conditions and excessive heat. As a result, the abundant vegetative growth dies off and provides ample fuel for wildfires.

Fire Danger Levels

The National Fire Danger Rating System (NFDRS) allows local agencies to estimate today’s or tomorrow’s fire danger. It integrates the effects of existing and expected fire danger factors into one or more qualitative values that reflect an area’s fire protection needs. It links local agencies’ readiness level to the potential fire problems for that particular day.

Level	Criteria
Low	<p>Ignition: Fuels do not ignite readily from small firebrands although a more intense heat source, such as lightning, may start fires.</p> <p>Spread: Fires in open cured grasslands may burn freely a few hours after rain, but woods fires spread slowly by creeping or smoldering and burn in irregular fingers.</p> <p>Spotting: There is little danger of spotting.</p> <p>Control: Easy</p>
Moderate	<p>Ignition: Fires can start from most accidental causes, but with the exception of lightning fires in some areas, the number of starts is generally low.</p> <p>Spread: Fires in open cured grasslands will burn briskly and spread rapidly on windy days. Timber fires spread slowly to moderately fast. The average fire is of moderate intensity, although heavy concentrations of fuel, especially draped fuel, may burn hot.</p> <p>Spotting: Short-distance spotting may occur, but is not persistent.</p> <p>Control: Fires are not likely to become serious and control is relatively easy.</p>
High	<p>Ignition: All fine dead fuels ignite readily and fires start easily from most causes. Unattended brush and campfires are likely to escape.</p> <p>Spread: Fires spread rapidly. High-intensity burning may develop on slopes or in concentrations of fine fuels.</p>

	<p>Spotting: Short-distance spotting is common.</p> <p>Control: Fires may become serious and their control difficult unless they are attacked successfully while small.</p>
Very High	<p>Ignition: Fires start easily from all causes.</p> <p>Spread: Immediately after ignition, spread rapidly and increase quickly in intensity. Fires burning in light fuels may quickly develop high-intensity characteristics such as long-distance spotting and fire whirlwinds when they burn into heavier fuels.</p> <p>Spotting: Spot fires are a constant danger; long-distance spotting is likely.</p> <p>Control: Direct attack at the head of such fires is rarely possible after they have been burning for more than a few minutes.</p>
Extreme	<p>Ignition: Fires start quickly and burn intensely. All fires are potentially serious.</p> <p>Spread: Furious spread likely, along with intense burning. Development into high-intensity burning will usually be faster and occur from smaller fires than in the very high fire danger class.</p> <p>Spotting: Spot fires are a constant danger; long distance spotting occurs easily.</p> <p>Control: Direct attack is rarely possible and may be dangerous except immediately after ignition. Fires that develop headway in heavy slash or in conifer stands may be unmanageable while the extreme burning condition lasts. Under these conditions, the only effective and safe control action is on the flanks until the weather changes or the fuel supply lessens.</p>

Source: National Fire Danger Rating System

The National Weather Service provides alerts when conditions are favorable for Wildfires.

Alert	Criteria
Fire Weather Watch	Conditions are favorable for red flag conditions in and close to the watch area in the next 12 to 48 hours.
Red Flag Warning	Issued for weather events that may result in extreme fire behavior that will occur within 24 hours. Red Flag criteria occur whenever a geographical area has been in a dry spell for a week or two, or for a shorter period, and the National Fire Danger Rating System (NFDRS) is high to extreme and if there is a sustained wind average of 15 mph or greater, relative humidity less than or equal to 25 percent, and a temperature of greater than 75°F.

Hazard Consequence

Area Impacted:

- High-risk ecosystems
- Urban-Wildland Interface

Duration of the event:

- Wildfires can occur instantly and spread extremely quickly if conditions (fuel, heat, oxygen) are right.
- Although most fires are small and last only a few hours, some fires can last for several days if large enough.
- Essential Service Disruption
- Disruption of essential government services

Special Needs:

- None

Direct Damage:

- The presence of combustible or vulnerable building material, dense vegetation within 30 feet of structures, and potential losses to physical structures and equipment
- Wildfire events cause a release of certain emissions into the surrounding air. The major emissions include: particulate, carbon dioxide, and carbon monoxide. All of these can affect the local environment.
- Hazardous Material Release – Both transportation and fixed facilities have the potential to be at risk of wildfires.
- Potential risks include destruction of land, property, and structures, as well as injuries and loss of life.

Economic Damage:

- Business interruption
- Decreases in tourism and gaming
- Loss of agricultural fields and crops or pastures and livestock can last for months and result in significant damage to the farming community.

Emergency Services:

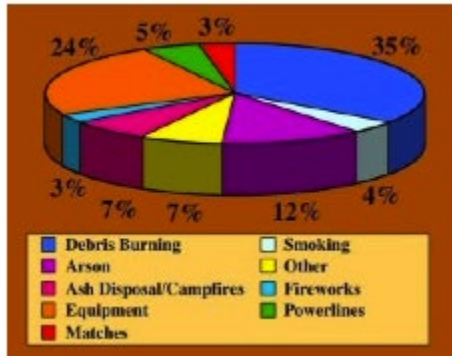
- Fire suppression costs.
- Inadequate water supply to effectively manage fire.
- Large areas that lack wildland maintenance (prescribed burn).
- Evacuation of gaming facilities and residents of reservation property.
- Emissions can cause a decrease in visibility, which can become of great concern with respect to road rights-of-way and traffic hazards.
- Inadequate service roads to remote locations.
- Major fires have the ability to disrupt transportation.

Social Factors:

- Many of the rural communities of Wisconsin do not have adequate management of wildlands nor equipment and supplies to suppress wildfires.
- Urban sprawl into once uninhabitable areas will continue.

Location and Extent

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

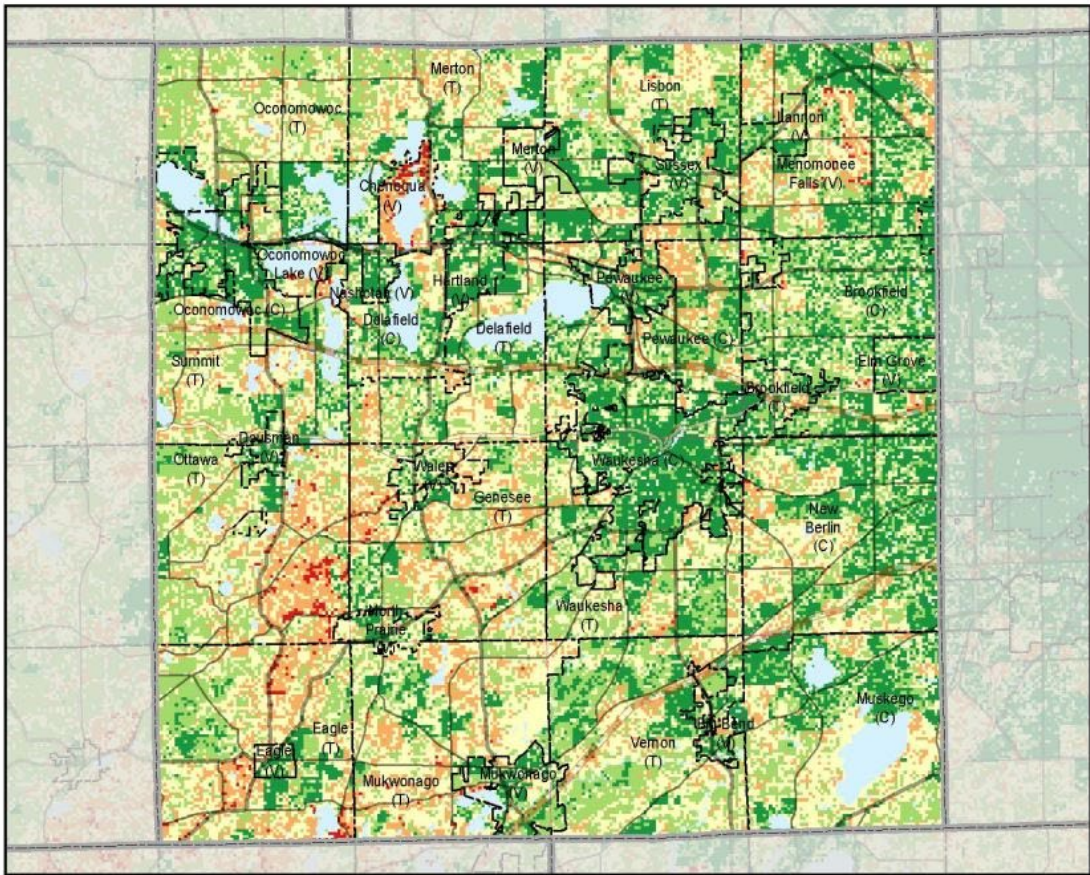


Source: Department of Natural Resources

Fox Brook Park, Fox River Park, Menomonee Park, Minooka Park, Mukwonago Park, Muskego Park, Naga-Waukee Park, Nashotah Park, Old World Wisconsin, the Kettle Moraine State Forest– Southern Unit and the Kettle Moraine State Forest–Lapham Peak Unit are the natural areas in Waukesha County. Local fire departments are responsible for fire protection in these open acreage areas although state firefighting assets would provide mutual aid assistance in the state-owned lands.

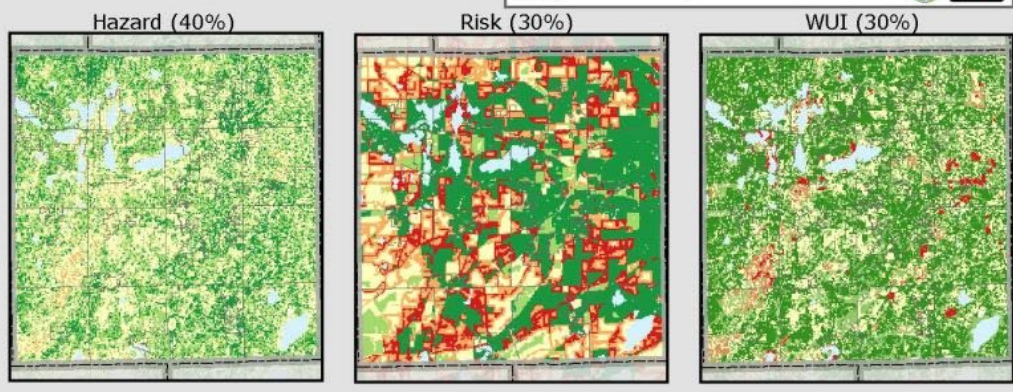
The following map shows the communities in Waukesha County at risk of wildfire.

Waukesha County Communities-at-Risk Composite Map



Communities at Risk is comprised of three weighted inputs: Hazard, Risk, and Wildland Urban Interface (WUI).

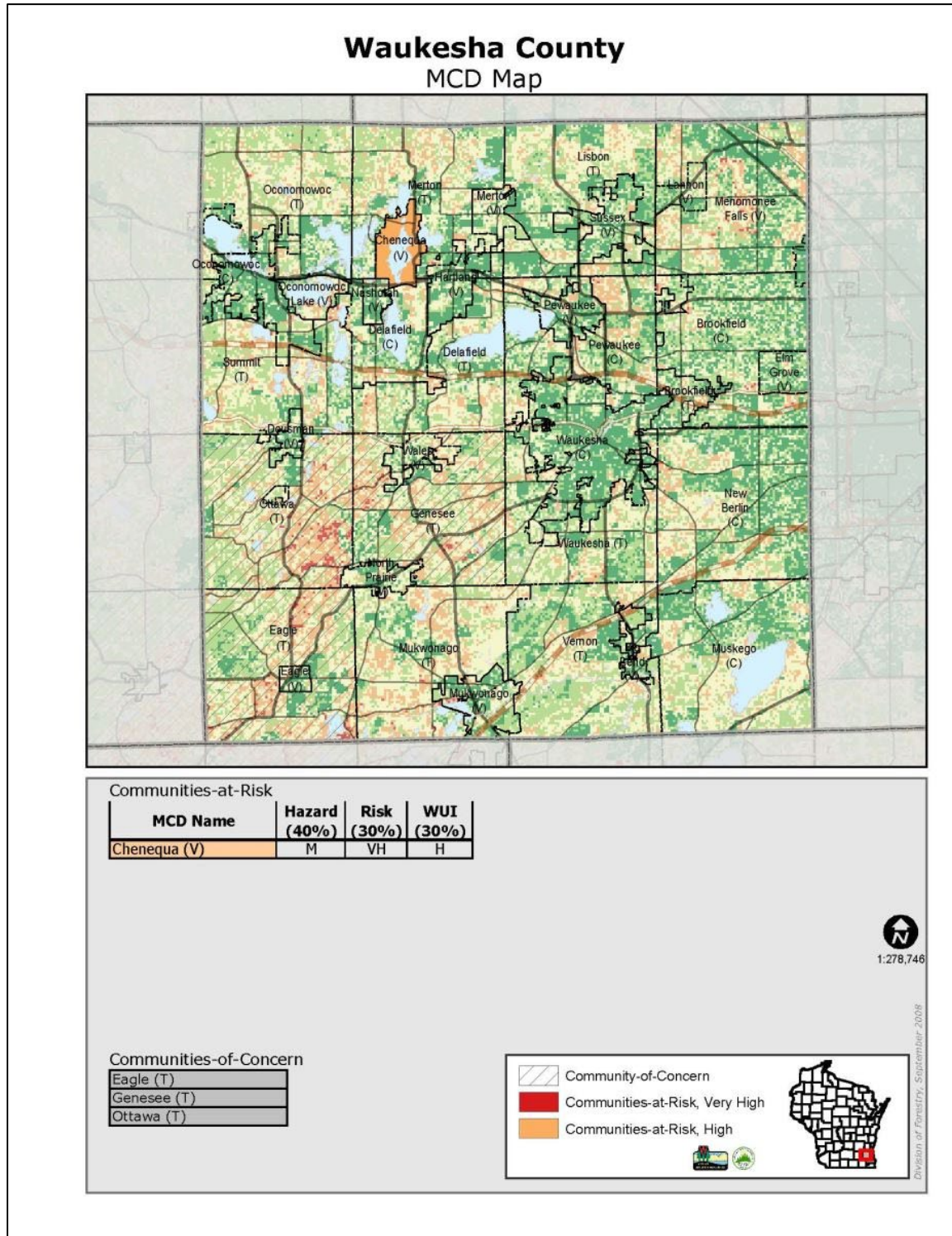
County	
Legal Township	Very High High Moderate Low Very Low
Civil Township	



Division of Forestry, September 2008

Source: WI Department of Natural Resources

In Wisconsin, Communities-at-Risk is defined at the minor civil division (MCD) or town level. Those MCD's determined to have a high or very high threat of wildfire are considered Communities-at-Risk.



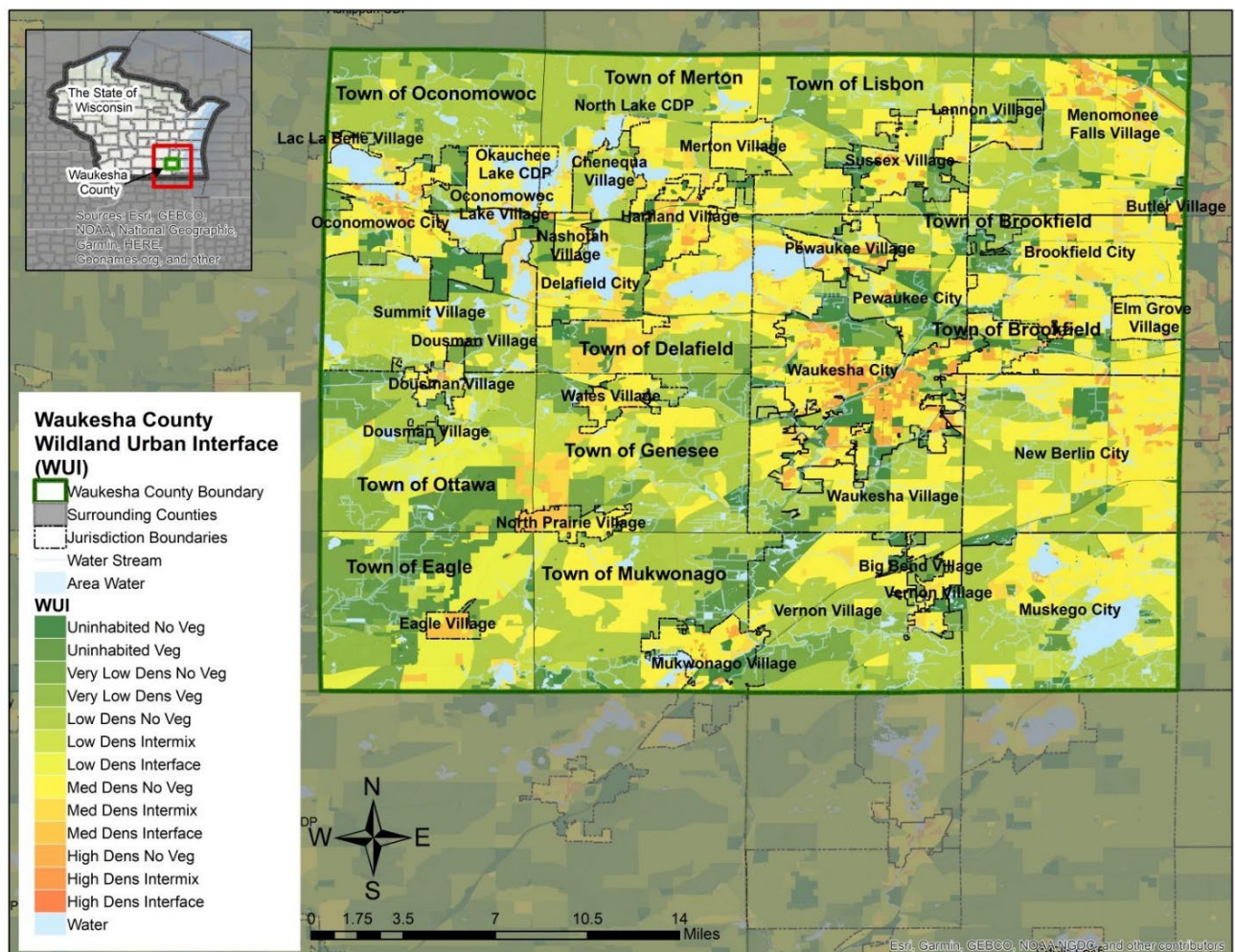
Source: WI Department of Natural Resources

Frequency and Probability

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 forest fire in Waukesha County is very low and the probability of a wildfire is low. The probability of damage from forest or wildfire is also considered low. On April 2, 2021 there was a fire on Marcy Rd that burned 230 acres and resulted in \$73,540 in damages. There have been 19 statewide wildfire events recorded since 1950 by the National Weather Service. These events caused a total of 3 injuries, 1 death, and approximately \$1.81 million of property damage.

Vulnerability

Forest and wildfires can impact the ecology of the open lands. Waukesha County, which has two state forest areas and several counties and municipal parks, would be impacted by a wildfire since a disruption from a fire could erase the usability of this habitat for wildlife and/or recreational purposes for many years.



Hazard Assessment	
Forest and Wildfires	
Frequency/Probability (i.e. Future Probability)	Low
Magnitude/Extent (i.e. Strength or Magnitude)	Low
Vulnerability (i.e. Consequence and Impact)	Low
Overall Risk Rating	Low

Severe Temperatures

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.

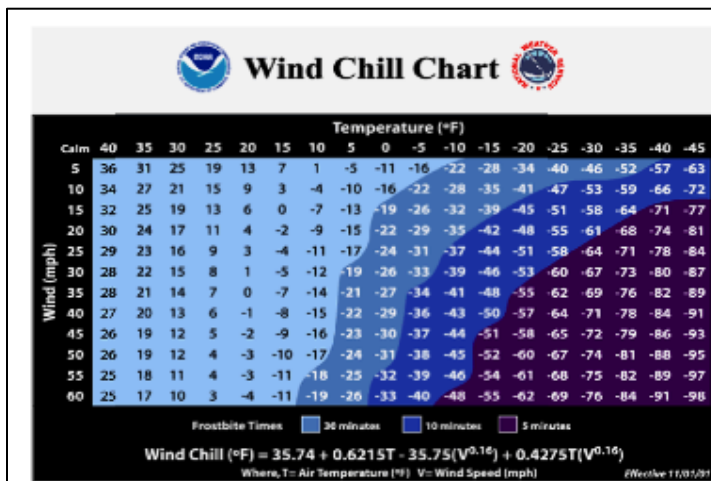
Severe Temperature Hazard Profile

Hazard Profile

Extreme Cold

Extreme cold consisting of long periods of below-freezing temperatures sometimes accompanies a winter storm. Prolonged exposure to the cold can cause frostbite or hypothermia and become life-threatening. Frostbite occurs when the extremities become excessively cold, and hypothermia is a serious health condition where a person’s body temperature falls below 90 degrees. Both conditions are influenced by wind conditions. Various wind chill indices have been developed to predict cold temperature's effect on humans. For instance, a temperature of 5 degrees will have a wind chill of -19 degrees if the wind is blowing 30 mph.

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



Source: National Weather Service

The major risks to people due to extreme cold are:

- Hypothermia - occurs when, due to exposure to cold, the body is unable to maintain its proper core temperature. It may occur in temperatures above freezing and may lead to death.
- Frostbite - describes local cooling, usually to an extremity, which occurs when exposure to cold air or liquid causes constriction of the blood vessels. There are three degrees of frostbite:
 - Frostnip - brought on by direct contact with a cold object or exposure to cold air or water. Tissue damage is minor and response to treatment is usually very good.
 - Superficial frostbite - involves the skin and subcutaneous layers.
 - Freezing - is deep frostbite in which the skin, subcutaneous layers and deeper structures (e.g., muscles, bone, deep blood vessels, organ membranes) of the body are affected and can become frozen.
 - Chilblains - lesions that occur from repeated/chronic exposure of bare skin to temperatures of 60°F or lower.
 - Trenchfoot - a condition that occurs when the lower extremities remain in cool water for a prolonged period of time.

Extreme Heat

Extreme heat is defined as temperatures that are approximately 10 degrees or more above the average high temperature for a given region lasting a prolonged period of time, usually several weeks. Extreme heat occurs when a layer of high atmospheric pressure descends over a geographical area. High pressure causes the air normally located high in our atmosphere to descend, compress, and increase in temperature. This leads to hazy, humid, and muggy air. High pressure systems can reside in an area for weeks as they are resistant to being moved by other weather systems. In addition, high pressure inhibits wind and clouds which normally mitigates the effects of the sun.

Every year, most municipalities experience periods in which the air temperature and humidity creates conditions that could potentially harm human health. Urban areas in particular experience a “heat island” effect. Urban heat island is when an urban area experiences warmer temperatures than its surrounding rural areas. This is caused by large amounts of concrete absorbing heat from the sun during the day. The heat releases at night keeping temperatures high and allowing little time for cooling. This can lead to increased energy demands and stress at-risk populations, especially those without access to air conditioning.

Although extreme heat conditions may not be as notable as other hazards, its consequences can still be devastating. Between 1992 and 2001, deaths from extreme heat in the United States numbered 2,190, compared to 880 deaths from floods and 150 from hurricanes. The average annual number of fatalities directly attributed to extreme heat in the United States is approximately 400.

Extreme heat is typically seasonal in nature with heat waves occurring in the summer months. However, heat waves are associated with high pressure systems and can occur in late spring and early fall as well. For regions in southern latitudes, extreme heat events can occur any time of the year. High pressure systems associated with heat waves can move into an area within a matter of days. These systems are resistant to being moved by other systems and can affect a

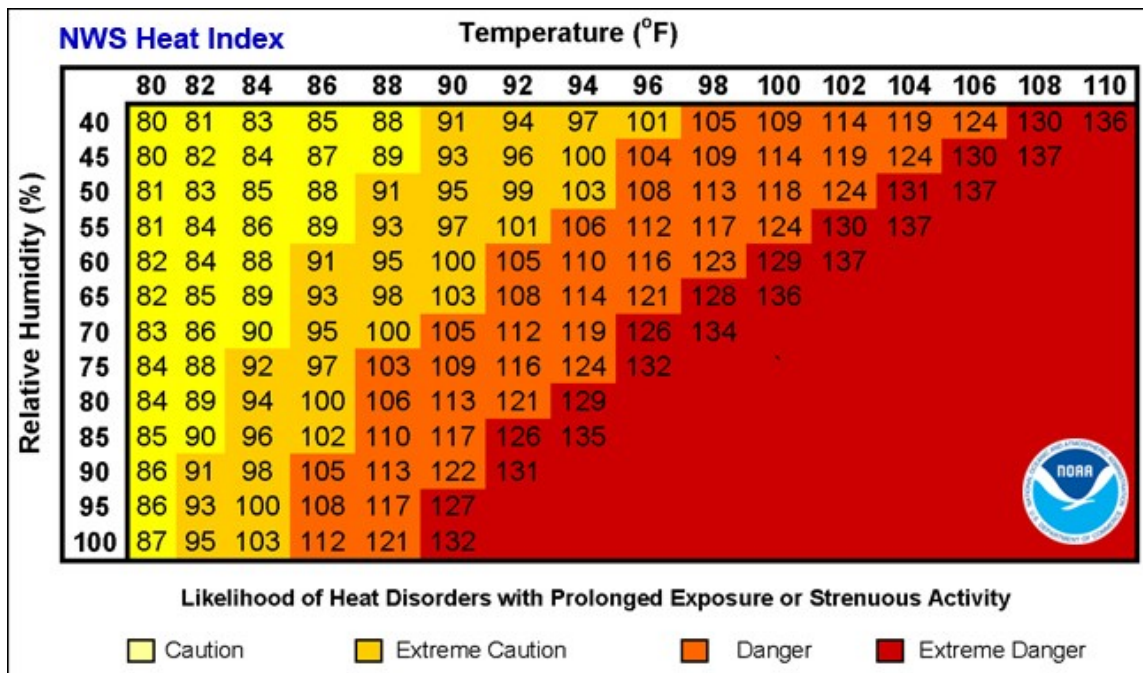
region for days, weeks, or months. The frequency of extreme heat is dependent on weather patterns within a particular region. Weather patterns are affected by many variables including ocean currents, jet streams, and man’s footprint on the environment.

Extreme heat is correlated to high-pressure weather systems and can occur several times a season. High pressure systems associated with heat waves can move into an area within a matter of days. These systems are resistant to being moved by other systems and can affect a region for days, weeks, or months.

The frequency of extreme heat is dependent on weather patterns within a particular region. Weather patterns are affected by many variables including ocean currents, jet streams, and man’s footprint on the environment. Extreme heat is correlated to high-pressure weather systems and can occur several times a season. The magnitude of the hot weather is also affected by many variables including where the system originates, strength and size of the system, the relative humidity and precipitation in the area, and whether another system forms that will push the existing system out. The magnitude of the hot weather is also affected by many variables including where the system originates, strength and size of the system, the relative humidity and precipitation in the area, and whether another system forms that will push the existing system out.

Heat Index

Heat index is created by the National Weather Service. It is the apparent temperature (i.e. the temperature the human body generally feels) when the air temperature is combined with the relative humidity. The heat index is generally used to determine the effects the temperature and humidity can have on the population. Heat index values are reduced by shady, light wind conditions. Full sunshine conditions can increase heat index values by up to 15 degrees.



Source: NOAA

In the event of extreme heat, the National Weather Service will issue heat advisories based on heat indices through media messages. The National Weather Service provides assistance to state and local health officials in preparing civil emergency messages in severe heat waves in addition to issuing special weather statements such as who are at most risk, safety rules, and the severity of the hazard. The National Weather Service will also aid state and local authorities on issuing warnings and survival tips. State and local health officials will be responsible to check on vulnerable populations such as the disabled and the elderly. Residents will be notified to remain indoors and refrain from strenuous activities. They will also be reminded to consume fluids often throughout the day and to stay near air conditioning, fans, and so forth. Exposure to extreme heat can result in various health issues such as sunburn, dehydration, heat cramps, heat exhaustion, and heat stroke. The following table lists some common health hazards that correspond to a certain range of heat index and how dangerous the conditions may be:

Category	Heat Index	Possible Heat Disorders for people in high risk groups
Extreme	130 degrees F or higher	Heat stroke or sun stroke likely.
Danger	105-129 degrees F	Sunstroke, muscle cramps, and/or heat exhaustion possible with prolonged exposure and/or physical activity.
Extreme Caution	90-105 degrees F	Sunstroke, muscle cramps, and/or heat exhaustion possible with prolonged exposure and/or physical activity.
Caution	80-90 degrees F	Fatigue possible with prolonged exposure and/or physical activity.

Source: National Weather Service

Conditions that can induce heat-related illnesses include stagnant atmospheric conditions and poor air quality. Urban areas may be at greater risk from the effects of a prolonged heat wave than rural areas. Asphalt and concrete store heat longer and gradually release heat at night, which can produce higher nighttime temperatures known as the “urban heat island effect. Heat causes more fatalities than all weather related fatalities in the US.”

Heat exceeding 100 degrees is generally considered dangerous; however, lower temperatures coupled with high humidity are also considered dangerous. Heat indices have been developed to account for this interaction. At 80 degrees, a heat index of 101 degrees is reached if the humidity is 90percent. At 90 degrees, a heat index of 106 degrees is reached if the humidity is 70 percent.

Extreme heat can pose a significant risk to all populations but especially the elderly. Extreme heat also has the potential to result in other related hazards. The severity of a drought is directly related to the temperature extreme. Very hot conditions can dry out plant life making it much more susceptible to fire. Heat waves can also cause massive amounts of energy to be consumed. Maximum energy use days all occur on days of extreme heat. Rolling blackouts are not unusual due to the large demand from the power grid.

Hazard Considerations

Area impacted:

- Regional or statewide

Duration of the event:

- Extreme temperatures can last days, weeks or months. Essential Service Disruption

- Excessive power use results in power disruption or outages.
- Transportation – Severe winter storm conditions present a significant transportation hazard. These conditions slow down and hurt the transportation infrastructure. Depending on the intensity of the storm event, the impacts on transportation can range from a system wide delay to a major breakdown of the infrastructure.

Special Considerations:

- The elderly are particularly susceptible to heat and cold waves; young adults participating in sports or recreational outdoor activities during heat waves are also susceptible to fatigue, heat stroke and death.
- Elderly persons and small children, or persons who are on certain medications or overweight are vulnerable to heat stress.

Direct Damage:

- Individual can die from excessive heat. Heat waves can impact the human body in the following adverse ways: sunstroke, muscle cramps, and/or heat exhaustion likely; heatstroke possible with prolonged exposure and/or physical activity.

Economic Damage:

- Business interruption, e.g., airports can be closed and transportation systems shutdown for extended periods of time during periods of extreme heat or cold.
- Decreases in tourism and gaming
- Severe drought combined with heat waves can cause significant losses to agricultural-related industries, e.g., the drought/heat wave of 2000 is estimated to have caused over \$4.0 billion in damages and 140 deaths nationwide.

Emergency Services:

- EMS transports to medical facilities and well-being checks will increase dramatically.
- Emergency shelters for special populations
- Heat waves and drought can cause severe dry conditions which can fuel wildfires.

Social Factors:

- The lack of insulation and adequate heating can lead to serious consequences for residents such as hypothermia and death. During heat waves, individuals need to stay hydrated and avoid outdoor activity from the hours of 10 a.m. to 4 p.m. to avoid excessive sun exposure, which can cause heat stroke and death.

Location and Extent

Wisconsin is well known for its frigid winters and its extreme heat. In 1995, at least 68 people died during an extreme heat event when temperatures remained over 90°F for seven consecutive days. The characteristics of extreme heat will fluctuate dependent on the region. Therefore, extreme heat in Wisconsin may not qualify for extreme heat in Louisiana. Extreme heat health problems are also related to urbanization and social, economic,

and physiological vulnerability. According to research conducted by the Wisconsin Initiative on Climate Change Impacts, extreme heat events are projected to become more frequent, longer-lasting, and geographically widespread. By the middle of the century, Wisconsin residents are projected to experience 1.5 to 4 more weeks of daytime temperatures exceeding 90 °F. Public health officials and concerned citizens will be charged with the task of protecting the most vulnerable populations in the face of these changes.

Another dangerous winter weather situation is the combination of extremely cold temperatures and strong winds that can result in wind chills that cause bodily injury such as frostbite and death due to exposure (hypothermia). Despite the fact that Wisconsin’s harsh winter temperatures have become slightly milder over the past couple of decades, the number of severe winter storms shows an increasing trend. This may be partially related to better documentation generated by the NWS, but may also be related to the fact that warmer air can hold more moisture which ultimately can fall as snow.

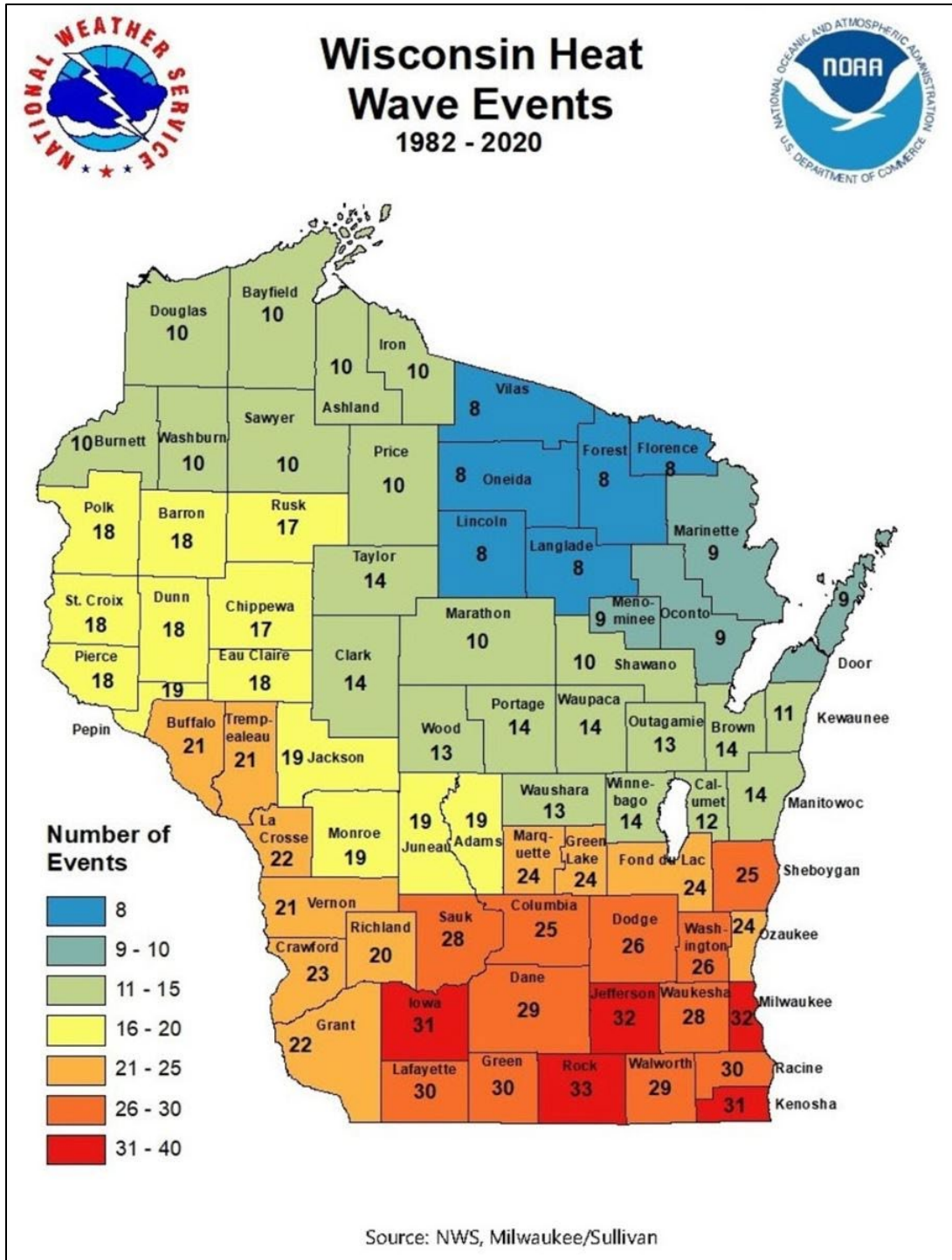
Frequency and Probability

Temperature extremes, both cold and hot, have a medium likelihood of occurrence in any given year. Excessive heat events recorded by the National Weather Service between 1950 and 2021 are outlined below:

Location	Date	Type	Death	Injury	Property Damage	Crop Damage
Statewide	6/4/1994	Heat Wave	0	0	0	0
Waukesha County	10/12/1995	Record Warmth	0	0	0	0
Waukesha County	9/27/1998	Record Heat	0	0	0	0
Waukesha County	9/13/1998	Excessive Heat	0	0	0	0
Waukesha County	11/23/1998	Excessive Heat	0	0	0	0
Waukesha County	12/1/1998	Excessive Heat	0	0	0	0
Waukesha County	7/4/1999	Excessive Heat	0	0	0	0
Waukesha County	7/29/1999	Excessive Heat	8	0	0	0
Waukesha County	7/21/2001	Extreme Wind Chill / Cold	2	0	0	0
Waukesha County	7/31/2001	Excessive Heat	0	0	0	0
Waukesha County	8/6/2001	Excessive Heat	4	0	0	0
Waukesha County	4/15/2002	Excessive Heat	1	0	0	0
Waukesha County	6/20/2002	Excessive Heat	1	0	0	0
Waukesha County	6/22/2002	Excessive Heat	1	0	0	0
Waukesha County	6/30/2002	Excessive Heat	0	0	0	0
Waukesha County	7/1/2002	Excessive Heat	0	0	0	0
Waukesha County	7/8/2002	Excessive Heat	0	0	0	0

Waukesha County	7/21/2002	Excessive Heat	0	0	0	0
Waukesha County	7/24/2005	Excessive Heat	0	0	0	0
Waukesha County	7/3/2012	Excessive Heat	0	0	0	0
Waukesha County	7/16/2006	Heat	0	0	0	0
Waukesha County	7/30/2006	Heat	0	40	0	0
Waukesha County	8/1/2006	Heat	2	0	0	0
Waukesha County	7/3/2012	Heat	0	0	0	0
Waukesha County	11/2014	Heat	0	0	0	0
Waukesha County	7/21/2016	Heat	0	0	0	0
Waukesha County	6/17/2018	Heat	0	0	0	0
Waukesha County	6/29/2018	Excessive Heat	0	0	0	0
Waukesha County	7/04/2018	Heat	0	0	0	0
Waukesha County	7/19/2019	Heat	0	0	0	0

Below is a map of Extreme Heat events in Wisconsin from 1982-2020.

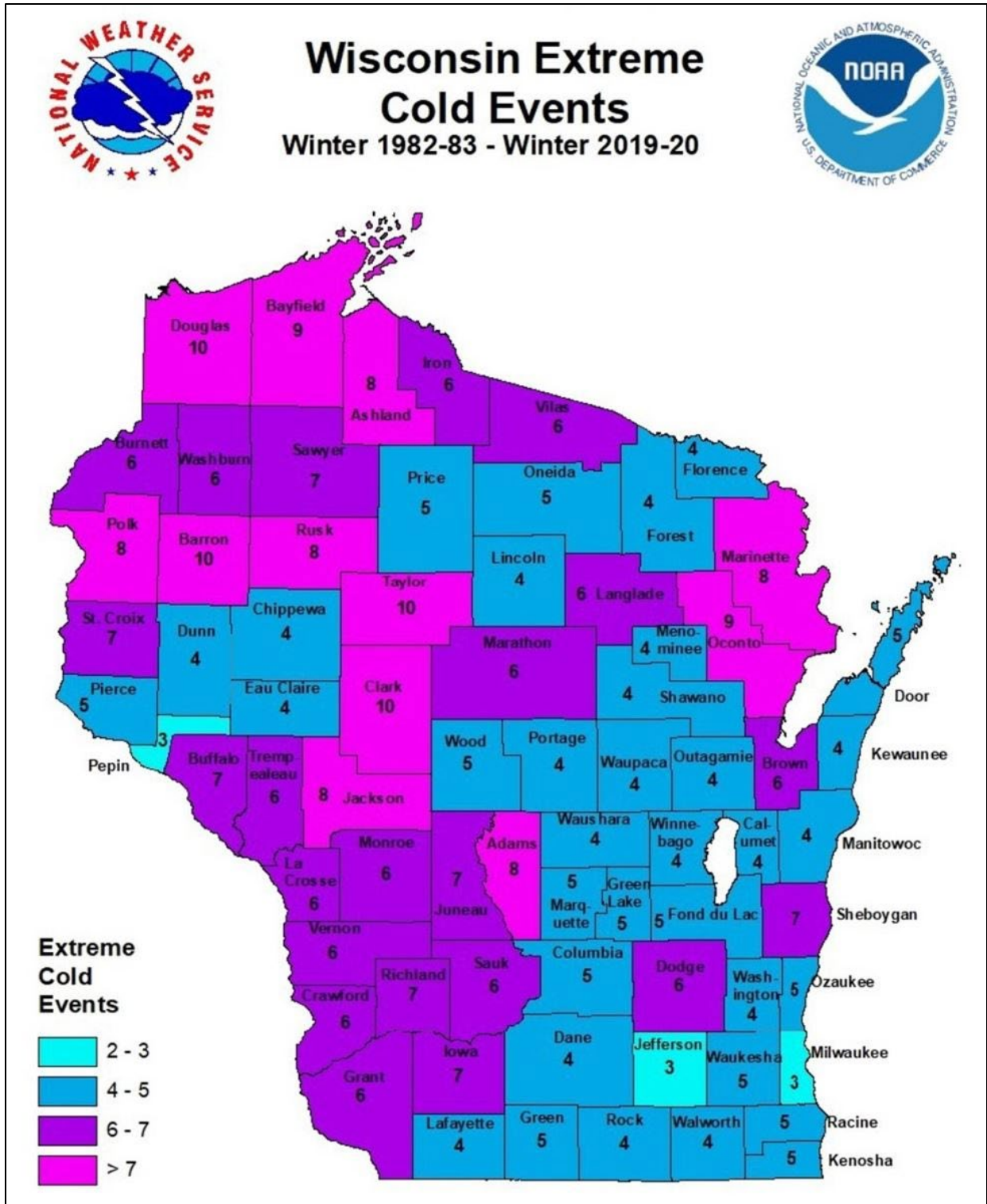


Following is a chart that outlines severe cold events that have been recorded by the National Weather Service in Waukesha County between 1 January 1950 and 28 February 2021:

Location	Date	Type	Death	Injury	Property Damage	Crop Damage
Statewide	1/13/1994	Cold	0	0	0	0

Waukesha County	12/9/1995	Cold	2	21	0	0
Waukesha County	1/30/1996	Extreme Wind Chill	2	0	0	0
Waukesha County	1/31/1996	Extreme Cold	0	10	0	0
Waukesha County	2/1/1996	Extreme Cold	4	18	0	0
Waukesha County	1/17/1997	Extreme Cold	0	3	20	0
Waukesha County	1/5/1999	Extreme Cold	0	0	0	0
Waukesha County	12/18/2005	Extreme Wind Chill / Cold	0	0	0	0
Waukesha County	2/17/2006	Extreme Wind Chill / Cold	0	0	0	0
Waukesha County	2/18/2006	Extreme Wind Chill / Cold	0	0	0	0
Waukesha County	2/3/2007	Extreme Wind Chill / Cold	0	0	0	0
Waukesha County	1/6/2014	Extreme Wind Chill / Cold	0	0	0	0
Waukesha County	1/28/2014	Extreme Wind Chill / Cold	0	0	0	0
Waukesha County	2/5/2007	Cold / Wind Chill	0	0	03	0
Waukesha County	1/30/2008	Cold / Wind Chill	0	0	0	0
Waukesha County	12/15/2008	Cold / Wind Chill	0	0	0	0
Waukesha County	1/21/2013	Cold / Wind Chill	0	0	0	0
Waukesha County	1/7/2015	Cold / Wind Chill	0	0	0	0
Waukesha County	1/9/2015	Cold / Wind Chill	0	0	0	0
Waukesha County	12/14/2016	Cold / Wind Chill	0	0	0	0
Waukesha County	12/18/2016	Cold / Wind Chill	0	0	0	0
Waukesha County	12/25/2017	Cold / Wind Chill	0	0	0	0
Waukesha County	1/01/2018	Cold / Wind Chill	0	0	0	0
Waukesha County	1/29/2019	Extreme Wind Chill / Cold	0	0	0	0

Below is a map of Extreme Cold events in Wisconsin from Winter 1982-83 to Winter 2019-20.



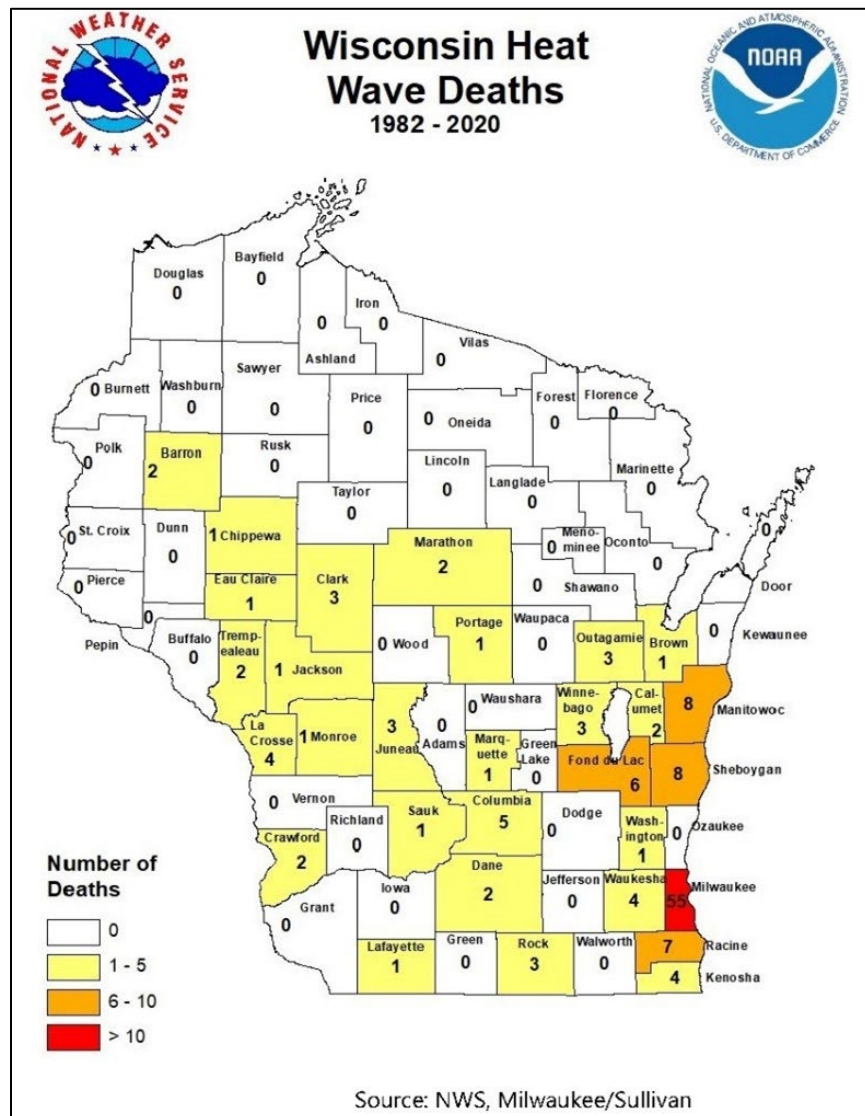
The loss of property due to temperature extremes is not likely but the loss of life or injury to people has a medium likelihood of occurrence. Extreme temperatures marked by heat and cold waves can adversely affect the environment causing deaths in the population, drought, wildfires and economic losses for the agricultural-based industries. However, the economic impact upon Waukesha County because of extreme temperatures would be minimal. Other potential impacts

could be felt in higher energy costs, e.g., most record energy-use days occur on days of extreme heat. Excessive energy use during a heatwave can cause serious energy hazards, such as rolling blackouts.

Vulnerability

Vulnerability to temperature extremes is generally assessed on an individual basis with the most vulnerable sections of our community’s population having the greatest risk. These people may include the elderly, the very young and the chronically ill. People from economically disadvantaged backgrounds, especially those listed in the categories above, are even more vulnerable since they are least able to afford the cost of adequate heating or air conditioning systems. Around 19% of the entire population in Waukesha County are 65 years and older.

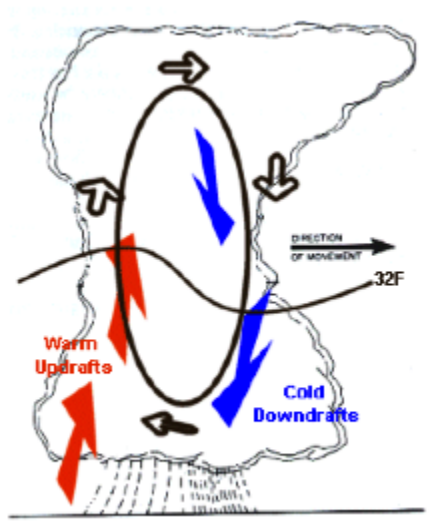
The Waukesha County social services agencies are aware of many of these people who reside in our communities and they, along with the public health department, have plans and access to economic assistance programs to help these people in times of concern.



Hazard Assessment	
Severe Temperatures	
Frequency/Probability (i.e. Future Probability)	Medium
Magnitude/Extent (i.e. Strength or Magnitude)	Medium
Vulnerability (i.e. Consequence and Impact)	Low
Overall Risk Rating	Medium

Hail

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



Source: NWS, January 10, 2003

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

Hail Hazard Profile

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

Hail Size Estimates	
Size	Inches in Diameter
Pea	1/4 inch
Marble/mothball	1/2 inch
Dime/Penny	3/4 inch

Nickel	7/8 inch
Quarter	1 inch
Ping-Pong Ball	1 1/2 inch
Golf Ball	1 3/4 inches
Tennis Ball	2 1/2 inches
Baseball	2 3/4 inches
Tea cup	3 inches
Grapefruit	4 inches
Softball	4 1/2 inches

Source: NSW, January 10, 2003

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.

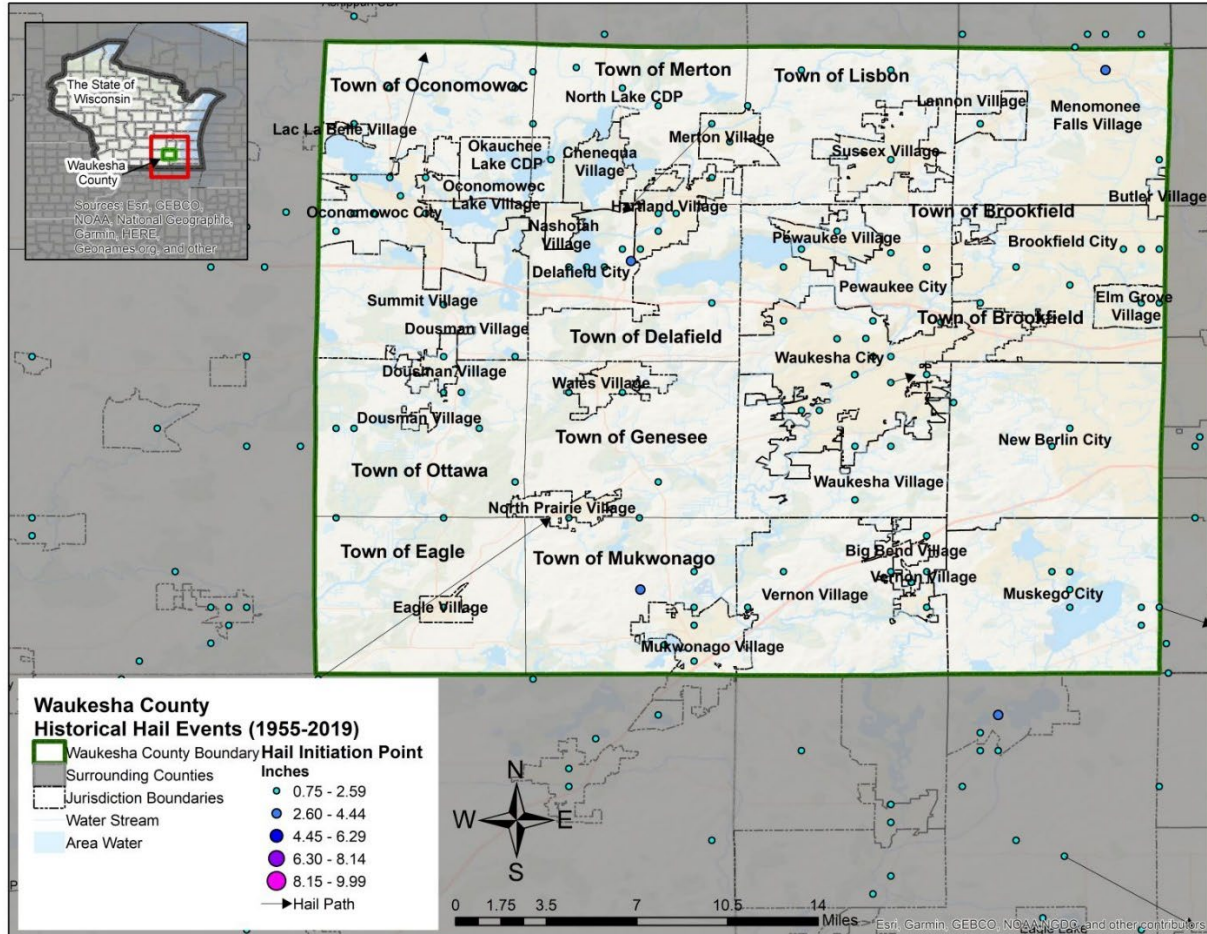
There are methods available to detect hail-producing thunderstorms using weather satellites and weather radar imagery. Hailstones generally fall at higher speeds as they grow in size, though complicating factors such as melting, friction with air, wind, and interaction with rain and other hailstones can slow their descent through Earth's atmosphere. Severe weather warnings are issued for hail when the stones reach a damaging size, as it can cause serious damage to human-made structures and, most commonly, farmers' crops.

The size of hailstones is best determined by measuring their diameter with a ruler. In the absence of a ruler, hailstone size is often visually estimated by comparing its size to that of known objects, such as coins.

Location and Extent

Hailstorms usually occur from May through August and Wisconsin averages two or three hail days per year. Waukesha County has a high probability of hail occurrence in Wisconsin. The likelihood of damage due to hail is therefore considered high.

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.



Frequency and Probability

There have been 145 hail events recorded by the National Weather Service between 1950 and 2021.

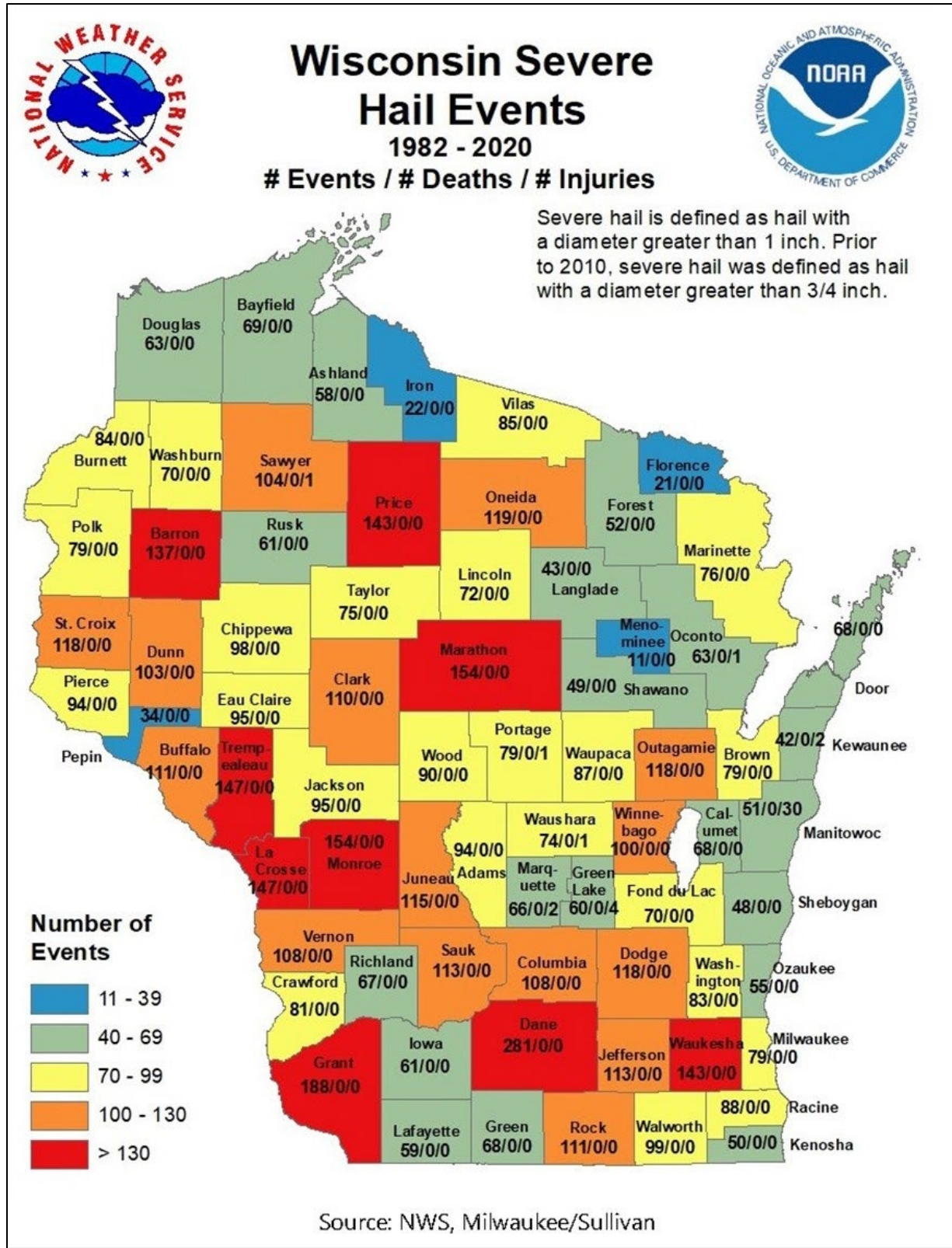
Location	Date	Size	Death	Injury	Property Damage	Crop Damage
Waukesha County	5/14/1957	1.75 in.	0	0	0	0
Waukesha County	7/11/1969	1.75 in.	0	0	0	0
Waukesha County	6/23/1973	2.00 in.	0	0	0	0
Waukesha County	8/30/1973	0.75 in.	0	0	0	0
Waukesha County	7/3/1975	1.75 in.	0	0	0	0
Waukesha County	7/3/1975	1.75 in.	0	0	0	0
Waukesha County	4/2/1977	0.75 in.	0	0	0	0
Waukesha County	6/20/1979	1.75 in.	0	0	0	0
Waukesha County	6/20/1979	1.75 in.	0	0	0	0
Waukesha County	5/28/1980	1.00 in.	0	0	0	0
Waukesha County	5/30/1980	0.75 in.	0	0	0	0
Waukesha County	5/30/1980	1.00 in.	0	0	0	0
Waukesha County	6/5/1980	1.75 in.	0	0	0	0
Waukesha County	8/4/1980	0.75 in.	0	0	0	0
Waukesha County	6/26/1984	1.75 in.	0	0	0	0
Waukesha County	5/26/1985	0.75 in.	0	0	0	0
Waukesha County	5/21/1987	1.75 in.	0	0	0	0
Waukesha County	5/21/1987	1.75 in.	0	0	0	0

Waukesha County	5/21/1987	1.75 in.	0	0	0	0
Waukesha County	8/8/1988	1.00 in.	0	0	0	0
Waukesha County	7/27/1989	0.75 in.	0	0	0	0
Waukesha County	9/9/1991	0.75 in.	0	0	0	0
Oconomowoc	3/23/1994	1.00 in.	0	0	0	0
Brookfield	7/11/1994	1.00 in.	0	0	0	0
Waukesha	7/11/1994	0.75 in.	0	0	0	0
Hartland	4/18/1995	0.75 in.	0	0	0	0
Dousman	6/7/1995	0.75 in.	0	0	0	0
Hartland	8/28/1995	0.75 in.	0	0	0	0
Mukwonago	10/29/1996	2.00 in.	0	0	1.2M	0
New Berlin	10/29/1996	0.75 in.	0	0	0	0
Eagle	5/5/1997	0.75 in.	0	0	0	0
Dousman	6/21/1997	0.88 in.	0	0	0	0
Delafield	7/20/1998	100 kts.	0	0	6K	0
Dousman	8/24/1998	0.75 in.	0	0	0	0
Waukesha	9/1/1998	0.75 in.	0	0	0	0
Dousman	6/28/1999	0.75 in.	0	0	0	0
Waukesha	7/9/1999	0.75 in.	0	0	0	0
Muskego	8/10/1999	1.00 in.	0	0	0	0
Muskego	3/8/2000	0.75 in.	0	0	0	0
Eagle	3/8/2000	1.00 in.	0	0	0	0
Wales	3/8/2000	1.00 in.	0	0	0	0
Mukwonago	5/8/2000	1.00 in.	0	0	0	0
Mukwonago	5/18/2000	1.25 in.	0	0	0	0
Waukesha	5/18/2000	1.00 in.	0	0	0	0
Menomonee Falls	5/18/2000	0.75 in.	0	0	0	0
Delafield	5/18/2000	1.25 in.	0	0	5K	0
Waukesha	5/18/2000	0.75 in.	0	0	0	0
Waukesha	5/18/2000	1.00 in.	0	0	0	0
Merton	5/18/2000	1.75 in.	0	0	0	0
Delafield	7/2/2000	0.88 in.	0	0	0	0
Eagle	5/14/2001	1.00 in.	0	0	0	0
Oconomowoc	5/14/2001	1.75 in.	0	0	0	0
North Prairie	5/14/2001	1.75 in.	0	0	0	0
New Berlin	5/14/2001	1.00 in.	0	0	0	0
Sussex	6/18/2001	1.00 in.	0	0	0	0
Stonebank	6/18/2001	0.88 in.	0	0	0	0
Eagle	7/31/2003	1.00 in.	0	0	0	0
Merton	8/1/2003	1.00 in.	0	0	0	25K
Oconomowoc	3/1/2004	1.00 in.	0	0	0	0
Waukesha	5/8/2004	0.75 in.	0	0	0	0
Delafield	5/23/2004	1.00 in.	0	0	0	0
Oconomowoc	5/23/2004	0.88 in.	0	0	0	0
Menomonee Falls	5/23/2004	1.00 in.	0	0	0	0
Oconomowoc	7/16/2004	0.75 in.	0	0	0	0
Delafield	7/16/2004	0.75 in.	0	0	0	0
Muskego	3/30/2005	1.00 in.	0	0	0	0
Oconomowoc	5/6/2005	0.75 in.	0	0	0	0
Dousman	5/6/2005	0.88 in.	0	0	0	0
North Prairie	5/6/2005	1.00 in.	0	0	0	0
Mukwonago	5/6/2005	0.88 in.	0	0	0	0
Mukwonago	11/5/2005	0.75 in.	0	0	0	0

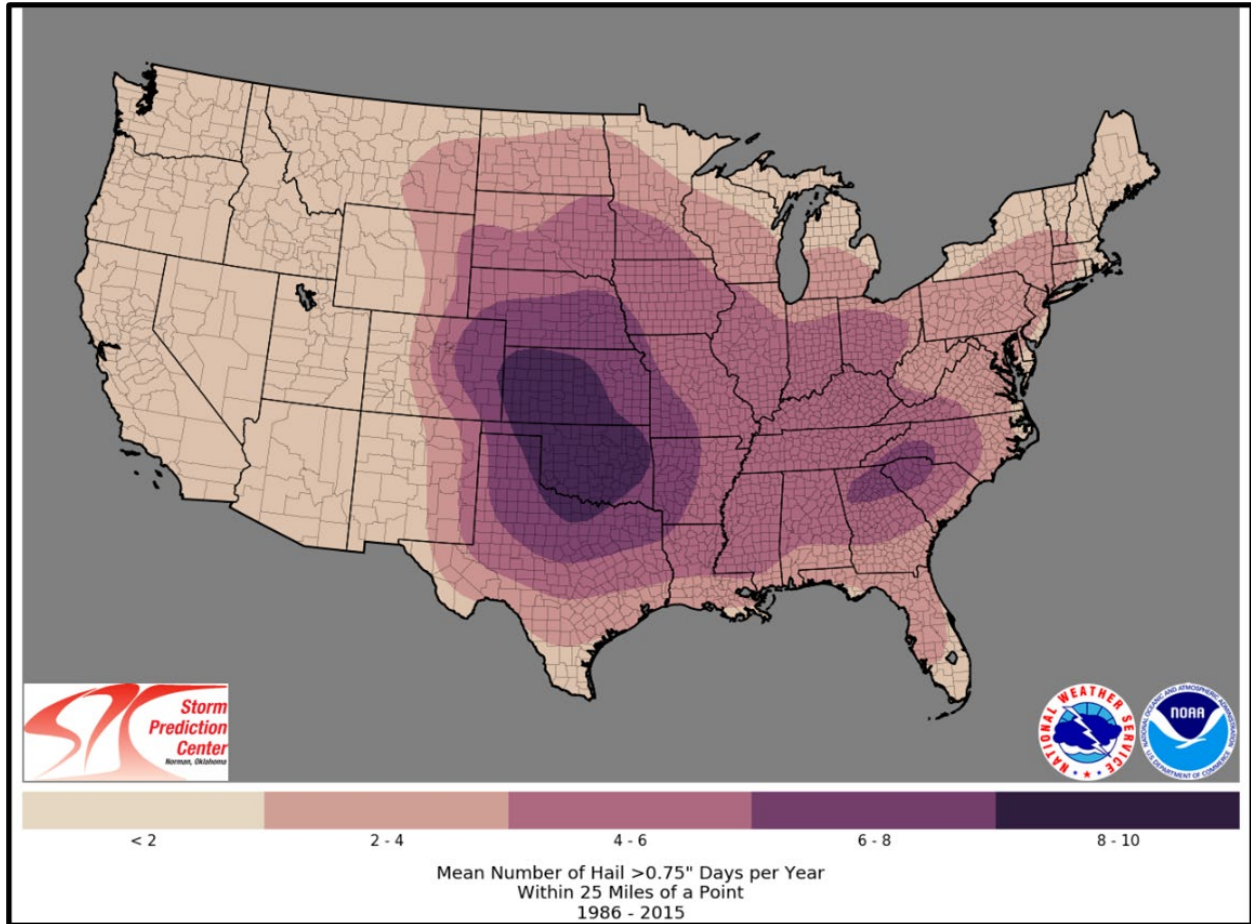
Big Bend	11/5/2005	0.75 in.	0	0	0	0
Brookfield	11/5/2005	0.75 in.	0	0	0	0
Hartland	4/13/2006	1.75 in.	0	0	4.4M	0
Merton	4/13/2006	2.00 in.	0	0	4.4M	0
Sussex	4/13/2006	2.00 in.	0	0	4.4M	0
Sussex	4/13/2006	2.00 in.	0	0	4.4M	0
Menomonee Falls	4/13/2006	2.75 in.	0	0	4.4M	0
Waukesha	4/13/2006	0.88 in.	0	0	0	0
Hartland	5/17/2006	1.00 in.	0	0	0	0
Oconomowoc	6/28/2006	0.88 in.	0	0	0	0
Brookfield	7/9/2006	1.25 in.	0	0	0	0
Elm Grove	7/9/2006	0.75 in.	0	0	0	0
Brookfield	7/9/2006	0.75 in.	0	0	0	0
Brookfield	7/9/2006	0.75 in.	0	0	0	0
Brookfield	7/9/2006	1.00 in.	0	0	0	0
North Prairie	7/9/2006	0.75 in.	0	0	0	0
North Prairie	7/9/2006	1.75 in.	0	0	0	0
Big Bend	8/24/2006	1.00 in.	0	0	0	0
Lannon	9/6/2006	1.00 in.	0	0	0	0
Delafield	9/8/2006	0.88 in.	0	0	0	0
Duplainville	9/8/2006	0.75 in.	0	0	0	0
Eagle	10/2/2006	0.75 in.	0	0	0	0
Oconomowoc	3/21/2007	0.75 in.	0	0	0	0
Pewaukee	3/21/2007	0.75 in.	0	0	0	0
Menomonee Falls	3/21/2007	0.75 in.	0	0	0	0
Hartland	3/22/2007	1.75 in.	0	0	0	0
Mukwonago	3/22/2007	0.88 in.	0	0	0	0
Hartland	7/9/2007	0.75 in.	0	0	0	0
Wales	9/27/2007	0.75 in.	0	0	0	0
Waukesha	4/25/2008	0.75 in.	0	0	0	0
Waukesha Co Arpt	6/7/2008	2.00 in.	0	0	0	0
Oconomowoc	6/7/2008	1.75 in.	0	0	0	0
Waukesha	6/7/2008	1.00 in.	0	0	0	0
Hartland	6/7/2008	3.00 in.	0	0	0	0
Dousman	6/28/2008	0.75 in.	0	0	0	0
Mukwonago	6/8/2009	1.50 in.	0	0	0	0
Downtown Waukesha	9/27/2009	1.00 in.	0	0	0	0
Eagle	6/21/2010	1.50 in.	0	0	0	0
Lannon	6/23/2010	0.75 in.	0	0	0	0
Muskego	7/10/2010	0.75 in.	0	0	0	0
Oconomowoc	9/2/2010	0.88 in.	0	0	0	0
Oconomowoc	9/2/2010	0.88 in.	0	0	0	0
Downtown Waukesha	9/6/2010	1.75 in.	0	0	0	0
Downtown Waukesha	9/6/2010	0.75 in.	0	0	0	0
Hartland	5/11/2011	2.00 in.	0	0	0	0
Hartland	5/11/2011	1.00 in.	0	0	0	0
Hartland	5/11/2011	1.25 in.	0	0	0	0
Eagle	5/22/2011	1.75 in.	0	0	0	0
Oconomowoc	5/1/2012	0.75 in.	0	0	0	0
Oconomowoc	5/1/2012	1.50 in.	0	0	0	0
Oconomowoc	5/1/2012	1.00 in.	0	0	0	0
Stonebank	5/28/2012	0.88 in.	0	0	0	0
North prairie	7/30/2012	1.00 in.	0	0	0	0

Brookfield	8/16/2012	0.88 in.	0	0	0	0
Mukwonago	5/28/2013	1.25 in.	0	0	0	0
Eagle	7/21/2013	0.75 in.	0	0	0	0
Bethesda	8/21/2013	0.88 in.	0	0	0	0
Vernon	8/21/2013	0.75 in.	0	0	0	0
Delafield	8/30/2013	1.00 in.	0	0	0	0
Merton	8/30/2013	1.00 in.	0	0	0	0
Buena vista	8/30/2013	1.00 in.	0	0	0	0
Waukesha co arpt	8/30/2013	0.88 in.	0	0	0	0
Hartland	8/30/2013	1.00 in.	0	0	0	0
Waukesha co.	4/12/2014	0.75 in.	0	0	0	0
Waukesha co.	4/12/2014	0.75 in.	0	0	0	0
Waukesha co.	4/12/2014	1.00 in.	0	0	0	0
Brookfield	5/7/2014	1.00 in.	0	0	0	0
Downtown Waukesha	5/7/2014	1.00 in.	0	0	0	0
Elm grove	6/17/2014	1.25 in.	0	0	0	0
Brookfield	6/17/2014	1.75 in.	0	0	0	0
Brookfield	6/18/2014	0.75 in.	0	0	0	0
Hartland	8/1/2014	1.00 in.	0	0	0	0
New berlin	8/1/2014	1.00 in.	0	0	0	0
Phantom lake	8/1/2014	0.75 in.	0	0	0	0
Downtown Waukesha	8/02/2015	0.88 in.	0	0	0	0
Wukwonago	8/02/2015	3.75 in.	0	0	3K	0
Wukwonago	8/02/2015	1.75 in.	0	0	0	0
Big Bend	8/02/2015	0.2 in.	0	0	0	0
Muskego	8/02/2015	2.50 in.	0	0	0	0
Downtown Waukesha	8/14/2015	1.00 in.	0	0	0	0
Edgewood	8/14/2015	0.88 in.	0	0	0	0
Edgewood	8/14/2015	1.00 in.	0	0	0	0
Big Bend	11/11/2015	1.00 in.	0	0	0	0
Mukwonago	04/25/2016	0.75 in.	0	0	0	0
Phantom Lake	3/23/2017	0.88 in.	0	0	0	0
Mukwonago	3/23/2017	0.75 in.	0	0	0	0
Pewaukee	6/19/2017	1.00 in.	0	0	0	0
Merton	7/01/2017	0.75 in.	0	0	0	0
Merton	7/07/2017	0.75 in.	0	0	0	0
Okauchee	7/15/2017	1.00 in.	0	0	0	0
Dousman	7/15/2017	0.88 in.	0	0	0	0
Dousman	7/15/2017	0.75 in.	0	0	0	0
Oconomowoc Lake	5/02/2018	1.25 in.	0	0	0	0
Bethesda	5/02/2018	1.00 in.	0	0	0	0
Downtown Waukesha	5/02/2018	1.00 in.	0	0	0	0
Lannon	4/07/2020	1.00 in.	0	0	0	0
Merton	6/10/2020	1.00 in.	0	0	0	0
Oconomowoc Lake	6/10/2020	0.75 in.	0	0	0	0
Summit Corners	6/10/2020	1.00 in.	0	0	0	0

Below is a map of Hail Events in Wisconsin from 1982 - 2020.



Historical Probability of Severe Hail Event in the US



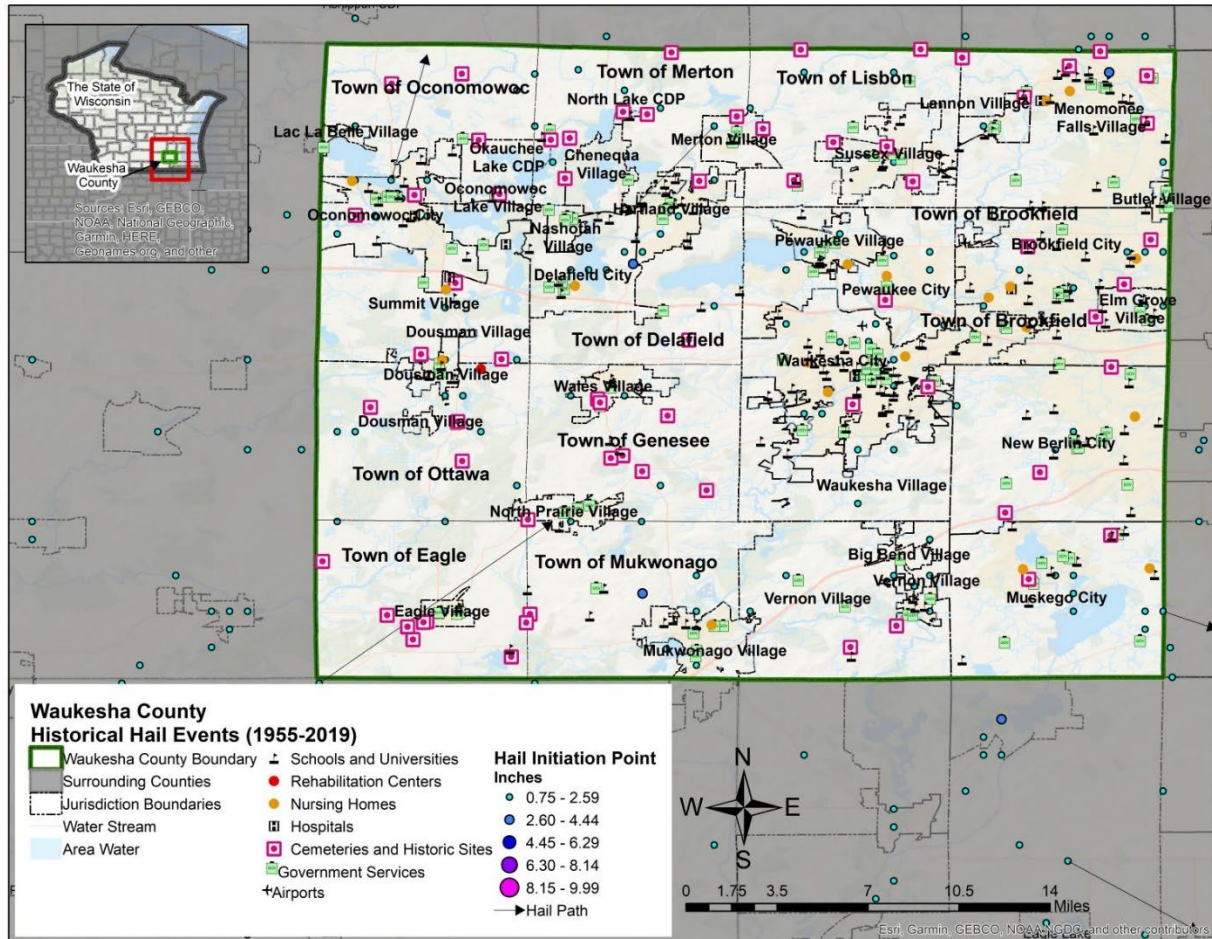
Vulnerability

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

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

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

Hail can be particularly damaging to agricultural concerns, including farm buildings, standing crops and livestock.



Hazard Assessment	
Hail	
Frequency/Probability (i.e. Future Probability)	High
Magnitude/Extent (i.e. Strength or Magnitude)	Medium
Vulnerability (i.e. Consequence and Impact)	Low
Overall Risk Rating	Medium

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



University Corporation for Atmospheric Research [UCAR]

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

Lightning Hazard Profile

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.

Location and Extent

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 that 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.

Frequency and Probability

Waukesha County has a high probability of lightning occurrence; the likelihood of damage due to lightning is considered medium for the more rural areas of the county and low for the more urban areas of the county. Per the 2022 Wisconsin State Hazard Mitigation Plan, Waukesha County leads Wisconsin in the number of lightning events.

Below is a map of Lightning events in Wisconsin from 1982 - 2020.



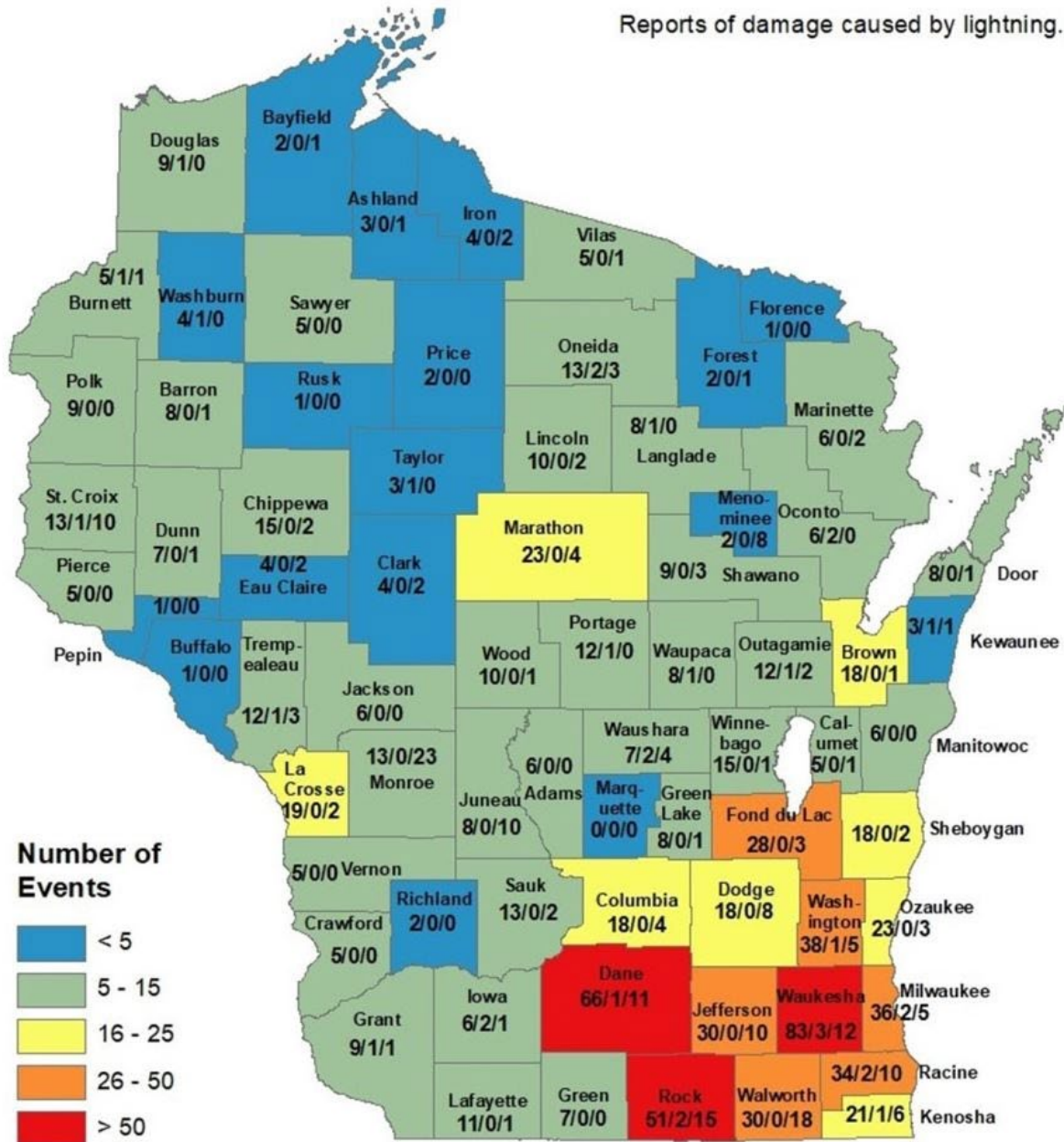
Wisconsin Lightning Events

1982 - 2020

Events / # Deaths / # Injuries



Reports of damage caused by lightning.



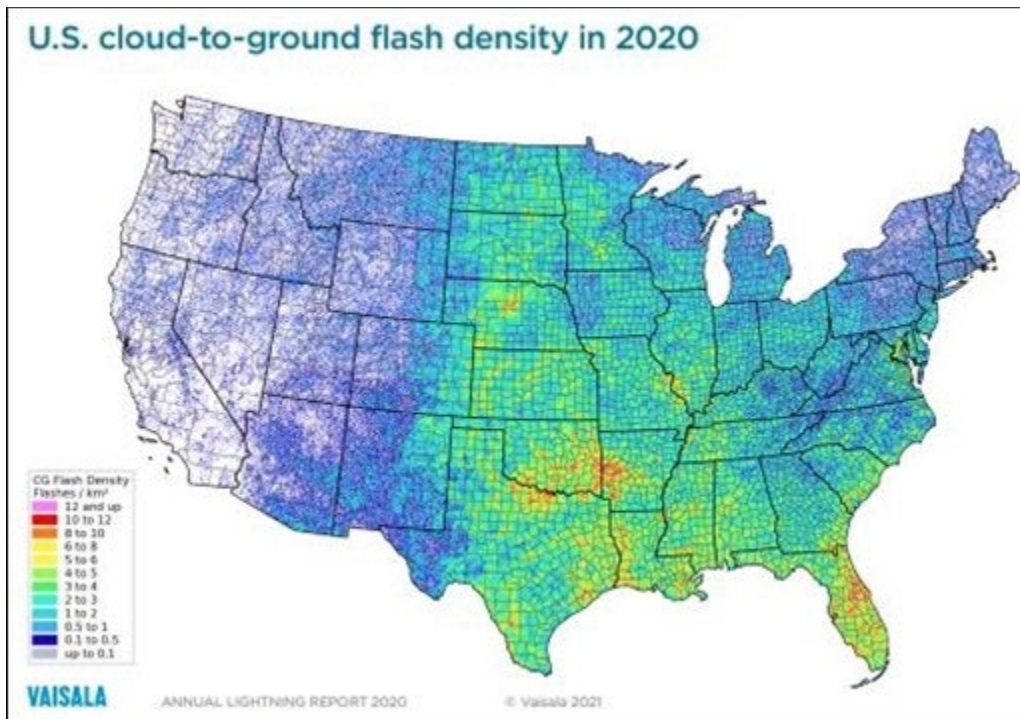
Source: NWS, Milwaukee/Sullivan

The following table shows the lightning events recorded by the National Weather Service between 1 January 1950 and 28 February 2021.

Location	Date	Death	Injury	Property Damage	Crop Damage
Merton	7/4/1995	0	0	0	0
Delafield	7/25/1995	0	0	0	0
Dousman	8/9/1995	0	0	0	0
Dousman	8/9/1995	0	0	85K	0
Merton	8/9/1995	0	0	0	0
Brookfield	8/9/1995	0	0	12K	0
Mukwonago	8/9/1995	0	0	100K	0
Sussex	8/14/1995	0	0	0	0
Hartland	8/19/1995	1	0	0	0
Muskego	8/19/1995	0	1	0	0
Waukesha	8/19/1995	0	0	0	0
Merton	1/17/1996	0	0	15K	0
Elm Grove	6/2/1996	0	0	10K	0
Oconomowoc	6/2/1996	0	0	30K	0
Sussex	7/15/1996	0	1	0	0
New Berlin	8/5/1996	0	0	150K	0
Menomonee Falls	8/5/1996	0	0	25K	0
Chenequa	10/6/1996	0	1	10K	0
Hartland	6/20/1997	0	0	5K	0
Sussex	6/21/1997	0	1	0	0
Brookfield	7/2/1997	0	0	105K	0
Pewaukee	7/21/1997	0	0	12K	0
Muskego	9/16/1997	0	0	5K	0
Muskego	9/16/1997	0	0	1K	0
Muskego	9/16/1997	0	0	1K	0
Muskego	9/16/1997	0	0	1K	0
Sussex	5/12/1998	0	0	2K	0
Delafield	5/28/1998	0	0	20K	0
Delafield	5/31/1998	0	0	4K	0
Delafield	5/31/1998	0	0	10K	0
Pewaukee	5/31/1998	0	0	3K	0
Nashotah	6/18/1998	0	0	5K	0
Waukesha	6/24/1998	0	0	6K	0
Elm Grove	6/28/1998	0	0	10K	0
Oconomowoc	7/20/1998	0	0	4K	0
Oconomowoc	5/17/1999	0	0	2K	0
New Berlin	7/9/1999	0	0	2K	0
Pewaukee	8/26/2000	0	0	210K	0
Hartland	8/26/2000	0	0	10K	0
Brookfield	5/14/2001	0	0	3K	0
Elm Grove	8/12/2002	0	0	250K	0
Delafield	8/21/2002	0	0	3K	0
Hartland	8/21/2002	0	0	5K	0
Waukesha	8/3/2004	0	0	100K	0
Hartland	11/5/2005	0	0	1.1M	0
Brookfield	5/24/2006	0	0	1K	0
Waukesha	7/27/2006	0	1	0	0
Muskego	8/24/2006	0	1	0	0
Waterville	8/22/2007	0	0	200K	0
Waukesha	3/31/2008	0	0	25K	0
New Berlin	3/31/2008	0	0	10K	0
Oconomowoc	7/10/2008	0	0	50K	0
Oconomowoc	7/10/2008	0	0	100K	0
Mukwonago	8/4/2008	0	0	25K	0
North Prairie	8/4/2008	0	0	150K	0

New Berlin	8/9/2009	0	0	50K	0
Marcy	9/18/2010	0	0	100K	0
Merton	7/11/2011	0	0	1.00K	0
Hartland	7/11/2011	0	0	1.00K	0
Downtown Waukesha	9/25/2011	0	0	2.00K	0
Merton	4/9/2013	0	0	20.00K	0
New Berlin	4/9/2013	0	0	5.00K	0
Eagle	7/21/2013	0	1	0K	0
Hartland	3/15/2016	0	0	1K	0
Oconomowoc	6/10/2016	0	0	100K	0
Hales Corner	6/18/2018	0	0	20K	0
Downtown Waukesha	9/12/2019	0	0	2.5M	0

The following figure shows the Flash Density Map for the US.



Vulnerability

One of the most damaging lightning events occurred in downtown Waukesha in 2019. Lightning struck and caused a fire in a 42-unit apartment building causing 100 people to be displaced and the building to be totaled.

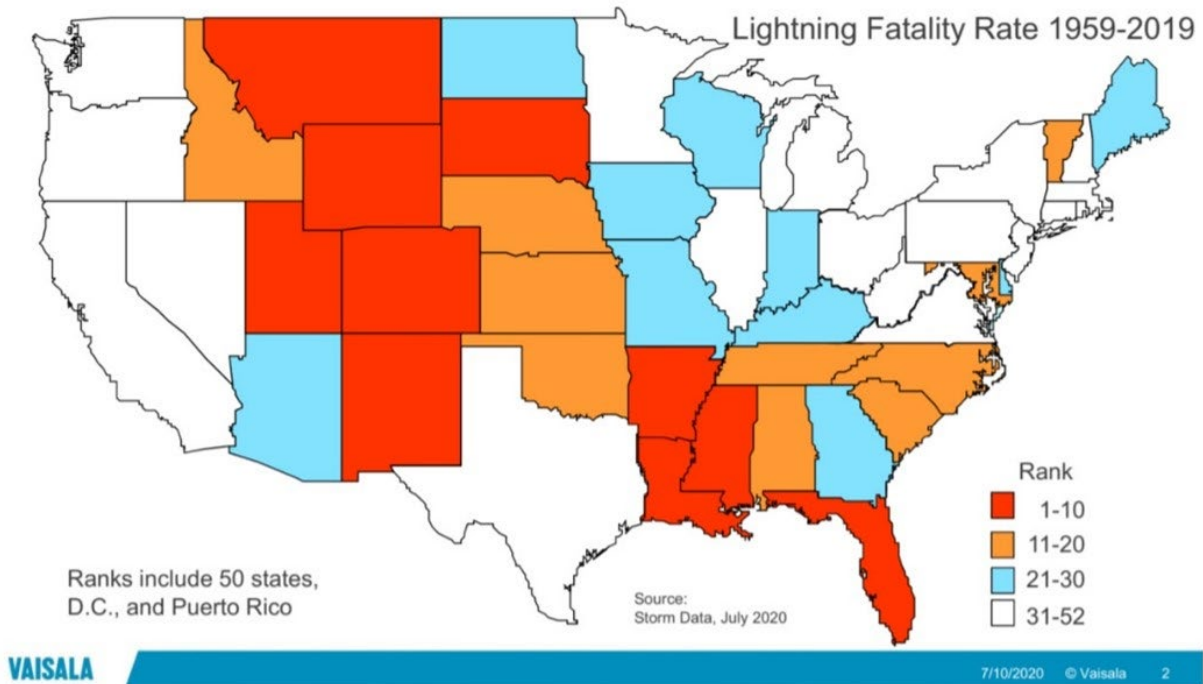
Lightning, which often occurs in conjunction with thunderstorms and hail, can damage many types of infrastructure, including electric lines/poles/transformers, telephone lines and radio communication equipment. These pieces of infrastructure are needed by both first response agencies and the general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

Residential and business properties are liable to receive damage either as a result of a lightning strike causing a fire or other type of direct damage or by overloading electronic equipment (e.g.,

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 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.

The hazard posed by lightning is significantly underrated. After floods, lightning kills the most people on average each year. Nationally, lightning has the highest total fatalities since 1940 out of all the severe weather hazards. However, in Wisconsin, there were no reported lightning fatalities since 2017. High winds, rainfall, and a darkening cloud cover are warning signs for possible cloud-to-ground lightning strikes. While many casualties of lightning occur at the onset of a storm, more than half of lightning-related deaths transpire after a thunderstorm has passed.



Source: National Lightning Safety Council (NLSC), NOAA

Hazard Assessment	
Lightning	
Frequency/Probability (i.e. Future Probability)	▶ High
Magnitude/Extent (i.e. Strength or Magnitude)	▶ Medium
Vulnerability (i.e. Consequence and Impact)	▶ Low
Overall Risk Rating	▶ Medium

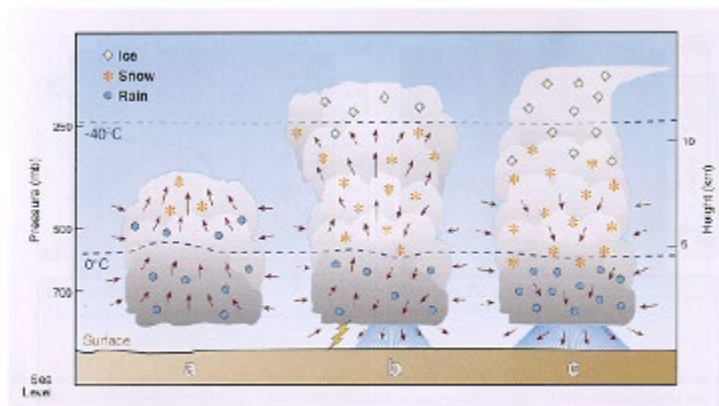
Thunderstorms

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

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

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

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



National Weather Service - Flagstaff

Thunderstorms Hazard Profile

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

Summers are generally rainy in Wisconsin, and the state experiences about 30 to 40 thunderstorms per year, with occasional hail and lightning. Precipitation is usually higher in areas with the highest elevations, such as the Northern Highlands and Western Uplands. Annual precipitation figures range from approximately 28 to 34 inches, depending on the region.

Location and Extent

There are approximately 100,000 thunderstorms in the United States every year and approximately 10% of those are considered severe (i.e., has at least ¾" hail, winds of at least 58 mph or a tornado). Most Wisconsin counties, including Waukesha County, average between 30

and 40 thunderstorm days per year although a portion of southwestern and south-central Wisconsin average 40 to 50 thunderstorm days per year. In Waukesha County, there are typically several severe thunderstorms per year. Thunderstorms can occur throughout the year with the highest frequency during the months of May through September. The majority of storms occur between the hours of noon and midnight.

Frequency and Probability

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 3/4" hail, winds of at least 58 mph or a tornado). Most Wisconsin counties, including Waukesha County, average between 30 and 40 thunderstorm days per year although a portion of southwestern and south-central Wisconsin average 40 to 50 thunderstorm days per year. In Waukesha County, there are typically several severe thunderstorms per year. Thunderstorms can occur throughout the year with the highest frequency during the months of May through September. The majority of storms occur between the hours of noon and midnight.

The probability of thunderstorms occurring in Waukesha County is high. 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.

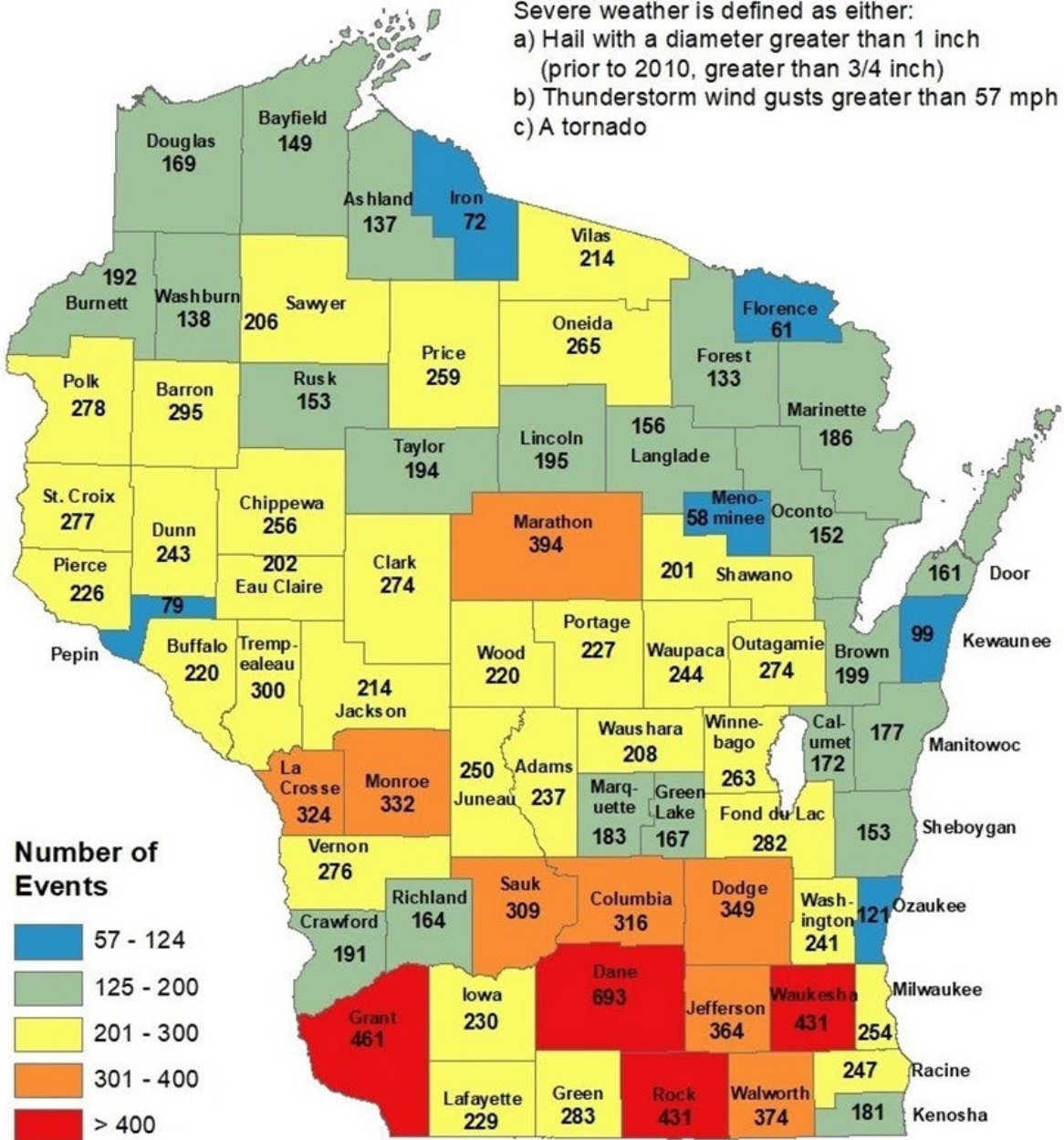
Below is a map of Thunderstorm Wind Events in Wisconsin from 1844 - 2020.



Wisconsin Total Severe Weather Events 1844 - 2020



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



Source: NOAA, NWS, Milwaukee/Sullivan

The following table lists the thunderstorms and high wind events that have been recorded in Waukesha County by the National Weather Service between 1 January 1950 and February 2021.

Location	Date	Wind Speed	Death	Injury	Property Damage	Crop Damage
WAUKESHA CO.	7/31/1955	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	6/17/1957	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	10/8/1959	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	6/10/1961	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	6/29/1962	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	4/11/1965	70 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	6/20/1965	55 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	9/9/1965	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	7/10/1966	61 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	6/10/1968	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	7/14/1972	65 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	4/21/1973	60 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	6/16/1973	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	6/9/1974	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	7/6/1977	50 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	7/6/1977	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	7/18/1978	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	8/15/1978	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	6/29/1979	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	6/5/1980	56 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	7/16/1980	52 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	7/29/1980	61 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	8/4/1980	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	8/4/1980	75 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	8/4/1980	65 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	6/24/1981	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	7/12/1981	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	7/12/1981	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	8/31/1981	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	8/3/1982	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	7/19/1983	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	7/19/1983	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	7/19/1983	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	7/19/1983	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	7/19/1983	0 kts.	0	0	0.00K	0.00K

WAUKESHA CO.	8/10/1983	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	6/6/1984	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	6/26/1984	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	7/9/1984	69 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	7/9/1984	69 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	7/23/1984	57 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	10/16/1984	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	5/12/1985	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	6/11/1986	60 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	7/27/1986	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	7/27/1986	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	5/21/1987	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	6/25/1987	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	7/6/1987	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	7/20/1987	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	7/29/1987	65 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	5/8/1988	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	5/8/1988	55 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	8/4/1988	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	8/8/1988	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	8/8/1988	52 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	11/16/1988	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	5/24/1989	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	7/27/1989	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	7/27/1989	56 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	8/4/1989	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	8/4/1989	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	8/4/1989	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	8/18/1990	50 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	3/27/1991	54 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	4/29/1991	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	7/1/1991	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	7/7/1991	52 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	7/7/1991	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	7/7/1991	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	7/7/1991	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	5/11/1992	70 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	6/17/1992	0 kts.	0	0	0.00K	0.00K
WAUKESHA CO.	6/17/1992	0 kts.	0	0	0.00K	0.00K
Oconomowoc	8/9/1993	0 kts.	0	0	5.00K	5.00K
Hartland	8/9/1993	0 kts.	0	0	50.00K	50.00K

Pewaukee	8/9/1993	0 kts.	0	0	50.00K	50.00K
Dousman	4/18/1994	52 kts.	0	0	0.00K	0.00K
Waukesha	4/18/1994	61 kts.	0	0	50.00K	0.00K
Oconomowoc	7/4/1994	61 kts.	0	0	0.00K	5.00K
Delafield	7/4/1994	50 kts.	0	0	0.00K	0.00K
Hartland	7/4/1994	0 kts.	0	0	5.00K	5.00K
Waukesha	7/11/1994	52 kts.	0	0	0.00K	0.00K
Eagle	8/9/1995	0 kts.	0	0	0.00K	0.00K
North Prairie	8/9/1995	52 kts.	0	0	0.00K	0.00K
Hartland	8/9/1995	0 kts.	0	0	0.00K	0.00K
Butler	8/28/1995	0 kts.	0	0	0.00K	0.00K
Mukwonago	8/28/1995	0 kts.	0	0	0.00K	0.00K
OCONOMOWOC	8/5/1996		0	0	15.00K	0.00K
BROOKFIELD	8/19/1996		0	0	10.00K	0.00K
WALES	10/29/1996		0	0	20.00K	0.00K
MUKWONAGO	4/5/1997		0	0	12.00K	0.00K
CHENEQUA	6/15/1997		0	1	3.00K	0.00K
HARTLAND	6/21/1997	52 kts.	0	0	0.50K	0.00K
MUKWONAGO	6/24/1997	54 kts.	0	0	1.00K	0.00K
WAUKESHA	6/24/1997		0	0	3.00K	0.00K
OCONOMOWOC	7/26/1997		0	0	15.00K	0.00K
MUSKEGO	8/3/1997		0	0	200.00K	0.00K
EAGLE	5/15/1998		0	0	1.00K	0.00K
MUSKEGO	5/15/1998		0	0	1.00K	0.00K
DOUSMAN	5/28/1998		0	0	8.00K	0.00K
WAUKESHA	5/28/1998	61 kts.	0	0	15.00K	0.00K
COUNTYWIDE	5/31/1998	70 kts.	0	0	6.700M	50.00K
DOUSMAN	6/18/1998		0	0	30.00K	0.00K
HARTLAND	2/11/1999	55 kts.	0	0	3.00K	0.00K
MUKWONAGO	6/6/1999	70 kts.	0	0	40.00K	0.00K
BROOKFIELD	6/6/1999		0	0	15.00K	0.00K
OCONOMOWOC	6/10/1999		0	0	1.00K	0.00K
WAUKESHA	6/10/1999		0	0	1.00K	0.00K
WAUKESHA	6/10/1999		0	0	1.00K	0.00K
BROOKFIELD	6/11/1999	51 kts.	0	0	0.00K	0.00K
SUSSEX	6/11/1999	56 kts.	0	0	0.00K	0.00K
DOUSMAN	6/11/1999		0	0	1.00K	0.00K
DELAFIELD	5/8/2000		0	0	1.00K	0.00K
DELAFIELD	5/11/2000	52 kts. E	0	0	1.00K	0.00K
HARTLAND	5/11/2000	65 kts. E	0	0	100.00K	0.00K
GENESEE	6/1/2000		0	0	2.00K	0.00K

WAUKESHA	7/2/2000	68 kts. M	0	0	100.00K	0.00K
DOUSMAN	7/2/2000	61 kts. M	0	0	150.00K	0.00K
BROOKFIELD	7/2/2000		0	0	200.00K	0.00K
WAUKESHA	7/2/2000		0	0	2.00K	0.00K
WALES	8/26/2000		0	0	2.00K	0.00K
WAUKESHA	9/11/2000		0	0	3.00K	0.00K
COUNTYWIDE	6/11/2001	52 kts. M	0	0	75.00K	0.00K
WAUKESHA	8/9/2001	52 kts. E	0	0	0.00K	0.00K
DOUSMAN	9/3/2001	50 kts. E	0	0	0.00K	0.00K
BIG BEND	9/3/2001	56 kts. E	0	0	0.00K	0.00K
OCONOMOWOC	9/7/2001	52 kts. E	0	0	0.00K	0.00K
SUSSEX	6/10/2002	56 kts. E	0	0	0.00K	0.00K
PEWAUKEE	7/8/2002	52 kts. M	0	0	0.00K	0.00K
WAUKESHA CO ARPT	8/21/2002	87 kts. E	0	0	2.000M	0.00K
WAUKESHA	8/21/2002	56 kts. M	0	0	0.00K	0.00K
NORTH LAKE	9/2/2002	58 kts. M	0	0	0.00K	0.00K
EAGLE	10/4/2002	61 kts. E	0	0	50.00K	0.00K
OCONOMOWOC	10/4/2002	64 kts. M	0	0	300.00K	0.00K
WAUKESHA	7/4/2003	55 kts. MG	0	0	0.00K	0.00K
EAGLE	7/4/2003	56 kts. EG	0	0	5.00K	0.00K
WAUKESHA	7/6/2003	56 kts. MG	0	0	0.00K	0.00K
OCONOMOWOC	7/15/2003	61 kts. EG	0	0	0.00K	0.00K
ELM GROVE	7/30/2003	54 kts. MG	0	0	0.00K	0.00K
MERTON	8/1/2003	56 kts. EG	0	0	0.00K	0.00K
OCONOMOWOC	3/1/2004	52 kts. EG	0	0	1.00K	0.00K
OCONOMOWOC	4/18/2004	57 kts. MG	0	0	50.00K	0.00K
PEWAUKEE	5/21/2004	56 kts. MG	0	0	0.00K	0.00K
EAGLE	6/23/2004	56 kts. EG	0	0	0.00K	0.00K
NEW BERLIN	6/23/2004	56 kts. EG	0	0	0.00K	0.00K
WAUKESHA	8/3/2004	45 kts. EG	0	0	20.00K	0.00K
MERTON	6/30/2005	56 kts. EG	0	0	0.00K	0.00K
EAGLE	6/30/2005	56 kts. EG	0	0	0.00K	0.00K
GENESEE	6/30/2005	52 kts. EG	0	0	0.00K	0.00K
BROOKFIELD	6/30/2005	52 kts. EG	0	0	0.00K	0.00K
NEW BERLIN	7/21/2005	59 kts. MG	0	0	5.00K	0.00K
WAUKESHA	7/21/2005	61 kts. EG	0	0	10.00K	0.00K
HARTLAND	7/23/2005	52 kts. EG	0	0	1.00K	0.00K
DOUSMAN	7/23/2005	52 kts. EG	0	0	1.00K	0.00K
MUKWONAGO	7/23/2005	52 kts. EG	0	0	1.00K	0.00K
NORTH PRAIRIE	7/25/2005	56 kts. EG	0	0	5.00K	0.00K
MUKWONAGO	9/13/2005	58 kts. MG	0	0	0.00K	0.00K

DOUSMAN	9/13/2005	56 kts. EG	0	0	0.00K	0.00K
SUSSEX	9/13/2005	61 kts. EG	0	0	0.00K	0.00K
PEWAUKEE	9/13/2005	61 kts. EG	0	0	0.00K	0.00K
HARTLAND	9/13/2005	56 kts. EG	0	0	0.00K	0.00K
DELAFIELD	5/24/2006	50 kts. EG	0	0	10.00K	0.00K
BROOKFIELD	6/21/2006	56 kts. EG	0	0	10.00K	0.00K
BROOKFIELD	6/21/2006	52 kts. EG	0	0	0.00K	0.00K
DELAFIELD	6/28/2006	52 kts. EG	0	0	0.00K	0.00K
NEW BERLIN	7/9/2006	57 kts. MG	0	0	0.00K	0.00K
SUSSEX	7/9/2006	56 kts. EG	0	0	75.00K	0.00K
DOUSMAN	7/20/2006	52 kts. EG	0	0	0.00K	0.00K
BROOKFIELD	7/20/2006	52 kts. EG	0	0	10.00K	0.00K
EAGLE	7/27/2006	52 kts. EG	0	0	0.00K	0.00K
PEWAUKEE	7/27/2006	56 kts. EG	0	0	20.00K	0.00K
WAUKESHA	7/27/2006	61 kts. EG	0	0	0.00K	0.00K
BIG BEND	7/27/2006	52 kts. EG	0	0	5.00K	0.00K
MUSKEGO	8/2/2006	50 kts. EG	0	0	0.00K	0.00K
DOWNTOWN WAUKESHA	10/2/2006	56 kts. EG	0	0	0.00K	0.00K
NEW BERLIN	10/2/2006	51 kts. MG	0	0	0.00K	0.00K
HARTLAND	10/4/2006	50 kts. EG	0	0	0.00K	0.00K
MUSKEGO	6/7/2007	52 kts. EG	0	0	0.00K	0.00K
BROOKFIELD	6/18/2007	52 kts. EG	0	0	2.00K	0.00K
MENOMONEE FALLS	6/18/2007	52 kts. EG	0	0	2.00K	0.00K
OCONOMOWOC	8/22/2007	52 kts. EG	0	0	25.00K	0.00K
SUSSEX	8/22/2007	52 kts. EG	0	0	75.00K	0.00K
PEWAUKEE	8/22/2007	56 kts. EG	0	0	25.00K	0.00K
SUSSEX	4/25/2008	52 kts. EG	0	0	1.00K	0.00K
DOUSMAN	4/25/2008	56 kts. EG	0	0	30.00K	0.00K
EAGLE	6/6/2008	50 kts. EG	0	0	0.00K	0.00K
LANNON	6/6/2008	50 kts. EG	0	0	0.00K	0.00K
LANNON	6/6/2008	50 kts. EG	0	0	0.00K	0.00K
WAUKESHA CO ARPT	6/7/2008	61 kts. EG	0	0	0.00K	0.00K
DOUSMAN	6/8/2008	50 kts. EG	0	0	0.00K	0.00K
OCONOMOWOC	6/28/2008	61 kts. EG	0	0	0.00K	0.00K
DOWNTOWN WAUKESHA	6/28/2008	50 kts. EG	0	0	0.00K	0.00K
HARTLAND	7/2/2008	56 kts. EG	0	0	10.00K	0.00K
DOWNTOWN WAUKESHA	7/7/2008	50 kts. EG	0	0	0.00K	0.00K
DOWNTOWN WAUKESHA	7/7/2008	56 kts. EG	0	0	15.00K	0.00K

EAGLE	7/10/2008	56 kts. EG	0	0	10.00K	0.00K
STONEBANK	7/16/2008	56 kts. EG	0	0	0.00K	0.00K
NEW BERLIN	7/16/2008	65 kts. EG	0	0	15.00K	0.00K
DOWNTOWN WAUKESHA	6/18/2009	56 kts. EG	0	0	5.00K	0.00K
MUSKEGO	8/9/2009	61 kts. EG	0	0	10.00K	0.00K
EAGLE	8/9/2009	56 kts. EG	0	0	0.00K	0.00K
DOWNTOWN WAUKESHA	8/9/2009	52 kts. EG	0	0	0.00K	0.00K
DELAFIELD	9/27/2009	56 kts. EG	0	0	0.00K	0.00K
MUKWONAGO	6/18/2010	66 kts. MG	0	0	0.00K	0.00K
MUSKEGO	6/18/2010	65 kts. EG	0	0	0.00K	0.00K
DOUSMAN	6/21/2010	60 kts. EG	0	0	0.00K	0.00K
MUSKEGO	6/21/2010	65 kts. EG	0	0	0.00K	0.00K
OCONOMOWOC	6/23/2010	56 kts. EG	0	0	0.00K	0.00K
LANNON	7/14/2010	52 kts. EG	0	0	0.00K	0.00K
DOWNTOWN WAUKESHA	7/22/2010	59 kts. MG	0	0	0.00K	0.00K
DOUSMAN	8/9/2010	56 kts. EG	0	0	0.00K	0.00K
STONEBANK	8/20/2010	50 kts. EG	0	0	0.00K	0.00K
PEWAUKEE	8/20/2010	56 kts. MG	0	0	0.00K	0.00K
NASHOTAH	9/2/2010	70 kts. EG	0	0	0.00K	0.00K
MUSKEGO	4/10/2011	70 kts. EG	0	0	0.00K	0.00K
MUSKEGO	6/8/2011	65 kts. EG	0	0	0.00K	0.00K
EAGLE	6/21/2011	96 kts. EG	0	1	276.00K	0.00K
EAGLE	6/21/2011	69 kts. MG	0	0	0.00K	0.00K
MUKWONAGO	6/21/2011	61 kts. EG	0	0	0.00K	0.00K
DOUSMAN	7/11/2011	56 kts. EG	0	0	0.00K	0.00K
DOWNTOWN WAUKESHA	7/11/2011	56 kts. MG	0	0	0.00K	0.00K
MONTEREY	9/3/2011	56 kts. EG	0	0	2.00K	0.00K
MUKWONAGO	5/6/2012	56 kts. EG	0	0	2.00K	0.00K
STONEBANK	5/28/2012	61 kts. EG	0	0	5.00K	0.00K
DOWNTOWN WAUKESHA	5/28/2012	56 kts. EG	0	0	5.00K	0.00K
NEW BERLIN	5/28/2012	52 kts. EG	0	0	20.00K	0.00K
OCONOMOWOC	7/26/2012	61 kts. EG	0	0	0.00K	0.00K
DELAFIELD	7/26/2012	61 kts. EG	0	0	25.00K	0.00K
BIG BEND	7/26/2012	56 kts. EG	0	0	0.00K	0.00K
WAUKESHA CO ARPT	7/26/2012	51 kts. MG	0	0	0.00K	0.00K
MUSKEGO	7/30/2012	52 kts. EG	0	0	0.00K	0.00K
EAGLE	9/4/2012	56 kts. EG	0	0	3.00K	0.00K
OCONOMOWOC	5/14/2013	59 kts. MG	0	0	30.00K	0.00K

PEWAUKEE	6/12/2013	56 kts. EG	0	0	10.00K	0.00K
BROOKFIELD	6/12/2013	56 kts. EG	0	0	25.00K	0.00K
BROOKFIELD	6/27/2013	56 kts. EG	0	0	1.00K	0.00K
DOUSMAN	8/22/2013	50 kts. EG	0	0	0.50K	0.00K
NASHOTAH	8/22/2013	50 kts. EG	0	0	0.50K	0.00K
NASHOTAH	8/30/2013	56 kts. EG	0	0	0.00K	0.00K
DOWNTOWN WAUKESHA	8/30/2013	58 kts. MG	0	0	0.00K	0.00K
NORTH PRAIRIE	8/30/2013	52 kts. EG	0	0	1.50K	0.00K
WAUKESHA COUNTY	2/2014		0	0	0	0.00K
DOUSMAN	5/12/2014	58 kts. EG	0	0	2.00K	0.00K
DOUSMAN	5/12/2014	50 kts. EG	0	0	2.00K	0.00K
BROOKFIELD	6/17/2014	60 kts. EG	0	0	10.00K	0.00K
DOWNTOWN WAUKESHA	6/17/2014	55 kts. EG	0	0	5.00K	0.00K
EAGLE	6/17/2014	50 kts. EG	0	0	1.00K	0.00K
OCONOMOWOC LAKE	6/18/2014	50 kts. EG	0	0	15.00K	0.00K
UTICA	6/18/2014	50 kts. EG	0	0	2.00K	0.00K
NEW BERLIN	6/18/2014	50 kts. EG	0	0	2.00K	0.00K
BETHESDA	6/30/2014	57 kts. EG	0	0	10.00K	0.00K
MENOMONEE FALLS	6/30/2014	51 kts. EG	0	0	1.00K	0.00K
WAUKESHA CO ARPT	7/29/2014	55 kts. EG	0	0	5.00K	0.00K
WAUKESHA COUNTY	5/2014		0	0	0K	0.00K
WAUKESHA COUNTY	6/2014		0	0	0K	0.00K
WAUKESHA COUNTY	7/2014		0	0	0K	0.00K
WAUKESHA COUNTY	8/2014		0	0	0K	0.00K
WAUKESHA COUNTY	9/2014		0	0	0K	0.00K
WAUKESHA COUNTY	10/2014		0	0	0K	0.00K
WAUKESHA COUNTY	11/2014		0	0	0K	0.00K
WAUKESHA COUNTY	12/2014		0	0	0K	0.00K
WAUKESHA COUNTY	4/2015		0	0	0K	0.00K
DOWNTOWN WAUKESHA	6/22/2015	52 kt. EG	0	0	.50K	0.00K
MUSKEGO LAKE	6/22/2015	52 kt. EG	0	0	.50K	0.00K
EAGLE	7/13/2015	65 kt. EG	0	0	25K	0.00K
EAGLE	7/18/2015	50 kt. EG	0	0	10K	0.00K

VERNON	8/02/2015	50 kt. EG	0	0	1K	0.00K
WAUKESHA COUNTY	2/2016		0	0	0K	0.00K
WAUKESHA COUNTY	3/2016		0	0	0K	0.00K
MENOMONEE FALLS	5/28/2016	70 kt. EG	0	0	51K	0.00K
LANNON	5/28/2016	50 kt. EG	0	0	5K	0.00K
WAUKESHA CO ARPT	6/05/2016	61 kt. EG	0	0	5K	0.00K
NORTH PRAIRIE	6/05/2016	64 kt. EG	0	0	10K	0.00K
DOUSMAN	6/05/2016	57 kt. EG	0	0	2K	0.00K
UTICA	6/05/2016	61 kt. EG	0	0	5K	0.00K
NEW BERLIN	6/05/2016	61 kt. EG	0	0	10K	0.00K
NORTH PRAIRIE	6/05/2016	56 kt. EG	0	0	10K	0.00K
JERICHO	6/05/2016	61 kt. EG	0	0	6K	0.00K
DOWNTOWN WAUKESHA	7/21/2016	52 kt. EG	0	0	6K	0.00K
TESS CORNERS	9/07/2016	55 kt. EG	0	0	10K	0.00K
WAUKESHA COUNTY	12/2016		0	0	0K	0.00K
DOWNTOWN WAUKESHA	4/20/2017	52 kt. EG	0	0	.50K	0.00K
SUMMIT CORNERS	5/15/2017	50 kt. EG	0	0	2K	0.00K
OCONOMOWOC LAKE	5/17/2017	61 kt. EG	0	0	1K	0.00K
SUMMIT CORNERS	5/17/2017	61 kt. EG	0	0	3K	0.00K
LANNON	6/28/2017	52 kt. EG	0	0	10K	0.00K
UTICA	5/02/2018	50 kt. EG	0	0	2K	0.00K
DOWNTOWN WAUKESHA	5/02/2018	52 kt. EG	0	0	0K	0.00K
MAPLETON	5/27/2018	50 kt. EG	0	0	1K	0.00K
PHANTOM LAKE	6/18/2018	50 kt. EG	0	0	3K	0.00K
DELAFIELD	7/01/2018	50 kt. EG	0	0	4K	0.00K
BROOKFIELD	7/01/2018	50 kt. EG	0	0	3K	0.00K
MENOMONEE FALLS	7/01/2018	50 kt. EG	0	0	1K	0.00K
LAC LA BELLE	8/26/2018	50 kt. EG	0	0	1K	0.00K
SUMMIT CORNERS	8/26/2018	50 kt. EG	0	0	2K	0.00K
OCONOMOWOC LAKE	8/26/2018	56 kt. EG	0	0	2K	0.00K
OCONOMOWOC LAKE	6/27/2019	53 kt. EG	0	0	4K	0.00K
OCONOMOWOC	6/27/2019	50 kt. EG	0	0	8K	0.00K
DOUSMAN	6/27/2019	50 kt. EG	0	0	1K	0.00K
BUENA VISTA	6/27/2019	61 kt. EG	0	0	5K	0.00K
DOWNTOWN WAUKESHA	6/27/2019	61 kt. EG	0	0	7K	0.00K

DOWNTOWN WAUKESHA	6/27/2019	61 kt. EG	0	0	10K	0.00K
DOWNTOWN WAUKESHA	6/27/2019	61 kt. EG	0	0	7K	0.00K
MENOMONEE FALLS	6/27/2019	50 kt. EG	0	0	7K	0.00K
LAC LA BELLE	6/30/2019	56 kt. EG	0	0	12K	0.00K
PEWAUKEE	7/02/2019	50 kt. EG	0	0	3K	0.00K
LANNON	7/02/2019	50 kt. EG	0	0	3K	0.00K
BROOKFIELD	7/02/2019	50 kt. EG	0	0	6K	0.00K
WAUKESHA CO ARPT	8/18/2019	50 kt. EG	0	0	2K	0.00K
WAUKESHA COUNTY	10/1/2019					
BROOKFIELD	4/20/2020	50 kt. EG	0	0	5K	0.00K
MERTON	6/10/2020	50 kt. EG	0	0	2K	0.00K
BETHESDA	6/11/2020	50 kt. EG	0	0	1K	0.00K
FUSSVILLE	7/07/2020	50 kt. EG	0	0	6K	0.00K
UTICA	7/09/2020	50 kt. EG	0	0	3K	0.00K
LAC LA BELLE	7/09/2020	50 kt. EG	0	0	3K	0.00K
OCONOMOWOC	8/09/2020	50 kt. EG	0	0	1K	0.00K
BETHESDA	8/09/2020	50 kt. EG	0	0	3K	0.00K
BROOKFIELD	8/23/2020	50 kt. EG	0	0	5K	0.00K
SAYLESVILLE	11/10/2020	52 kt. EG	0	0	12K	0.00K
BIG BEND	11/10/2020	52 kt. EG	0	0	8K	0.00K

Vulnerability

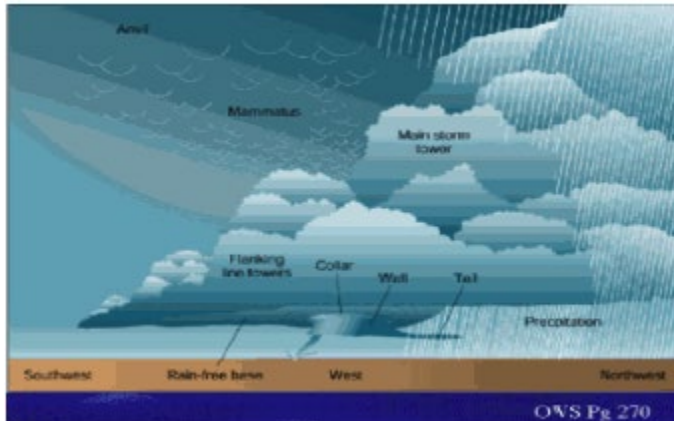
Thunderstorms, which often produce hail and lightning and may occasionally spawn tornadoes, high wind storms or flash flooding, can damage many types of infrastructure. Waukesha County’s thunderstorm vulnerabilities due to associated hail, lightning, winds and floodwaters are discussed in the other hazard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

According to the 2022 State of Wisconsin Hazard Mitigation Plan, 273 total assets and 10 critical facilities with a replacement cost of \$41,942,643 are at risk of severe weather, and are deemed critical to the state.

Hazard Assessment	
Thunderstorms	
Frequency/Probability (i.e. Future Probability)	▶ High
Magnitude/Extent (i.e. Strength or Magnitude)	▶ Medium
Vulnerability (i.e. Consequence and Impact)	▶ Low
Overall Risk Rating	▶ Medium

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 like a tornado.

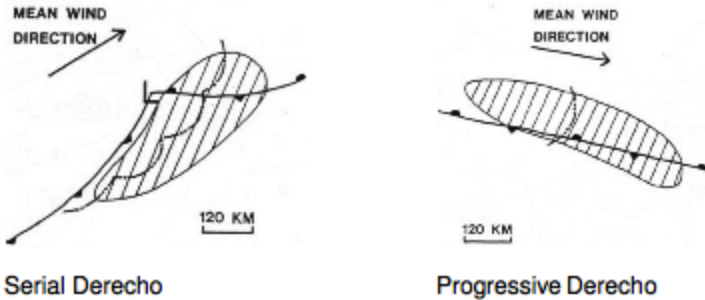


A derecho is a widespread, long-lived, violent, convectively-induced straight-line windstorm that is associated with a fast-moving band of severe thunderstorms usually taking the form of a bow echo.

Derechos blow in the direction of movement of their associated storms; this is similar to a gust front except that the wind is sustained and generally increases in strength behind the "gust" front. A warm-weather phenomenon, derechos occur mostly in summer, especially July, in the northern hemisphere. They can occur at any time of the year and occur as frequently at night as in the daylight hours.

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

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



Tornadoes and High Winds Hazard Profile

Hazard Profile

Tornado

Tornadoes are nature's most violent storms. Spawned from powerful thunderstorms, tornadoes can cause fatalities and devastate a neighborhood in seconds. A tornado appears as a rotating, funnel-shaped cloud that extends from a thunderstorm to the ground with whirling winds that can reach 250 miles per hour or more. Damage paths can be in excess of one mile wide and 50 miles long. Some tornadoes are clearly visible, while rain or nearby low-hanging clouds obscure others. A cloud of debris can mark the location of a tornado even if a funnel is not visible. Occasionally, tornadoes develop so rapidly that little, if any, advance warning is possible.

Tornadoes occur as part of strong thunderstorms that develop in unstable atmospheric conditions. Tornadoes can accompany tropical storms and hurricanes that move over land, and are most common to the right and ahead of the path of the storm center as it comes ashore. The strongest tornadoes form with supercells, rotating thunderstorms with a well-defined radar circulation called a mesocyclone. One in three supercells experience a descent of clouds or funnel clouds. These thunderstorms can also produce damaging hail and severe straight-line winds even without a tornado occurrence.

Tornadoes develop under three scenarios:

- Along a squall line ahead of an advancing cold front moving from the north;
- In connection with thunderstorm squall lines during hot, humid weather; and
- In the outer portion of a tropical cyclone.

Tornadoes are visible because low atmospheric pressure in the vortex leads to cooling of the air by expansion and to condensation and formation of water droplets. They are also visible as a result of the airborne debris and dust in its high winds. Wind and pressure differential are believed to account for ninety percent of tornado damage in most cases. Because tornadoes are associated with storm systems, they usually are accompanied by hail, torrential rain and intense lightning.

Tornadoes typically produce damage in an area that does not exceed one-fourth mile in width or sixteen miles in length. Tornadoes with track lengths greater than 150 miles have been reported although such tornadoes are rare. Tornado damage severity is measured by the Fujita Tornado Scale, which assigns an "F" ("Fujita") value from 0 – 5 to denote the wind speed.

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

Enhanced Fujita (EF) Scale

On February 1, 2007, the National Weather Service adopted “Enhanced Fujita (EF) Scale”. The EF Scale evaluates and categorizes tornado events by intensity. Both the original Fujita Scale and the EF Scale estimate the intensity of a tornado (3-second gust speed) based on the magnitude of damage. The original scale had a lack of damage indicators and with the increasing standards for buildings, the rating of tornadoes was becoming inconsistent. The EF Scale evaluates tornado damage with a set of 28 indicators (see NOAA website). Each indicator is a structure with a typical damage description for each magnitude of a tornado.

Fujita Scale			Derived EF Scale			Operational EF Scale
F Number	Fastest 1/4 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

High Winds

High winds can occur during severe thunderstorms or with a strong weather system. The National Severe Storms Laboratory (NSSL) classifies damaging winds using the following terms:

1. **Straight-line winds** are associated with thunderstorms, but do not have rotations. This term is used to differentiate straight-line from tornadic winds.
2. A **downdraft** is a small-scale column of air that rapidly sinks toward the ground.

3. A **downburst** is a burst of strong winds that occur when a downdraft reaches the ground. Downbursts can be separated into microbursts and macrobursts.

a. A microburst is a small, concentrated downburst that produces an outward burst of strong winds at or near the surface of the earth with horizontal dimensions less than 2.5 miles across. Microbursts are short-lived (2-5 minutes) and can have windspeeds up to 168 mph.

b. A macroburst is an outward burst of strong winds at or near ground with horizontal dimensions larger than 2.5 miles. Compared to microbursts, macroburst winds are not as strong, but are spread out over a larger area and last longer (5-20 minutes).

4. A **gust front** is the leading edge of rain-cooled air that clashes with warmer thunderstorm inflow.

5. A **derecho** is a widespread, long-lived windstorm that is associated with a band of rapidly moving showers or thunderstorms.

6. A **haboob** is a wall of dust that is pushed out along the ground from a thunderstorm downdraft at high speeds.

Hazard Considerations

Area Impacted:

- Damage paths can be in excess of one mile wide and 50 miles long.

Duration of Event:

- Tornadoes can develop with short warning and last for minutes or hours
- Tornadoes can also develop at any time of the day or night during the landfall of a hurricane.
- However, by 12 hours after landfall, tornadoes tend to occur mainly during daytime hours.

Essential Service Disruption:

- Schools may be temporarily closed after the incident due to indirect reasons (public concerns for safety or a lack of transportation) or directly because the school was damaged.
- Electricity and other essential services to local areas can be disrupted during storm events. In severe cases, power can be lost for several days or weeks.
- Continuity of government.

Special Considerations:

- Special populations i.e. the elderly, infirm, disabled, children, infants, and foreign/out-of-state guests will be a real concern during a tornado due to the size and complexity of a tornado impact.
- If a tornado occurs during school hours, children will be required to shelter in place. Have schools briefed parents on what to expect during this time?
- Animals and pets will be set loose by their owners or by the storm itself; conversely, owners will refuse evacuation or shelter unless pets have provisions for care.

Direct Damage:

- Structural damage to buildings directly in the path of the tornado. High winds can also damage or destroy structurally vulnerable facilities that are constructed with materials that have low tensile strength.
- A tornado generates high winds and the debris generated by those winds may disrupt landlines, cellular phones, push-to-talk, land mobile radio (LMR), and Internet communications.
- High wind speeds and the resulting debris may disrupt electrical and gas power.
- A powerful tornado, F-3 to F-5, hitting an industrialized area can also generate secondary hazards such as a hazardous materials event
- Injuries that commonly occur during or after a tornado are for example: puncture wounds and concussion injuries from flying debris, electric shock from down power lines, orthopedic trauma from falling debris and structures, burns from fires, inhalation issues from hazardous material releases, and mental trauma from the shock of the event.
- Tornadoes do not have the strength to destroy the frame of a high-rise structure but falling glass and debris continuing after the impact will make search and rescue, and evacuation difficult and dangerous.
- Facilities and residences sustaining structural damage may cause natural gas leaks.
- Damage to the supply of electricity may cause water supply, sewage treatment, and gasoline/diesel supply disruptions.
- Humans and animals are often injured or killed by severe tornado activity. Most cases involve a direct impact combined with minimal shelter or protection.

Affected Population:

- Although tornadoes typically impacted a select area, it can also generate mass casualties if it hits an urban area or during the night.
- In rural areas, tornadoes can impact a significant number of the population if it hits a developed area of the community.

Economic Damage:

- The costs of losing revenue by the temporary closure of special events and commercial sites will be directly affected by the speed and efficiency of recovery phase operations and by retaining public confidence by efficient response operations.

Emergency Services:

- Debris scattered across roads and highways will make it difficult for first responder vehicles to have a rapid ingress/egress to impact areas e.g. damage to vehicle tires can greatly inhibit Fire, EMS, and Law Enforcement response.
- Tornadoes can cause mass casualties that will exceed local resources and capabilities.
- The lack of emergency warning sirens may inhibit effective tornado warnings. Sirens with live voice broadcasting/adjustable audio output capabilities are recommended due to their versatility.
- Temporary mass sheltering may be an operational requirement at schools, hotels, museums, and exhibits i.e. owners and operators should strongly encourage their patrons to remain until the situation improves and care arrives for these patrons.

Social Factors:

- None identified

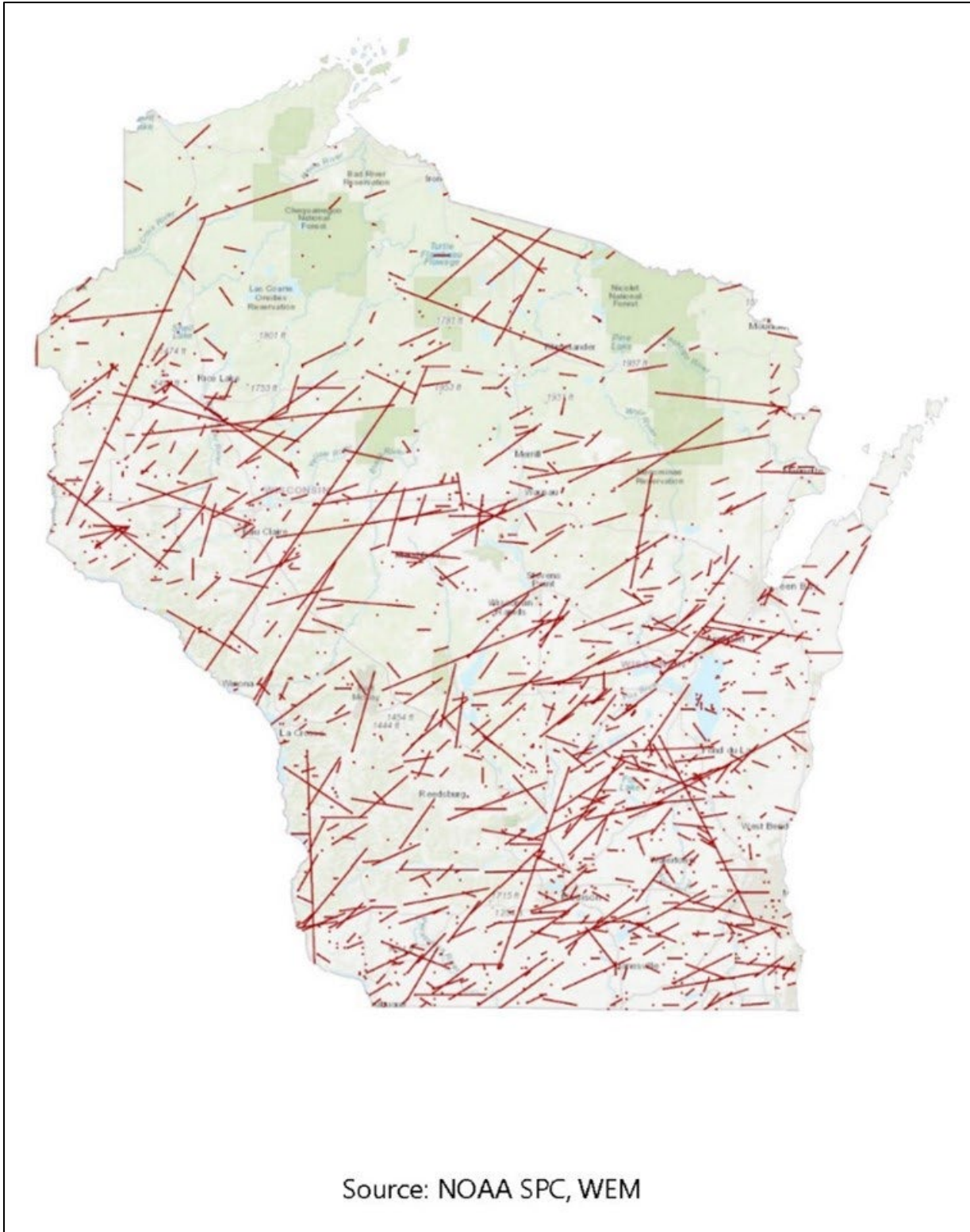
Location and Extent

Tornado

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

Wisconsin's tornado season runs from the beginning of April through September with the most severe tornadoes typically occurring in April, May and June. Tornadoes have, however, occurred in Wisconsin every month except February. Many tornadoes strike in the 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. Tornadoes can occur anywhere in the County.

Wisconsin Tornado Tracks 1950-2019



High Winds

High winds are the most common form of severe weather in Wisconsin; thus, there is a highly likely probability of occurrence each year. As with severe thunderstorms, the peak season for severe thunderstorm winds is April through August. Most severe thunderstorms will also start in the afternoons; although, they can occur during any month or time. High Winds can occur anywhere in the County.

High Wind Threat Level Descriptions

High Wind Threat Level	Threat Level Descriptions
Extreme	"An Extreme Threat to Life and Property from High Wind." "Damaging high wind" with sustained speeds greater than 58 mph, or frequent wind gusts greater than 58 mph. Damaging wind conditions are consistent with a high wind warning.
High	"A High Threat to Life and Property from High Wind." "High wind" with sustained speeds of 40 to 57 mph. Wind conditions consistent with a high wind warning.
Moderate	"A Moderate Threat to Life and Property from High Wind." "Very windy" with sustained speeds of 26 to 39 mph, or frequent wind gusts of 35 to 57 mph. Wind conditions consistent with a wind advisory.
Low	"A Low Threat to Life and Property from High Wind." "Windy" conditions. Sustained wind speeds of 21 to 25 mph, or frequent wind gusts of 30 to 35 mph.
Very Low	"A Very Low Threat to Life and Property from High Wind." "Breezy" to "Windy" conditions. Sustained wind speeds around 20 mph, or frequent gusts of 25 to 30 mph.
Non-Threatening	"No Discernable Threat to Life and Property from High Wind." The sustain wind speeds are non-threatening; "breezy" conditions may still be present.

Source: NOAA, NWS, Melbourne

Frequency and Probability

The probability of Waukesha County being struck by a tornado in the future is high and the likelihood of damage from future tornadoes is also high.

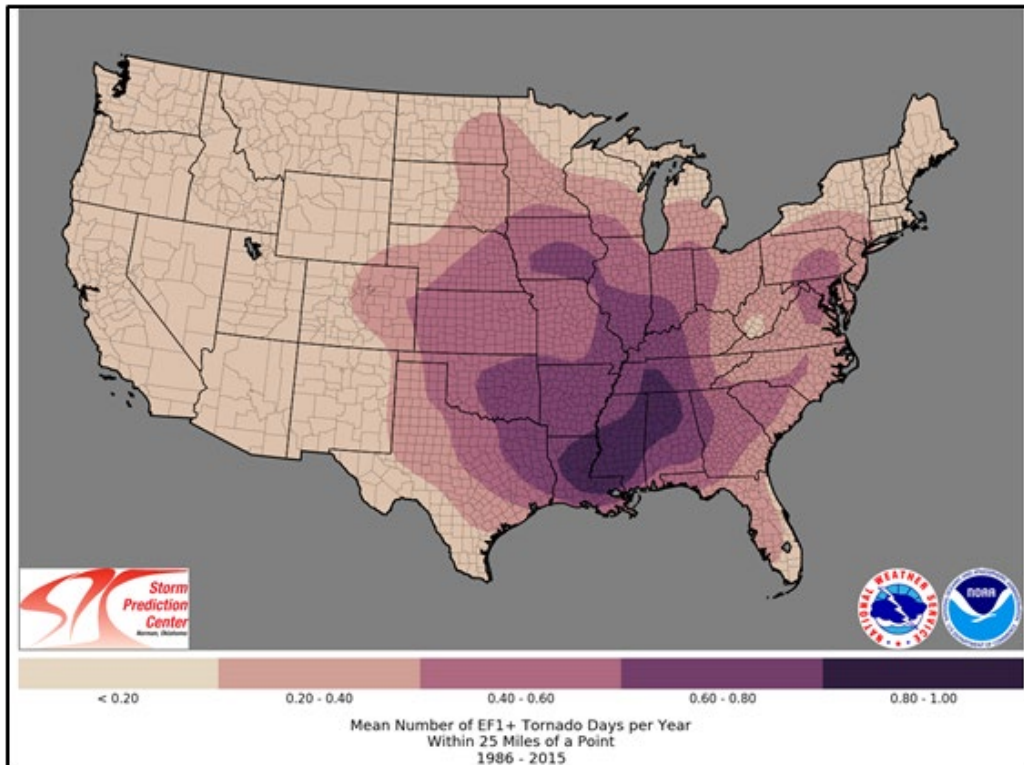
According to the National Weather Service, Waukesha County had 7 funnel clouds and 31 tornadoes between April 1954 and July 2021. The following table lists these events.

Location	Date	Type	Magnitude	Death	Injury	Property Damage	Crop Damage
Pewaukee	8/30/1993	Funnel Cloud	N/A	0	0	0	0
Pewaukee	7/11/1994	Funnel Cloud	N/A	0	0	0	0
Delafield	7/11/1994	Funnel Cloud	N/A	0	0	0	0
Hartland	7/2/1996	Funnel Cloud	N/A	0	0	0	0
Delafield	5/23/2004	Funnel Cloud	N/A	0	0	0	0
Menomonee Falls	5/23/2004	Funnel Cloud	N/A	0	0	0	0
Eagle	7/22/2010	Funnel Cloud	N/A	0	0	0	0

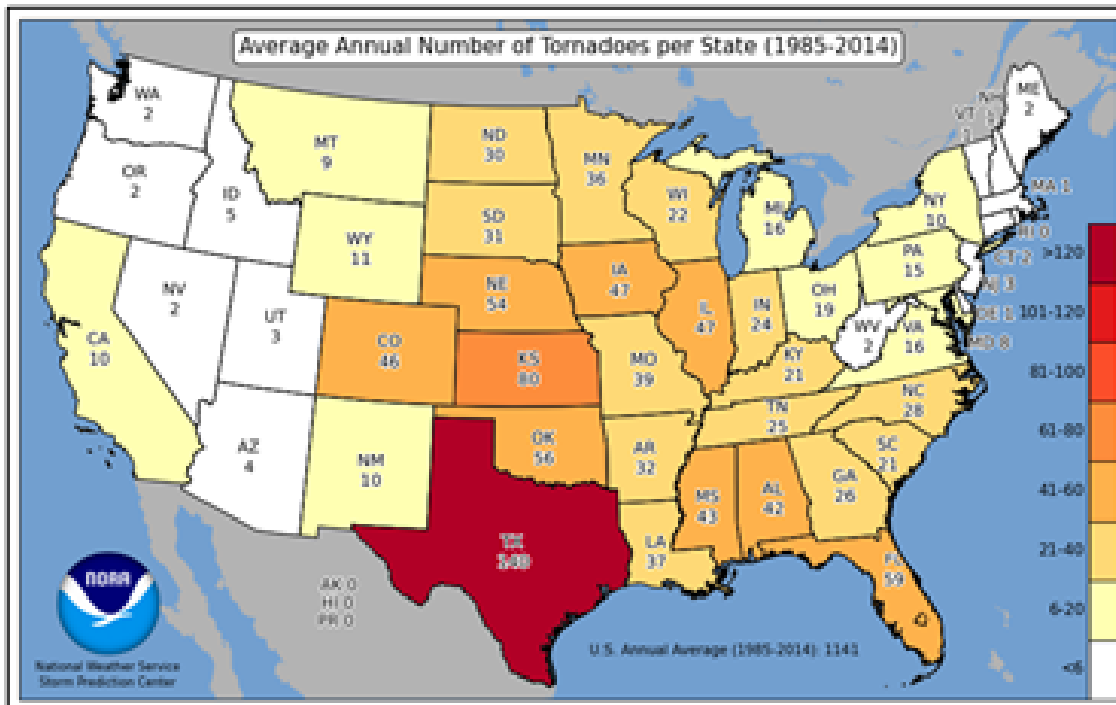
Location	Date	Type	Magnitude	Death	Injury	Property Damage	Crop Damage
Waukesha County	4/7/1954	Tornado	F1	0	0	25K	0
Waukesha County	7/16/1956	Tornado	F0	0	0	3K	0
Waukesha County	6/11/1959	Tornado	F1	0	0	3K	0
Waukesha County	10/8/1959	Tornado	F2	0	0	25K	0
Waukesha County	5/8/1959	Tornado	F1	0	0	25K	0
Waukesha County	5/8/1965	Tornado	F1	0	0	25K	0
Waukesha County	6/27/1965	Tornado	F1	0	0	25K	0
Waukesha County	7/10/1966	Tornado	F2	0	0	250K	0
Waukesha County	5/18/1967	Tornado	F2	0	0	250K	0
Waukesha County	6/29/1969	Tornado	F1	0	0	3K	0
Waukesha County	7/14/1972	Tornado	F0	0	0	2.5M	0
Waukesha County	8/30/1973	Tornado	F2	0	0	2.5M	0
Waukesha County	4/2/1977	Tornado	F3	0	2	250K	0
Waukesha County	6/5/1977	Tornado	F3	0	0	250K	0
Waukesha County	6/5/1977	Tornado	F1	0	0	25K	0
Waukesha County	7/29/1980	Tornado	F2	0	0	250K	0
Waukesha County	6/15/1981	Tornado	F1	0	0	250K	0

Waukesha County	5/15/1982	Tornado	F4	1	14	2.5M	0
Waukesha County	4/27/1984	Tornado	F4	1	0	1.3M	0
Waukesha County	8/17/1985	Tornado	F1	0	0	2.5M	0
Waukesha County	7/6/1987	Tornado	F1	0	1	2.5M	0
Waukesha County	5/8/1988	Tornado	F0	0	0	0	0
Waukesha County	6/6/1999	Tornado	F1	0	0	100K	0
Waukesha County	6/7/2008	Tornado	EF0	0	0	0	0
Waukesha County	6/8/2008	Tornado	EF0	0	0	0	0
Waukesha County	6/21/2010	Tornado	EF2	0	15	20.6M	0
Waukesha County	6/21/2010	Tornado	EF1	0	0	430K	0
Waukesha County	7/22/2010	Tornado	EF2	0	0	0	0
Waukesha County	8/18/2015	Tornado	EF1	0	0	45K	0
Waukesha County	8/18/2015	Tornado	EF0	0	0	10K	0
Waukesha County	10/01/2019	Tornado	EF0	0	0	0	0
Waukesha County	07/29/2021	Tornado	EF1	0	0	0	0

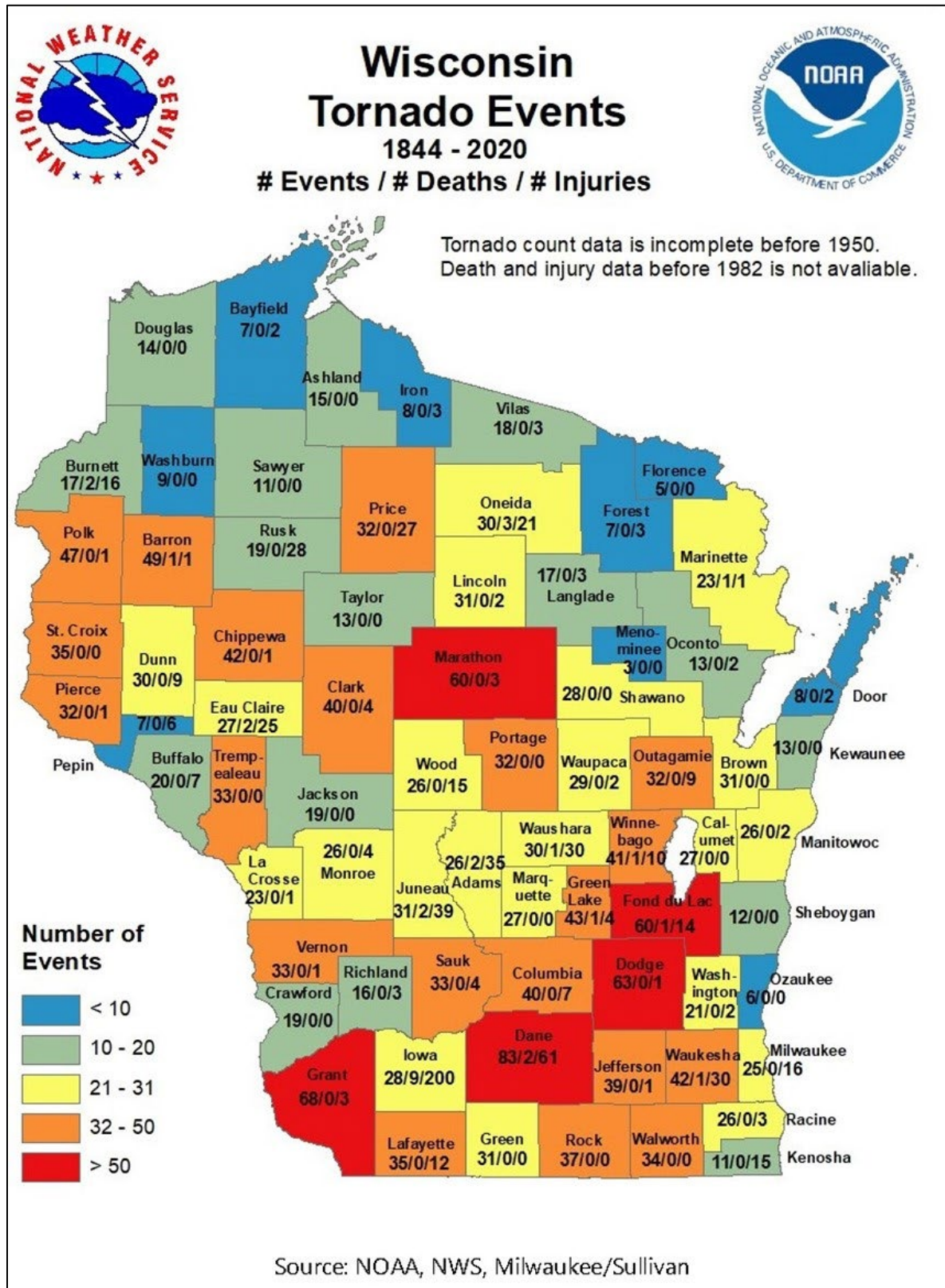
Historical Probability of a Tornado Event in the United States



Average Annual Tornadoes per State



Below is a map of Tornado Events in Wisconsin from 1844 - 2020.

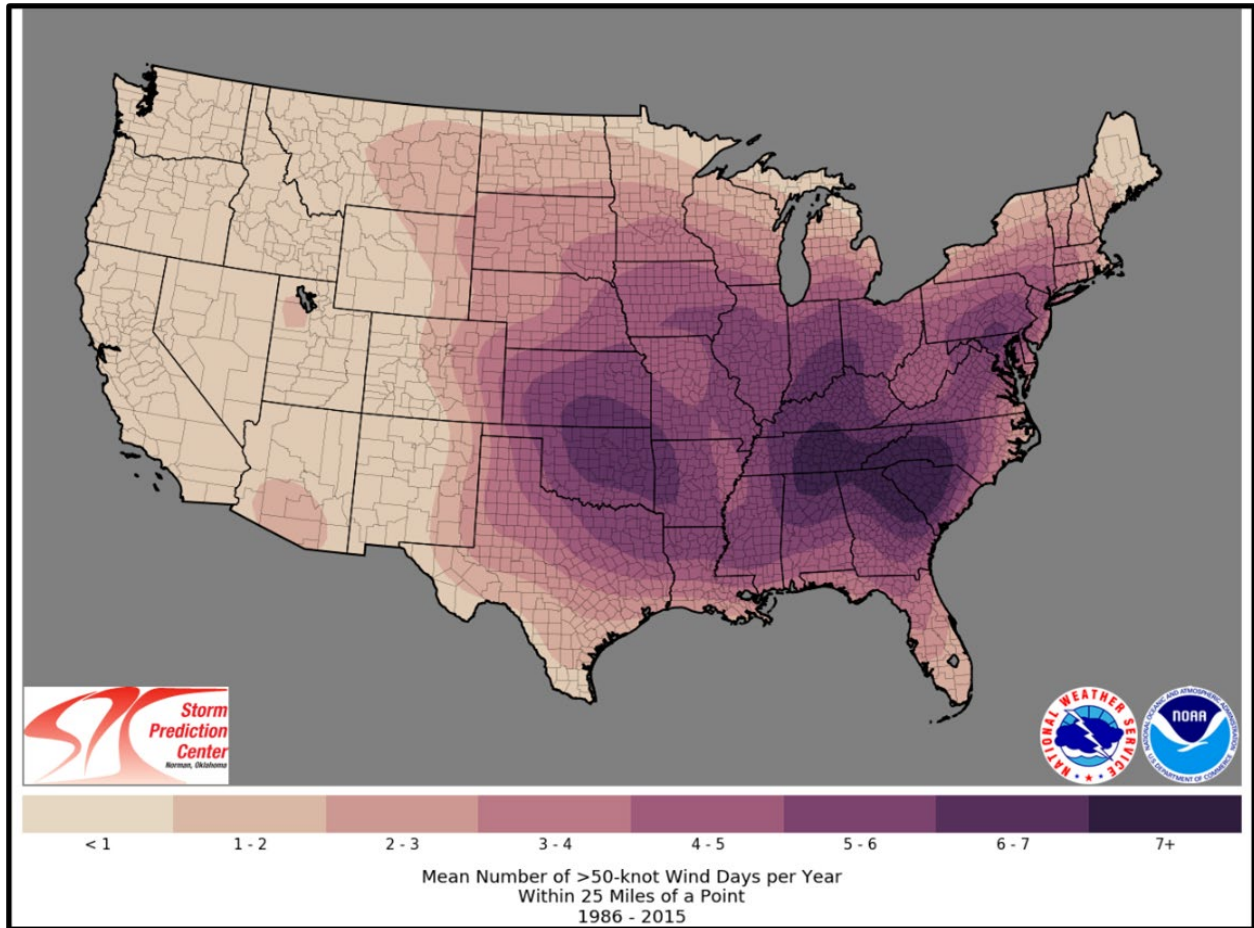


Historical High Wind Events

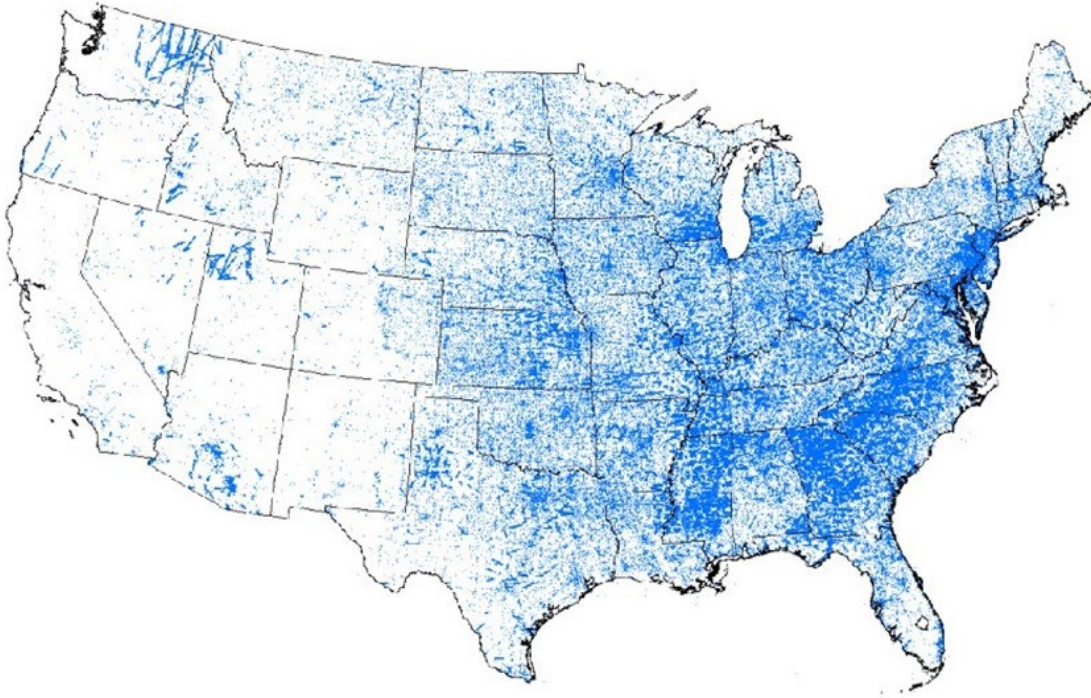
Location	Date	Type	Magnitude	Death	Injury	Property Damage	Crop Damage
Waukesha County	9/29/1997	Wind	N/A	0	0	N/A	N/A
Waukesha County	5/24/2000	Wind	N/A	0	0	N/A	N/A
Waukesha County	09/19/2001	Wind	N/A	0	0	N/A	N/A
Waukesha County	10/24/2001	Wind	N/A	0	0	N/A	N/A
Waukesha County	12/05/2001	Wind	N/A	0	0	5K	0
Waukesha County	11/12/2003	Wind	49 KTS. MG	0	0	3.5K	0
Waukesha County	3/7/2004	Wind	48 KTS. MG	0	0	4K	0
Waukesha County	3/14/2004	Wind	40 KTS. MG	0	0	2K	0
Waukesha County	4/18/2004	Wind	43 KTS. MG	0	0	10K	0
Waukesha County	12/12/2004	Wind	47 KTS. MG	0	0	2K	0
Waukesha County	1/24/2006	Wind	43 KTS. MG	0	0	5K	0
Waukesha County	3/13/2006	Wind	45 KTS. MG	0	0	10K	0
Waukesha County	3/31/2006	Wind	39 KTS. EG	0	0	5K	0
Waukesha County	5/11/2006	Wind	38 KTS. MG	0	0	1K	0
Waukesha County	2/22/2006	Wind	40 KTS. MG	0	0	2K	0
Waukesha County	4/04/2007	Wind	45 KTS. MG	0	0	5K	0
Waukesha County	5/24/2007	Wind	39 KTS. MG	0	0	2K	0
Waukesha County	8/27/2007	Wind	39 KTS. EG	0	0	10K	0
Waukesha County	11/05/2007	Wind	39 KTS. MG	0	0	5K	0
Waukesha County	11/27/2007	Wind	46 KTS. EG	0	0	5K	0
Waukesha County	12/23/2007	Wind	44 KTS. MG	0	0	5K	0
Waukesha County	4/26/2008	Wind	43 KTS. MG	0	0	5K	0
Waukesha County	10/26/2008	Wind	39 KTS. EG	0	0	5K	0
Waukesha County	09/27/2009	Wind	39 KTS. EG	0	0	5K	0
Waukesha County	10/06/2009	Wind	46 KTS. MG	0	0	5K	0

Waukesha County	5/05/2010	Wind	39 KTS. EG	0	0	10K	0
Waukesha County	9/07/2010	Wind	48 KTS. MG	0	0	5K	0
Waukesha County	9/24/2010	Wind	40 KTS. MG	0	0	1K	0
Waukesha County	2/18/2011	Wind	26 KTS. MG	0	0	2K	0
Waukesha County	4/15/2011	Wind	35 KTS. MG	0	0	3K	0
Waukesha County	5/15/2011	Wind	32 KTS. MG	0	0	5K	0
Waukesha County	9/29/2011	Wind	39 KTS. EG	0	0	2K	0
Waukesha County	10/19/2011	Wind	39 KTS. EG	0	0	2K	0
Waukesha County	11/13/2011	Wind	41 KTS. MG	0	0	1K	0
Waukesha County	1/01/2012	Wind	40 KTS. MG	0	0	2K	0
Waukesha County	6/18/2012	Wind	39 KTS. EG	0	0	10K	0
Waukesha County	1/18/2013	Wind	39 KTS. EG	0	0	5K	0
Waukesha County	1/19/2013	Wind	4 KTS. MG	0	0	5K	0
Waukesha County	4/11/2013	Wind	42 KTS. MG	0	0	7K	0
Waukesha County	12/23/2015	Wind	49 KTS. MG	0	0	1K	0
Waukesha County	12/04/2017	Wind	48 KTS. MG	0	0	5K	0
Waukesha County	10/20/2018	Wind	39 KTS. EG	0	0	1K	0
Waukesha County	2/24/2019	Wind	44 KTS. MG	0	0	1K	0
Waukesha County	11/27/2019	Wind	43 KTS. MG	0	0	7K	0
Waukesha County	4/30/2020	Wind	39 KTS. EG	0	0	3K	0
Waukesha County	5/01/2021	Wind	39 KTS. EG	0	0	1.5K	0

Historical Probability of Severe Wind in the US

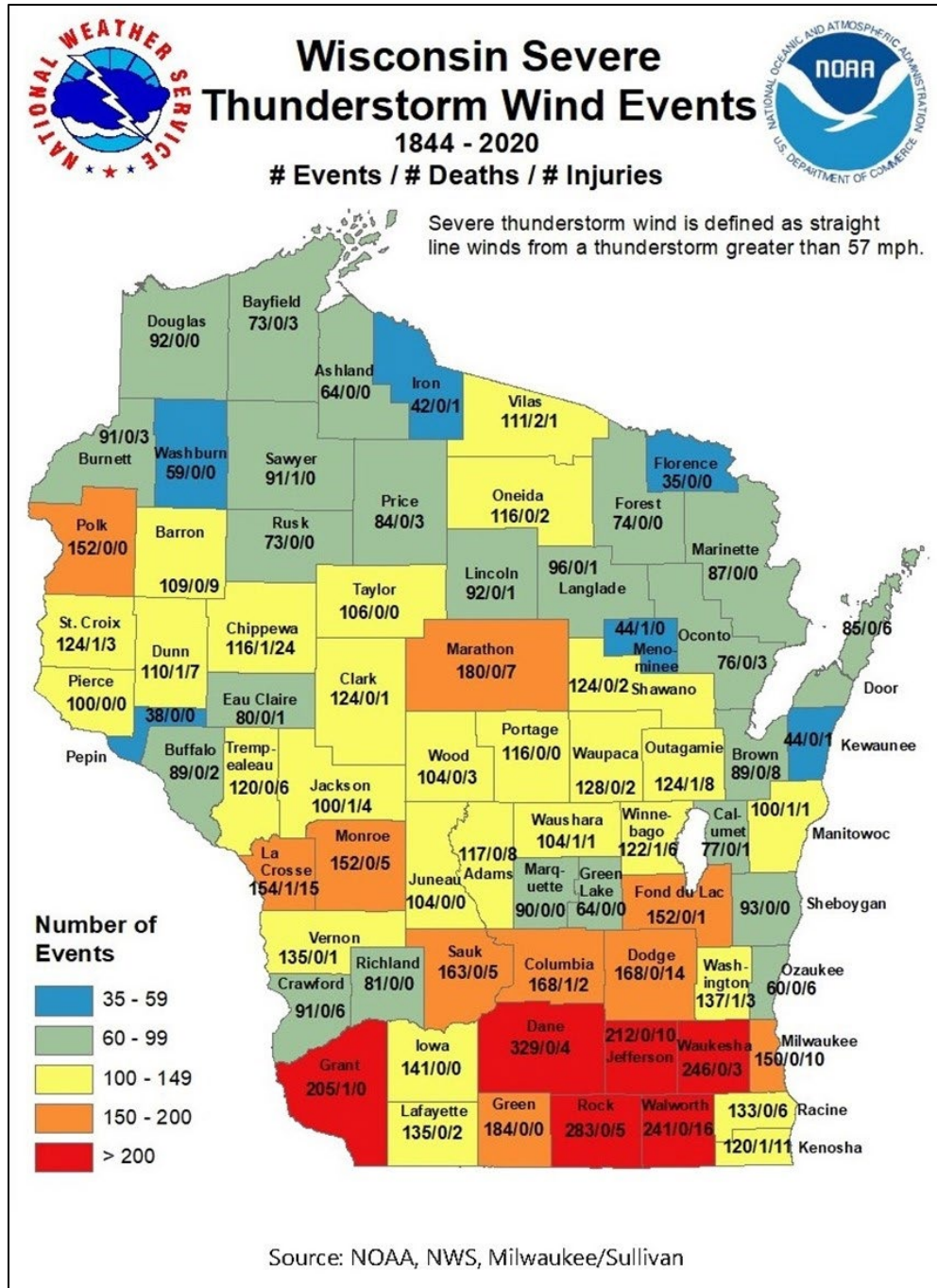


Wind Tracks 1950-2019



Source: NOAA, NWS, SPC

Below is a map of Wind Events in Wisconsin from 1844 - 2020.



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; Waukesha County has several of each type of property. Both have high concentrations of people in a small area, generally have structures that provide less protection than standard construction homes generally do not provide storm shelters. Other places of concern during these types of events include critical emergency

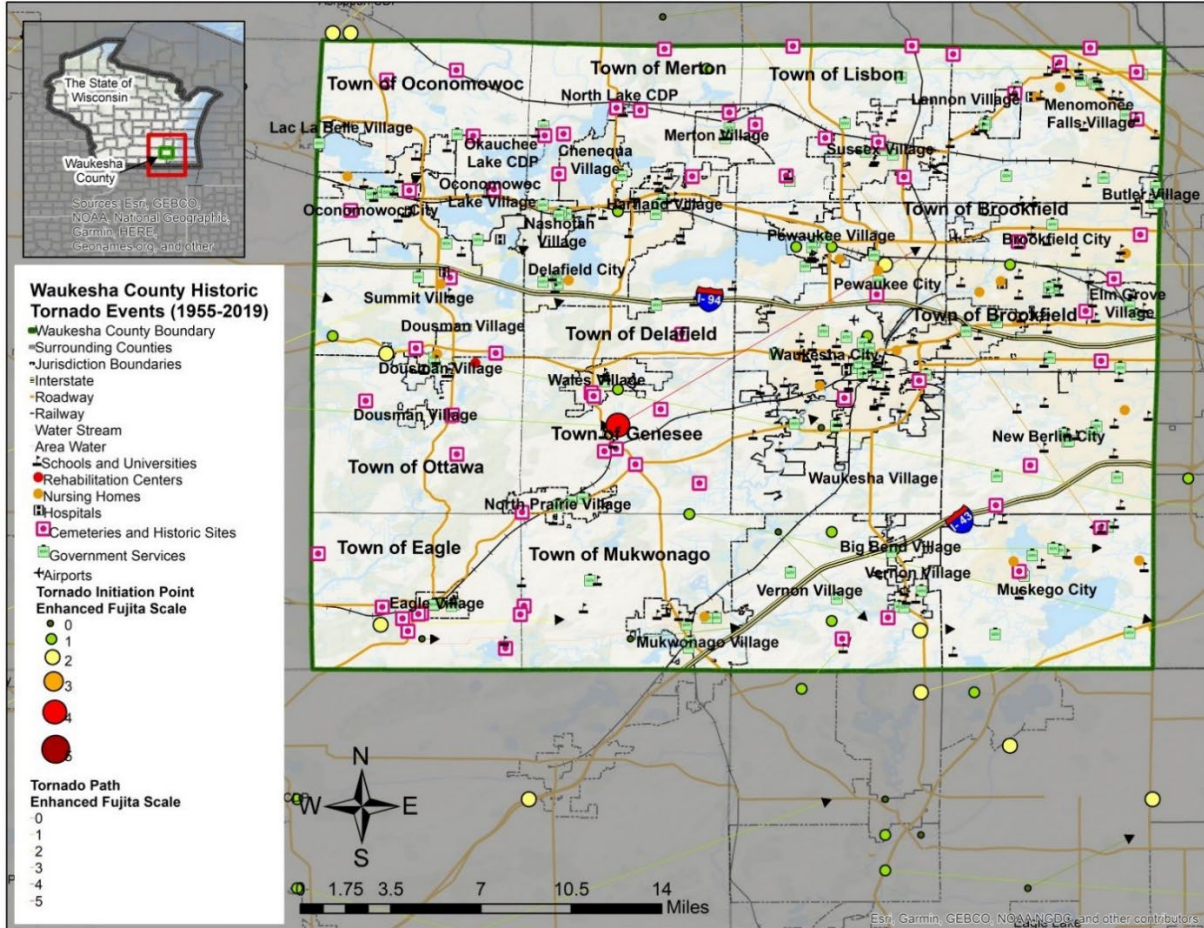
facilities such as hospitals and public works/highway garages, police stations and fire departments, which contain equipment and services needed by the public after a tornado.

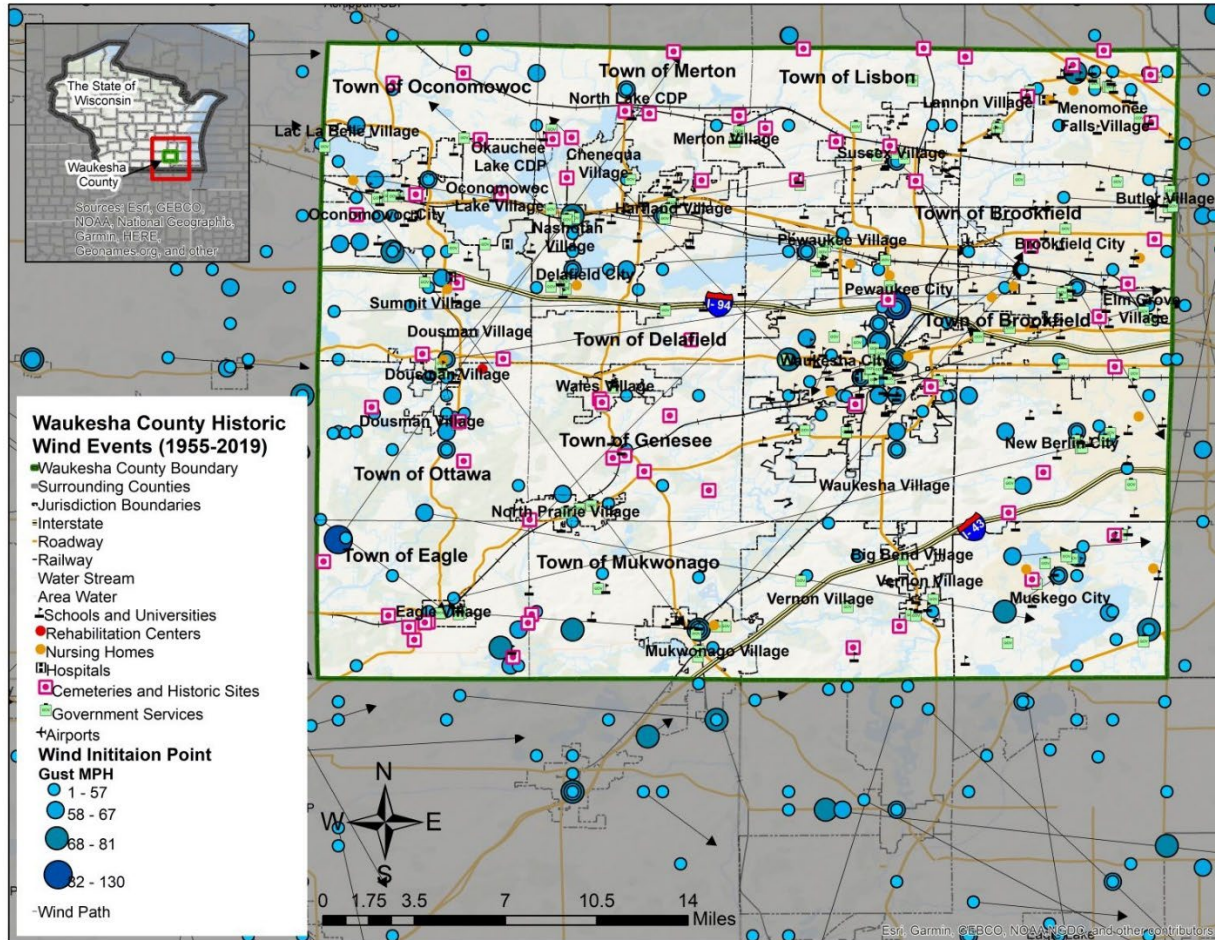
Schools, in addition to holding children, are the major type of structure used as community disaster shelters and their loss might therefore affect the community on several levels (e.g., the death or injury of children, the loss of a community housing shelter). School gymnasiums are often the specific 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.

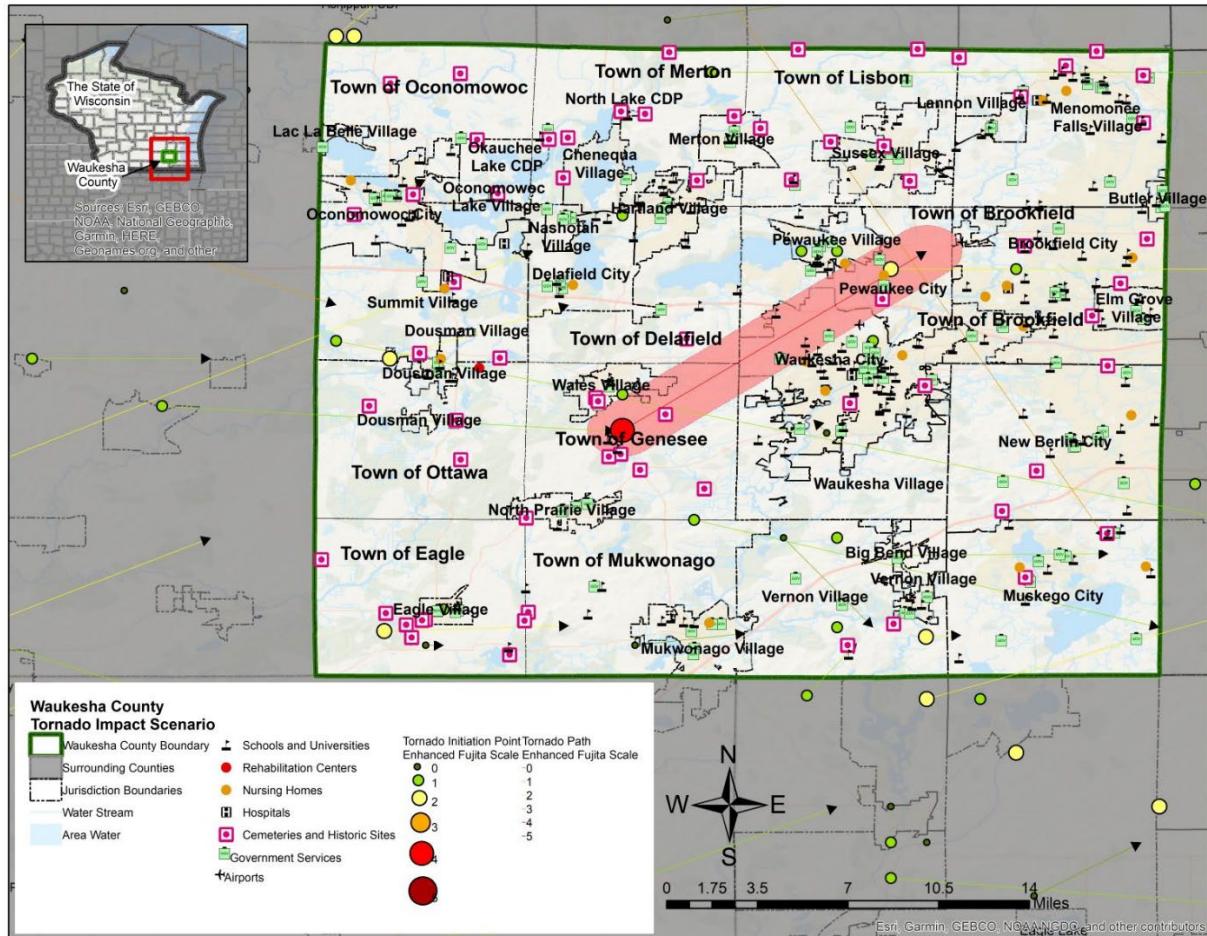
Business properties are at risk for having damage to infrastructure including signs, windows, siding and billboards. Agricultural buildings, such as barns and silos, are also generally not constructed in a manner that makes them wind-resistant, which can lead to the loss of livestock and harvest. Standing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





Hazard Assessment	
Tornadoes and High Winds	
Frequency/Probability (i.e. Future Probability)	▶ Medium
Magnitude/Extent (i.e. Strength or Magnitude)	▶ Medium
Vulnerability (i.e. Consequence and Impact)	▶ High
Overall Risk Rating	
▶ Medium	

Waukesha County Tornado Scenario Map



Winter Storms

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

Winter Storms Hazard Profile

A winter storm is an event in which the varieties of precipitation are formed that only occur at low temperatures, such as snow or sleet, or a rainstorm where ground temperatures are low enough to allow ice to form (i.e. freezing rain). In temperate continental climates, these storms are not necessarily restricted to the winter season but may occur in the late autumn and early spring as well.

A winter storm can range from moderate snow over a few hours to blizzard conditions with blinding wind-driven snow that lasts several days. Some winter storms may be large enough to affect several states, while others may affect only a single community. Many winter storms are accompanied by low temperatures and heavy and/or blowing snow, which can severely reduce visibility.

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.

A major winter storm can last for several days and be accompanied by high winds, freezing rain or sleet, heavy snowfall, and cold temperatures. People can become trapped at home, without utilities or other services. Heavy snowfall and blizzards can trap motorists in their cars. Attempting to walk for help in a blizzard can be a deadly decision.

Winter storms can make driving and walking extremely hazardous. The aftermath of a winter storm can have an impact on a community or region for days, weeks, or even months. Storm effects such as extremely cold temperatures and snow accumulation, and sometimes coastal flooding, can cause hazardous conditions and hidden problems for people in the affected area.

Hazard Considerations

Area Impacted:

- Region and Statewide

Duration of Event

- Severe winter storms can last anywhere from several hours to several days.

Essential Service Disruption

- Disruption of utilities (i.e. power, telephone, etc.) may last for days.
- Continuity of government.

Special Considerations:

- Preservation of cultural and historical locations, facilities, and artifacts.

Direct Damage

- Ice storms may disrupt power lines.

Affected Population

- Winter storms can impact a significant number of the population.

Economic Damage

- Loss of revenue by the temporary closure of roads, special events and commercial sites.

Location and Extent

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

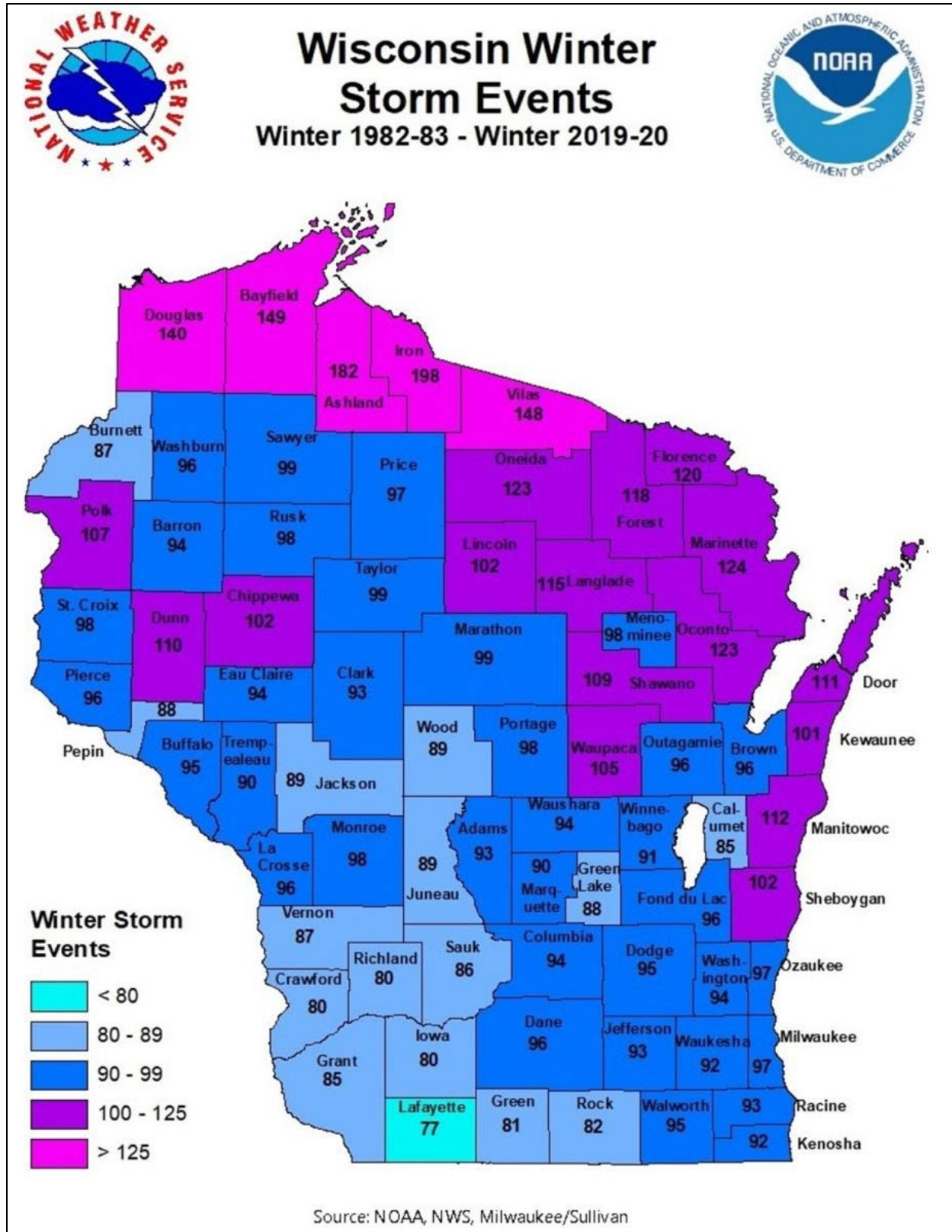
Frequency and Probability

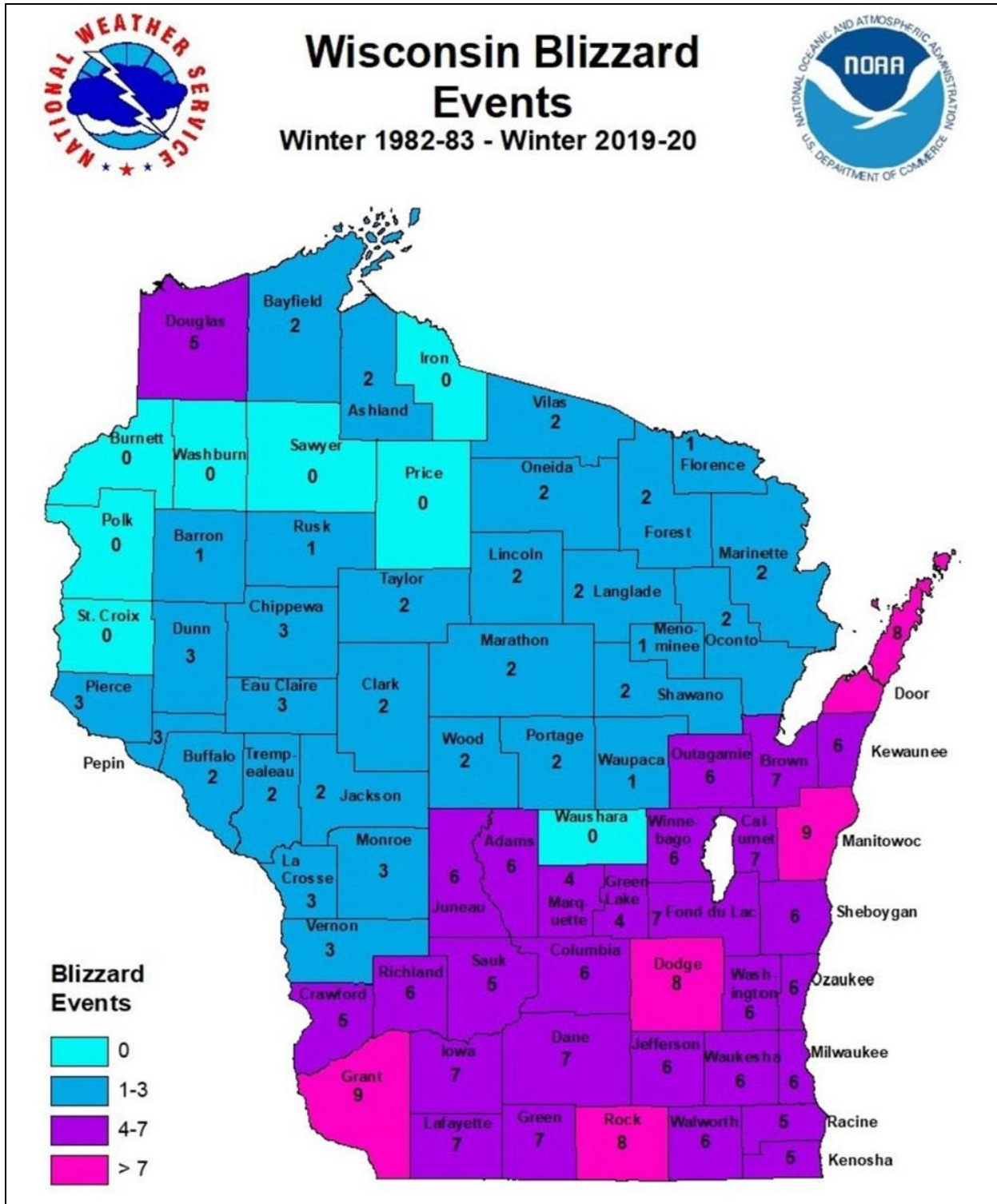
Annual snowfall in Wisconsin varies between thirty inches in southern counties to one hundred inches in the north. Waukesha County averages approximately 38 inches of snow annually. Storm tracks originating in the southern Rockies or Plains states that move northeastward produce the heaviest precipitation, 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.

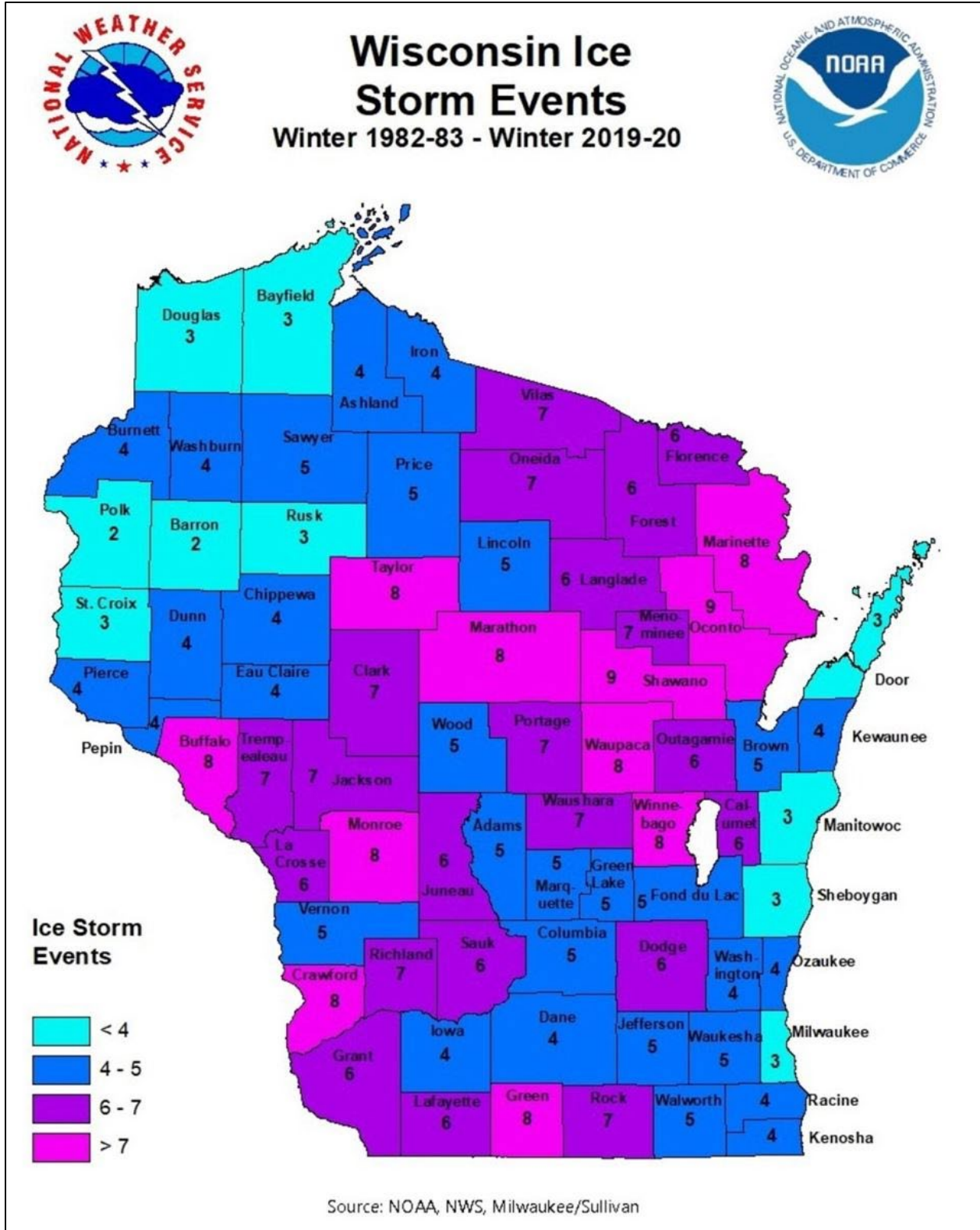
Although massive blizzards are rare in Wisconsin, blizzard-like conditions often exist during heavy snowstorms when gusty winds cause blowing and drifting of snow. Near blizzard conditions existed in Wisconsin in January 1979 when record snowfalls were recorded in many areas and wind speeds gusted to over thirty miles per hour.

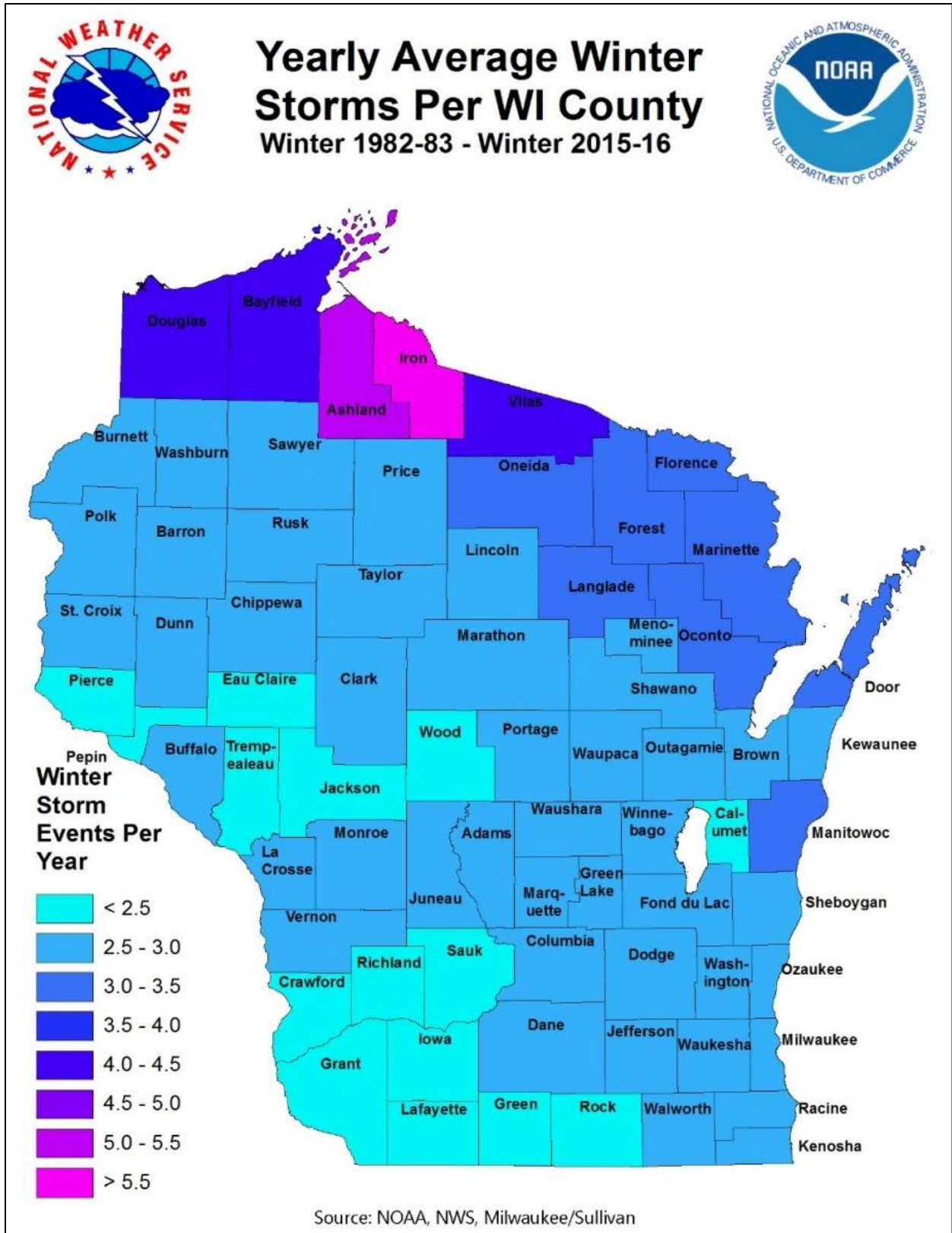
Both ice and sleet storms can occur at any time throughout the winter season from November to April. Ice storms of disastrous proportions occurred in central Wisconsin in February 1922 and in southern Wisconsin in March 1976. A Presidential Disaster Declaration occurred as a result of the 1976 storm.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

Below are maps demonstrating the frequency of Winter Storms, Blizzards, and Ice Storms in Wisconsin.









The probability that there will be severe winter storms in Waukesha County is medium and the likelihood that those storms will cause significant damage is also medium. The following table

details Waukesha County's 70 winter storm statistics (i.e., snow and ice events) as reported by the National Weather Service including human loss and injury and property damage estimates from 1 January 1950 through 28 February 2021:

Location	Date	Type	Death	Injury	Property Damage	Crop Damage
Statewide	1/13/1993	Heavy Snow	0	0	0	0
Central And Southern	1/5/1994	Heavy Snow	0	0	0	0
All But Far Northwest	1/26/1994	Heavy Snow/ice Storm	0	0	0	0
Southern And Eastern	2/7/1994	Heavy Snow	0	0	0	0
Southeast Wisconsin	2/12/1994	Heavy Snow	0	0	0	0
Southern Half Of Wisc	2/22/1994	Heavy Snow	0	0	0	0
Southern Half Of Wisc	2/25/1994	Heavy Snow	0	0	0	0
Southern Wisconsin	4/30/1994	Heavy Snow	0	0	0	0
Waukesha County	12/5/1994	Heavy Snow	0	0	0	0
Waukesha County	1/19/1995	Heavy Snow	0	0	0	0
Southeast Wisconsin	11/11/1995	Heavy Snow	0	0	0	0
Central And Southern	11/26/1995	Heavy Snow	0	1	0	0
Southern Wisconsin	12/13/1995	Glaze	0	0	0	0
Waukesha County	1/26/1996	Heavy Snow	0	0	0	0
Waukesha County	3/17/1997	Ice Storm	0	0	0	0
Waukesha County	4/11/1997	Winter Storm	0	0	0	0
Waukesha County	1/8/1998	Winter Storm	0	0	0	0
Waukesha County	3/9/1999	Winter Storm	0	0	0	0
Waukesha County	4/7/2000	Winter Storm	0	0	0	0
Waukesha County	12/11/2000	Heavy Snow	0	0	0	0
Waukesha County	12/18/2000	Heavy Snow	0	0	0	0
Waukesha County	3/2/2002	Heavy Snow	0	0	0	0
Waukesha County	2/3/2003	Winter Weather/mix	0	0	0	0
Waukesha County	2/11/2003	Winter Storm	0	0	0	0
Waukesha County	3/4/2003	Heavy Snow	0	0	0	0
Waukesha County	4/4/2003	Winter Weather/mix	0	0	0	0
Waukesha County	4/7/2003	Winter Weather/mix	0	0	0	0

Waukesha County	1/4/2004	Winter Weather/mix	0	0	0	0
Waukesha County	1/16/2004	Weather/mix	0	0	0	0
Waukesha County	1/26/2004	Heavy Snow	0	0	0	0
Waukesha County	2/8/2004	Winter Weather/mix	0	0	0	0
Waukesha County	11/30/2004	Winter Weather/mix	0	0	0	0
Waukesha County	12/18/2004	Winter Weather/mix	0	0	0	0
Waukesha County	1/1/2005	Winter Weather/mix	0	0	0	0
Waukesha County	1/6/2005	Winter Storm	0	0	0	0
Waukesha County	1/22/2005	Winter Storm	0	0	0	0
Waukesha County	2/16/2006	Winter Storm	0	0	0	0
Waukesha County	12/1/2006	Winter Storm	0	0	0	0
Waukesha County	2/25/2007	Winter Storm	0	0	0	0
Waukesha County	12/11/2007	Ice Storm	0	0	0	0
Waukesha County	12/15/2007	Winter Weather	0	0	0	0
Waukesha County	1/21/2008	Heavy Snow	0	0	0	0
Waukesha County	1/29/2008	Winter Storm	0	0	0	0
Waukesha County	2/5/2008	Winter Storm	0	0	0	0
Waukesha County	2/17/2008	Ice Storm	0	0	20K	0
Waukesha County	11/30/2008	Winter Storm	0	0	0	0
Waukesha County	12/1/2008	Winter Storm	0	0	0	0
Waukesha County	12/8/2008	Winter Storm	0	0	0	0
Waukesha County	12/21/2008	Winter Storm	0	0	0	0
Waukesha County	12/27/2008	Winter Storm	0	0	0	0
Waukesha County	1/3/2009	Winter Weather	0	0	0	0
Waukesha County	1/9/2009	Winter Weather	0	0	0	0
Waukesha County	1/13/2009	Winter Weather	0	0	0	0
Waukesha County	3/28/2009	Winter Weather	0	0	0	0
Waukesha County	12/23/2009	Winter Storm	0	0	0	0
Waukesha County	1/7/2010	Winter Storm	0	0	0	0
Waukesha County	2/9/2010	Winter Storm	0	0	0	0

Waukesha County	3/19/2010	Winter Weather	0	0	0	0
Waukesha County	12/9/2010	Winter Weather	0	0	0	0
Waukesha County	12/20/2010	Winter Weather	0	0	0	0
Waukesha County	2/6/2011	Winter Weather	0	0	0	0
Waukesha County	2/20/2011	Winter Storm	0	0	0	0
Waukesha County	3/9/2011	Winter Weather	0	0	0	0
Waukesha County	12/20/2012	Winter Storm	0	0	0	0
Waukesha County	2/7/2013	Winter Storm	0	0	0	0
Waukesha County	2/26/2013	Winter Storm	0	0	0	0
Waukesha County	3/5/2013	Winter Storm	0	0	0	0
Waukesha County	12/22/2013	Winter Storm	0	0	0	0
Waukesha County	2/17/2014	Winter Storm	0	0	0	0
Waukesha County	2/1/2015	Winter Storm	0	0	0	0
Waukesha County	1/2014	Winter Weather	0	0	0	0
Waukesha County	2/2014	Winter Weather	0	0	0	0
Waukesha County	3/2014	Winter Weather	0	0	0	0
Waukesha County	2/2015	Winter Weather	0	0	0	0
Waukesha County	11/20/2015	Winter Storm	0	0	0	0
Waukesha County	12/28/2015	Winter Storm	0	0	0	0
Waukesha County	02/29/2016	Winter Weather	0	0	0	0
Waukesha County	3/01/2016	Winter Weather	0	0	0	0
Waukesha County	3/24/2016	Winter Weather	0	0	0	0
Waukesha County	4/02/2016	Winter Weather	0	0	0	0
Waukesha County	4/08/2016	Winter Weather	0	0	0	0
Waukesha County	12/04/2016	Winter Weather	0	0	0	0
Waukesha County	12/10/2016	Winter Storm	0	0	0	0
Waukesha County	12/16/2016	Winter Storm	0	0	0	0
Waukesha County	1/03/2017	Winter Weather	0	0	0	0
Waukesha County	1/10/2017	Winter Weather	0	0	0	0
Waukesha County	1/11/2017	Winter Weather	0	0	0	0

Waukesha County	1/16/2017	Winter Weather	0	0	0	0
Waukesha County	2/24/2017	Winter Weather	0	0	0	0
Waukesha County	1/10/2018	Winter Weather	0	0	0	0
Waukesha County	1/14/2018	Winter Weather	0	0	0	0
Waukesha County	1/22/2018	Winter Weather	0	0	0	0
Waukesha County	2/03/2018	Winter Weather	0	0	0	0
Waukesha County	2/05/2018	Winter Weather	0	0	0	0
Waukesha County	2/08/2018	Winter Weather	0	0	0	0
Waukesha County	2/11/2018	Winter Weather	0	0	0	0
Waukesha County	3/05/2018	Winter Weather	0	0	0	0
Waukesha County	4/03/2018	Winter Weather	0	0	0	0
Waukesha County	4/14/2018	Winter Weather	0	0	0	0
Waukesha County	4/18/2018	Winter Weather	0	0	0	0
Waukesha County	11/25/2018	Winter Weather	0	0	0	0
Waukesha County	12/28/2018	Winter Weather	0	0	0	0
Waukesha County	12/29/2018	Winter Weather	0	0	0	0
Waukesha County	1/18/2019	Winter Weather	0	0	0	0
Waukesha County	1/22/2019	Winter Storm	0	0	0	0
Waukesha County	1/27/2019	Winter Storm	0	0	0	0
Waukesha County	2/05/2019	Winter Weather	0	0	0	0
Waukesha County	2/07/2019	Winter Weather	0	0	0	0
Waukesha County	2/09/2020	Winter Storm	0	0	0	0
Waukesha County	2/11/2019	Winter Storm	0	0	0	0
Waukesha County	2/17/2019	Winter Weather	0	0	0	0
Waukesha County	2/23/2019	Winter Weather	0	0	0	0
Waukesha County	2/26/2019	Winter Weather	0	0	0	0
Waukesha County	3/09/2019	Winter Weather	0	0	0	0
Waukesha County	4/14/2019	Winter Weather	0	0	0	0
Waukesha County	4/27/2019	Winter Weather	0	0	0	0
Waukesha County	10/30/2019	Winter Weather	0	0	0	0

Waukesha County	11/06/2019	Winter Weather	0	0	0	0
Waukesha County	11/10/2019	Winter Weather	0	0	0	0
Waukesha County	12/14/2019	Winter Weather	0	0	0	0
Waukesha County	12/30/2019	Winter Weather	0	0	0	0
Waukesha County	1/10/2020	Winter Weather	0	0	0	0
Waukesha County	1/17/2020	Winter Weather	0	0	0	0
Waukesha County	1/24/2020	Winter Weather	0	0	0	0
Waukesha County	1/31/2020	Winter Weather	0	0	0	0
Waukesha County	2/12/2020	Winter Weather	0	0	0	0
Waukesha County	2/17/2020	Winter Weather	0	0	0	0
Waukesha County	11/24/2020	Winter Weather	0	0	0	0

Vulnerability

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

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

Hazard Assessment	
Winter Storms	
Frequency/Probability (i.e. Future Probability)	Medium
Magnitude/Extent (i.e. Strength or Magnitude)	Medium
Vulnerability (i.e. Consequence and Impact)	Medium
Overall Risk Rating	Medium

Hazardous Materials Release

Note: *Although non-natural hazards are not required by FEMA for inclusion in a hazard mitigation plan, the County wishes to rank and mitigate against a comprehensive list of hazard events that could impact the planning area. Due to both the nature of non-natural hazards and the discretionary status regarding their inclusion, the following hazards of interest have been briefly and qualitatively assessed for the sake of public education and informing their inclusion within the hazard ranking and mitigation process.*

Hazardous materials are materials that if released, can pose a threat to human health or the environment. Hazardous material releases can cause long/short term health effects, damage to property, expensive cleanup/contractor costs, serious injury, and even death.

Hazards Materials Release Hazard Profile

Hazard Profile

There are as many as 500,000 different products that qualify as hazardous materials. Hazardous materials are stored and transported throughout the Waukesha area in various quantities. The storage of hazardous materials ranges from residential storage of household products to bulk storage of large volumes for industrial purposes. Hazardous materials are transported by various methods such as railcars, barges, and trucks. A “release” may occur by spilling, leaking, emitting toxic vapors, or any other process that enables the material to escape its container, enter the environment, and create a potential hazard. Hazards are classified in many different ways.

Hazard Classes:

Class 1: Explosives

Class 2: Gases

Class 3: Flammable Liquids

Class 4: Other Flammable Substances

Class 5: Oxidizing Substances and Organic Peroxides

Class 6: Toxic (Poisonous) & Infectious Substances

Class 7: Radioactive Materials

Class 8: Corrosives

Class 9: Miscellaneous Dangerous Goods

A material is classified as hazardous when it is corrosive, explosive, toxic, ignitable, biologically irritating, radioactive, or packaged in a dangerous container. Hazardous material spills involving

vehicles provide unique challenges for personnel working to protect the public and the environment. When hazardous materials spill on roadways, personnel may have to negotiate traffic snarls that prevent emergency equipment and ambulances from getting to the scene, flammable and explosive materials, or toxic fumes which may require evacuations.

Hazard Considerations

Area Impacted:

- General hazard material releases are confined to several hundred to a thousand feet from the source

Population Exposed:

- Events at facilities in urban areas can result in mass casualties due to condensed community.

Duration of the Event:

- Hazardous material can pose a risk immediately after release
- Fixed facility events can last as long as several days if the substance released is extremely hazardous (i.e. radioactive material) or emergency response is complicated (i.e. large scale fire at refinery)

Essential Service Disruption:

- Disruption of transportation networks
- Possibly disruption of water/wastewater service if is the source of the release

Special Considerations:

- Evacuation of elderly from gaming facilities

Direct Damage:

- Contaminated material.
- Health effects from exposure.
- Infrastructure damage includes water/wastewater infrastructure and utilities
- Structural failure or damage if release causes a fire.

Economic Damage:

- Minimal economic damage unless release directly impacts a facility or Seminole HQ.

Emergency Services:

- Possible fire services

Social Factors:

- The release of hazardous materials can result in acute or chronic health problems.

Location and Extent

Hazardous materials can be released into the environment because of an accident, a natural event such as an earthquake, or an act of terrorism. Rail traffic accidents are less common than roadway spills, however, their consequences can be greater simply because of the volume of toxic materials a train can transport. Hazardous material releases are rarely intentional, but terrorist or vandalism releases are possible. Once a hazardous material release is recognized, immediate action must be taken to respond to the release to preserve health and safety and reduce the impact on the neighboring community and the environment. Hazardous material releases in highly populated areas could result in evacuation or “shelter-in-place” situations.

Fixed Facilities

Hazardous materials being used or stored at industrial facilities and in buildings is defined as a fixed facility hazardous material release hazard. Fixed facilities include industrial facilities that store hazardous materials required for their processing or facilities that store hazardous materials that result from an industrial process. An uncontrolled release or mishandling of hazardous materials from a fixed facility may result in possible injury or fatality, severe financial loss or liability, contamination, and disruption of critical infrastructure.

The Emergency Planning and Community Right-to-Know Act (EPCRA), also known as SARA Title III, was enacted in November 1986 to enable state and local governments to adequately prepare and plan for chemical emergencies. Facilities that have spilled hazardous substances, or that store, use, or release certain chemicals are subject to various reporting requirements. Common EPCRA topics include: emergency planning; hazardous chemical inventory reporting; chemical information; toxic chemical release reporting; risk management plans, and the Toxics Release Inventory (TRI) database. The TRI database includes facilities that manufacture (including importing), process, or otherwise use a listed toxic chemical above threshold quantities. Facilities covered by EPCRA must submit an emergency and hazardous chemical inventory form to the Local Emergency Planning Committee (LEPC), the State Emergency Response Commission (SERC) and the local fire department annually. This report, also called a Tier I or Tier II, includes basic information including facility identification; employee contact information for emergencies and non-emergencies; and site-specific information including facility description, chemical types and descriptions, releases or incidents, and chemical storage capacity, capabilities, and locations.

Transport

A 1998 report by the U.S. Department of Transportation entitled Hazardous Materials Shipments states that over 800,000 shipments of hazardous materials are estimated to occur within the United States per day, resulting in a total of 3.1 billion tons shipped annually. Of the 3.1 billion tons shipped annually, 42.9% is transported by truck, 4.4% by rail, 37.9% by pipeline, 14.7% by water, and 0.05% by air.

Truck

Although rail transports a larger gross tonnage of hazardous materials, the number of truck traffic counts carrying hazardous materials shipments is greater. This is due to the larger volumes involved in a single rail shipment.

Railway

Because rail is the primary means for shipping crude, and Wisconsin railroads lie between the massive oil reserve and East Coast refineries, the state has seen its share of the growth in crude-by-rail traffic. Crude oil shipments by rail gained attention after a string of accidents, including an explosion in a small town in Quebec that killed 47 people in July 2013. The U.S. Department of Transportation issued an emergency order requiring railroads to notify states of large shipments of Bakken crude oil. The order will apply to shipments containing more than 1 million gallons of crude, or about 35 tank cars, and railroads will have to disclose volumes, frequencies of anticipated train traffic and routes.

Transporting crude on the country's railroads grew from just 9,500 carloads in 2008 to more than 400,000 carloads in 2013, according to the Association of American Railroads. The following railroads run through Waukesha County:

- Wisconsin and Southern Rail Road
- Canadian National Rail Road
- Union Pacific Rail Road
- CP Rail System
- Union Pacific Rail Road
- East Troy Rail Road

Even though a hazardous material spill event can occur at any time, inclement weather such as fog, smoke, and heavy rainfall can increase the likelihood of a spill event on roads and railways. High winds can increase the likelihood of accidents for high-profile vehicles such as tractor-trailers and fan flames after ignition. The duration of an incident should be thought of in two ways: emergency and long-term. The duration of the emergency may last from several hours to several days depending upon the location of the event, the quantity and type of material involved, and the preparedness of the community for an emergency. The duration of the event long-term may be decades due to long-lasting effects on the community and environment.

Toxics Release Inventory (TRI) from the Environmental Protection Agency

The Toxics Release Inventory (TRI) provides information on toxic chemical releases from certain facilities in communities across the United States, covering 20,000 facilities and more than 675 toxic chemicals. For the purposes of the below information, a “release” refers to the different ways toxic chemicals from industrial facilities enter the air, water and land. Facilities who report to TRI:

1. Must be in a TRI-covered industry sector or category, including Manufacturing, Coal/Oil Electricity Generation, Certain Mining Facilities, Hazardous Waste Management, & Federal Facilities.
2. Facility must have the equivalent of at least 10 full-time employees.
3. Facility must manufacture, process or use more than a certain amount of a TRI-listed toxic chemical per year.

Description	Waukesha County		Wisconsin		United States
	Number	Percent of Wisconsin	Number	Percent of United States	Number
Number of TRI Facilities	0	0%	862	0%	21,598
Facilities reporting newly implemented source reduction	0	0%	119	0	3,261
Total on-site	0	0%	18,831,624 lbs	0	3,739,532,090 lbs
Air	0	0%	12,534,867 lbs	0	773,028,732 lbs
Water	0	0%	2,938,152 lbs	0	212,120,819 lbs
Land	0	0%	3,358,605 lbs	0	2,754,382,540 lbs
Total off-site	0	0%	16,865,237 lbs	0	405,418,333 lbs
Total on-site and off-site disposal or other releases	0	0%	35,696,861 lbs	0%	4,144,950,423 lbs

Source: Toxic Release Inventory, Environmental Protection Agency

Frequency and Probability

A total of 1276 Hazardous Materials incidents have been recorded by Waukesha County Emergency Management during the five-year period from 11/01/2016 to 11/01/2021. Of these the count per material involved is as follows:

- Acetone – 1
- Acetylene – 1
- Ammonia – 8
- Asbestos – 1
- Battery Acid – 1
- Biohazard – 1
- Diesel – 74
- Explosives – 9
- Fertilizers or Herbicides – 8
- Fire with Hazmat release – 1
- Freon – 2
- Gasoline – 142
- Mercury – 4
- Muriatic/Hydrochloric Acid – 1
- Natural Gas – 742
- Oil – 20
- Automotive Oil – 37
- Heating Oil – 2
- Hydraulic Oil – 18
- Mineral Oil – 22
- Other Chemicals – 85
- Other Petroleum – 10
- Propane – 5
- Salt – 1

- Unknown Substance – 65

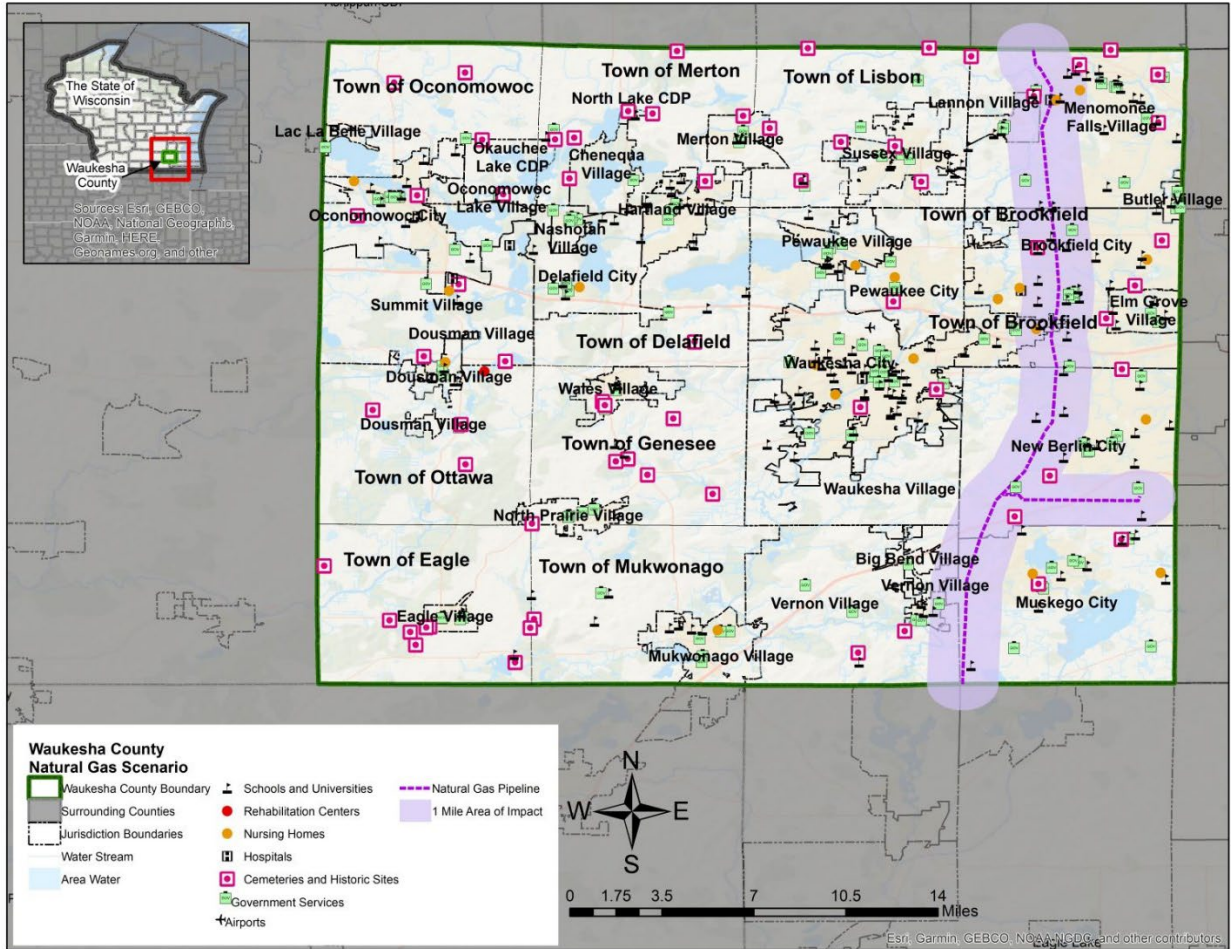
Notable Hazmat Incidents include:

- 7/31/2018 – NCL Graphics Fire - N29 W22960 Marjean Ln – Pewaukee – 2nd Alarm Fire, Hazmat response for monitoring, approx. \$1million in damage
- 5/19/2020 – SW Metal Finishing Fire - 2795 S 166th St – New Berlin – 2nd Alarm Fire, Hazmat response; chemicals at the plant included copper sulfate and sulfuric acid, some in open vats with a total potential quantity of 15,000 gallons. The Haz-Mat crew placed acid booms to slow down the flow, but thousands of gallons of water were involved as a result of fighting the fire. The runoff reached Deer Creek via a drainage ditch and water discoloration was observed. The nearby industrial park was also temporarily evacuated due to potentially hazardous smoke.
- The Hazmat Team also responded to three industrial incidents in which chemicals were mixed improperly (no fatalities), two completed chemical suicides in vehicles, and other small-scale incidents.

Vulnerability

Hazardous materials release is a low to low-moderate hazard potential of occurring for those facilities located near transit hubs or large industrial facilities that store or produce hazardous materials. Due to security concerns, the quantity and type of hazardous materials contained at neighboring facilities could not be determined. It is expected that many of these facilities are gas stations, small service stores, and commercial businesses and therefore designated as small quantity generators. Since a hazardous materials release is more likely to occur during handling or shipping than during storage, a hazardous materials incident is more likely to occur as a result of a transportation accident.

Hazardous materials releases have the potential to cause significant health impacts and/or structural damage. These materials have different potential impacts upon release, depending on their chemical properties. Additionally, the impact differs depending on how much material is released to the environment.



Hazard Assessment	
Hazardous Materials Release	
Frequency/Probability (i.e. Future Probability)	Medium
Magnitude/Extent (i.e. Strength or Magnitude)	Medium
Vulnerability (i.e. Consequence and Impact)	Medium
Overall Risk Rating	Medium

Utility Failure

Note: Although non-natural hazards are not required by FEMA for inclusion in a hazard mitigation plan, the County wishes to rank and mitigate against a comprehensive list of hazard events that could impact the planning area. Due to both the nature of non-natural hazards and the discretionary status regarding their inclusion, the following hazards of interest have been briefly and qualitatively assessed for the sake of public education and informing their inclusion within the hazard ranking and mitigation process.

A utility emergency usually means an electrical power or natural gas outage or a fuel shortage caused by an oil embargo, power failure or natural disaster.

Utility Failure Hazard Profile

Hazard Profile

An electric power outage (also power failure or power loss) is the loss of the electricity supply to a geographic area. The area of an outage (scale) can range from a single facility or neighborhood to a multi-state region. The length of the outage (scope) is determined by a combination of factors including the scale of the outage, weather, and redundant equipment and capacity.

A power outage can be described as a blackout if power is lost completely or as a brownout if the voltage level is below the normal minimum level specified for the system. The reasons for a power outage can for instance be a defect in a power station, damage to a power line or other part of the distribution system, a short circuit, or the overloading of electricity mains. 'Load shedding' is a common term for a controlled way of rotating available generation capacity between various districts or customers, thus avoiding total wide-area blackouts.

Power outages are particularly serious for hospitals and other critical facilities and operations. Our society is extremely reliant upon life-critical medical devices, communications, and electronic information all of which require reliable (uninterrupted) electric power. This reliance on electric power has forced hospitals, data and telecommunications centers, and financial and trading institutions to have arrays of backup batteries and emergency power generators. These generators, which are typically powered by diesel fuel, but should be ideally powered by natural gas where available, are configured to start automatically, as soon as a power failure occurs.

The entire energy system is complex and consists of three major parts: generation, transmission, and distribution. The control and communication between these parts are extremely important as the failure of one part could disrupt the entire system. The energy system is reliant upon the following factors: continual maintenance, equipment replacement and redundancy, and additional high-load capacity. These factors have to be carefully balanced against operating cost and profit i.e. these initiatives are expensive but the costs cannot be readily pushed down to the consumer due to public pressure and opinion.

Hazard Considerations

Area Impacted:

- Depending on the cause, scale, and scope of the power outage one or more of the County's jurisdictions could be directly and significantly affected.

Duration of the Event:

- A power outage can last minutes to multiple days, even weeks and months.

Essential Service Disruption:

- Disruption of essential government services.

- The loss of water treatment or distribution can be lead to additional expenses for citizens in buying potable water and complicated logistics for support agencies i.e. water is heavy and is bulky to transport.
- A typical family can lose hundreds of dollars in food stored in the refrigerator or freezer if the outage exceeds 36 hours. Additionally, people may unwisely eat spoiled food resulting in illness or possibly death.

Special Considerations:

- People on life support at the hospital, care facility, or at home are in possibly life-threatening danger.
- People with health conditions, the elderly and infirmed are at increased risk of environmental factors such as excessive heat/humidity and cold go beyond a highly maintained comfort level.

Direct Damage:

- Millions of dollars in losses to the equipment supporting the electrical system will be eventually passed to the consumer in the form of higher rates and fees.

Affected Population:

- Depending upon a variety of factors, the better people are prepared the less the affected population.

Economic Damage:

- Economic losses occur hourly and mount exponentially as the outage impacts business and commercial enterprises that are interconnected and reliant upon each other's ability to produce goods, services, personnel, and expertise.
- Business interruption
- Decreases in tourism

Emergency Services:

- Law enforcement, fire, and emergency medical services will be impacted indirectly by a loss of systems (e.g. data and communications, street and traffic lighting, alarm) and directly by increased calls for service.
- Emergency response and evacuation and may be adversely affected due to a lack of electric power to fuel pumps at fleet operations centers and service stations.
- Evacuation of facilities
- Burn-out of emergency service staff and wear and tear of equipment could be dramatic

Social Factors:

- The loss of alarm systems, lights, gates and other security systems will increase the likelihood of criminal and civil disturbance activity. People, particularly the elderly, will feel less secure and emotionally distressed.

- Down power lines are specially and directly dangerous during thunderstorms, winter storms, and flooding. The dangers of electrically charged lines in pools of water are a real danger to pedestrians and motorists.

Location and Extent

An electric power outage (also power failure or power loss) is the loss of the electricity supply to a geographic area. The area of an outage (scale) can range from a single facility or neighborhood to a multi-state region. The length of the outage (scope) is determined by a combination of factors including the scale of the outage, weather, and redundant equipment and capacity. The scale of the outage often directly affects the scope as often occurs during a severe storm; the greater number of down utility poles, wires, and transformers the longer the repair and restoration time.

Modern society is very dependent on electrical power for normal living and is therefore quite disrupted by the 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. Waukesha County is provided with electric service by WE Energies. In addition, a municipal electric power utility is operated by the City of Oconomowoc. There are no electric power generating facilities located within the county. Natural gas service is provided by WE Energies and by the Wisconsin Gas Company.



Image: Electrical substation

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

Disruptions are often sudden, and there may or may not be time to prepare for them. The two types of outages are:

- **Planned Outages:** An upgrade to electricity or gas infrastructure or to perform important maintenance.
- **Unplanned Outages:** Unplanned outages can be caused by severe weather, accidents or natural disasters.

As populations increase, severe weather becomes more common, and the electrical grid ages, there has also been an increase in the frequency and magnitude of power outages. Major power outages are defined as those affecting more than 50,000 people.

Frequency and Probability

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

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

Vulnerability

The failure of a utility to function can have a wide-ranging impact in Waukesha County. People, especially special needs populations, in residential properties may not be able to safely live in their homes because of inadequate heat, the inability to cook, etc. Businesses, including the utilities themselves, may lose money due to the inability to produce goods and services for which they can bill. While there are generally backup generators on sewage lift stations in Waukesha County, other utilities may also be non-operational due to damaged infrastructure, which can be very expensive to replace and/or repair. Critical infrastructure such as hospitals, schools and government facilities may not be able to operate or may have to operate at a reduced capacity due to the loss of utility services. EPCRA facilities may not be able to adequately control and contain their chemicals and there may be a release of hazardous materials that can impact people or the environment.

Agricultural assets may be impacted by the loss of utilities because 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.

Hazard Assessment	
Utility Failure	
Frequency/Probability (i.e. Future Probability)	▶ Medium
Magnitude/Extent (i.e. Strength or Magnitude)	▶ Medium
Vulnerability (i.e. Consequence and Impact)	▶ Low
Overall Risk Rating	▶ Medium

Rail Transportation Incident

Note: *Although non-natural hazards are not required by FEMA for inclusion in a hazard mitigation plan, the County wishes to rank and mitigate against a comprehensive list of hazard events that could impact the planning area. Due to both the nature of non-natural hazards and the discretionary status regarding their inclusion, the following hazards of interest have been briefly and qualitatively assessed for the sake of public education and informing their inclusion within the hazard ranking and mitigation process.*

The Rail Transportation system is a vast network connecting cities, producers, manufacturers, and retailers, moving substantial quantities of goods to, from, and through Wisconsin. Throughout the United States, there are hundreds of railroads, more than 143,000 route miles of track, more than 1.3 million freight cars, and roughly 20,000 locomotives.

Rail Transportation Incident Hazard Profile

Bakken Formation

The Bakken Formation, located in northwest North Dakota, northeastern Montana, southern Saskatchewan, and southwestern Manitoba, is one of the largest contiguous deposits of oil and natural gas in the United States. The formation is an interbedded sequence of black shale, siltstone, and sandstone.

The Bakken Formation has only recently been tapped for oil and natural gas. As recently as 2007, the Bakken Formation was considered to be a marginal to submarginal resource because the oil and natural gas are locked in a rock formation with low permeability. However, advances in drilling and recovery technology such as horizontal drilling and hydrofracturing have allowed oil and natural gas to be extracted. In fact, the recent boom in oil production from the Bakken Formation has moved North Dakota to the second-largest oil producer in the US. The Bakken Formation resources are expected to be productive for decades.

Hazard

This new source of oil and natural gas, brings with it a new hazard, such as accidents when transporting the crude oil via railroads. In fact, in recent years, accidents involving railroads and crude oil have increased.

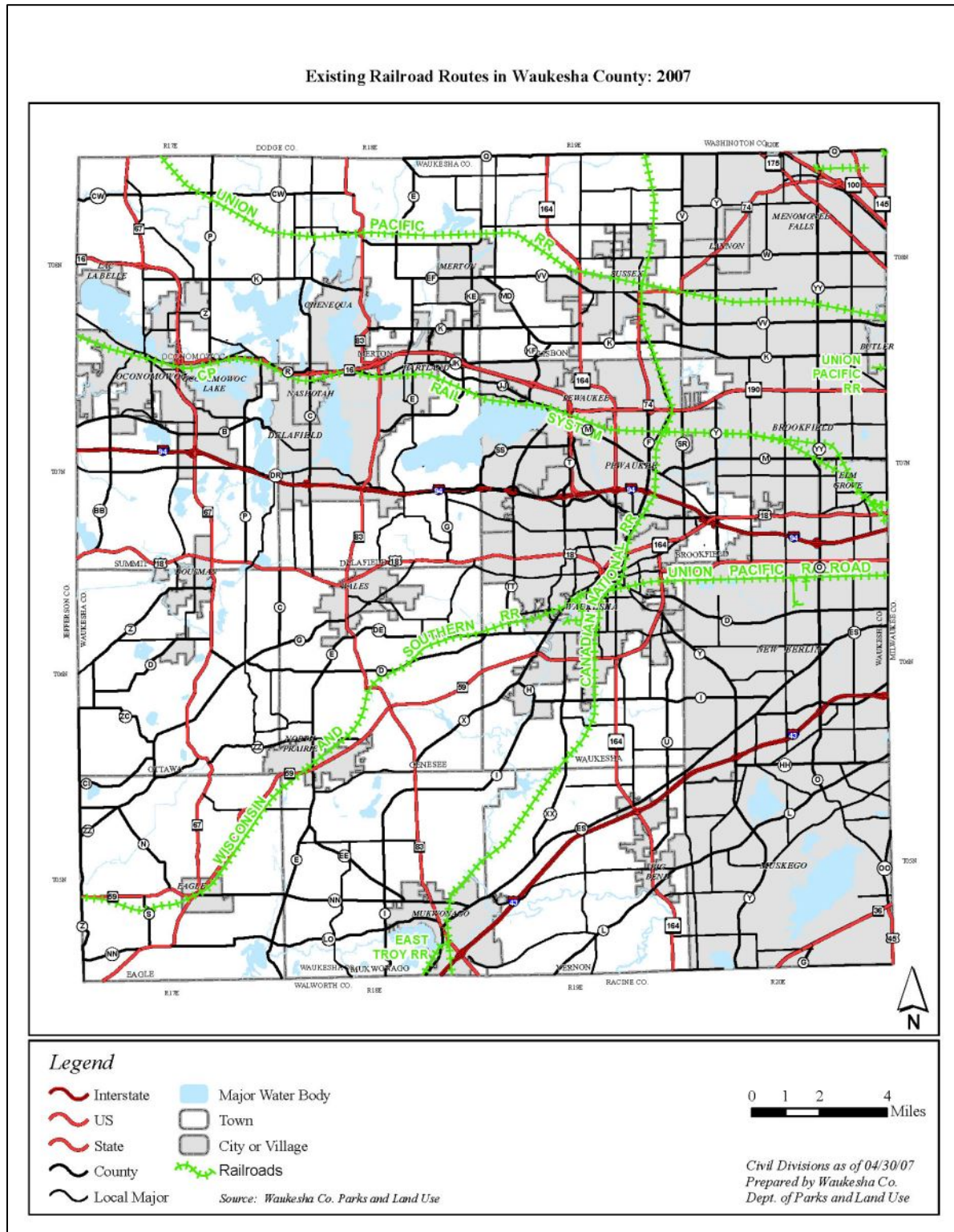
In January of 2014, the US Department of Transportation gave a "Call to Action" for those involved to work to keep crude oil shipments safe. One new emergency order by the Department of Transportation requires railroads transporting crude oil to notify state emergency response commissions.

According to Wisconsin Emergency Management, this is a multi-faceted issue, with considerations needed from Hazardous Materials professionals, Firefighters, and Environmental officials.

Source: <http://geology.com/articles/bakken-formation.shtml>

Location and Extent

Because of Waukesha County's proximity to the large transportation hub, Chicago, there are many rail routes through the state of Wisconsin. In fact, Crude Oil is transported via railroads through 47% of the counties in Wisconsin, including Waukesha.

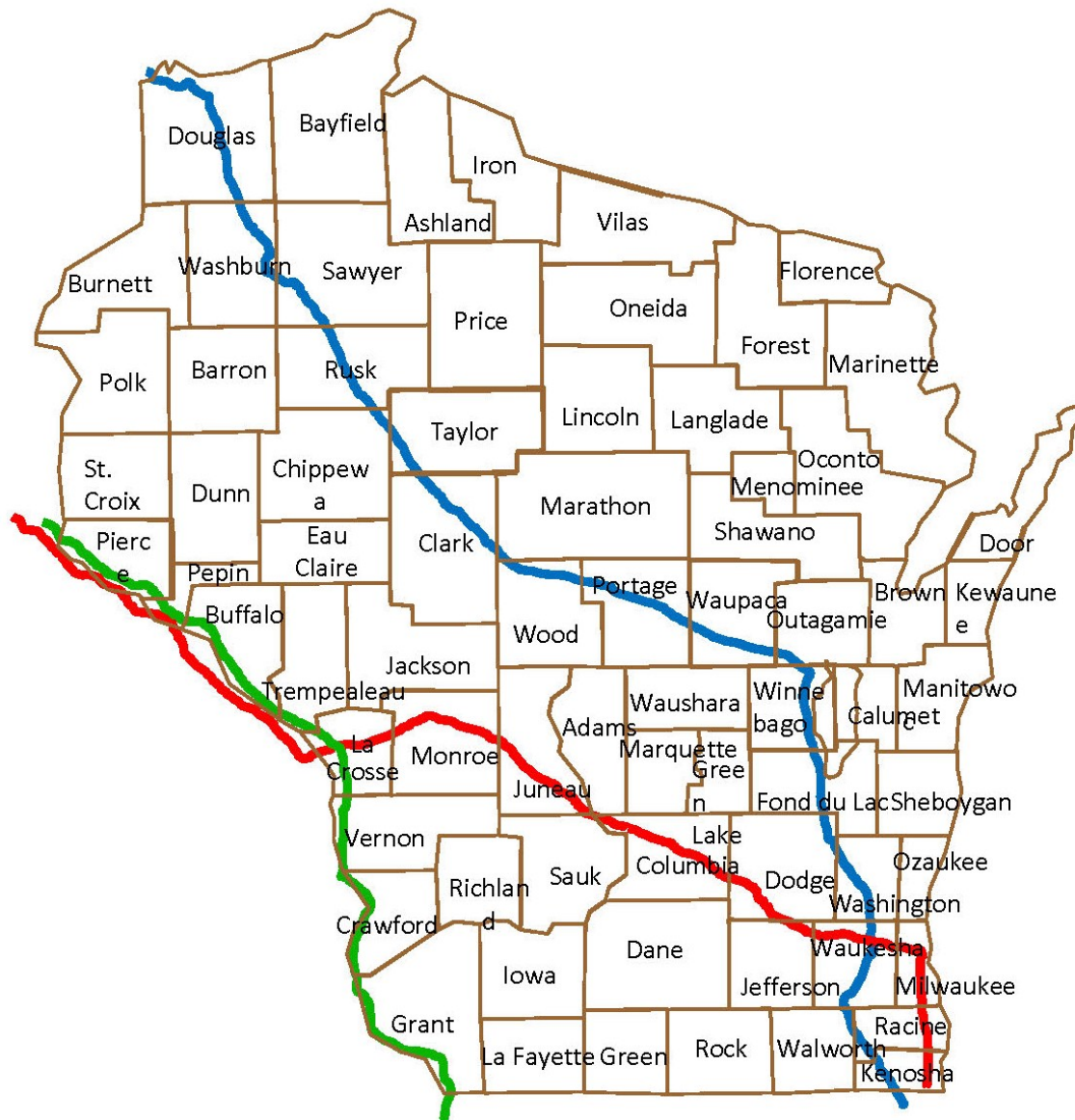


There are three main railroad companies that ship crude oil through Wisconsin:

- Canadian National RR
- Canadian Pacific RR
- Burlington Northern-Santa Fe RR

The first two listed above (Canadian National and Canadian Pacific Railroads) go through Waukesha County. This is also within the area of the state with the highest population, with Waukesha County being the third most populous county in the state.

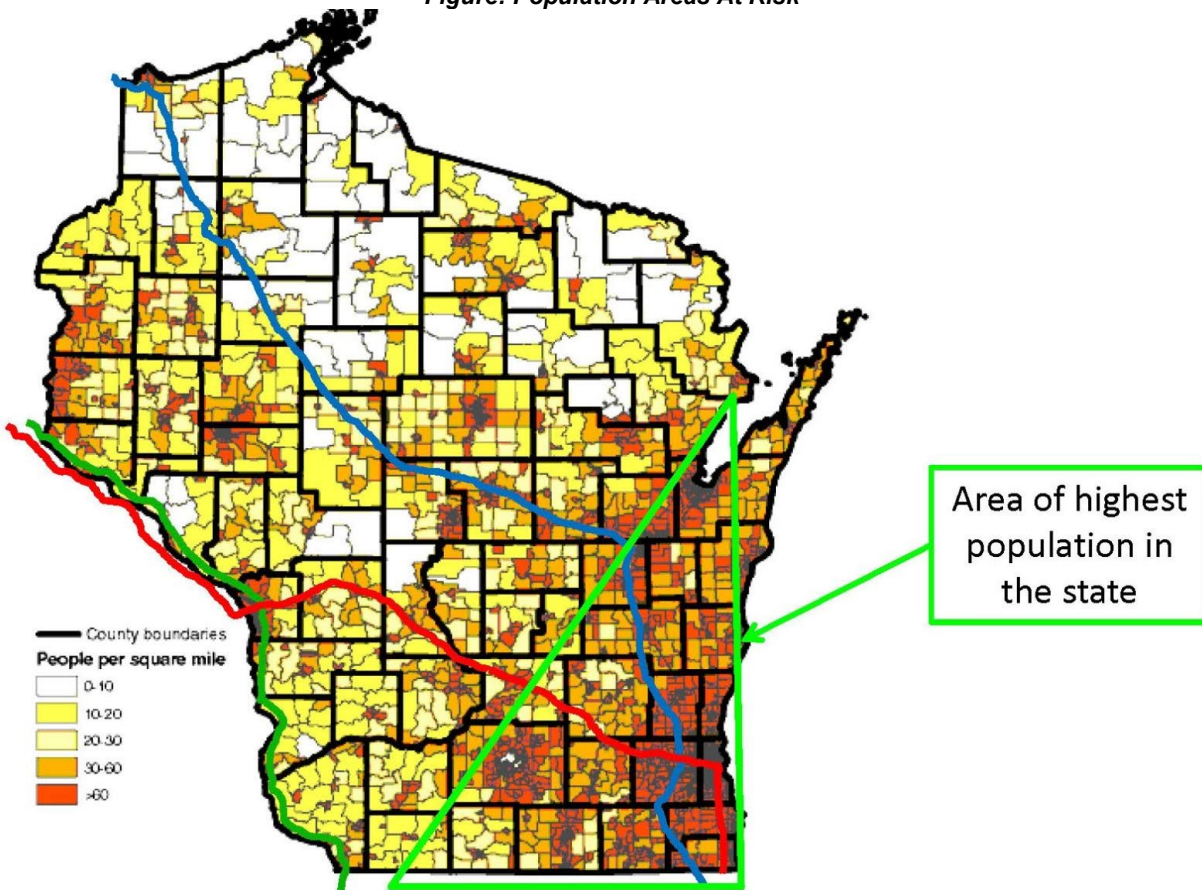
Figure: Rail Routes Transporting Crude Oil



Legend: Blue = Canadian National RR; Red = Canadian Pacific RR

Source: Wisconsin Emergency Management, Bakken Crude Oil, 2014

Figure: Population Areas At Risk



Source: Wisconsin Emergency Management, Bakken Crude Oil, 2014

Frequency and Probability

Crude Oil Incidents

- July 6, 2013, Lac-Megantic, Quebec, CA - unattended train, derail, fire, 47 killed, evacuation
- November 8, 2013, Aliceville, AL - 26 cars derail, fire, wetlands impacted
- December 30, 2013, Casselton, ND - 21 cars derailed, 400,000 gallons released, fire
- April 30, 2014, Lynchburg, VA - 105 cars derail, fire, 30,000 gallons into James River, evacuation
- May 6, 2015, North Dakota - 7 cars derail
- May 7, 2015 Illinois, 21 cars derail
- July 17, 2015, Montana, 20 car derail, 35,000 gallons of crude oil spilled, evacuations
- February 2, 2015 Pennsylvania, no spills
- February 16, 2015 West Virginia, 28 car derail, 30,000 crude oil gallons, evacuations
- November 8, 2015, Wisconsin, 13 cars derail, 1,000 crude oil gallons spilled
- March 7, 2015, Ontario, 0 cars derail, spilled into local river, fires
- June 3, 2016, Oregon, 11 cars derail

- July 3, 2017, Illinois, 20 cars derail, 20,000 gallons spilled
- May 3, 2017, Mississippi, 12 cars derailed, 20,000 gallons spilled, fire
- November 6, 2017, Fatal Train vs. Auto Collision – North Lake / Town of Merton – UP Rail
- June 22, 2018, Iowa, 32 cars derail, 230,000 gallons spilled into floodwaters
- March 22, 2019, Train vs Semi-Trailer Collision – Oconomowoc – Loaded Ethanol Key Train – No Derailment – Major damage to lead locomotive
- March 25, 2019, Derailment - Menominee Falls – UP Rail – 13 gondola cars of scrap metal derailed downhill onto private property north of golf course
- November 12, 2020, Loaded Car of Sodium Chlorate - Pewaukee – No Derailment – Wheel burn damage to car – able to continue to destination under movement authority

Vulnerability

Hazard Assessment		
Rail Transportation Incident		
Frequency/Probability (i.e. Future Probability)	▶	Low
Magnitude/Extent (i.e. Strength or Magnitude)	▶	Low
Vulnerability (i.e. Consequence and Impact)	▶	Low
Overall Risk Rating		▶ Low

Political Hazards

Note: Although non-natural hazards are not required by FEMA for inclusion in a hazard mitigation plan, the County wishes to rank and mitigate against a comprehensive list of hazard events that could impact the planning area. Due to both the nature of non-natural hazards and the discretionary status regarding their inclusion, the following hazards of interest have been briefly and qualitatively assessed for the sake of public education and informing their inclusion within the hazard ranking and mitigation process.

Political Hazards include the following:

Civil Disturbances:

- Labor Disputes
- Protests

Terrorism:

- Explosive Devices(bombs)
- Airline Attacks
- Chemical/Biological/Nuclear Attacks
- Hostage Taking
- Infrastructure Attacks
- Active Assailant Attacks
- Home Grown Violent Extremists

Civil Disturbances

Note: *Although non-natural hazards are not required by FEMA for inclusion in a hazard mitigation plan, the County wishes to rank and mitigate against a comprehensive list of hazard events that could impact the planning area. Due to both the nature of non-natural hazards and the discretionary status regarding their inclusion, the following hazards of interest have been briefly and qualitatively assessed for the sake of public education and informing their inclusion within the hazard ranking and mitigation process.*

A civil disturbance is any act by an individual or group of persons with the intention to agitate or cause a public disruption of daily life and/or normal operations. These disturbances may come in the form of labor disputes or protests by groups on specific interests or issues.

Significant civil disturbances in Waukesha County remain a low probability hazard. Labor strikes occurred in the past but generally concluded peacefully and without hostile actions. In a pending labor situation, the sheriff and/or police chief meet with strike leaders to set up conduct guidelines for a lawful strike. Law enforcement officials maintain mutual aid pacts for additional support.

Various facilities and organizations received prank bomb threats in the past. Responders located a number of explosive-type objects, such as pipe bombs, military hardware and blasting supplies. Several isolated instances of pipe bombs exploding and destroying property in close proximity occurred in Waukesha County.

Each school, hospital, business and government building should develop and maintain current bomb threat plans, policies and procedures. Waukesha County Emergency Management, the Waukesha Sheriff's Department and local police agencies assisted numerous organizations in developing and exercising these plans.

Threats against government officials and others in top positions by persons who believe they suffered unjustly or wronged in some manner occurred. So far in Waukesha County such threats remained minimal and never carried out.

Special events involving large numbers of people must obtain event permits as a mitigation strategy to minimize disturbances. Law Enforcement agencies develop and utilize intelligence information to gain advanced data on potential problems and work with event organizers to minimize or eliminate disruptive behaviors whenever possible.

Notable Incidents

- June 1, 2020: Peaceful protests for George Floyd in Waukesha.

Terrorism

Note: *Although non-natural hazards are not required by FEMA for inclusion in a hazard mitigation plan, the County wishes to rank and mitigate against a comprehensive list of hazard events that could impact the planning area. Due to both the nature of non-natural hazards and the discretionary status regarding their inclusion, the following hazards of interest have been*

briefly and qualitatively assessed for the sake of public education and informing their inclusion within the hazard ranking and mitigation process.

Terrorism is defined as the unlawful use of force or violence against persons or property to intimidate or coerce a government, the civilian population or any segment thereof, in the furthering of political or social objectives. The Federal Bureau of Investigation categorizes two types of terrorism in the United States: domestic terrorism which involves groups or individuals whose activities are directed at elements of our government or population without foreign direction; and international terrorism which involves groups or individuals who are foreign-based and/or directed by countries or groups outside the U.S. or whose activities transcend national boundaries. Additionally, some acts conducted by gangs, people involved in civil disturbances, radical splinter groups, activists and people involved in illegal drug trade could fall within the definition of terrorism.

An act of terrorism can take several forms, depending on the technological means available to the terrorist, the nature of the political issue motivating the act, and the points of weakness of the terrorism target. Terrorist actions may include:

Bombing: Most terrorist incidents in the U.S. involved explosives or incendiary devices, including detonated and undetonated explosive devices, tear gas, pipe and firebombs and rocket attacks. Often the capacity existed for large-scale damage and/or mass casualties. The bombing of the Federal Building in Oklahoma City in August 1995 is a recent example. The type of materials and method of delivery utilized in the bombing of the Murrah Federal Building proved readily accessible to potential terrorists. Because of the ready availability of such materials, the potential for mass damage, casualties and experiences to date nationally, the United States Department of Homeland Security warns that of the various types of WMD weapons, explosive weapons remain a high potential hazard for use in the U.S.

Airline Attack: Despite efforts to improve airline security in the U.S. after the 9/11/01 attacks on the World Trade Center in New York, some note that airport security still falls short of acceptable and necessary standards. In addition to hijacked planes crashing into buildings, incidents could include airplane bombings, sabotage or hijacking, airport bombings or shootings or tampering with air navigation and control systems, resulting in plane crashes or collisions.

Chemical/Biological/Nuclear: Terrorists may use chemical and biological agents or weapons to either extort or deliberately try to kill in order to further political goals. Toxins such as anthrax or even some radiological materials represent credible threats. From October-December 2001, emergency services responded to nearly 100 anthrax hoaxes in Waukesha County. Although these threats and letters proved to be hoaxes, first responders cannot afford to treat these types of cases lightly.

Hostage Taking: Terror groups and homegrown violent extremists believe the taking of hostages provides those groups or individuals publicity for their political or social objectives, allows negotiation for the furtherance of their aims, or results in events that are designed to invoke sympathy for their causes. The main goal of response agencies is to end the incident, with the absolute minimum loss of life possible. Despite a common belief, most response agencies will not agree to any demand to prevent endangering the safety of hostages.

Infrastructure Attack: An individual or group of terrorists could coordinate an attack against utilities and other public services such as the water supply, electric power generation, power transmission, or telephone service. Cyber-terrorism attacks computer resources such as networks, databanks and software by infiltrating computer networks and altering, stealing or destroying programs and data or implementing distributed denial of service attacks. As society becomes more dependent on computers, networks, Supervisory Control and Data Acquisition (SCADA) Systems, and cell phones, this form of cyber-terrorism is an increasing concern.

Active Assailants: Recent events nationally and across the globe involved individuals and groups of individuals conducting assaults on unsuspecting citizens. Weapons involved include firearms, edged weapons, improvised explosive devices, and vehicles. Psychologically impaired individuals conducted some of these attacks, while others involved radicalized persons attempting to further a political cause.

Home-Grown Violent Extremists (HVE): Positive enhancements to border security and entry visas made travel into the United States by members affiliated with organized terror groups increasingly difficult. As a result, several terror-related organizations actively promote acts of extreme violence by radicalized individuals living in the target area of the world, including the United States. Unidentified radicalized individuals already within a target area undergo far less travel scrutiny than identified terror group affiliates. This allows them to move about more freely to plan and implement attacks at various soft target venues.

Other Related Information: The emergency management community in the United States understand that national security and intelligence organizations may not always achieve success in preventing terrorist incidents. State and local emergency management systems must respond when these attacks occur. The ramifications of responding to a terrorist incident may vary from traditional large-scale emergencies. Responders must remain alert for secondary and tertiary devices intended to incapacitate or kill emergency workers responding to the initial attack or threat. The safety of emergency service providers must remain an early, primary consideration. Federal and state government agencies depend directly on local managers and emergency response personnel and their initial and follow-on actions during any terrorist incident.

When dealing with terrorist incidents, the traditional local incident command structure must adapt to include additional federal and state agencies. The potential for secondary and tertiary devices or attacks may threaten the lives of patients and emergency personnel, thus requiring the rapid evacuation of the injured from the scene even before treatment begins. In addition, chemical, biological or nuclear attacks may require mass decontamination.

Waukesha County developed a Terrorism Consequence Management Annex and a Bioterrorism Response Plan as adjunct documents supporting the Comprehensive Emergency Management Plan. The planning process identified potential targets, as well as threat and risk potentials in coordination with the Threat, Hazard Identification and Risk Analysis (THIRA) guidance and planning implemented by the State and federal governments. Potential terrorist targets include a wide variety of venues. Any type of

facility or event upon which a terrorist attack could generate desired publicity or further terrorist objectives could be classified as a potential target.

Numerous first responders successfully completed Weapons of Mass Destruction (WMD) awareness and response training. Waukesha County conducted one of the first exercises in the nation to integrate civilian and military assets for response to a biological incident. Exercises and training continue to increase the readiness level of all responders to a terrorist incident while also identifying methodologies to mitigate potential attacks and their impact. Waukesha County utilized a combination of local, state, and federal funds to purchase domestic preparedness equipment to enhance the local capabilities of first responders and hazardous materials teams. Waukesha County partnered in August 2015 with the City of Waukesha, Wisconsin National Guard, Wisconsin Emergency Management, other State agencies, and the United States Department of Homeland Security to conduct a full-scale exercise integrating all levels of government and civilian and military assets in a response to a simulated event.

VI. Hazard Mitigation Goals and Objectives

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 Waukesha 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, assess the risks, analyze the potential for mitigation and 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:

Overall Hazard Goals and Objectives

GOALS
<p>1. To preserve life and minimize the potential for injuries or death.</p> <ul style="list-style-type: none"> • Identify natural and manmade hazards that threaten life in Waukesha County.
<p>2. To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate mitigation strategies to minimize potential property damage.</p> <ul style="list-style-type: none"> • Implement programs and projects that assist in protecting lives by making homes, businesses, essential facilities, critical infrastructure, and other property more resistant to losses from all hazards. • Improve hazard assessment information to make recommendations for discouraging new development and encouraging preventive measures for existing development in areas vulnerable to natural hazards.

<ul style="list-style-type: none"> • Protect life and property by implementing state-of-the-art standards, codes and construction procedures.
<p>3. To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.</p> <ul style="list-style-type: none"> • Continue developing and strengthening inter-jurisdictional coordination and cooperation in the area of emergency services. • Continue to support and develop comprehensive mutual aid agreements. • Continue providing County and City emergency services with training and equipment to address all identified hazards.
<p>4. To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p>
<p>5. Increase public awareness</p> <ul style="list-style-type: none"> • Increase public awareness of existing threats and the means to reduce these threats by conducting educational and outreach programs to all the various community groups in the County. • Provide informational items, partnership opportunities and funding resource information to assist in implementing mitigation activities.

VII. Mitigation Strategy & Initiatives

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized.

This section is organized as follows:

- Mitigation Action Plan
- Plan Integration
- Mitigation Implementation and Progress

Mitigation Action Plan

The action plan helps to prioritize mitigation initiatives according to a benefit/cost analysis of the proposed projects and their associated costs (44 CFR, Section 201.6(c)(3)(iii)). The action plan also provides the framework for how the proposed projects and initiatives will be implemented and administered over the next 5 years. It is also meant to programmatically guide the annual updates and progress for each mitigation initiative.

Each new mitigation project identified during the 2021 plan update has been organized based on the following table below.

Table. New Mitigation Action Form

Mitigation Project:							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021						
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
Action/Implementation Plan and Project Description:							

Mitigation Strategy/Action Timeline Parameters

While the preference is to provide definitive project completion dates, this is not possible for every mitigation strategy/action. Therefore, the parameters for the timeline (**Projected Completion Date**) are as follows:

- **Short Term** = to be completed in 1 to 5 years
- **Long Term** = to be completed in greater than 5 years
- **Ongoing** = currently being funded and implemented under existing programs.

Mitigation Strategy/Action Benefit Parameters

Benefit ratings were defined as follows:

- **High**—Project will provide an immediate reduction of risk exposure for life and property.
- **Medium**—Project will have a long-term impact on the reduction of risk exposure for life and property, or project will provide an immediate reduction in the risk exposure for property.
- **Low**—Long-term benefits of the project are difficult to quantify in the short term.

Mitigation Strategy/Action Estimated Cost Parameters

While the preference is to provide definitive costs (dollar figures) for each mitigation strategy/action, this is not possible for every mitigation strategy/action. Therefore, the estimated costs for the mitigation initiatives identified in this Plan were identified as high, medium, or low, using the following ranges:

- **High**—Existing funding will not cover the cost of the project; implementation would require new revenue through an alternative source (for example, bonds, grants, and fee increases).

- **Medium**—The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
- **Low**—The project could be funded under the existing budget. The project is part of or can be part of an ongoing existing program.

Mitigation Strategy/Action Prioritization Process

The action plan must be prioritized according to a benefit/cost analysis of the proposed projects and their associated costs (44 CFR, Section 201.6(c)(3)(iii)). The benefits of proposed projects were weighed against estimated costs as part of the project prioritization process. The benefit/cost analysis was not of the detailed variety required by FEMA for project grant eligibility under the Hazard Mitigation Grant Program (HMGP) and Building Resilient Infrastructure and Communities (BRIC) grant program. A less formal approach was used because some projects may not be implemented for up to 10 years, and associated costs and benefits could change dramatically in that time. Therefore, a review of the apparent benefits versus the apparent cost of each project was performed. Parameters were established for assigning subjective ratings (high, medium, and low) to the costs and benefits of these projects.

The priorities are defined as follows:

- **High Priority**—A project that meets multiple objectives (i.e., multiple hazards), has benefits that exceed cost, has funding secured or is an ongoing project and meets eligibility requirements for the HMGP or BRIC grant program. High priority projects can be completed in the short term (1 to 5 years).
- **Medium Priority**—A project that meets goals and objectives, that has benefits that exceed costs, and for which funding has not been secured but that is grant eligible under HMGP, BRIC or other grant programs. The project can be completed in the short term, once funding is secured. Medium priority projects will become high priority projects once funding is secured.
- **Low Priority**—A project that will mitigate the risk of a hazard, that has benefits that do not exceed the costs or are difficult to quantify, for which funding has not been secured, that is not eligible for HMGP or BRIC grant funding, and for which the timeline for completion is long term (1 to 10 years). Low priority projects may be eligible for other sources of grant funding from other programs.

For many of the strategies identified in this action plan, the partners may seek financial assistance under the HMGP or HMA programs, both of which require detailed benefit/cost analyses. These analyses will be performed on projects at the time of application using the FEMA benefit-cost model. For projects not seeking financial assistance from grant programs that require detailed analysis, the partners reserve the right to define “benefits” according to parameters that meet the goals and objectives of this plan.

Mitigation Alternatives and Strategies

Plan participants assessed and included a comprehensive range of hazard mitigation strategies/actions, including strategies from FEMA documents, strategies from the 2016 Waukesha County Hazard Mitigation Plan and suggestions from participating communities and

their respective stakeholders during a series of workshops that took place throughout the County in August of 2021.

Each of the participating communities, including Waukesha County, was invited to participate in a series of workshops in which goals, objectives, and strategies were discussed, identified, updated and prioritized. Each participant in this session was provided with a number of resources to help them identify relevant mitigation strategies. These include the following documents:

- Mitigation Examples Handout (see Appendix C. Mitigation Project Examples)

All potential strategies that arose through this process are included in this Plan. A final draft of the Plan was presented to all stakeholders to allow them to provide final edits and approval of the strategies and their priority.

One of the benefits of using the Online Planning System was to ensure neighboring communities had full visibility of each other's mitigation initiatives. This was done to ensure synergies were identified, when applicable, and that mitigation actions in one community would not adversely impact another nearby community.

Mitigation Strategies by County Agencies/Departments

The mitigation strategies and actions from county departments/agencies, and those actions that are applicable to all participating jurisdictions, are included in **Volume 2**. Also included are those mitigation actions that benefit multiple jurisdictions. They can be found here:

- [Countywide Mitigation Actions/Projects](#)
- [Multi-Jurisdictional Mitigation Actions/Projects](#)

Each entities' Mitigation Strategies & Actions are organized as follows:

- **New Mitigation Actions**—New actions identified during this 2021 update process
- **Ongoing Mitigation Actions**—These ongoing actions were included in the previous update and have yet to be completed. Some of these actions have no definitive end. During the 2021 update, these "ongoing" mitigation strategies/actions were modified and/or amended, as needed, to better define the strategy/action.
- **Completed Mitigation Actions**—Completed actions since 2016. Completed actions also included a brief description of the "Resulting Reduction or Limitation of Hazard Impact(s) Achieved" in order to show the resulting benefits of implementing the mitigation initiative.

Mitigation Strategies by Community

The mitigation strategies and actions from the participating jurisdictions are included in **Volume 2**.

- [Volume 2: Waukesha County Hazard Mitigation Plan 2021: Municipalities](#)

They include:

- **New Mitigation Actions**—New actions identified during this 2021 update process
- **Ongoing Mitigation Actions**—These ongoing actions were included in the previous update and have yet to be completed. Some of these actions have no definitive end. During the 2021 update, these "ongoing" mitigation strategies/actions were modified and/or amended, as needed, to better define the strategy/action.
- **Completed Mitigation Actions**—Completed actions since 2016. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

Summary of Mitigation Strategies

The following table represents a summary of new and ongoing mitigation projects. For a complete and more detailed description of each mitigation project, please see [Volume II](#).

Applicable Jurisdiction	Mitigation Actions	Priority	Status
Countywide	Study and identify flood-prone areas not mapped in FEMA's maps	High	New
Countywide	Study and develop flooding map and analysis of chronic areas	Medium	New
Countywide	Procure portable generators for key assets and to use during emergency incidents	Medium	New
Countywide	Purchase All Terrain Vehicles to support incident response	Medium	New
Countywide	Purchase Hydraulic Door Spreader	Medium	New
Countywide	Continue to promote the increased use of National Oceanic and Atmospheric Administration (NOAA) weather radios	Medium	Ongoing
Countywide	Continue supporting volunteer recruitment and engagement in the County	Low	Ongoing
Countywide	Integrate the usage of AlertSense mass community notification system into emergency plans, procedures and practice in the county. Promote enrollment into Alertsense.	High	Ongoing
Countywide	Continue to add/update Emergency Management Department links on the existing county web site. Publicize the website to show the community what is there.	High	Ongoing
Countywide	Each municipality should complete a survey of the municipality's siren need and capability; and ensure that maintenance, monitoring and usage policies/procedures remain current as defined by each jurisdiction.	Low	Ongoing
Countywide	County should be prepared to provide disaster-related information to farmers (e.g., crop irrigation, crop insurance)	Low	Ongoing
Countywide	Prepare/publicize water usage information for non-farm areas during drought	Low	Ongoing
Countywide	*Continue updating GIS mapping data on regular five-year cycle.	Medium	Ongoing
Countywide	*Continue public outreach efforts for flood mitigation efforts.	Medium	Ongoing
Countywide	*Provide information to citizens about the purchase of flood insurance	Medium	Ongoing
Countywide	Provide public information via website links or brochures regarding safe driving procedures in the fog	Low	Ongoing
Countywide	Continue to provide outreach efforts to stakeholders on protecting homes and structures from wildfires and on obtaining the proper burn permits	Low	Ongoing
Countywide	Conduct outreach to stakeholders regarding wildfires caused by railroads	Low	Ongoing
Countywide	Continue public outreach and information sharing on severe temperature preparedness	Medium	Ongoing

Countywide	Continue to provide sheltering services to citizens in need during an emergency or disaster, and update the County Waukesha County Mass Care Plan.	High	Ongoing
Countywide	Place hail storm safety materials in county display rack, on the website and during severe weather week.	Medium	Ongoing
Countywide	Provide information regarding the purchase of crop insurance	Low	Ongoing
Countywide	Continue lightning awareness and safety outreach through the website and social media, especially during severe weather week	Medium	Ongoing
Countywide	Provide information regarding the use of fire-resistant materials and surge protectors.	Low	Ongoing
Countywide	Continue thunderstorm awareness and safety outreach through the website and social media, especially during severe weather week	Medium	Ongoing
Countywide	Work with local fair/ festival boards, as requested, to create emergency plans in case of inclement weather.	Medium	Ongoing
Countywide	Fund a study to revise rainfall classifications from a recurrence interval standard to a simple scale like those used for hurricanes, tornadoes and earthquakes with the goal of making it easier for the public to understand. Calling major rainstorms that have occurred multiple times in a short period of time the "100-year storm" confuses the public and misleads them into thinking they need not protect themselves against such storms since they are "rare."	Medium	Ongoing
Countywide	Explore the feasibility of constructing tornado shelters in areas where deficient especially in mobile home parks and campgrounds.	Medium	Ongoing
Countywide	Encourage builders and owners of manufactured and mobile homes to use tie-downs with ground anchors. Procure funding sources to support implementation.	Medium	Ongoing
Countywide	Explore the feasibility of increasing the wind resistance of the roofs of community storm shelters.	Low	Ongoing
Countywide	Promote tornado awareness, including safety measures.	Medium	Ongoing
Countywide	Promote winter hazards awareness, including home and travel safety measures	Medium	Ongoing
Countywide	Maintain the proper amount of resources (e.g., salt) to properly manage winter storms.	High	Ongoing
Countywide	The County would like additional Road Weather Information System (RWIS) monitoring system stations.	Low	Ongoing
Countywide	The county would like to have AVL (automatic vehicle locator) and routing software for snowplows to increase efficiency and reduce waste.	Low	Ongoing
Countywide	Complete a survey to determine which railroad intersection safety systems do not have electrical power back-ups. Seek funding sources based on survey results.	Low	Ongoing
Countywide	Consider back-up power needs. The county purchased two large (100KW) portable generators with the major goal of providing power at any mass clinic site but can be used at shelters if not needed for a clinic. May need to evaluate if this is sufficient for sheltering operations.	High	Ongoing
Multi-Jurisdiction: Cities of Oconomowoc and Waukesha; Waukesha County, Village of Hartland	Support communities working toward and to maintain the National Weather Service "Storm Ready" designation	Low	Ongoing
Multi-Jurisdiction: Waukesha Co; Cities of Brookfield, Delafield, Muskego, New Berlin,	Look for an acceptable (environmentally, socially, cost-benefit, politically, etc.) solution for removing water from flood-prone areas, especially those areas that are basin/bowl shaped. Seek out funding sources (grants) to execute solutions.	High	Ongoing

Oconomowoc, Pewaukee, Waukesha; Villages of Big Bend, Butler, Chenequa, Dousman, Eagle, Elm Grove, Hartland, Lac La Belle, Lannon, Menomonee Falls, Merton, Mukwonago, Nashotah, North Prairie, Oconomowoc Lake, Pewaukee, Sussex, Wales; Town of Mukwonago			
Multi-Jurisdiction: Town & Villages of Mukwonago, Lake Nagawicka (City of Delafield and Village of Nashotah), Saylesville Lake (TN Genesee)	Work with the DNR on dam safety and flooding issues, including better communication and emergency plans.	Medium	Ongoing
Multi-Jurisdiction: Town, Village and City of Oconomowoc	Continue planning discussions regarding flooding issues caused by dam management procedures with the goal of creating agreements to reduce the flooding in downstream municipalities.	Medium	Ongoing
Multi-Jurisdiction: VI of Menomonee Falls, CI & TN of Brookfield, VI of Big Bend & VI of Vernon, TN of Genesee, VI of Summit, CI & VI of Waukesha, CI of Pewaukee	Raise floodplain county roads that get overtopped by water out of the danger zone.	High	Ongoing
Multi-Jurisdiction: Southern Kettle Moraine including the Villages of Eagle and Dousman	Provide ample training for volunteer fire fighters for larger wildfires	Medium	Ongoing
Multi-Jurisdiction: State DOT, Waukesha County Highway, VL & TN of Mukwonago, Village of Elm Grove	Create additional locations for road salt storage: The county would like one, large 15,000 lb salt dome for state and county usage. Village and Town of Mukwonago would like additional storage in a smaller salt domes.	High	Ongoing
Multi-Jurisdiction: Cities of Pewaukee and Waukesha	The Cities of Pewaukee and Waukesha would like to have truck-mounted water pumps to serve as back-ups to the stationary pumps in an electrical failure	Medium to High	Ongoing
Multi-Jurisdiction: Villages of Big Bend, Chenequa, Eagle, Hartland, Lac La Belle, North Prairie and Wales	Evaluation options for providing shelters, with back-up power generators (or panels to accept portable generators), within the municipalities.	Medium to High	Ongoing

Multi-Jurisdiction: WCTC, Village of Pewaukee	WCTC would like to add five additional storm water retention basins as part of the Master Facilities Plan.	Low to Medium	Ongoing
Multi-Jurisdiction: WCTC, Village of Pewaukee	Continue working on existing hazard mitigation activities at the Waukesha County Technical College (WCTC), including: Installing a water retention pond at the base of a hill that separates WCTC's property from the Pewaukee High School. Meeting with local residents with concerns over walking trails eroded by rain in 2008-09 and described some planned repairs.	Medium to High	Ongoing
Multi-Jurisdiction: WCTC, Village of Pewaukee	WCTC would like to add five additional storm water retention basins as part of the Master Facilities Plan.	Low to Medium	Ongoing
City of Brookfield	Study and implement strategic actions to build resiliency in utility and power infrastructure, to include, but not limited to: Burying strategic overhead powerlines, where appropriate, improving and upgrading utility infrastructure to be more resilient to wind, ice, and other natural disasters.	High	New
City of Brookfield	Floodproofing Buildings	High	New
City of Brookfield	Purchase generators and appropriate hookups	High	New
City of Brookfield	Upgrade Sanitary Sewer System	High	New
City of Brookfield	Upgrade and improve storm sewers to mitigate the effects of flooding.	Medium	New
City of Brookfield	Purchase and raze repetitive loss structures from flood prone areas or where properties are subject to surface water drainage up to and into the house. Project would also include regrading property to provide detention of runoff to reduce drainage issues elsewhere in the neighborhood.	High	Ongoing
City of Brookfield	Provide backwater valves to property owners subject to basement backups.	Medium	Ongoing
City of Delafield	Look for an acceptable (environmentally, socially, cost-benefit, politically, etc.) solution for removing water from flood-prone areas, especially those areas that are basin/bowl shaped. Seek out funding sources (grants) to execute solutions.	High	Ongoing
City of Delafield	Work with the DNR on dam safety and flooding issues, including better communication and emergency plans.	Medium	Ongoing
City of Muskego	Evaluate and implement hazard mitigation measures for properties that have a history of damage due to overland flooding.	Medium/High	Ongoing
City of Muskego	Upgrade the lift station to 5 million gallons per day.	High	Ongoing
City of New Berlin	Procure backup generators and appropriate hookups	High	New
City of New Berlin	Install Sprinkler System at critical city storage facilities.	High	New
City of New Berlin	Implement the mitigation measures in the City of New Berlin's Stormwater Management Plan a possible.	Medium/High	Ongoing
City of Oconomowoc	Procure generators and appropriate hookups	High	New
City of Oconomowoc	Universal Electrical Generators	Medium	New
City of Pewaukee	Study and implement alternative transportation routes to mitigate impact and safety concerns posed by rail lines.	Medium	New
City of Pewaukee	Continue exploring the feasibility of creating a Storm Water Management District in the City of Pewaukee to fund mitigation projects.	Medium	Ongoing
City of Waukesha	Study and implement flood management measures to mitigate flooding along the Fox River.	Medium	New
City of Waukesha	Study and implement flood acquisition of property impacted by repetitive flooding	Medium	New
City of Waukesha	Provide inspectors and city staff with enhanced communications devices to more efficiently conduct and communicate damages during an incident.	Low	New
City of Waukesha	Burying utility infrastructure	High	New

City of Waukesha	Provide funding to property owners in floodplains to take measures to flood-proof existing structures.	Medium	New
City of Waukesha	Provide training to city staff to become certified in floodplain management.	Medium	New
City of Waukesha	Procure generators and appropriate hookups.	Low	New
City of Waukesha	Purchase a portable generator to provide power at sewage pump stations.	High	New
City of Waukesha	Purchase and install an emergency backup generator at West Bluemound Lift Station	Medium	New
City of Waukesha	Purchase and install an emergency backup generator at Springbrook Lift Station	Medium	New
City of Waukesha	Purchase and install an emergency backup generator at East Bluemound Pump Station	Medium	New
City of Waukesha	Provide flood protection for sewer pump station at Waukesha Airport	Medium	New
City of Waukesha	Purchase a 4" Diesel Towable Trash Pump for flooding and/or sewer bypass pumping	Medium	New
City of Waukesha	Purchase a trash pump to support flood response capabilities	Medium	New
City of Waukesha	Procure and install an emergency generator to provide power to the secondary treatment train (Bldg. 220)	Medium	New
City of Waukesha	Study and procure land for a temporary debris storage and reduction site (TDSR)	High	New
City of Waukesha	Upgrade and upsize storm sewers	Medium	New
City of Waukesha	The City of Waukesha would like to upgrade its ICP: ICP - Upgrade the ICP (tear out walls, add computers, CAD station, streaming video)	High	Ongoing
City of Waukesha	Complete projects recommended in the City of Waukesha City-Wide Storm Management Plan in areas deemed vulnerable: Drainage Area 1: Rolling Ridge Dr. and N. University Dr. The stormwater infrastructure improvements resulting from the detailed modeling evaluations included a combination of additional stormwater conveyance capacity, and new pond storage. The increased conveyance capacity is to be accomplished with new storm sewers, new sewers parallel to existing sewers, replacing existing sewers with larger storm sewers, and replacing undersized culverts.	High	Ongoing
City of Waukesha	Complete projects recommended in the City of Waukesha City-Wide Storm Management Plan in areas deemed vulnerable: Drainage Area 2: N. University Dr., Darrell Dr., and Patrick Ln. The improvements resulting from the detailed modeling included a combination of additional stormwater conveyance capacity, and increased pond capacity. The increased conveyance capacity is to be accomplished with new sewers parallel to existing sewers, and replacing existing sewers with larger storm sewers.	High	Ongoing
City of Waukesha	Complete projects recommended in the City of Waukesha City-Wide Storm Management Plan in areas deemed vulnerable: Drainage Area 3: Airport Business Park and Peters Dr. The modeled improvements for Area 3 included only minor areas of increased conveyance, including new sewers north of Peters Drive and parallel sewers east of Aviation Drive.	High	Ongoing
City of Waukesha	Complete projects recommended in the City of Waukesha City-Wide Storm Management Plan in areas deemed vulnerable: Drainage Area 4: Frame Park Creek at Harding Ave. and Anoka Ave. The modeled improvement for Area 4 was the addition of below-grade storage northeast of the intersection of Harding and Anoka Avenues.	High	Ongoing
City of Waukesha	Complete projects recommended in the City of Waukesha City-Wide Storm Management Plan in areas deemed vulnerable: Drainage Area 5: Lawndale Ave. and S.	High	Ongoing

	Washington Ave. Stormwater infrastructure improvements for Area 5 included underground storage at Waukesha Memorial Hospital and additional stormwater conveyance in the form of new and parallel storm sewers west and south of the new storage to convey flows toward an existing pond in Woodfield Park.		
City of Waukesha	Complete projects recommended in the City of Waukesha City-Wide Storm Management Plan in areas deemed vulnerable: Darien Area 6: E. Moreland Blvd . at Wolf Rd. Several alternatives were considered for Area 6, including a storage alternative that involved multiple ponds, and a conveyance alternative that increased the capacity along existing storm sewer routes. A third alternative that added additional conveyance capacity while directing the water under Moreland Boulevard to the Fox River instead of west along Greenway Terrace was also developed, and selected as the preferred alternative. This alternative included replacement sewers, parallel sewers and new sewers along Moreland Boulevard.	High	Ongoing
City of Waukesha	Complete projects recommended in the City of Waukesha City-Wide Storm Management Plan in areas deemed vulnerable: Drainage Area 7: Summit Ave. and Michigan Ave. Stormwater infrastructure improvements for Area 7 included new stormwater ponds at of UW-Waukesha, Summit View Elementary School and Lowell Park. Increases in conveyance capacity are accomplished with new, parallel, and replacement storm sewers, primarily located along Summit Avenue, Garland Avenue, Greenmeadow Drive and Michigan Avenue.	High	Ongoing
City of Waukesha	Complete projects recommended in the City of Waukesha City-Wide Storm Management Plan in areas deemed vulnerable: Drainage Area 8: S. West Ave., S. Grand Ave., and S. East Ave. at W. Sunset Dr. The modeled improvements in Area 8 included storage and conveyance alternatives. The preferred alternative was a conveyance alternative that included replacement, parallel and new storm sewers. The storm sewers generally convey flows from north to south and east to west along Tenny Avenue, Sunset Drive and East Avenue; Grand Avenue; Vitoria Drive Bard Street and West Avenue; and the former railway right-of-way.	High	Ongoing
City of Waukesha	Complete projects recommended in the City of Waukesha City-Wide Storm Management Plan in areas deemed vulnerable: Drainage Area 9: W. Newhall Ave. at S. West Ave. Stormwater infrastructure improvements for Area 9 include a combination of new storage and conveyance. Replacement sewers are to be located along Newhall Avenue west toward the treatment plant, and new storage at the former location of Department of Motor Vehicles building.	High	Ongoing
City of Waukesha	Complete projects recommended in the City of Waukesha City-Wide Storm Management Plan in areas deemed vulnerable: Drainage Area 10: Merrill Crest Park. The modeled improvements in Area 10 included a combination of new storage and additional conveyance. The modifications included parallel storm sewers along Shoshone Drive that drain into new storage in Merrill Crest Park.	High	Ongoing
Village of Big Bend	Procure DPW and fire department backup generator and appropriate hookups	High	New
Butler Village	Provide shoreline erosion control and abatement to stabilize current riverbed and surrounding shoreline to minimize	Medium	New

	flooding potential and restore/maintain the environment for natural growth of vegetation and wildlife.		
Butler Village	Procure generator and appropriate hookups at critical facilities.	High	New
Village of Chenequa	Conduct Tree Maintenance on all Public Roads	High	New
Village of Chenequa	Provide Employee Hazard Training	Medium	New
Village of Dousman	Study and update aging water system and main, including, but not limited to associated connections to mains and valves.	High	New
Village of Eagle	Look for an acceptable (environmentally, socially, cost-benefit, politically, etc.) solution for removing water from flood-prone areas, especially those areas that are basin/bowl shaped. Seek out funding sources (grants) to execute solutions.	High	Ongoing
Village of Elm Grove	Study and implement mitigation measures to relocate and/or divert creek that is experiencing significant erosion.	High	New
Village of Elm Grove	Relocating flow of the creek bed for flood control	High	New
Village of Elm Grove	Monitor severe weather advisories regarding extreme dry conditions.	Low	Ongoing
Village of Elm Grove	Minor stormwater conveyance systems should be designed to provide protection from a ten-year recurrence interval event. Major stormwater conveyance systems should be designed to provide protection from a 100-year recurrence interval event.	Medium	Ongoing
Village of Elm Grove	Public and private drainage ways, both natural and man-made, should be kept free from obstructions. Easements should be obtained to protect drainage ways and allow access for maintenance. Ordinances should be adopted to enforce protection of and access to drainageways. A maintenance schedule has been developed to keep the stormwater system functioning.	High	Ongoing
Village of Elm Grove	A comprehensive process should be put in place to review filling and grading of public and private parcels to assure that all stormwater management issues are addressed. Public education needs to create an awareness of the problems that can occur with improper filling and grading by homeowners. Engineering review, permitting, inspection and enforcement will be incorporated into the development and redevelopment of property.	Medium	Ongoing
Village of Elm Grove	As private wells provide a direct channel to the community's water resource, wells should be brought into compliance with current WDNR regulations. This would include well casings that terminate at least twelve inches (12") above the ground and twenty-four inches (24") above the base flood elevations in flood hazard zones. Well caps should be sealed.	Medium	Ongoing
Village of Elm Grove	Floodplain zoning ordinances should be actively enforced. Policies should be established to address structures located in flood hazard zones. Policies could include elevation of structures, flood proofing, removal of structures, the provision of detention storage and modification of stream channels and/or bridges. If these alternatives are not feasible, the structures should be isolated from the municipal sanitary sewer system.	Medium	Ongoing
Village of Elm Grove	A comprehensive Stormwater Management Plan, including development and evaluation of alternative plans to abate problems caused by flooding, inadequate drainage, and nonpoint source pollution; development of a recommended plan; and establishment of procedures for plan implementation, should be adopted.	High	Ongoing

Village of Elm Grove	Monitor severe thunderstorm weather advisories, since hailstorms tend to occur in conjunction with severe thunderstorms.	Medium	Ongoing
Village of Elm Grove	Monitor severe thunderstorm weather advisories, since lightening tends to occur in conjunction with severe thunderstorms	Medium	Ongoing
Village of Elm Grove	Monitor severe thunderstorm weather advisories.	Medium	Ongoing
Village of Elm Grove	Monitor severe weather advisories if at risk for tornadoes.	Medium	Ongoing
Village of Elm Grove	Continue active coordination with the Waukesha County Emergency Warning System.	Medium	Ongoing
Village of Elm Grove	Monitor severe weather advisories if at risk for winter storms.	High	Ongoing
Village of Hartland	Study and implement bank stabilization/erosion control projects	High	New
Village of Hartland	Study and implement utility resilience measures, such as, but not limited to: burying powerlines	Medium	New
Village of Hartland	Obtain Storm Ready designation	Medium	New
Village of Lac La Belle	Look for an acceptable (environmentally, socially, cost-benefit, politically, etc.) solution for removing water from flood-prone areas, especially those areas that are basin/bowl shaped. Seek out funding sources (grants) to execute solutions.	High	Ongoing
Village of Lannon	Procure and/or replace generator and appropriate hookups	High	New
Village of Menomonee Falls	Study and implement appropriate improvements at Lepper Dam.	High	New
Village of Merton	Procure generator and appropriate hookups for Village Hall	High	New
Village of Mukwonago	Shore stabilization and erosion control measure	High	New
Village of Mukwonago	Develop an emergency shelter plan for the village.	Medium	New
Village of Mukwonago	Provide stormwater facilities in historic areas	High	New
Village of Mukwonago	Modify bridges to withstand flooding	Medium	New
Village of Mukwonago	Install backup generators	High	New
Village of Mukwonago	Replace water and sewer lines.	High	New
Village of Mukwonago	Install generator	High	New
Village of Mukwonago	Replace the south gate on the Phantom Lake Dam	High	New
Village of Mukwonago	Develop a hazardous materials mitigation plan	Medium	New
Village of Mukwonago	Cybersecurity response plan, procedures, and equipment	High	New
Village of Mukwonago	Bury overhead powerlines	Medium	New
Village of Mukwonago	The north bank of the Mukwonago River needs to be stabilized to control erosion from North Main (Hwy ES) to Highway 83.	High	Ongoing
Village of Mukwonago	The Village of Mukwonago would like to upgrade their old water utility pumps.	Low	Ongoing
Village of Nashotah	Look for an acceptable (environmentally, socially, cost-benefit, politically, etc.) solution for removing water from flood-prone areas, especially those areas that are basin/bowl shaped. Seek out funding sources (grants) to execute solutions.	High	Ongoing
Village of Nashotah	Work with the DNR on dam safety and flooding issues, including better communication and emergency plans.	Medium	Ongoing
Village of North Prairie	Procure generators and appropriate hookups for municipal buildings	High	New
Village of North Prairie	Study and procure an early warning siren to warn residents	Medium	New
Village of Oconomowoc Lake	Look for an acceptable (environmentally, socially, cost-benefit, politically, etc.) solution for removing water from flood-prone areas, especially those areas that are basin/bowl shaped. Seek out funding sources (grants) to execute solutions.	High	Ongoing
Village of Pewaukee	Purchase generator and appropriate hookup at key sites, such as well #3	High	New
Village of Pewaukee	Develop COOP plan	High	New
Village of Pewaukee	Develop an All-Hazards Emergency Operations Plan (EOP)	High	New

Village of Pewaukee	Install a back-up generator at Well #3 in the Village of Pewaukee.	Medium to High	Ongoing
Village of Summit	Establish tree management program. Conduct tree pruning near power lines and removal of dead/diseased trees	Medium	New
Village of Summit	Create a hazardous materials release plan	High	New
Village of Summit	Study, develop, and implement a fuel shortage plan and strategy.	High	New
Village of Summit	Develop power outage plan/strategy and implement measures to ensure power is available at key facilities during a prolonged power outage situation. Measures include, but are not limited to: Harden utilities to ensure greater resiliency to natural and manmade hazards. Procure generators and hookups for key facilities. Study and explore sustainable microgrid alternatives to ensure continuity of power.	High	New
Village of Summit	Ongoing maintenance and enforcement of the Mitigation Handbook. Distribute handbook to residents, as needed	High	Ongoing
Village of Sussex	Study and relocate, if necessary, buildings vulnerable to flooding. Sites include, but are not limited to: Parks Buildings	Medium	New
Village of Sussex	Purchase generators and appropriate hookups	High	New
Village of Sussex	Study and implement water looping measures for certain portions of the Village.	Medium	New
Village of Sussex	Install a back-up generator in the Village of Sussex public safety building.	High	Ongoing
Village of Sussex	Generator for Public Safety Building	High	Ongoing
Village of Vernon	Raise roads that get overtopped by water. Study and implement flood mitigation measures.	High	Ongoing
Village of Wales	Install generator and appropriate hookups at the community building	Medium	New
Village of Wales	Maintain and clean storm basins and implement a culvert replacement strategy to mitigate flooding	Low	New
Village of Wales	Improve public awareness and education, including, but not limited to: updating Village website to include county, state, and federal emergency management and preparedness sites, and increase presence on social media.	Low	New
Village of Wales	Procure funds and build a salt shed to increase winter weather response and safety capabilities	Medium	New
Village of Wales	Remove old, diseased or damaged trees that are a risk for damaging property in a severe storm.	Medium	Ongoing
Village of Waukesha	Establish shelter and procure equipment for extreme heat/cold and winter storms events	High	New
Village of Waukesha	Study and fix/replace undersized or failing culverts to mitigate flooding issues	High	New
Village of Waukesha	Establish emergency backup power. Procure generators and appropriate hookups, and implement mitigation measures to ensure power supply and equipment are resilient to surge and lightning.	High	New
Town of Brookfield	Study and implement electric/powerline relocation or improvements to mitigate power outages in Summit Lawn Estates/Black Forest Knoll subdivisions.	High	New
Town of Brookfield	Purchase backup generators and appropriate hookups	High	New
Town of Brookfield/City of Brookfield	Study and implement flood mitigation alternatives in high-risk areas, such as, but not limited to: Barker Rd/Poplar Creek, Deer Creek Corridor, Dousman Ditch/Underwood Creek Corridor, Briar Ridge Dr/Timberline Dr, Brook Park Subdivision, I-94/Springdale Road	Medium	New
Brookfield Town	Brook Park Pond Outlet structure emergency improvements to address flood/erosion issues.	High	Complete
Brookfield Town	Brook Park Pond Dr/Gray Fox Drive reconstruction to address flooding issues	High	Complete
Brookfield Town	Poplar Creek Streambank stabilization and restoration to address erosion and flooding issues.	High	Complete

Town of Delafield	Study and implement improvements on Elmhurst Road, such as increasing the culvert capacity, to mitigate future flooding.	High	New
Town of Delafield	Mitigate flooding on Cushing Park Road	Medium	New
Town of Eagle	Establish and promote a public education program	High	New
Town of Genesee	Implement measures to prepare town for tornados and high winds, such as, but not limited to: removing trees, hardening utilities, and better educating residents.	High	New
Town of Genesee	Upgrade internet wiring, routers and broadband infrastructure to build resiliency against cyberattacks	Medium	New
Town of Genesee	Purchase generators and appropriate hookups in all town buildings	High	New
Town of Genesee	Mitigate concerns and issues on Saylesville Dam	High	New
Town of Genesee	Study and improve road infrastructure (i.e. roads and culverts) to mitigate flooding and potential for washouts. Areas of concern include, but are not limited to: Grush Road, Paint Rd, Hillside Rd, Holiday Rd, Quail Run, Bartell Rd, Spring Ridge, St Davids Rd, Morris Rd, and Old Village Rd.	High	New
Town of Lisbon	Procure generators and appropriate hookups for key locations, such as, but not limited to: Mobile Home Park and Town Hall	Medium	New
Town of Merton	Establish and promote a public education program	High	New
Lisbon, Sussex	Update railroad crossing to ensure safety and improved access. Study and implement appropriate measures, such as consideration for a bridge.	High	New
Town of Lisbon	Continue working on the acquisition and demolition project on Maple Avenue in the Town of Lisbon	High	Ongoing
Town of Lisbon	Property Acquisition	High	Ongoing
Town of Mukwonago	Obtain generators and provide safe rooms at town hall and elementary schools	High	New
Town of Mukwonago	Tree removal program along roadways	Medium/High	New
Town of Mukwonago	Review, replace, and assess undersized culverts	Medium/High	New
Town of Mukwonago	Pond Staging	High	New
Town of Mukwonago	Address flooding and roadway improvements associated with the Country Bliss subdivision. The preliminary solution is to install a force main and pumping station to take accumulated water out of a natural basin and pump it out.	High	Ongoing
Town of Oconomowoc	Place powerlines underground in the Okauchee area	High	New
Town of Oconomowoc	Procure generators and appropriate hookups for all town facilities	High	New
Town of Ottawa	Continue to review and monitor stop logs for damage on Mill Pond Dam	Medium	New
Town of Ottawa	Procure generator and appropriate hookups for Town Hall	Low	New
Town of Ottawa	Study and replace culverts under Gramling Lane to mitigate flooding	Medium/High	New
Town of Ottawa	Implement mitigation for undersized or clogged culverts.	Medium	New
Lake County Fire Department	Replace/install backup electrical generators	High	New
Lake County Fire Department	Purchase towable backup electric generators	High	New
Lake County Fire Department	Establish and promote a public education program	High	New
Eagle Springs Lake Management District	Rehabilitation of existing dry hydrant system	Medium	New
Eagle Springs Lake Management District	Conduct Dam Failure Analysis	High	New
Eagle Springs Lake Management District	Improve and replace aging segments of the water control systems	High	New

Eagle Springs Lake Management District	Improve Kroll Outlet Discharge System	High	Ongoing
Western Lakes Fire District	Replace/install backup electrical generators	High	New
Western Lakes Fire District	Obtain various materials designed to contain, absorb, and slow hazardous materials from contaminating the environment	High	New
Western Lakes Fire District	Purchase towable backup electric generators	High	New
Western Lakes Fire District	Procure Portable Changeable Message (PCM) signs for public notification	High	New
Western Lakes Fire District	Identify and procure a debris removal site for the temporary holding of debris	Medium	New
Western Lakes Fire District	Establish and promote a public education program	High	New
Western Lakes Fire District	Purchase portable hazardous materials air monitors to identify air quality	High	New

Plan Integration Strategy

Many of the strategic recommendations in the previous section have relationships to other plans and policies for which coordination, integration and consistency are vital. These related plans tend to fall within the following general categories:

- Local capital improvements plans and other budget documents. Most notable are infrastructure projects, such as those related to stormwater systems, water supplies, warning sirens, and communications equipment, which may be considered as part of local budgets. For instance, since the original plan, significant road and flood mitigation improvements have been made in some areas which may have addressed past overland flooding concerns.
- Regulations, agreements, and related procedures. These strategies are primarily identified in the policy strategies. Amendments can often be performed in concert with other ordinance updates. Some related actions may be accomplished procedurally without an ordinance amendment.
- Existing emergency operating or response plans. Many local municipalities continue to update their emergency plans and procedures. County Emergency Management and other County offices will also work cooperatively with stakeholders regarding plans, procedures, and grant applications related to the issues identified within this plan.

Mitigation planning is on a different schedule than comprehensive planning, with most comprehensive plans likely to be updated no more frequently than once per decade.

The Environmental Scan completed by the Waukesha County Health and Human Services Department was integrated into the 2021 Hazard Mitigation Plan.

While the mitigation plan was not specifically referenced in most participant comprehensive plans, some of the mitigation recommendations are included as comprehensive plan policies. Most communities with 100-year floodplains included strategies in their comprehensive plans to discourage or not allow any floodplain development, and are implementing these policies through floodplain zoning.

Stormwater management and emergency services are other common themes in many local comprehensive plans. Even so, greater effort is needed to ensure that the hazard mitigation plan is considered during other local planning efforts, and vice versa.

As the mitigation plan strategies reflect, Waukesha County will continue to work with County Planning and Zoning Departments and local municipalities to encourage coordination and consistency between comprehensive planning and the hazard mitigation plan and provide instruction on how to incorporate mitigation strategies into their comprehensive plans and other planning mechanisms.

Since key County staff were actively involved in the development and update of the County mitigation plan, many of the mitigation strategies are based on staff recommendations and give confidence that a high level of coordination between these various planning efforts will continue.

Because the integration of hazard risks and mitigation strategies can be better integrated into future documents, plan meetings were used to emphasize the importance of ensuring the County and participating jurisdictions carefully and intentionally integrate elements of this plan into future county/municipality documents.

Plan Name	How the Document was Used
2021 Wisconsin Hazard Mitigation Plan	Risk assessment data Served as the primary framework for the 2021 update
National Climatic Data Center	Historical data for natural hazards
Environmental Scan	Community Profile and Risk Assessment
2020-22 Waukesha County Department Strategic Plans	Provided valuable data for the Community Profile
2019-2021 Growth Strategy	Community/Business Profile data

Mitigation Implementation and Progress

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.

Hazard Analysis and Previous Mitigation Projects ensure that county mitigation information is shared and it is incorporated into their planning as appropriate. Each community will be given a copy of the plan to use as a reference during their own preparedness activities (i.e., planning, training, permitting, zoning). Communities that have their own comprehensive plan will reference this mitigation plan and its contents in the next scheduled plan update. Municipalities that do not have comprehensive plans either are under the purview of and request assistance from the Waukesha County Planning, Resources and Land Management Department or have their own planning departments. Members of the County Planning, Resources and Land Management 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.

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

Hazard Mitigation Grant Program

- City of Brookfield (1997, DR-1180) – Acquisition of one residential structure. \$139,203.
- Village of Menomonee Falls (1997, DR-1180) – Acquisition of 11 residential structures. \$1,969,799.
- City of Brookfield (1998, DR-1236) – Acquisition of one residential structure. \$140,060.
- Village of Elm Grove (1998, DR-1236) – Acquisition of one residential structure and one commercial structure. \$921,601.
- Village of Menomonee Falls (1998, DR-1236) – Acquisition of two residential structures. This project was a continuation of the DR-1180 project for Menomonee Falls. \$397,396.
- City of New Berlin (1998, DR-1236) – Acquisition of 1 residential structure. \$93,947.
- Village of Elm Grove (2000, DR-1332) – Acquisition of two apartment buildings. \$943,638.
- Village of Elm Grove (2002, DR-1429) – Acquisition of one commercial structure. \$208,400.
- Waukesha County (2021) - Fox River Watershed Mitigation Plan

Flood Mitigation Assistance Program

- City of Brookfield (1999) – Flood Mitigation Plan approved by FEMA on 1-14-02. \$10,000
- City of Brookfield (2000) – Acquisition of one repetitive loss property (Supplemented FMA 2000 funds). \$46,267.
- City of Brookfield (2001) - Acquisition of one repetitive loss property (Supplemented FMA 2000 funds). \$140,219.

Pre-Disaster Program

- Village of Elm Grove (2002) – All-Hazards Mitigation Plan; was approved. \$4,369.
- Waukesha County (2007C) - All-Hazards Mitigation Plan. \$63,976.

Community Development Block Grant – Community Facilities

- Village of Menomonee Falls (FY99-0504). CDBG DRA grant to acquire two of ten floodplain properties (land and buildings). \$171,261.
- WI Department of Natural Resources – Municipal Flood Control
- Village of Elm Grove (3/1/02–8/31/04, MFC-67122-A-02) – Underwood Creek Flood Control Property Acquisition. \$744,678.
- City of Brookfield (3/1/02–6/30/03, MFC-67206-A-02-UNDER)
- Underwood Creek Flood Storage Property Acquisition. \$257,004.
- City of New Berlin (1/1/06-12/31/07, MFC-67261-06) – U-314 Fullerton Avenue Property. \$147,070.
- City of Brookfield (12/15/06-12/15/08, MFC-67206-06) – Calhoun Dam Removal and Channel Restoration. \$207,922.50.

VIII. Plan Maintenance Strategy

Plan Maintenance & Implementation

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 Waukesha County Hazard Mitigation Steering Committee 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 Waukesha County Hazard Mitigation Plan maintenance process includes a schedule for annual monitoring and evaluation of the programmatic outcomes established in the Plan and for producing a formal Plan revision every five years.

Formal Review Process

The Plan may be reviewed on an annual basis by the Emergency Management Coordinator and reviewed and revised every five years by the committee to determine the effectiveness of programs and to reflect changes that may affect mitigation priorities. The Emergency Management Coordinator or designee will be responsible for contacting the Mitigation Steering Committee members and organizing the review. Committee members will be responsible for monitoring and evaluating the progress of the mitigation strategies in the Plan. The Committee will review the goals and action items to determine their relevance to changing situations in the County as well as changes in Federal policy and to ensure they are addressing current and expected conditions. The Committee will also review the risk assessment portion of the Plan to determine if this information should be updated or modified, given any newly available data. The organizations responsible for the various action items will report on the status of the projects, the success of various implementation processes, difficulties encountered, the success of coordination efforts, and which strategies should be revised or removed.

The Coordinator or designee will be responsible for ensuring the updating of the Plan. The Coordinator will also notify all holders of the Plan and affected stakeholders when changes have been made. Every five years the updated plan will be submitted to Wisconsin Emergency Management and to the Federal Emergency Management Agency for review.

Continued Public Involvement

Waukesha County Emergency Management is dedicated to involving the public directly in the review and updates of the Plan. The Coordinator is responsible for the review and update of the Plan. The public will also have the opportunity to provide input into Plan revisions and updates. Copies of the Plan will be kept by appropriate County departments and outside agencies.

A public meeting will be held when deemed necessary by the Coordinator. The meetings will provide a forum where the public can express concerns, opinions, or new alternatives that can then be included in the Plan. The Coordinator will be responsible for using County resources to publicize the public meetings and maintain public involvement.

To further facilitate continued public involvement in the planning process, Waukesha County will ensure that:

- The Waukesha County Office of Emergency Management will keep a copy of the plan on hand at their office for review and comment by the public.
- Waukesha County Office of Emergency Management will conduct outreach after a disaster event to remind members of the importance of mitigation and to solicit mitigation ideas to be included in the plan.

Monitoring, Evaluation, and Updating the Plan

To ensure the County Hazard Mitigation Plan continues to provide an appropriate path for risk reduction throughout the County, it is necessary to regularly evaluate and update it. The Waukesha County Office of Emergency Management will be responsible for monitoring the status of the plan and gathering appropriate parties to report of the status of Mitigation Actions. The Mitigation Steering Committee will convene on an annual basis to determine the progress of the identified mitigation actions. The Mitigation Steering Committee will also be an active participant in the next plan update. As the County Hazard Mitigation Plan matures, new stakeholders will be identified and encouraged to join the existing Mitigation Steering Committee.

The Waukesha County Office of Emergency Management is responsible for contacting committee members and organizing the annual meeting. The Committee's responsibilities include:

- Annually reviewing each goal and objective to determine its relevance and appropriateness.
- Monitor and evaluate the mitigation strategies in this plan to ensure the document reflects current hazard analyses, development trends, code changes and risk analyses and perceptions.
- Ensure the appropriate implementation of annual status reports and regular maintenance of the plan. The committee will hear progress reports from the parties responsible for the various implementation actions to monitor progress.
- Create future action plans and mitigation strategies. These should be carefully assessed and prioritized using the benefit-cost analysis (BCA) methodology that FEMA has developed.
- Ensure the public is invited to comment and be involved in mitigation plan updates.
- Ensure that the County complies with all applicable Federal statutes and regulations during the periods for which it receives grant funding, in compliance with 44 CFR.
- Reassess the plan in light of any major hazard event. The committee will convene within 45 days of any major event to review all applicable data and to consider the risk assessment, plan goals, objectives, and action items given the impact of the hazard event.
- Review the hazard mitigation plan in connection to other plans, projects, developments, and other significant initiatives.
- Coordinate with appropriate municipalities and authorities to incorporate regional initiatives that transcend the boundaries of the County.
- Update the plan every five years and submit for FEMA approval.
- Amend the plan whenever necessary to reflect changes in State or Federal laws and statutes required in 44 CFR.

The Five Year Action Plan

This section outlines the implementation agenda that the Mitigation Committee should follow five years following the adoption of this plan, and then every five years thereafter. The Mitigation Steering Committee, led by the Waukesha County Office of Emergency Management, is responsible to ensure the Hazard Mitigation Plan is updated every five years.

The Committee will consider the following an action plan for the first 5-year planning cycle. It should be noted that the schedule below can be modified as necessary and does not include any meetings and/or activities that would be necessary following a disaster event (which would include reconvening the Mitigation Steering Committee within 45 days of a disaster or emergency to determine what mitigation projects should be prioritized during the community recovery). If an emergency meeting of the Mitigation Steering Committee occurs, this proposed schedule may be altered to fit any new needs.

Year 0:

- 2021/22: Update Hazards Mitigation Plan, including a series of Mitigation Steering Committee meetings & Public meetings. Submit 2021/22 Hazard Mitigation Plan for FEMA approval.
- March 2022 – December 2022: Work on Mitigation Actions, Waukesha County Office of Emergency Management to stay in contact with lead departments to keep tabs on project status.

Year 1:

- January 2023 - February 2023: Prepare for and promote the first annual Plan Review and Public meetings.
- March 2023: Reconvene Committee for first annual Mitigation Steering Committee meeting. Introduce the concept of Mitigation Plan Integration with other planning documents. Host first annual Public meeting.
- April 2023 – December 2023: Work on Mitigation Actions, the Waukesha County Office of Emergency Management to stay in contact with lead departments to keep tabs on project status. Encourage plan integration efforts.

Year 2:

- January 2024 - February 2024: Prepare for and promote the second annual Plan Review and Public meetings.
- March 2024: Reconvene Committee for second annual Mitigation Steering Committee meeting. Review plan integration efforts. Host second annual Public meeting.
- April 2024 – December 2024: Work on Mitigation Actions, the Waukesha County Office of Emergency Management to stay in contact with lead departments to keep tabs on project status. Encourage plan integration efforts.

Year 3:

- January 2025 - February 2025: Prepare for and promote third annual Plan Review and Public meetings.

- March 2025: Reconvene Committee for third annual Mitigation Steering Committee meeting. Review plan integration efforts. Host second annual Public meeting.
- April 2025 – December 2025: Work on Mitigation Actions, the Waukesha County Office of Emergency Management to stay in contact with lead departments to keep tabs on project status. Encourage plan integration efforts. Seek grant funding to update the 2027 Hazard Mitigation Plan update.

Year 4:

- January 2026: Begin updating 2027 Hazard Mitigation Plan.
- February 2026 – December 2026: Update 2027 Hazard Mitigation Plan.

Year 5:

- January 2027: Submit 2027 Hazard Mitigation Plan.
- March 2027: Adopt 2027 Hazard Mitigation Plan.

Annual Mitigation Steering Committee Meetings

During each annual Mitigation Steering Committee meeting, the Committee will be responsible for a brief evaluation of the 2021/22 Hazards Hazard Mitigation Plan and to review the progress on Mitigation Actions.

Plan Evaluation

To evaluate the plan, the Mitigation Steering Committee should answer the following questions:

- Are the goals and objectives still relevant?
- Is the risk assessment still appropriate, or has the nature of the hazard and/or vulnerability changed over time?
- Are current resources appropriate for implementing this plan?
- Have lead agencies participated as originally proposed?
- Has the public been adequately involved in the process? Are their comments being heard?
- Have departments been integrating mitigation into their planning documents?

If the answer to each of the above questions is “yes,” the plan evaluation is complete. If any questions are answered with a “no,” the identified gap must be addressed.

Review of Mitigation Actions

Once the plan evaluation is complete, the Committee must review the status of the Mitigation Actions. To do so, the Mitigation Steering Committee should answer the following questions:

- Have the Mitigation Actions been implemented as planned?
- Have outcomes been adequate?
- What problems have occurred in the implementation process?

Meeting Documentation

Each annual Mitigation Steering Committee meeting must be documented, including the plan evaluation and review of Mitigation Actions. Mitigation Actions have been formatted to facilitate the annual review process.

Implementation through Existing Programs

Hazard mitigation practices must be incorporated within existing plans, projects and programs. Therefore, the involvement of all departments, private non-profits, private industry, and appropriate jurisdictions is necessary in order to find mitigation opportunities within existing or planned projects and programs. To execute this, the Waukesha County Office of Emergency Management will assist and coordinate resources for the mitigation actions and provide strategic outreach to implement mitigation actions that meet the goals and objectives identified in this plan.

Appendix A: Notice of Endorsement & Adoption

Upon formal approval, Notices of Endorsement and Adoption will be obtained and provided in this section for each jurisdiction in the County.

ENROLLED ORDINANCE 177-38

REPEAL THE 2016 WAUKESHA COUNTY ALL HAZARD MITIGATION PLAN AND
ADOPT THE 2021 WAUKESHA COUNTY ALL HAZARD MITIGATION PLAN

WHEREAS, Waukesha County recognizes the threat that natural, technological, and man-made hazards pose to people, property, and the environment; and

WHEREAS, undertaking hazard mitigation actions before disasters occur reduces the potential for harm to people, property, the environment, while saving taxpayer dollars; and

WHEREAS, an adopted all hazard mitigation plan is required by the Federal Emergency Management Agency (FEMA) as a condition of future grant funding for mitigation projects under FEMA pre- and post-disaster mitigation grant programs; and

WHEREAS, Waukesha County last adopted an all hazard mitigation plan in 2016 and it is now desirable and necessary to update that plan; and

WHEREAS, Waukesha County participated jointly in the planning and update process with other local units of government, the State of Wisconsin and the Federal Emergency Management Agency to prepare the 2021 Waukesha County All Hazard Mitigation Plan, which was made available for review and will reside permanently in the Waukesha County Emergency Management Division of the Department of Emergency Preparedness; and

WHEREAS, Wisconsin Emergency Management and Federal Emergency Management Agency, Region V, officials reviewed the 2021 update and approved it contingent upon official adoption by the participating governing bodies in Waukesha County.

THE COUNTY BOARD OF SUPERVISORS OF THE COUNTY OF WAUKESHA ORDAINS that the 2016 Waukesha County All Hazard Mitigation Plan is hereby repealed.


IT IS FURTHER ORDAINED that the 2021 Waukesha County All Hazard Mitigation Plan, a copy of which is on file with the Waukesha County Department of Emergency Preparedness, is hereby approved and adopted as the official hazard mitigation plan for Waukesha County.


IT IS FURTHER ORDAINED that the Waukesha County Board of Supervisors do hereby endorse and agree to participate in the implementation of the 2021 Waukesha County All Hazard Mitigation Plan as it applies to this jurisdiction.

File Number: 177-O-039

REPEAL THE 2016 WAUKESHA COUNTY ALL HAZARD MITIGATION PLAN AND
ADOPT THE 2021 WAUKESHA COUNTY ALL HAZARD MITIGATION PLAN

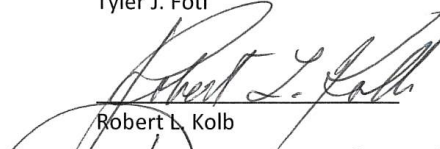
Presented by:
Judiciary & Law Enforcement Committee

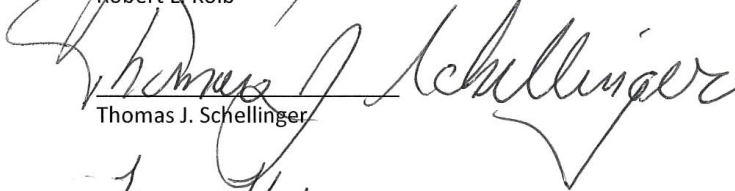

Jacob LaFontain, Chair


Michael A. Crowley

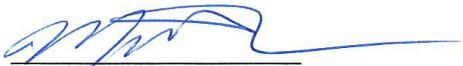
Absent

Tyler J. Foti


Robert L. Kolb


Thomas J. Schellinger


Terry Thieme


Matthew E. Weil

The foregoing legislation adopted by the County Board of Supervisors of Waukesha County, Wisconsin, was presented to the County Executive on:

Date: August 12, 2022, 
Margaret Wartman, County Clerk

The foregoing legislation adopted by the County Board of Supervisors of Waukesha County, Wisconsin, is hereby:

Approved: X

Vetoed: _____


Date: 8/1/2022, 
Paul Farrow, County Executive

VOTING RESULTS

AYE 24 NAY 0 ABSTAIN 0 ABSENT 1

Ordinance 177-O-039

Ordinance 177-O-039: Repeal The 2016 Waukesha Co...

 **Passed By Majority Vote**

D1 - Foti	AYE	D14 - Mommaerts	AYE
D2 - Weil	AYE	D15 - Kolb	AYE
D3 - Morris	AYE	D16 - Crowlev	AYE
D4 - Batzko	AYE	D17 - Meier	AYE
D5 - Grant	ABSENT	D18 - Nelson	AYE
D6 - Walz	AYE	D19 - Enriquez	AYE
D7 - LaFontain	AYE	D20 - Schellinger	AYE
D8 - Michalski	AYE	D21 - Gaughan	AYE
D9 - Heinrich	AYE	D22 - Wysocki	AYE
D10 - Thieme	AYE	D23 - Hammitt	AYE
D11 - Howard	AYE	D24 - Bangs	AYE
D12 - Wolff	AYE	D25 - Johnson	AYE
D13 - Decker	AYE		



July 26 2022 - July 26 2022 07:30:39 PM

Appendix B: Public Outreach & Participation

Appendix B provides additional information that documents plan participation.

Planning Meetings and Documentation

Webinar:

Link: [Registration, June 22, 2021](#)

Link: [Registration, June 28, 2021](#)

Link: [Webinar Invite](#)

Link: [Webinar PowerPoint](#)

Mitigation Workshops:

Link: [Workshop Flyer](#)

Link: [Hazards Handout](#)

Link: [New Mitigation Actions Handout](#)

Link: [Mitigation Actions Handout](#)

Link: [Mitigation Workshop PowerPoint](#)

Link: [Sign-in Sheets for Workshops](#)



Public Participation Documentation

Press Releases and Notices:

Multiple press releases and meeting notices were issued to encourage greater participation and input into the Hazard Mitigation Plan. Social media was leveraged to promote the survey and public meetings.

Link: [Press Release - Waukesha County Residents Invited to Participate in Community Preparedness Study](#)

Link: [Press Release - Open House to Provide Input Into the Waukesha County Hazard Mitigation Plan](#)

Handouts Used in Public Meetings:

Link: [Public Meeting Agenda](#)

Link: [Public Meeting PowerPoint](#)

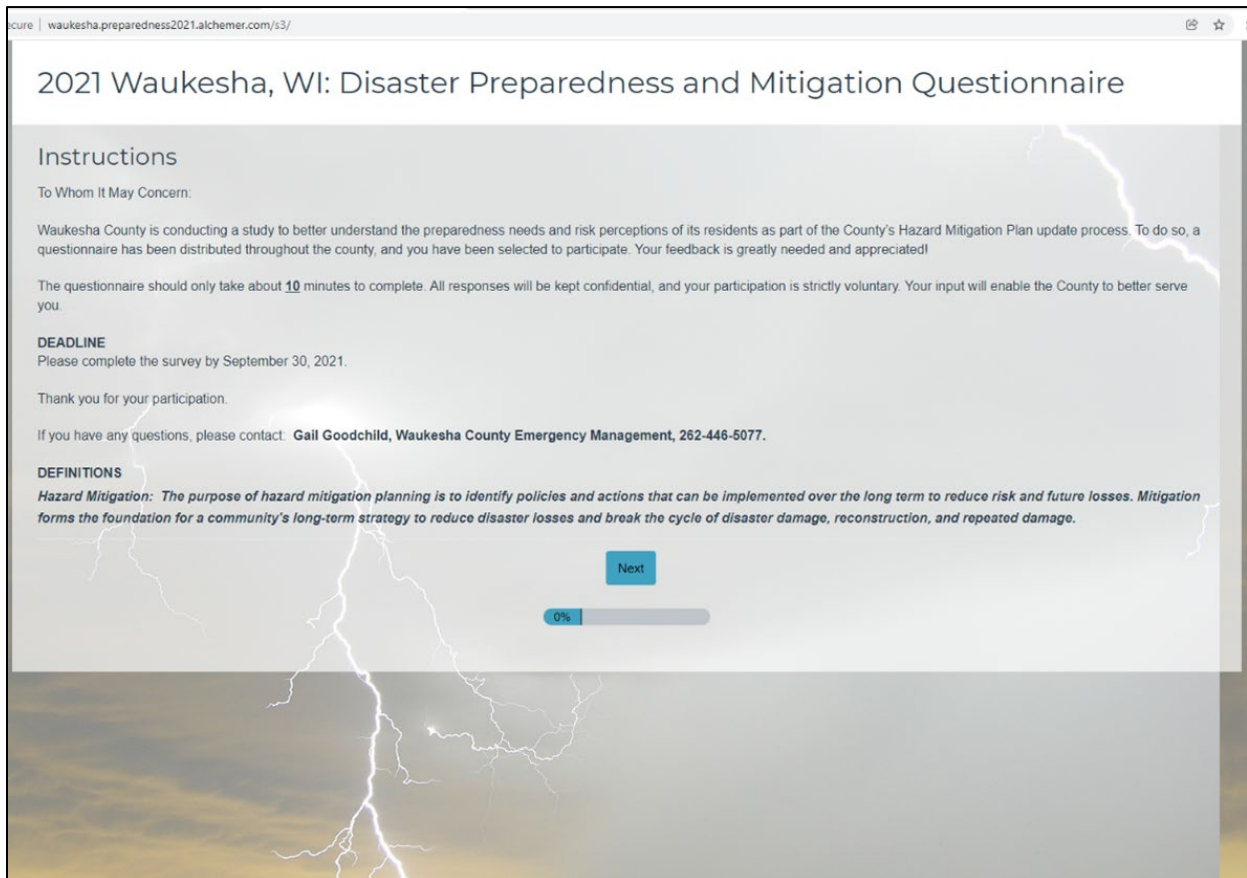
Sign-in Sheet for Public Meeting:

Link: [Sign-in Sheet](#)

Hazard Mitigation Questionnaire & Results

373 questionnaires were completed during the course of this planning process. In total, 622 residents entered the survey.

Please click the link to access the following: Hazard Mitigation Questionnaire Results



Appendix C: Mitigation Project Examples

Purpose: The following handout was provided to Steering Committee members, agency/organization representatives, and members of the public to solicit additional mitigation actions for the 2021 update.

See: <https://waukeshacounty.isc-cemp.com/Cemp/DetailsRef/4602390>

Appendix D: Federal Funding Sources and Programs

Many local governments are in a quandary to implement measures to secure and protect property with today's economic constraints. Many programs, including FEMA's Pre-Disaster Mitigation Program and the Hazard Mitigation Grant Program, are the victims of budget cuts. DHS' 2006 Emergency Management Performance Grants – Program Guidance and Application Kit states that "emergency managers at all levels should leverage all available funding and resources from multiple sources wherever possible...(and)...should not restrict their activities to only Federal funding to achieve the goals outlined within their strategies. Rather, special attention should be given to leveraging relevant funding sources and resources that support"... mitigation activities.[1] In addition to federal programs, the State homeland security and preparedness programs and resources may be available to meet the objectives outlined in the All-Hazard Mitigation Plan. This section outlines potential funding sources.

See: <https://waukeshacounty.isc-cemp.com/Cemp/DetailsRef/4602391>

Appendix E: Benefit-Cost Analysis Guidance

Benefit-Cost Analysis is an important mechanism used among local, state, tribal, and federal governments in evaluating hazard mitigation projects. It is a critical part of the hazard mitigation planning process for project development. As part of mitigation project development, strategies in the All Hazard Mitigation Plan should be assessed using a FEMA/DHS approved benefit cost method. This should be done for all projects including ones not intended to be funded by FEMA/DHS grants. This is critical to ensure that all funds, regardless of their source, are appropriately considered. The County does have funds available for mitigation projects, but they are not unlimited, and projects must demonstrate that the benefit is worth the cost.

The benefit-cost analysis compares the benefits and costs of a proposed hazard mitigation project. For example, the benefit of a tornado shelter is the reduction of injury and loss of life. This benefit is monetized using Federal guidelines for injury and loss of life. The costs considered are those necessary to implement and maintain the specific mitigation project under evaluation. The two, benefit and cost, can then be compared.

Costs are generally well determined for specific projects for which engineering design studies have been completed. Benefits, however, must be estimated probabilistically because they depend on the improved performance of the building or facility to future hazard events, the timing and severity of which are random variables. The benefits calculated by the program are expected annual benefits, which are estimated over the useful lifetime of the mitigation project. To account for the time value of money, a net present value calculation must be performed. This

calculation is done automatically in the program, using the discount rate and project useful lifetime entered by the user. Results of benefit-cost calculations are presented in two ways: first, the benefit-cost ratio (benefits divided by costs) and second, the net benefits (benefits minus costs).

To estimate future damages (and the benefits of avoiding them), the probabilities of future events must be considered. This profoundly affects whether or not a proposed hazard mitigation project is cost-effective. Mitigation may not be cost-effective even though a particular facility experienced great damage in a past event due to an event with a low probability of occurrence (i.e., a 500- or 1000-year event). Conversely, mitigation may be cost-effective even though the particular facility experienced little or no damage in a past event, due to a higher probability of occurrence.

Technical guidelines developed by FEMA for performing an approved Benefit-Cost Analysis are provided in the June 2009 FEMA publication “Final BCA Reference Guide”, which can be found online at <https://www.fema.gov/media-library/assets/documents/18870>. An outline is available below:

FEMA’s Benefit-Cost Analysis (BCA) program

FEMA’s Benefit-Cost Analysis (BCA) program is a key mechanism for evaluating certain hazard mitigation projects to determine eligibility and assist in Federal funding decisions. The FEMA BCA program is comprised of methodologies and software for a range of major natural hazards.

To be eligible for Federal funding assistance, a BCA should show that the project is cost-effective and will reduce future damages and losses from natural disasters. Mitigation projects can include: construction projects, education programs, publications or videos, building code enhancements, and mitigation planning activities. A reduction in losses or prevention of future damages is the benefit of the project.

Cost, as it relates to mitigation, is the price to develop and maintain a mitigation project. The project cost estimate, as used in the FEMA mitigation grant guidance, includes all costs associated with the proposed mitigation project, and represents the best estimated costs for the activity.

Estimates are required for the following cost item categories:

- Anticipated cash and in-kind Federal match
- Equipment
- Labor
- Materials
- Subcontract costs

Other costs are those that do not fall neatly into one of these categories, but must be delineated in the BCA if applicable to the project. The FEMA BCA tool utilizes a six-step cost-estimating methodology:

- Step 1: Develop an estimate of pre-construction or non-construction costs
- Step 2: Develop an estimate of construction costs
- Step 3: Develop an estimate of ancillary costs

- Step 4: Develop an estimate of annual maintenance costs
- Step 5: adjust the estimate to account for project timing and whether the data is current
- Step 6: review and confirm the cost estimate

The following descriptions cover each hazard type and potential mitigation projects associated with each.

Damage Frequency Approach (DFA)

This module is applicable to any natural hazard as long as a relationship can be established between how often natural hazard events occur and how much damage and losses occur as a result of the events. The advantage of the DFA module is its flexibility—it can be used for a wide range of hazards including flood, landslides, snow/ice storms, and earthquake mitigation for utility projects. The module requires historical damage data for two or more events and typically provides results that are less accurate than those from the Full Data BCA modules.

Tornado

A tornado is a violent, rotating, funnel-shaped cloud that extends from a thunderstorm to the ground, with winds that can reach 300 miles per hour. A tornado is among the most destructive forces of nature. A tornado is classified by the Enhanced Fujita (EF) Scale, which not only correlates wind speeds with damage, but also takes into account the quality and type of structure that has been damaged to estimate wind speeds. The EF Scale is from EF0 (weakest) to EF5 (strongest).

The Tornado Safe Room module is used for projects providing safe room mitigation for high-wind events, and is used only to evaluate the life safety benefits of the mitigation project. Safe room projects are for tornadoes only.

Wildfire

The Wildland/Urban Interface (WUI) module takes into account LANDFIRE data, timber costs, fire suppression costs, and project effectiveness. WUI fires are essentially wildfires with additional fuel load from structures.

Possible projects include:

- Defensible Space Activities
 - Clearing out all combustibles
 - Minimizing the volume of vegetation
 - Replacing flammable vegetation with less-flammable species
- Hazardous Fuels Reduction Activities
 - Vegetation thinning or reduction of flammable vegetative materials for the protection of life and property
 - Slash removal
 - Vegetation clearing or thinning
 - Vegetation management
 - Vegetation removal
 - Vertical clearance of tree branches
- Ignition-Resistant Construction Activities

- Involves the use of non-combustible materials and technologies on new and existing structures

Flood

A flood is a partial or complete inundation of normally dry land areas from:

- Overland flow of a lake, river, stream, creek, slough, ditch, or the ocean
- The unusual and rapid accumulation of rainfall runoff or snowmelt
- Mudflows or the collapse of shoreline land

Floods are the most common and most costly of all natural disasters. In fact, most communities throughout the United States will experience some flooding. The Flood module utilizes Flood Insurance Study (FIS) data to establish risk, while providing the most accurate BCA results. This module takes into account probabilities of flooding; building type and associated damages; and the costs of contents, displacement, and loss of function.

Possible projects include:

- Acquisition/ Demolition
- Acquisition/ Relocation
- Dry floodproofing
- Elevation
- Minor localized flood reduction projects including culverts, floodgates, minor floodwall systems, and stormwater management activities.
- Mitigation reconstruction

FEMA will only consider a subapplication for an ignition-resistant construction project when the property owner has previously created defensible space and agreed to maintain the space, or the subapplication includes both the defensible space and ignition-resistant construction project as part of the same project subapplication.

Appendix F: Acronyms and Definitions

ADA American Disabilities Act
ASFPM Association of State Floodplain Managers
BCA Benefit Cost Analysis
BCR Benefit Cost Ratio
BMPs Best Management Practices
CBP Customs and Border Protection
CDBG Community Development Block Grant
CFR Code of Federal Regulations
CRS Community Rating System
CTP Cooperating Technical Partners
DFO Disaster Field Office
DMA2K Disaster Mitigation Act of 2000
DNR Department of Natural Resources
DOT Department of Transportation
EA Environmental Assessment

EMPG Emergency Management Performance Grant
EOC Emergency Operations Center
EPA Environmental Protection Agency
EWP Emergency Watershed Protection
FCO Federal Coordinating Officer
FEMA Federal Emergency Management Agency
FIA Flood Insurance Administration
FIRM Flood Insurance Rate Map
FIS Flood Insurance Study
FMA Flood Mitigation Assistance
FP&S Fire Prevention and Safety
GIS Geographic Information System
HAZUS
HMPG Hazard Mitigation Grant Program
HMTAP Hazard Mitigation Technical Assistance Program
HSGP Homeland Security Grant Program
HUD Housing and Urban Development
IA Individual Assistance
IAP Incident Action Plan
IBC International Building Code
ICC Increased Cost of Compliance
ICS Incident Command System
LCA Local Capability Assessment
MOU Memorandum of Understanding
MSAs Metropolitan Statistical Areas
NEPA National Environmental Policy Act
NFIP National Flood Insurance Program
NFIRA National Flood Insurance Reform Act
NRCS Natural Resources Conservation Service
OMB Office of Management and Budget
OPSG Operation Stonegarden
PA Public Assistance
PAO Public Assistance Officer
PDA Preliminary Damage Assessment
PDM Pre-Disaster Mitigation
PDM-C Pre-Disaster Mitigation Competitive
RFC Repetitive Flood Claims
RL Repetitive Loss
RLP Repetitive Loss Property
RLR Repetitive Loss Report
SAFER Staffing for Adequate Fire and Emergency Response
SFHA Special Flood Hazard Area
SHMO State Hazard Mitigation Officer
SHMP State Hazard Mitigation Plan
SHS State Historical Society
SHSP State Homeland Security Program
SRL Severe Repetitive Loss

THIRA Threat and Hazard Identification and Risk Assessment
UASI Urban Areas Security Initiative
UDC Uniform Dwelling Code
USBP United States Border Patrol
USDA U. S. Department of Agriculture
UW-EXT University of Wisconsin – Extension
WEM Wisconsin Emergency Management
WIVOAD Wisconsin Volunteer Organizations Active in Disasters

Countywide Mitigation Actions/Projects

Volume 2: Waukesha County Hazard Mitigation Plan

Mitigation Strategies and Actions

Mitigation Strategies & Actions are organized as follows:

- **New Mitigation Actions**—New actions identified during this 2021 update process
- **Ongoing Mitigation Actions**—These ongoing actions were included in the previous update and have yet to be completed. Some of these actions have no definitive end. During the 2021 update, these "ongoing" mitigation strategies/actions were modified and/or amended, as needed, to better define the strategy/action.
- **Completed Mitigation Actions**—Completed actions since 2016. Completed actions also included a brief description of the "Resulting Reduction or Limitation of Hazard Impact(s) Achieved" in order to show the resulting benefits of implementing the mitigation initiative.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

Mitigation Project: Study and identify flood-prone areas not mapped in FEMA's maps							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	County	Parks and Land Use Department	High	Short	\$100,000	Medium
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)		Potential Funding Source	
To preserve and enhance the quality of life throughout Waukesha County by identifying		Flooding and Dam Failure		High		BRIC, HMGP, Local Funds	

potential property damage risks and recommending appropriate.				
Action/Implementation Plan and Project Description:				

Mitigation Project: Study and develop flooding map and analysis of chronic areas							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	County	Land Information	Medium	Ongoing	\$100,000	Medium
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To preserve life and minimize the potential for injuries or death.		Flooding	Helps to focus resources in areas of concern after an event.		Medium	BRIC, HMGP, Local Funds	
Action/Implementation Plan and Project Description:							

Mitigation Project: Procure portable generators for key assets and to use during emergency incidents							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Waukesha County	Waukesha County Sheriff	Medium	Ongoing	\$30,000	Low
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To preserve life and minimize the potential for injuries or death.		All-Hazards	Offer electricity during critical incidents and team call-outs.		High	BRIC, HMGP, Local Funds, State Homeland Security Grants	

<p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p> <p>To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.</p> <p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p>				
Action/Implementation Plan and Project Description:				
Provide portable generators and on-scene lights to assist critical incidents during utility failure.				

Mitigation Project: Purchase All Terrain Vehicles to support incident response							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Waukesha County	Waukesha County Sheriff	Medium	Ongoing	\$30,000	Low
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To preserve life and minimize the potential for injuries or death.		Flooding and Dam Failure	Prevents the loss of life and property.		Medium	State Homeland Security Grants, Local Funds	
To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.		Thunderstorms Tornadoes and High Winds					

<p>To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.</p> <p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p>	<p>Winter Storms</p> <p>Utility Failure</p> <p>Rail Transportation Incident</p>			
Action/Implementation Plan and Project Description:				
Allows first responders to reach citizens during hazardous conditions such as tornadoes and other natural disasters.				

Mitigation Project: Purchase Hydraulic Door Spreader							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Waukesha County	Waukesha County Sheriff	Medium	Ongoing	\$10,000	Low
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
<p>To preserve life and minimize the potential for injuries or death.</p> <p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p> <p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p>		Utility Failure	Enables the ability to reach individuals trapped in buildings during utility failure and increases the ability to save lives.		High	State Homeland Security Grants, Local Funds	

Action/Implementation Plan and Project Description:

Purchasing a hydraulic Door Spreader allows emergency responders to reach individuals potentially trapped in areas without power during critical incidents (no power/ active shooter incidents).

Ongoing Mitigation Actions

Mitigation Project: Continue to promote the increased use of National Oceanic and Atmospheric Administration (NOAA) weather radios							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Countywide	Office of Emergency Mgt	Medium	Ongoing	N/A	N/A
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)		Potential Funding Source	
1		All Hazard	[Insert]	Medium		Covered by Dept annual budget	
Action/Implementation Plan and Project Description:							
<p>This would be done by a public information campaign that points citizens to vendors. The Waukesha Amateur Radio Emergency Services group and NWS also do campaigns in the area. Waukesha County and COAD began drawings for a free weather radio at Safety Fairs and National Nights Out in 2015.</p> <p>2017: Through Safety Fairs and other public education events. Drawings for free weather radios continued in 2016 and 2017.</p> <p>2021: Ongoing</p>							

Mitigation Project: Continue supporting volunteer recruitment and engagement in the County							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011 modified to address recruitment and engagement for 2016; 2016 - less emphasis on CERT	Countywide	Office of Emergency Mgt	Low	Ongoing	varies	N/A

Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source
1	All Hazard	[Insert]	Low	Covered by Dept annual budget

Action/Implementation Plan and Project Description:

The County is promoting citizen and community awareness and preparedness through the COAD. HHS maintains a list of volunteers to assist in a variety of services.

2021: County OEM is continuing to work with COAD and HHS. COAD (with the support and coordination of Waukesha County OEM) is continuing to expand toward a more regional approach and capability. HHS has completed their Volunteer Reception Center Plan.

Mitigation Project: Integrate the usage of AlertSense mass community notification system into emergency plans, procedures and practice in the county. Promote enrollment into Alertsense.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2007; 2016 added emphasis in increasing enrollment into Alertsense	Countywide	<ul style="list-style-type: none"> Office of Emergency Mgt Sheriff's Dept 	High	Ongoing	varies	N/A

Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source
1	All Hazard	[Insert]	High	Covered by Dept annual budget

Action/Implementation Plan and Project Description:

Waukesha County was a pilot program and is now a paying customer. The program can do polygon warnings. The county and City of Waukesha have been linking websites and working on seamless data merges. The County acquired IPAWS access through AlertSense in 2015.

2021: Integration into County plans, procedures, training, and exercising are complete. AlertSense will continue to be included in future mass notification efforts.

Mitigation Project: Continue to add/update Emergency Management Department links on the existing county web site. Publicize the website to show the community what is there.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Countywide	Office of Emergency Mgt	High	Ongoing	N/A	Low
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1		All Hazard	[Insert]		High	Covered by Dept annual budget	

Action/Implementation Plan and Project Description:

- The county would like to include some pre-scripted public information messages, especially for high-risk concerns (e.g., location of shelters). Alertsense has a platform for this and also a place for citizens to register for notices on information updates.
- The county is exploring the development of a self- reporting web-based disaster system.

2021: Ongoing in 2021. Web updates are ongoing; website promotion will increase once official departmental social media is utilized.

Mitigation Project: Each municipality should complete a survey of the municipality's siren need and capability; and ensure that maintenance, monitoring and usage policies/procedures remain current as defined by each jurisdiction.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Countywide	Each municipality that has a siren	Low	Ongoing	N/A	Low
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1		Tornadoes and High Winds; Hazardous Materials	[Insert]		High	Municipal Budget	

Action/Implementation Plan and Project Description:

All sirens are owned by their municipalities. County dispatch can test/tone some, but others are muni-operated only.

2017: Efforts are underway in the SE Region to develop uniform protocols.

2021: Ongoing.

Mitigation Project: County should be prepared to provide disaster-related information to farmers (e.g., crop irrigation, crop insurance)

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Countywide	UW-Ext./FSA	Low	Ongoing	N/A	Low
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1	Drought & Dust Storms, Flooding and Dam Failure, Severe Temperature, Hail, Tornadoes and High Winds		[Insert]		Low	Covered by annual budget	

Action/Implementation Plan and Project Description:

2021: Ongoing

Mitigation Project: Prepare/publicize water usage information for non-farm areas during drought

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Countywide	Municipal Water Utilities	Low	Ongoing	N/A	Low
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1	Drought & Dust Storms		[Insert]		Low	Covered by annual budget	

Action/Implementation Plan and Project Description:

2021: Ongoing

Mitigation Project: *Continue updating GIS mapping data on regular five-year cycle.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2010	Countywide	Land Information Office	Medium	Ongoing	\$200,000 - \$250,000	Low
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
3		Flood and Dam Failure	[Insert]		Medium	Departmental funding	
Action/Implementation Plan and Project Description:							
<ul style="list-style-type: none"> The county creates a very detailed surface model (contours and elevations) maps. 							
2021: Ongoing							

Mitigation Project: *Continue public outreach efforts for flood mitigation efforts.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Countywide	Municipal and County Zoning Offices	Medium	Ongoing	N/A	Low
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1		Flood and Dam Failure	[Insert]		Medium	Covered by annual budgets	
Action/Implementation Plan and Project Description:							
2021: Ongoing							

Mitigation Project: *Provide information to citizens about the purchase of flood insurance							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Countywide	Office of Emergency Mgt	Medium	Ongoing	N/A	Low
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
4		Flood and Dam Failure	[Insert]		Medium	Covered by annual budgets	
Action/Implementation Plan and Project Description:							
2021: Ongoing							

Mitigation Project: Provide public information via website links or brochures regarding safe driving procedures in the fog							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Countywide	Office of Emergency Mgt, Sheriff's Office and Muni PDs	Low	Ongoing	N/A	Low
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1		Fog	[Insert]		Low	Covered by annual budgets	
Action/Implementation Plan and Project Description:							
2021: Ongoing							

Mitigation Project: Continue to provide outreach efforts to stakeholders on protecting homes and structures from wildfires and on obtaining the proper burn permits							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Countywide	Local Fire Departments	Low	Ongoing	Varies	N/A

Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source
1	Forest and Wildfires	[Insert]	Low	N/A
Action/Implementation Plan and Project Description:				
2021: Done annually during National Night Out (August), National Preparedness Month (September), or the fire safety week in October				

Mitigation Project: Conduct outreach to stakeholders regarding wildfires caused by railroads

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Countywide	Office of Emergency Mgt, Local Fire Departments	Low	Ongoing	N/A	Low
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
1	Forest and Wildfires	[Insert]	Low	Covered by Dept annual budget			
Action/Implementation Plan and Project Description:							
2021: Ongoing							

Mitigation Project: Continue public outreach and information sharing on severe temperature preparedness

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Countywide	Office of Emergency Mgt	Medium	Ongoing	N/A	Low
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
1	Severe Temperatures, Winter Storms	[Insert]	Medium	Covered by budget			
Action/Implementation Plan and Project Description:							
2021: County OEM continues public information/outreach activities to promote severe temperature preparedness with the public.							

Mitigation Project: Continue to provide sheltering services to citizens in need during an emergency or disaster and update the County Waukesha County Mass Care Plan.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011; 2016 modified to be more all hazards as opposed to severe temperature incidents	Countywide	Health and Human Services with EM assistance	High	Ongoing	Cost varies	N/A
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source		
1	Flooding and Dam Failure, Forest and Wildfires, Severe Temperature, Tornadoes and High Winds, Winter Storms, Utility Failure		[Insert]	High	N/A		
Action/Implementation Plan and Project Description:							
2021: A protocol exists and is used during severe temperature incidents to open community shelters.							

Mitigation Project: Place hailstorm safety materials in county display rack, on the website and during severe weather week.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Countywide	Office of Emergency Mgmt	Medium	Ongoing	N/A	Low
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source		
2	Hail		[Insert]	Medium	Covered by Dept annual budget		

Action/Implementation Plan and Project Description:

2021: Ongoing

Mitigation Project: Provide information regarding the purchase of crop insurance

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Countywide	UW Ext	Low	Ongoing	N/A	Low
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1		Hail	[Insert]		Low	Covered by annual budget	

Action/Implementation Plan and Project Description:

2021: Ongoing

Mitigation Project: Continue lightning awareness and safety outreach through the website and social media, especially during severe weather week

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Countywide	Office of Emergency Management	Medium	Ongoing	N/A	Low
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1		Lightning	[Insert]		Medium	Covered by annual budget	

Action/Implementation Plan and Project Description:

2021: These activities continue, however the county no longer has a "display rack" for dedicated brochure distribution.

Mitigation Project: Provide information regarding the use of fire-resistant materials and surge protectors.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Countywide	Office of Emergency Mgt	Low	Ongoing	N/A	Low
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1		Lightning	[Insert]		Low	Covered by annual budget	
Action/Implementation Plan and Project Description:							
2021: Ongoing							

Mitigation Project: Continue thunderstorm awareness and safety outreach through the website and social media, especially during severe weather week							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Countywide	Office of Emergency Mgt	Medium	Ongoing	N/A	Low
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1		Thunderstorms	[Insert]		Medium	Covered by Dept annual budget	
Action/Implementation Plan and Project Description:							
2021: These activities continue, however the county no longer has a "display rack" for dedicated brochure distribution.							

Mitigation Project: Work with local fair/ festival boards, as requested, to create emergency plans in case of inclement weather.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Countywide	Sheriff's Department; Local Municipal PDs	Medium	Ongoing	N/A	Low
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1,2	Hail, Lightning, Thunderstorms, Tornadoes and High Winds, Winter Storms		[Insert]		Medium	Covered by Dept Annual Budget	
Action/Implementation Plan and Project Description:							
EM regularly works with the county fair board and other large events, as outlined in the county contract provisions.							
2021: In 2018 the Office of Emergency Management worked with Parks and Land Use to develop an emergency plan (all-hazard) for a large park. This year the Airport has requested the county's assistance in the development of their own all-hazards emergency plan.							

Mitigation Project: Fund a study to revise rainfall classifications from a recurrence interval standard to a simple scale like those used for hurricanes, tornadoes and earthquakes with the goal of making it easier for the public to understand. Calling major rainstorms that have occurred multiple times in a short period of time the "100-year storm" confuses the public and misleads them into thinking they need not protect themselves against such storms since they are "rare."

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Countywide	Unknown at this time	Medium	Ongoing	\$100,000	Low
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1	Thunderstorms		[Insert]		Medium	N/A	
Action/Implementation Plan and Project Description:							

The City of Brookfield DPW has developed a proposal, which has been presented at the Association of Flood Plain Manager's national conference and at the National Weather Service Eastern Region Flash Flood Conference. The white paper proposal was published in the August edition of the APWA Reporter and received support from all over the country.

2021: Ongoing

Mitigation Project: Explore the feasibility of constructing tornado shelters in areas where deficient especially in mobile home parks and campgrounds.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011; 2016 expanded to include all municipalities with mobile home parks and campgrounds	<ul style="list-style-type: none"> Countywide Municipalities with mobile home parks and campgrounds 	<ul style="list-style-type: none"> Waukesha County Parks, Land Use and Zoning Departments Municipal Officials 	Medium	Ongoing	Cost varies	N/A
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1	Tornadoes and High Winds		[Insert]		Medium	Grants	

Action/Implementation Plan and Project Description:

Maintenance buildings/lodges are used at campgrounds. Park rangers receive alerts from dispatch on their 800 MHz radios; they then go around and tell people of the alert. This works fine in small parks. On golf courses, people are alerted by an air horn blast.

Each village has a mobile home complex.

2021: Ongoing

Mitigation Project: Encourage builders and owners of manufactured and mobile homes to use tie-downs with ground anchors. Procure funding sources to support implementation.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Countywide	Office of Emergency Mgmt	Medium	Ongoing	N/A	Low
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1		Tornadoes and High Winds	[Insert]		Medium	Covered by annual budget	
Action/Implementation Plan and Project Description:							
Will provide information via the website link							
2021: Ongoing							

Mitigation Project: Explore the feasibility of increasing the wind resistance of the roofs of community storm shelters.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Countywide	Waukesha County Parks, Land Use and Zoning Departments	Low	Ongoing	N/A	Low
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1		Tornadoes and High Winds	[Insert]		Low	Covered by annual budget	
Action/Implementation Plan and Project Description:							
Focus on buildings getting upgraded and new buildings that are likely candidates for being community shelters (e.g., schools, community centers, etc.)							
2021: Ongoing							

Mitigation Project: Promote tornado awareness, including safety measures.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Countywide	Office of Emergency Mgmt	Medium	Ongoing	N/A	Low
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1		Tornadoes and High Winds	[Insert]		Medium	Covered by annual budget	
Action/Implementation Plan and Project Description:							
This is implemented during tornado awareness week in April. Information will be included on the website for homes, schools and business safety measures. PSA type videos for tornado awareness were shown in Marcus Theatres in the Fall of 2015.							
2021: Ongoing							

Mitigation Project: Promote winter hazards awareness, including home and travel safety measures							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Countywide	Office of Emergency Mgmt.	Medium	Ongoing	N/A	Low
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1		Winter Storms	[Insert]		Medium	Covered by annual budget	
Action/Implementation Plan and Project Description:							
This is implemented during winter weather awareness week in November.							
2021: Ongoing							

Mitigation Project: Maintain the proper amount of resources (e.g., salt) to properly manage winter storms.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Countywide	Public Works	High	Ongoing	Varies	N/A
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1		Winter Storms	[Insert]		High	N/A	
Action/Implementation Plan and Project Description:							
2021: Ongoing							

Mitigation Project: The County would like additional Road Weather Information System (RWIS) monitoring system stations.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Waukesha County Highway	County Highway	Low	Ongoing	\$40,000/site	Low
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1		Winter Storms	[Insert]		Low	As funding available - (WIDOT might also be interested in participating for additional stations.)	
Action/Implementation Plan and Project Description:							
There is one station on I-94 but the weather/road conditions vary widely around the county. The stations report air and bridge/road deck temperature and wind speed and direction.							
2021: Ongoing							

Mitigation Project: The county would like to have AVL (automatic vehicle locator) and routing software for snowplows to increase efficiency and reduce waste.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Countywide	County Highway	Low	Ongoing	As funding available - >\$85,000	N/A
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)		Potential Funding Source	
1	Winter Storms		[Insert]	Low		N/A	

Action/Implementation Plan and Project Description:

AVL systems also report pavement temperatures.

2021: Ongoing

Mitigation Project: Complete a survey to determine which railroad intersection safety systems do not have electrical power back-ups. Seek funding sources based on survey results.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Countywide	County Highway and Municipalities	Low	Ongoing	N/A	Low
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)		Potential Funding Source	
1	Utility Failure, Rail Transportation Incident		[Insert]	Low		Covered by budget	

Action/Implementation Plan and Project Description:

2021: Ongoing

Mitigation Project: Consider back-up power needs. The county purchased two large (100KW) portable generators with the major goal of providing power at any mass clinic site but can be used at shelters if not needed for a clinic. May need to evaluate if this is sufficient for sheltering operations.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Countywide	Office of Emergency Mgt and Health and Human Services Dept	High	Ongoing	Costs vary \$135,000	Low
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
1	Utility Failure	[Insert]	High	UASI grant for purchased generator			

Action/Implementation Plan and Project Description:

Currently, emergency shelters only have emergency back-up power (e.g., to exit lights), which is not adequate to fulfill the needs of evacuees.

2021: Recent discussions brought up the need to schedule a generator test at the EXPO center, specifically the arena and forum which are on the county shelter list. ARC is in the process of renewing the shelter agreement with the EXPO as well. This is an ongoing item.

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

Mitigation Project: Evaluate services, contracts and prices for a fixed satellite telephone for the Emergency Operations Center.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
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Complete	2008; 2016 this action was completed but modified to include a handheld satellite instead of fixed.	Countywide	Office of Emergency Mgmt	High	Completed 2011	\$3,000	Low
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1		All Hazard	[Insert]		High	Dept Budget	
Action/Implementation Plan and Project Description:							
This may entail extra costs because the highway building blocks the line-of-sight to the primary EOC.							
2016: 2016 this action was completed but modified to include a handheld satellite instead of fixed.							

Mitigation Project: Waukesha County would like to build a new Incident Command Post (ICP).

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Complete	2009	Countywide	<ul style="list-style-type: none"> Office of Emergency Mgt Sheriff's Office 	High	Completed (prior to 2015)	\$500,000	Medium
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1		All Hazard	[Insert]		High	UASI Grant	
Action/Implementation Plan and Project Description:							
The large, new Mobile Command Post was delivered and brought into service; it will provide support to incident response throughout the area.							
2016: The large, new Mobile Command Post was delivered and brought into service; it will provide support to incident response throughout the area. In 2014 all radios were narrow banded and the VHF state trunking was added. 8000 MHz Radios are also ready for P25 digital trunking							

Mitigation Project: Waukesha County has acquired a fully-outfitted Mass Casualty Incident (MCI) Response Trailer.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date	Est. Cost	Cost Analysis (Low, Medium, High)
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					(Short, Long-term, or Ongoing)		
Complete	2010	Countywide	<ul style="list-style-type: none"> Waukesha Co City of Waukesha 	High	Completed (prior to 2015)	N/A	N/A
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)		Potential Funding Source	
1		All H	[Insert]	High		N/A	
Action/Implementation Plan and Project Description:							
The trailer is housed at the Waukesha Fire Dept., which has agreed to transport it to any MCI in the county							
2016: The trailer is housed at the Waukesha Fire Dept., which has agreed to transport it to any MCI in the county							

Mitigation Project: *Work to update the zoning ordinances to reflect the implementation recommendations in the Feb. 2009 Comprehensive Development Plan

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Complete	2009-10	Countywide	Municipal and County Zoning Offices	High	Completed (2014)	N/A	N/A
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)		Potential Funding Source	
3		Flood and Dam Failure	[Insert]	High		Covered by annual budgets	
Action/Implementation Plan and Project Description:							
N/A							

Mitigation Project:

*Assist efforts, as requested, to update the floodplain:

- Newly delineated floodplains for Keesus and Golden Lakes should be submitted to DNR and FEMA for LOMR
- The floodplain for the Genesee Lakes should be delineated as part of the proposed lake water level project.
- There are new, “yet-to-be- studied” areas that will likely be scheduled for evaluation.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Complete	2010	Countywide	<ul style="list-style-type: none"> • Waukesha County Parks and Land Use Dept. • SEWRPC • Municipalities 	Medium	Completed	N/A	Low
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
3	Flood and Dam Failure	[Insert]	Medium	Covered by Dept annual budget			

Action/Implementation Plan and Project Description:

The county also just adopted the new floodplain in 2008. The county will be amending the floodplain provisions of its Shoreland and Floodland Protection Ordinance in 2010.

Multiple Jurisdiction Mitigation Actions/Projects

Volume 2: Waukesha County Hazard Mitigation Plan

Mitigation Strategies & Actions

Mitigation Strategies & Actions are organized as follows:

- **New Mitigation Actions**—New actions identified during this 2021 update process
- **Ongoing Mitigation Actions**—These ongoing actions were included in the previous update and have yet to be completed. Some of these actions have no definitive end. During the 2021 update, these "ongoing" mitigation strategies/actions were modified and/or amended, as needed, to better define the strategy/action.
- **Completed Mitigation Actions**—Completed actions since 2016. Completed actions also included a brief description of the "Resulting Reduction or Limitation of Hazard Impact(s) Achieved" in order to show the resulting benefits of implementing the mitigation initiative.

New Mitigation Actions

- None identified during this update

Ongoing Mitigation Actions

Mitigation Project: Support communities working toward and to maintain the National Weather Service "Storm Ready" designation							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011; modified in 2016 to include "maintaining" the Storm Ready designation; modified in 2021 to include Waukesha County and the Village of Hartland	Cities of Oconomowoc and Waukesha; Waukesha County, Village of Hartland	Office of Emergency Mgt	Low	Ongoing	N/A	Low

Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source
1	All Hazard	[Insert]	Low	Covered by Dept annual budget

Action/Implementation Plan and Project Description:

The Village of Dousman is StormReady. The Cities of Oconomowoc and Waukesha are working toward their designation.

2021: Waukesha County and the Village of Hartland are also looking to obtain the Storm Ready designation over the next 5 years.

Mitigation Project: Look for an acceptable (environmentally, socially, cost-benefit, politically, etc.) solution for removing water from flood-prone areas, especially those areas that are basin/bowl shaped. Seek out funding sources (grants) to execute solutions.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2009	Waukesha Co; Cities of Brookfield, Delafield, Muskego, New Berlin, Oconomowoc, Pewaukee, Waukesha; Villages of Big Bend, Butler, Chenequa, Dousman, Eagle, Elm Grove, Hartland, Lac La Belle, Lannon, Menomonee Falls, Merton, Mukwonago, Nashotah, North Prairie, Oconomowoc Lake, Pewaukee, Sussex, Wales; Town of Mukwonago	Municipal elected office	High	Ongoing	N/A	High

Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source
1	Flood and Dam Failure	[Insert]	High	Covered by annual budget. (Some

				grants received through CDBG-EAP.) Seeking Grants to fund these Capitol Improvement Projects. Approximately \$5,000,000
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Action/Implementation Plan and Project Description:

Some of the potential solutions may include acquisitions, demolitions or floodproofing or moving water to surface streams. Changes in development have caused increased storm runoff problems, which in turn has caused flooding in existing residential homes and streets in specific neighborhoods.

Groundwater in parts of the county is rising and in one neighborhood, hard rock comes all the way to the surface not allowing water to soak in. Homes on the high sides of these areas are getting water in their basements and are pumping it out. This floods the homes in the lower areas and roads/ intersections, which is a safety hazard.

- There are homes pumping out water sending it into lower-lying areas creating localized flooding.
- Existing storm sewers can not handle the large amount of water.

Town of Mukwonago:

- There are about 12 houses pumping and 2-3 at the bottom receiving water.
- The city has pumped water out to open the road to a key intersection.
- The water goes over a hill and into a surface stream.

There is a concern about pumping into a high-quality cold water stream and some easement issues.

- Several locations in the City of Waukesha experience significant flooding: W. College and Harvey, and Patrick and Sandra Lane, Harding and Anoka, Summit and North High and others.
- A homeowner in the Fiddler’s Creek subdivision has issues. The city is working with the homeowner’s association to mitigate the problem.

2021: Ongoing

Mitigation Project: Work with the DNR on dam safety and flooding issues, including better communication and emergency plans.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011; 2016 modified to include all municipalities versus just a few	Town & Villages of Mukwonago, Lake Nagawicka (City of Delafield and Village of Nashotah), Saylesville Lake (TN Genesee)	Municipalities	Medium	Ongoing	N/A	Low
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
3		Flood and Dam Failure	[Insert]		Medium	Covered by annual budget	
Action/Implementation Plan and Project Description:							
<ul style="list-style-type: none"> Four dams were overtopped by flood waters and the water was affecting bridges and roads. The munis were unaware that the DNR pulled the boards. DNR is looking to remove one dam and to create failure plans. 							
2021: Explore including all jurisdictions							

Mitigation Project: Continue planning discussions regarding flooding issues caused by dam management procedures with the goal of creating agreements to reduce the flooding in downstream municipalities.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing		Town, Village and City of Oconomowoc	WI DNR, Town, Village and City of Oconomowoc	Medium	Ongoing	N/A	Low
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
3		Flood and Dam Failure	[Insert]		Medium	Covered by annual budget	

Action/Implementation Plan and Project Description:

2021: Ongoing

Mitigation Project: Raise floodplain county roads that get overtopped by water out of the danger zone.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	<ul style="list-style-type: none"> • VI of Menomonee Falls • CI & TN of Brookfield • VI of Big Bend & VI of Vernon • TN of Genesee • VI of Summit • CI & VI of Waukesha • CI of Pewaukee 	County Highway	High	Ongoing	\$8,909,241	High
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
2	Flood and Dam Failure		[Insert]		High	As available	

Action/Implementation Plan and Project Description:

2021: Ongoing

Mitigation Project: Provide ample training for volunteer fire fighters for larger wildfires

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Southern Kettle Moraine including the Villages of Eagle and Dousman	Local Fire Departments, EM Dept.	Medium	Ongoing	Varies	N/A

Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source
1	Forest and Wildfires	[Insert]	Medium	N/A
Action/Implementation Plan and Project Description:				
Training for Eagle and Dousman				
2021: Ongoing				

Mitigation Project:

Create additional locations for road salt storage:

- The county would like one, large 15,000 lb salt dome for state and county usage.
- Village and Town of Mukwonago would like additional storage in a smaller salt domes

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	<ul style="list-style-type: none"> • State DOT, Waukesha County Highway • VL & TN of Mukwonago • Village of Elm Grove 	<ul style="list-style-type: none"> • County Highway • VL & TN of Mukwonago 	High	Partially Complete	\$500,000 <\$500,000	Low

Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source
1	Winter Storms	[Insert]	High	As funding available
Action/Implementation Plan and Project Description:				
2021: Ongoing				

Mitigation Project: The Cities of Pewaukee and Waukesha would like to have truck-mounted water pumps to serve as back-ups to the stationary pumps in an electrical failure

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Cities of Pewaukee and Waukesha	Cities of Pewaukee and Waukesha Water Utilities	Medium to High	Ongoing	~\$335,000	[Insert]
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1	Utility Failure		[Insert]		Medium to High	As available	

Action/Implementation Plan and Project Description:

- In a power outage, water is available for 24 hours.
- Water is needed for regular community usage and firefighting.

2021: Ongoing

Mitigation Project: Evaluate options for providing shelters, with back-up power generators (or panels to accept portable generators), within the municipalities.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Villages of Big Bend, Chenequa, Eagle, Hartland, Lac La Belle, North Prairie and Wales	Municipal officials	Medium to High	Ongoing	Costs vary depending on options selected	N/A
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1	Utility Failure		[Insert]		Medium to High	As available	

Action/Implementation Plan and Project Description:

The Village of Chenequa has 2 state highways and a railroad through the village. They have no shelter and no facility with back-up power. May use the school. The Village of Wales shelter is at the school but it does not have back-up power.

2021: Ongoing

Mitigation Project: WCTC would like to add five additional storm water retention basins as part of the Master Facilities Plan.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2009	WCTC, Village of Pewaukee	WCTC Facilities Services	Low to Medium	Ongoing	\$600,000	Medium
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)		Potential Funding Source	
2		Flood and Dam Failure	[Insert]	Low to Medium		N/A	

Action/Implementation Plan and Project Description:

- Also working on an environmental project, which is an engineering study to see if a “green roof” can be installed on an existing building. The planned roof would be planted with approximately 6 inches of soil and native grasses.

2021: Ongoing

Mitigation Project:

Continue working on existing hazard mitigation activities at the Waukesha County Technical College (WCTC), including:

- Installing a water retention pond at the base of a hill that separates WCTC’s property from the Pewaukee High School.
- Meeting with local residents with concerns over walking trails eroded by rain in 2008-09 and described some planned repairs.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	WCTC, Village of Pewaukee	WCTC Facilities Services	Medium to High	Ongoing	N/A	Low

Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source
1,2	Flood and Dam Failure	[Insert]	Medium to High	Covered by Dept annual budget
Action/Implementation Plan and Project Description:				
Also working on community and environmental projects such as: <ul style="list-style-type: none"> • Work with the City of Brookfield’s Fox River Water Pollution Control Center to monitor and maintain safe water discharge levels as part of the Slug Prevention Plan. • Working with the DNR to update the Air Pollution Control Registration Permit. 				
2021: Ongoing				

Mitigation Project: WCTC would like to add five additional storm water retention basins as part of the Master Facilities Plan.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2009	WCTC, Village of Pewaukee	WCTC Facilities Services	Low to Medium	Ongoing	\$600,000	Low
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
2	Flood and Dam Failure	[Insert]	Low to Medium	N/A			
Action/Implementation Plan and Project Description:							
<ul style="list-style-type: none"> • Also working on an environmental project, which is an engineering study to see if a “green roof” can be installed on an existing building. The planned roof would be planted with approximately 6 inches of soil and native grasses. 							
2021: Ongoing							

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

Mitigation Project: Assist with completing the multi- jurisdictional Bark River flooding area study.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Complete	2009	Municipalities participating in the floodplain study	Waukesha County Parks and Land Use Dept., SEWRPC and municipalities	High	Completed (2014)	N/A	Low
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
3	Flood and Dam Failure		[Insert]		High	Covered by Dept Annual Budget	
Action/Implementation Plan and Project Description:							
The study is nearly complete and is about to be submitted for review. The municipalities disagreed with some of the findings and they may be adjusted.							

Waukesha County

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Goodchild	Gail	Emergency Management Coordinator	Waukesha County Emergency Management	262-548-7313	ggoodchild@waukeshacounty.gov

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Waukesha County	Yes	Yes	Yes	Yes	Yes	Yes	Yes

2021 Plan Participation and Involvement						
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)		Other Participation Activities
Fruth	Jason	Yes	Yes			
Greenberg	Ben		Yes			
Panas	Lisa	Yes	Yes			
Rauchle	Bob	Yes	Yes			
Farrell	Cory		Yes			
Bell	Gary	Yes	Yes			
Freeman	Alexander	Yes	Yes	Yes		Bi-weekly meetings

Kober	Kevin	Yes	Yes	Yes	Bi-weekly meetings
Goodchild	Gail	Yes	Yes	Yes	Bi-weekly meetings

Brookfield City

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Scott	Robert	Director of Finance / Emergency Manager	City of Brookfield	262-347-1376	scott@ci.brookfield.wi.us
Grisa	Tom	Director of Public Works			grisa@ci.brookfield.wi.us

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Brookfield City	18	Yes	Yes	Yes	Yes	Yes	Yes

2021 Plan Participation and Involvement						
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities	
Grisa	Tom	Yes	Yes			
Scott	Robert	Yes	Yes	Yes - Approved annex		
Mason	David	Yes	Yes			
Reek	Jennifer	Yes				
Goudy	Larry		Yes			
Gatlin	Anthony		Yes			

Community Profile and Description

Date of Incorporation: 1954

Current Population: The population of Brookfield in the 2019 US Census ACS was 39,115.

Population Growth: The population fluctuates between different times of the day. The city has an overnight population of about 40,000 people and a daytime jobs population of 80,000 due to job commuting. According to the Wisconsin Department of Administration, the city’s population is expected to grow to 41,179 in 2025, to 41,607 in 2030, and then to 42,096 in 2035.

Location and Description: The City of Brookfield is located in southeastern Wisconsin and covers over 27 square miles. Brookfield is placed along the Interstate 94 corridor, west of Milwaukee and Brookfield will continue to be a central place in the region passing route to Madison.

Governing Body Format: The City is governed under a Mayor/Council format.

Development Trends: The city has a total area of 27.59 square miles, of which 27.29 square miles is land and 0.367 square miles is water.

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional	Comments

			Authority	
Codes, Ordinances & Requirements				
Building Code	Yes		State	IBC and UDC
Zonings	Yes			
Subdivisions	Yes		State	
Stormwater Management	Yes		State	
Post Disaster Recovery	Yes	Yes	Yes	
Growth Management	Yes			
Public Health and Safety	-	Yes		
Planning Documents				
General or Comprehensive Plan	Yes			
Environmental Protection	-	Yes	State/WI DNR	
Transportation Plan	Yes	Yes	SEWRPC	
Parks Plan	Yes			
Trail Plan	Yes			
Response/Recovery Planning				
Comprehensive Emergency Management Plan	Yes	Yes		
WUI Plan	-			
Post-Disaster Recovery Plan	-			
Continuity of Operations Plan	Yes			Department specific

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY		
Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Community development, Engineering
Engineers or professionals trained in building or infrastructure construction practices	Yes	Engineering, Inspector Services
Planners or engineers with an understanding of natural hazards	Yes	Engineering
Staff with training in benefit/cost analysis	Yes	Finance
Surveyors	Yes	Engineering
Personnel skilled or trained in GIS applications	Yes	Info Tech, Engineering
Emergency manager	Yes	Admin
Grant writers	Yes	Multiple Departments

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE	
What department is responsible for floodplain management in your jurisdiction?	Community development and engineering
Are any certified floodplain managers on staff in your jurisdiction?	Yes
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	-
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	Yes, but updates may be needed
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Continuing Education
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	-

TABLE: COMMUNITY CLASSIFICATIONS			
	Participating?	Classification	Date Classified
NFIP	Yes		
Community Rating System	-		
StormReady	-		

Jurisdiction-Specific Hazards

Hazards that represent a county-wide risk are addressed in Volume 1. This section only addresses the hazards and their associated impacts that are relevant and unique to the municipality.

- **Dam Failure:** There are no dams located in Brookfield City.
- **Extreme Cold:** Extreme cold is a risk for the aging population given their dependency upon others.
- **Extreme Heat:** Extreme heat is a risk for the aging population given their dependency upon others.
- **Flooding:** River Road is susceptible to floods after large storms. Many other areas are also prone to floods; however, flooding events have lessened due to mitigation efforts over the past 20 years.
- **Forest and Wildfires:** Forest and Wildfire pose as little hazards for the city.
- **Hail:** Hail poses a hazard to the city by contributing to building damage and property damage.
- **Hazardous Materials Release:** There is a moderate risk for hazardous materials release.
- **Lightning:** There is a moderate risk for effects from lightning.
- **Rail Transportation Incident:** There is a medium risk with population density along the railroad corridor.
- **Thunderstorms:** Thunderstorms pose a medium risk by contributing to taking trees down, wires down, flooding, road closures, or loss of electricity.
- **Tornados and High Winds:** Medium risk. Effects from tornados and high winds could be trees down, wires down, flooding, road closures, or loss of electricity.
- **Utility Failure:** Increasing issue based on resident reports following recent storms. It does not appear to have a significant impact on congregate living facilities. Many city utility areas do not have backup generators.
- **Winter Storm:** Winter storms pose a high risk primarily as it impacts major transportation facilities running through city.
- **Political Hazards:** Civil disturbances have increased in the last several years. The concentration of facilities in the Civic Center could present issues in event of mass protests (police, main fire station, city hall).

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section:

- New Mitigation Strategies for Waukesha County and All Participating Jurisdictions

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

Mitigation Project: Study and implement strategic actions to build resiliency in utility and power infrastructure, to include, but not limited to: Burying strategic overhead powerlines, where appropriate, improving and upgrading utility infrastructure to be more resilient to wind, ice, and other natural disasters.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	City of Brookfield	WEC Energy Group	High	Ongoing	\$30,000,000	High

Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source
To preserve life and minimize the potential for injuries or death. To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.	Utility Failure Severe Weather	Maintain power during wind, tornado, thunderstorms, or ice storms.	High	HMGP, BRIC, private sector funds
Action/Implementation Plan and Project Description:				
Bury strategic overhead powerlines in corridors.				

Mitigation Project: Floodproofing Buildings							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	City of Brookfield	City of Brookfield	High	Ongoing	N/A	High
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
To preserve life and minimize the potential for injuries or death. To preserve and enhance the quality of life throughout Waukesha County by identifying potential property	Flooding and Dam Failure Thunderstorms	Avoid loss of life from flooded structures, property damage from flooding, and basement backups in areas from an overloaded sanitary sewer system.	High	HMGP, BRIC, FMA			

damage risks and recommending appropriate.				
To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.				

Action/Implementation Plan and Project Description:

Block up any walk-out basements and raise the lowest point of entry of properties adjacent to floodplains and areas subject to flooding.

Mitigation Project: Purchase generators and appropriate hookups

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	City of Brookfield	Water Utility	High	2030	N/A	High
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
To preserve life and minimize the potential for injuries or death.	Lightning Thunderstorms Tornadoes and High Winds Winter Storms Utility Failure	Maintain an adequate supply of potable water during power outages.	High	HMGP, BRIC			

Action/Implementation Plan and Project Description:

Provide backup generators for three well sites, two water tower locations, and one booster station. This will allow each of these facilities to provide an adequate supply of water to our customers and to maintain communications via SCADA to operate the water system efficiently and safely.

Mitigation Project: Upgrade Sanitary Sewer System							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	City of Brookfield	City of Brookfield	High	2026	\$5,000,000 each	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To preserve life and minimize the potential for injuries or death.		Thunderstorms Utility Failure	Avoid loss of life from basement backups. Minimize property damage from basement backups.		High	HMGP, BRIC	
To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.							
Action/Implementation Plan and Project Description:							
Upgrade sanitary sewer interceptors to convey greater amounts of wastewater and infiltration and inflow water to avoid basement backups. This could also include providing wastewater storage tanks to temporarily store excess wastewater for conveyance and treatment at a later time when flows return to normal.							

Mitigation Project: Upgrade and improve storm sewers to mitigate the effects of flooding.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	City of Brookfield	City of Brookfield	Medium	2030	\$4,000,000	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	

To preserve life and minimize the potential for injuries or death.	Flooding and Dam Failure	Reduce overland flooding and reduce the impact on structures.	High	HMGP, BRIC, FMA
To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.	Thunderstorms			

Action/Implementation Plan and Project Description:

Upgrade storm sewers in subdivisions subject to flooding. Coordinate with Waukesha County for improvements to Springdale Road and other county highways. Other areas include the Camelot Forest subdivision on the west side of the city, the Northeast industrial area north of Capitol Drive, and other areas.

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

Mitigation Project: Purchase and raze repetitive loss structures from flood prone areas or where properties are subject to surface water drainage up to and into the house. Project would also include regrading property to provide detention of runoff to reduce drainage issues elsewhere in the neighborhood.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2010	City of Brookfield	City of Brookfield	High	Ongoing	Up to 10 houses @ \$400,000 each	High
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)			Benefit Analysis (Low, Medium, High)	Potential Funding Source	
2	Flood and Dam Failure	[Insert]			High	TBD	

Action/Implementation Plan and Project Description:

These residential homes in the Imperial Estates subdivision and along urbanized creeks are subject to surface water flooding, some inclusive of the first floor. Others are subject to repetitive losses from sewer backups, likely contributed by the flooding of houses in the area.

Mitigation Project: Provide backwater valves to property owners subject to basement backups.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2010	City of Brookfield	City of Brookfield	Medium	Ongoing	\$20,000	Lows
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
2	Flood and Dam Failure	[Insert]	Medium	Grants			
Action/Implementation Plan and Project Description:							
Basement backup valves that install in floor drains are very inexpensive but may reduce backups, which subject properties to thousands of dollars of damage.							
2018: No longer being pursued							

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

Mitigation Project: Buyout one repetitive loss property (home) that, because of its topography, is prone to flooding. Demolish the structure and create a retention pond.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	City of Brookfield	Dept. of Public Works	High	Complete(2012)	\$400,000	[Insert]
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			

2	Flood and Dam Failure	[Insert]	High	DNR Flood Control Grant
Action/Implementation Plan and Project Description:				
The home (Parkhurst Drive) is the only one in the area and it sits in a “bowl” that floods. Most recently, the home flooded on 7/22/10 with the basement totally filling and 6” of water standing on the first floor living area.				
2016: The project was completed, and the home was acquired in 2012 with assistance from a DNR flood control grant				

Mitigation Project: Floodproof repetitive loss structures adjacent to urbanized creeks or in or adjacent to low lying areas or floodplains.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	City of Brookfield	City of Brookfield	High	Complete (2013)	Up to 15 houses @ \$50,000 each in various locations. Could be completed individually or collectively.	High
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source		
2	Flood and Dam Failure	[Insert]		High	Grants		
Action/Implementation Plan and Project Description:							
These residential properties have had flooding that may be “correctable” using floodproofing measures without purchasing the entire property or removing the house.							
2016: One home on Honey Creek Drive was floodproofed with the assistance of state grant dollars. Another property on Teal Ridge Court initially was interested, but ultimately declined to participate. No other homes are scheduled or interested at this time, so this project is considered complete.							

Mitigation Project: Repair severely eroded streambank on Underwood Creek and replace driveway culverts over the creek upstream of this property with a bridge or box section.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2010	City of Brookfield	City of Brookfield	Medium	No longer being pursued	\$75,000	Low
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
2	Flood and Dam Failure	[Insert]	Medium	N/A			

Action/Implementation Plan and Project Description:

One property along this creek is experiencing significant property loss from erosion in this creek. Replacing the driveway culverts upstream of the property with a bridge or box section may reduce likelihood of repeated erosion.

2016: No longer being pursued

Delafield City

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Hafner	Tom	Administrator		262-303-4626	thafner@ci.delafield.wi.us

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Delafield City	4	-	-	Yes	Yes	None identified	Yes

2021 Plan Participation and Involvement					
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities
Hafner	Tom				Meeting/Plan Item Development

Community Profile and Description

Date of Incorporation: 1959

Current Population: The population of Delafield in the 2019 US Census ACS was 7,141.

Population Growth: According to the Wisconsin Department of Administration, the City of Delafield is projected to grow up another 45% by 2035, resulting in the total population to be roughly 9,402 in 2035.

Location and Description: Delafield is located by Bark River and I-94. The city has a total area of 11.06 square miles, of which 9.41 square miles is land and 1.65 square miles is water.

Governing Body Format: The city is governed by a Mayor with seven supporting Districts.

Development Trends: The 2035 Regional Transportation System Plan for Southeastern Wisconsin regional land use plan shows a portion of the City of Delafield as a major economic activity center in the future. A general economic trend is that manufacturing jobs will decline while service jobs will increase by 2035.

Capabilities Assessment

The assessment of the jurisdiction's legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction's fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction's administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community's National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments
Codes, Ordinances & Requirements				
Building Code	Yes		State	
Zonings	Yes			
Subdivisions	Yes		State	
Stormwater Management	Yes		State	
Post Disaster Recovery	Yes	Yes		
Growth Management	Yes			
Public Health and Safety	-	Yes		
Planning Documents				
General or Comprehensive Plan	Yes			
Environmental Protection	Yes	Yes	State/WI DNR	
Transportation Plan	Yes	Yes	SEWRPC	
Parks Plan	Yes	Yes		
Trail Plan	Yes	Yes		
Response/Recovery Planning				
Comprehensive Emergency Management Plan	Yes	Yes		
WUI Plan	-			

Post-Disaster Recovery Plan	Yes	Yes	
Continuity of Operations Plan	Yes	Yes	Statutory, and part of CEMP

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Staff and Contract
Engineers or professionals trained in building or infrastructure construction practices	Yes	Staff and Contract
Planners or engineers with an understanding of natural hazards	Yes	Staff and Contract
Staff with training in benefit/cost analysis	Yes	
Surveyors	Yes	Contracted out
Personnel skilled or trained in GIS applications	Yes	Staff and Contract
Emergency manager	Yes	Lake Country Fire Protection District
Grant writers	Yes	Staff and Contract

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

What department is responsible for floodplain management in your jurisdiction?	Zoning, with delegation to City Planner and Engineer
Are any certified floodplain managers on staff in your jurisdiction?	-
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	-
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	Yes, but updates may be needed
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Yes, general training in floodplain management

Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No
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TABLE: COMMUNITY CLASSIFICATIONS			
	Participating?	Classification	Date Classified
NFIP	Yes		
Community Rating System	No		
StormReady	-		

Jurisdiction-Specific Hazards

Hazards that represent a county-wide risk are addressed in Volume 1. This section only addresses the hazards and their associated impacts that are relevant and unique to the municipality.

Dam failure: There is a high risk for dam failure in the city of Delafield because there is a dam located two blocks from downtown that would inundate significant areas impacting commerce and contributing to the loss of life and property. Other dams would result in a substantial loss of value for residences located on lakes.

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: New Mitigation Strategies for Waukesha County and All Participating Jurisdictions

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

- This jurisdiction does not have any new mitigation actions.

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

- This jurisdiction does not have any ongoing mitigation actions or actions that are still in progress as identified in previous plan updates.

Mitigation Project: Look for an acceptable (environmentally, socially, cost-benefit, politically, etc.) solution for removing water from flood-prone areas, especially those areas that are basin/bowl shaped. Seek out funding sources (grants) to execute solutions.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2009	Delafield	Municipal elected office	High	Ongoing	N/A	High
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)		Potential Funding Source	
1	Flood and Dam Failure		Flood mitigation	High		Covered by annual budget. (Some grants received through CDBG-EAP.)	

				Seeking Grants to fund these Capital Improvement Projects. Approximately \$5,000,000
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Action/Implementation Plan and Project Description:

Some of the potential solutions may include acquisitions, demolitions or floodproofing or moving water to surface streams. Changes in development have caused increased storm runoff problems, which in turn has caused flooding in existing residential homes and streets in specific neighborhoods.

2021: Ongoing

Mitigation Project: Work with the DNR on dam safety and flooding issues, including better communication and emergency plans.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011; 2016 modified to include all municipalities versus just a few	Lake Nagawicka (City of Delafield and Village of Nashotah)	City of Delafield	Medium	Ongoing	N/A	Low
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
3	Flood and Dam Failure	Mitigate flooding	Medium	Covered by annual budget			

Action/Implementation Plan and Project Description:

2021: Ongoing

Muskego City

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Westphal	Steve	Police Chief		262-679-4130	swestphal@cityofmuskego.org

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Muskego City	8	-	Yes	Yes	Yes	No new actions identified	Yes

2021 Plan Participation and Involvement					
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities
Westphal	Stephen		Yes	Yes	Meeting/ Plan Item Development

Community Profile and Description

Date of Incorporation: 1964

Current Population: The population of Muskego City in the 2019 US Census ACS was 25,127.

Population Growth: According to the Wisconsin Department of Administration, the city's population is expected to grow to 25,792 in 2025, then to 26,648 in 2030, then finally to 27,570 in 2035.

Location and Description: The city is the fifth largest place in Waukesha County. The city has a total area of 35.98 square miles, of which, 31.60 square miles is land, and 4.3 square miles is water.

Governing Body Format: The city is governed by a Common Council with a Mayor.

Development Trends: N/A

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional	Comments

			Authority	
Codes, Ordinances & Requirements				
Building Code	Yes		State	
Zonings	Yes			
Subdivisions	Yes		State	
Stormwater Management	Yes		State	
Post Disaster Recovery	Yes	Yes		
Growth Management	Yes			
Public Health and Safety	-	Yes		
Planning Documents				
General or Comprehensive Plan	Yes			
Environmental Protection	-	Yes	State/WI DNR	
Transportation Plan	-	Yes	SEWRPC	
Parks Plan	Yes			
Trail Plan	Yes			
Response/Recovery Planning				
Comprehensive Emergency Management Plan	Yes	Yes		
WUI Plan	-			
Post-Disaster Recovery Plan	Yes			
Continuity of Operations Plan	-			

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY		
Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	
Engineers or professionals trained in building or infrastructure construction practices	Yes	
Planners or engineers with an understanding of natural hazards	Yes	
Staff with training in benefit/cost analysis	Yes	
Surveyors	-	Contract
Personnel skilled or trained in GIS applications	Yes	
Emergency manager	Yes	
Grant writers	Yes	

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE	
What department is responsible for floodplain management in your jurisdiction?	
Are any certified floodplain managers on staff in your jurisdiction?	-
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	-
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	Yes, but updates may be needed
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Continuing Education
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No

TABLE: COMMUNITY CLASSIFICATIONS

	Participating?	Classification	Date Classified
NFIP	Yes		
Community Rating System	No		
StormReady	-		

Jurisdiction-Specific Hazards

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The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to ***all participating jurisdictions*** can be accessed by going to the following section: New Mitigation Strategies for Waukesha County and All Participating Jurisdictions

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

- This jurisdiction does not have any new mitigation actions.

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

Mitigation Project: Evaluate and implement hazard mitigation measures for properties that have a history of damage due to overland flooding.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	City of Muskego	Municipal Officials	Medium/High	Ongoing	Costs will vary by mitigation measure selected	N/A
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
2		Flood and Dam Failure	[Insert]		Medium/High	As available	
Action/Implementation Plan and Project Description:							
Exploring floodproofing, buy-outs, etc. to mitigate damages. There are 13 properties on Gaulke Dr., Saroyan Rd. (x 4), Catalina Dr., Cornell Dr., Racine Ave. (x2), Janesville (x2), Pioneer Dr. and Crowbar Dr.							

Mitigation Project: Upgrade the lift station to 5 million gallons per day.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	City of Muskego	Muskego Utilities	High	Ongoing	\$1,000,000	High

Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source
1,2	Flooding and Dam Failure & Utility Failure	[Insert]	High	Municipally funded
Action/Implementation Plan and Project Description:				
This project will help keep sewage from backing up into resident basements in floods.				

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

- This jurisdiction does not have any completed mitigation actions.

New Berlin City

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Burns	Jim	Emergency Manager		262-785-9580	jburns@newberlin.org

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
New Berlin City	143	Yes	Yes	Yes	Yes	Yes	Yes

2021 Plan Participation and Involvement						
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities	
Radomski	Josh	Yes	Yes			
Hart	Jim	Yes				
Burns	Jim	Yes	Yes	Yes - Approved annex		
Gscheidmeier	Ross	Yes				
Kosteretz	Tim	Yes				
Thompson	Steve	Yes				
Harenda	Ken		Yes			
Simonson	Tammy		Yes			

Pierce	Chris		Yes		
Hopkins	John		Yes		
Hewitt	Nicole		Yes		
Garrigues	Chuck		Yes		

Community Profile and Description

Date of Incorporation: 1959

Current Population: The 2020 US Census population estimates for the city of New Berlin population was 39,812 people.

Population Growth: According to the Wisconsin Department of Administration, the town’s population is expected to grow to 43,535 in 2025, to 44,529 in 2030, then finally to 45,607 in 2035.

Location and Description: The City of New Berlin is one of the younger cities in Wisconsin. The City of New Berlin covers 36.9 square miles and is located between Madison and Milwaukee. Major highways include Interstate Highway 94 located north of New Berlin, and Interstate Highway 43 passes through the city.

Governing Body Format: The government of the City of Berlin consists of the eight-member Common Council which includes seven aldermen, representing each of the city's seven aldermanic districts, and the mayor.

Developmental Trends: N/A

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments
Codes, Ordinances & Requirements				
Building Code	Yes		State	
Zonings	Yes			
Subdivisions	Yes		State	
Stormwater Management	Yes		State	
Post Disaster Recovery	-	Yes		
Growth Management	Yes			
Public Health and Safety	-	Yes		
Planning Documents				
General or Comprehensive Plan	Yes			
Environmental Protection	Yes	Yes	State/WI DNR	
Transportation Plan	Yes	Yes	SEWRPC	
Parks Plan	Yes			
Trail Plan	Yes			
Response/Recovery Planning				
Comprehensive Emergency Management Plan	Yes	Yes		
WUI Plan	-			

Post-Disaster Recovery Plan	-		
Continuity of Operations Plan	Yes		

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	DCD
Engineers or professionals trained in building or infrastructure construction practices	Yes	DCD, PW, EM
Planners or engineers with an understanding of natural hazards	Yes	DCD, PW
Staff with training in benefit/cost analysis	Yes	PW
Surveyors	Yes	DCD, PW
Personnel skilled or trained in GIS applications	Yes	DCD, PW, Utilities
Emergency manager	Yes	EM
Grant writers	Yes	DCD

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

What department is responsible for floodplain management in your jurisdiction?	Stormwater (DCD)
Are any certified floodplain managers on staff in your jurisdiction?	No
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	No
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	Yes
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	No

Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	Yes; No (just audited)
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TABLE: COMMUNITY CLASSIFICATIONS			
	Participating?	Classification	Date Classified
NFIP	Yes		
Community Rating System	Yes	6	10/1/2021
StormReady	Yes		

Jurisdiction-Specific Hazards

Hazards that represent a county-wide risk are addressed in Volume 1. This section only addresses the hazards and their associated impacts that are relevant and unique to the municipality.

Flooding: The city of New Berlin is susceptible to flooding.

Hail: The city of New Berlin is vulnerable to hail given fleet (40-45 vehicles) are not under roof and parked outside, therefore are susceptible to damages.

Utility Failure: The city of New Berlin is vulnerable to utility failure because not all buildings have backup generators to provide shelter and support to citizens.

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: New Mitigation Strategies for Waukesha County and All Participating Jurisdictions

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

Mitigation Project: Procure backup generators and appropriate hookups							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	City of New Berlin	Emergency Management	High	Short	N/A	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)		Potential Funding Source	
To preserve life and minimize the potential for injuries or death.		Utility Failure	Generate and return power to buildings used for shelter during an emergency.	High		HMGP, BRIC	
Action/Implementation Plan and Project Description:							
Add backup generators to city buildings: (4-DPW building, 1-Community Center, 1- Library, 1-Public Safety building, 4- School buildings) to support the community with shelter to citizens and general public safety.							

Mitigation Project: Install Sprinkler System at critical city storage facilities.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	City of New Berlin	Department of Public Works	High	Ongoing	\$750,000	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1, 2, 3, and 4		All Hazards	\$10,000,000		High	HMGP	
Action/Implementation Plan and Project Description:							
Build a sprinkler system for critical city storage facilities, particularly for vehicle storage areas because they provide critical DPW functions to serve the public for any hazard type.							

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

Mitigation Project: Implement the mitigation measures in the City of New Berlin’s Stormwater Management Plan a possible.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2008	City of New Berlin	Stormwater Utility Dept. with City Emergency Management	Medium/High	Complete	Cost varies	N/A
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
3		Flood and Dam Failure	[Insert]		Medium / High	N/A	
Action/Implementation Plan and Project Description:							

- The plan contains mitigation measures such as an extensive streambank stabilization project, creating retention ponds, waterway clearing and identifies 13 homes that could be bought- out and converted to open space and/or retention ponds.
- The home buyouts were submitted for a mitigation grant but were denied except for one property (on Grange) that was bought out. The city submitted another mitigation grant application to acquire several of these properties in Sept. 2010.

2021 update: 4 properties acquired 2011

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

Mitigation Project: Relocate, floodproof and elevate sewage lift stations that received damage in the 2008 floods							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Complete	2011	City of New Berlin	City of New Berlin Municipal Utility	High	Ongoing	350,000 - 400,000	Medium
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1,2		Flooding and Dam Failure & Utility Failure	[Insert]		High	As available	
Action/Implementation Plan and Project Description:							
Applied for a mitigation grant but were denied.							
2021 Update: Moved further east by 50 yards - No new problems/Complete							
Booster pump station #7							
Replacing generator - portable 75 KVA / 90 / 150 KW							

Westridge lift station replacement

Portable pump - 4" - 500 GPM

Oconomowoc City

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Bowen	Brad	Fire Chief	Western Lakes Fire Protection District	262-567-8282	bbowen@westernlakesfd.org
Frye	Mark		City of Oconomowoc	262-569-2184	mfrye@oconomowoc-wi.gov

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Oconomowoc City	4	Yes	-	Yes	Yes	Yes	Yes

2021 Plan Participation and Involvement					
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities
Pfister	James	Yes			
Bowen	Brad			Yes - provided status update to new and ongoing actions	

Community Profile and Description

Date of Incorporation: 1875

Current Population: The population of the City of Oconomowoc in the 2021 US Census ACS was 18,203.

Population Growth: The growth percentage within the City of Oconomowoc also exceeds the County as a whole by almost 12 percent. The City of Oconomowoc is predicted to exceed 34 percent growth between the years 2010-2040. The current population size has already surpassed the predictions made by the Wisconsin Department of Administration.

Location and Description: Oconomowoc City is located in northwestern Waukesha County, Wisconsin, and is nestled between Lac La Belle and Oconomowoc Lake. The city has access to I-94, State Trunk Highway (STH) 16, and STH 6.

Governing Body Format: The City of Oconomowoc is organized and governed under the Mayor-Council plan.

Development Trends: Given the increase in population in the future, Residential land use will continue to comprise the majority of land within the city's future land use plan, followed by residential land use then Urban Reserve, and then Open Space/Natural Areas.

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional	Comments

			Authority	
Codes, Ordinances & Requirements				
Building Code	Yes, Local Building		State	
Zonings	Yes, Local Zoning Dept			
Subdivisions	Yes		State	
Stormwater Management	Yes		State	
Post Disaster Recovery	-	Yes		Combination of Local and County
Growth Management	Yes			
Public Health and Safety	-	Yes		
Planning Documents				
General or Comprehensive Plan	Yes			
Environmental Protection	Yes	Yes	State/WI DNR	
Transportation Plan	-	Yes	SEWRPC	
Parks Plan	Yes			
Trail Plan	Yes			
Response/Recovery Planning				
Comprehensive Emergency Management Plan	Yes	Yes		Western Lakes Joint Emergency Management / County for Large Scale
WUI Plan	-		Regional	
Post-Disaster Recovery Plan	Yes	Yes		Western Lakes Joint Emergency Management / County for Large Scale
Continuity of Operations Plan	Yes	Yes		Western Lakes Joint Emergency Management / County for Large Scale

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY		
Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Public Works
Engineers or professionals trained in building or infrastructure construction practices	Yes	Public Works
Planners or engineers with an understanding of natural hazards	Yes	Public Works
Staff with training in benefit/cost analysis	Yes	Finance
Surveyors	Yes	Consulting Engineer
Personnel skilled or trained in GIS applications	Yes	Engineering
Emergency manager	Yes	Western Lakes
Grant writers	Yes	Various Department Heads

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE	
What department is responsible for floodplain management in your jurisdiction?	Zoning Dept
Are any certified floodplain managers on staff in your jurisdiction?	None on staff, utilize consultant
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	None known
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	Yes, but updates may be needed
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Continuing Education
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No; Not at this time

TABLE: COMMUNITY CLASSIFICATIONS			
	Participating?	Classification	Date Classified
NFIP	Yes		
Community Rating System	No		
StormReady	Yes		

Jurisdiction-Specific Hazards

Hazards that represent a county-wide risk are addressed in Volume 1. This section only addresses the hazards and their associated impacts that are relevant and unique to the municipality.

Dam inspection is completed annually. The city evaluated the impact of dam failure downstream, and the impact would be approximately a 1-inch increase in water level in Lac LaBelle. A home located within the dam inundation area has now been removed.

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
 - Generator at Community Center and Library - community gathering warming and cooling shelter
 - Generator at Public Works Building - ability for emergency crews to be deployed and provide services during emergency incidents
 - Generator at Water/Electric Utility Building - ability for emergency crews to be deployed and provide services during emergency incidents
 - Generator at Wells #4 & #6 - maintain water for system pressure and fire flows during electric failures

- Confined space response capabilities - sanitary sewer and storm sewer manholes, wet wells, and vaults. Currently, no local capabilities for rapid emergency response should someone become incapacitated within these confined spaces.
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
 - Transition from local 911 dispatch center to consolidated dispatching center in 2022.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.
 - Countywide Mutual Aid Agreement with other municipal departments including public works, police, fire, water utility, electric utility.
 - Joint Emergency Management Office with Western Lakes Fire District
 - Updated Emergency Management Plan
 - Revised response plans, protocols, and guidelines for response to incidents

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: New Mitigation Strategies for Waukesha County and All Participating Jurisdictions

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

Mitigation Project: Procure generators and appropriate hookups							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	City of Oconomowoc	City of Oconomowoc	High	Short	N/A	Medium
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	

To preserve life and minimize the potential for injuries or death.	Utility Failure	Provide community warming/cooling shelters and assist with the emergency response of public works, water, and electric departments.	High	HMGP, BRIC
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Action/Implementation Plan and Project Description:

Place backup generators at the various facilities that do not currently have them.

Mitigation Project: Universal Electrical Generators

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	City of Oconomowoc	City of Oconomowoc	Medium	2024	\$20,000	Medium
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
To preserve life and minimize the potential for injuries or death.	Utility Failure	Provide uninterrupted backup electrical power for a variety of buildings providing congregate living, emergency shelter to avoid the need for emergent relocation of sensitive populations and maintaining continuation of services.	Medium	HMGP, BRIC			

Action/Implementation Plan and Project Description:

The City seeks to identify key facilities that provide services (housing, shelter, essential services) that during an electrical utility failure which may or may not coincide with a disruptive weather event, that could be supported by a portable backup electrical generator, to install a universal connection and the necessary switching gear to support the building's essential systems (heating/air conditioning, lighting, lifts/elevators). The intent is to provide necessary electrical system support to allow for the resident population within the building to remain in place, rather than to establish a shelter and a relocation operation. The program would ease the burden on government services during adverse weather events and optimize the ability of individuals to maintain independence. Agreements would be obtained from building owners prior to any work commencing.

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

- Transition from local 911 dispatch center to consolidated dispatching center in 2022.

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

- Countywide Mutual Aid Agreement with other municipal departments including public works, police, fire, water utility, electric utility.
- Joint Emergency Management Office with Western Lakes Fire District
 - Updated Emergency Management Plan
 - Revised response plans, protocols, and guidelines for response to incidents

Pewaukee City

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Bierce	Kevin	Fire Chief		262-522-2500	kbierce@pewaukee.wi.us

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Pewaukee City	5	-	-	Yes	Yes	Yes	Yes

2021 Plan Participation and Involvement						
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities	
Bierce	Kevin				Meeting/Plan Item Development	

Community Profile and Description

Date of Incorporation: 1999

Current Population: The population of the City of Pewaukee in the 2019 US Census ACS was 14,431.

Population Growth: According to the Wisconsin Department of Administration, the population of the City of Pewaukee is expected to increase to up to 15,898 in 2025, then 16,768 in 2030, and finally to 17,708 in 2035.

Location and Description: The City of Pewaukee is located in Southeastern Wisconsin, has 21 square miles of land and water area, and also encompasses approximately 43% of Pewaukee Lake.

Governing Body Format: The City of Pewaukee is organized and governed under the Mayor-Council plan.

Development Trends: N/A

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments
Codes, Ordinances & Requirements				
Building Code	Yes		State	
Zonings	Yes			

Subdivisions	Yes		State	
Stormwater Management	Yes		State	
Post Disaster Recovery	-	Yes		
Growth Management	Yes		SEWRPC	
Public Health and Safety	-	Yes		
Planning Documents				
General or Comprehensive Plan	Yes			
Environmental Protection	-	Yes	State/WI DNR	
Transportation Plan	-	Yes	SEWRPC	
Parks Plan	Yes			
Trail Plan	Yes			
Response/Recovery Planning				
Comprehensive Emergency Management Plan	Yes	Yes		
WUI Plan	-			
Post-Disaster Recovery Plan	-	Yes		
Continuity of Operations Plan	Yes			

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	
Engineers or professionals trained in building or infrastructure construction practices	Yes	

Planners or engineers with an understanding of natural hazards	Yes	In house and WI DNR
Staff with training in benefit/cost analysis	Yes	
Surveyors	Yes	
Personnel skilled or trained in GIS applications	Yes	
Emergency manager	Yes	
Grant writers	Yes	In house and outside

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

What department is responsible for floodplain management in your jurisdiction?	Engineer
Are any certified floodplain managers on staff in your jurisdiction?	No
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	No
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	Yes, but updates may be needed
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Continuing Education
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No; Yes

TABLE: COMMUNITY CLASSIFICATIONS

	Participating?	Classification	Date Classified
NFIP	Yes		
Community Rating System	No		
StormReady	No		

Jurisdiction-Specific Hazards

Hazards that represent a county-wide risk are addressed in Volume 1. This section only addresses the hazards and their associated impacts that are relevant and unique to the municipality.

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: New Mitigation Strategies for Waukesha County and All Participating Jurisdictions

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

Mitigation Project: Study and implement alternative transportation routes to mitigate impact and safety concerns posed by rail lines.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date	Est. Cost	Cost Analysis (Low, Medium, High)

					(Short, Long-term, or Ongoing)		
New	2021	City of Pewaukee	City of Pewaukee	Medium	2025	\$50,000	High
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
<p>To preserve life and minimize the potential for injuries or death.</p> <p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p> <p>To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.</p> <p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p>	Rail Transportation Incident	Determine an alternative means to cross railings with vehicular traffic to preserve emergency first response for all hazards.	Medium	HMGP, BRIC, FMA, SEWRPC			
Action/Implementation Plan and Project Description:							
<p>The rail lines that bisect the community are all at grade, and frequently can block vehicular traffic, specifically emergency response vehicles from reaching areas of the community, causing significant delays. The impacts of these delays can delay lifesaving interventions during emergencies. An alternative means of crossing the rail lines are needed to avert these delays. In the event of a rail incident, the delays would be exacerbated as the rail incident would also block the surface roadways hindering any response. The impacts are increased risk of loss of life, further loss of property, and requiring neighboring agencies to assume primary response responsibilities due to the surface road crossings being rendered inaccessible. The study would seek to identify a cost-effective method to address these concerns and present a possible planning document for future roadway infrastructure improvements.</p>							

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

Mitigation Project: Continue exploring the feasibility of creating a Storm Water Management District in the City of Pewaukee to fund mitigation projects.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	City of Pewaukee	Municipal Officials	Medium	Ongoing	N/A	N/A
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
3,5	Flood and Dam Failure	[Insert]	Medium	Covered by annual budget			
Action/Implementation Plan and Project Description:							
N/A							

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

- This jurisdiction does not have any completed mitigation actions.

Waukesha City

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Baumann	Dan	Police Captain		262-524-3772	dbaumann@ci.waukesha.wi.us
Angle	Dennis	Deputy Chief of Police		262-524-3762	dangle@waukesha-wi.gov
Damien	Alex	Interim Director of Public Works		262-524-3907	adamien@waukesha-wi.gov
Andrews	Jennifer	Community Development Director		262-524-3753	jandrews@waukesha-wi.gov
Howard	Steve	Fire Chief		262-524-3651	showard@waukesha-wi.gov
Reilly	Shawn	Mayor		262-524-3700	sreilly@waukesha-wi.gov

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Waukesha City	66	Yes	Yes	Yes	Yes	Yes	Yes

2021 Plan Participation and Involvement					
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities
Howard	Steve	Yes	Yes		
Reilly	Shawn		Yes		
Damien	Alex		Yes		
Angle	Dennis		Yes		
Stone	Kristin		Yes		

Community Profile and Description

Date of Incorporation: 1896

Current Population: The population of Waukesha City in the 2019 US Census ACS was 72,308.

Population Growth: The growth in population in the City of Waukesha mirrors that of the County of Waukesha. The city is the most populous municipality in the county. According to the Wisconsin Department of Administration, the city's population is expected to grow to 74,859 in 2025, then 76,734 in 2030, and finally to 78,762 in 2035.

Location and Description: Waukesha City is part of the Milwaukee metropolitan area, and the city has a total area of 25.07 square miles, of which 24.81 square miles is land and 0.26 square miles is water. The city is also located on both sides of the Fox River, and the is easily accessible to Interstate 94 and Moreland Boulevard.

Governing Body Format: Common Council with a Mayor and representatives.

Development Trends: N/A

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance*

Program Compliance Table below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments
Codes, Ordinances & Requirements				
Building Code	Yes		State	
Zonings	Yes			
Subdivisions	Yes		State	
Stormwater Management	Yes		State	
Post Disaster Recovery	Yes	Yes		
Growth Management	Yes			
Public Health and Safety	Yes	Yes		
Planning Documents				
General or Comprehensive Plan	Yes			
Environmental Protection	-	Yes	State/WI DNR	
Transportation Plan	Yes	Yes	SEWRPC	
Parks Plan	Yes			
Trail Plan	Yes			
Response/Recovery Planning				

Comprehensive Emergency Management Plan	Yes	Yes		
WUI Plan	-			
Post-Disaster Recovery Plan	Yes			
Continuity of Operations Plan	Yes			

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	
Engineers or professionals trained in building or infrastructure construction practices	Yes	
Planners or engineers with an understanding of natural hazards	Yes	
Staff with training in benefit/cost analysis	Yes	
Surveyors	Yes	
Personnel skilled or trained in GIS applications	Yes	
Emergency manager	Yes	
Grant writers	No	

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

What department is responsible for floodplain management in your jurisdiction?	Community Development
Are any certified floodplain managers on staff in your jurisdiction?	No
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	No
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	Yes, but updates may be needed

Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Continuing Education
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No

TABLE: COMMUNITY CLASSIFICATIONS			
	Participating?	Classification	Date Classified
NFIP	Yes		
Community Rating System	No		
StormReady	No		

Jurisdiction-Specific Hazards

Hazards that represent a county-wide risk are addressed in Volume 1. This section only addresses the hazards and their associated impacts that are relevant and unique to the municipality.

Extreme Cold: Extreme cold affects vulnerable populations including the elderly and the homeless, and children.

Extreme Heat: Extreme heat affects vulnerable populations including the elderly and the homeless, and children.

Flooding: The positioning of the Fox River splits the city which increases the negative effects of this hazard. Flooding poses a threat to bridges and numerous roads that have low points which flood routinely during heavy rains.

Hazardous Materials Release: There are several industrial plants in the city that use hazardous materials that could compromise those areas.

Rail Transportation Incident: Numerous trains travel through the city daily that crossroads and can cause damages to nearby structures if interrupted.

Thunderstorms: Thunderstorms could increase the chance of flooding.

Tornados and High Winds: Tornadoes and high winds reoccur routinely during the summers.

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: New Mitigation Strategies for Waukesha County and All Participating Jurisdictions

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

Mitigation Project: Study and implement flood management measures to mitigate flooding along the Fox River.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	City of Waukesha	City of Waukesha	Medium	2028	\$2,000,000	High

Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source
<p>To preserve life and minimize the potential for injuries or death.</p> <p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p> <p>To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.</p> <p>Increase public awareness.</p>	<p>Flood and Dam Failure</p> <p>Utility Failure</p>	Reduce flooding and resulting damage on properties near Fox River	High	HMGP, BRIC, FMA
Action/Implementation Plan and Project Description:				
Take measures on City-owned property along the Fox River, to reduce flooding and increase flood storage. This will assist down the river and reduce the amount of flooding experienced on properties existing on the floodplain. These actions will also protect infrastructure and enhance the natural habitat and state of the riverbanks.				

Mitigation Project: Study and implement flood acquisition of property impacted by repetitive flooding							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	City of Waukesha	City of Waukesha	Medium	2028	\$2,000,000	High
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
To preserve life and minimize the potential for injuries or death.	Flooding and Dam Failure	Reduce property losses, injury, and death resulting from flooding.	High	HMGP, BRIC, FMA			

<p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p> <p>To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.</p>				
Action/Implementation Plan and Project Description:				
<p>The city would like to purchase structures that are within the floodplain. This could reduce property damage and injury as a result of flooding. It would also provide for additional flood storage and restore the natural state/habitat along the Fox River banks.</p>				

Mitigation Project: Provide inspectors and city staff with enhanced communications devices to more efficiently conduct and communicate damages during an incident.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	City of Waukesha	City of Waukesha	Low	2024	\$20,000	High
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source		
To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.	Flood and Dam Failure Hail Thunderstorms		Inspectors will be better able to communicate damage they see in the field which will increase response times.	High	HMGP, BRIC, FMA		

	Tornadoes and High Winds			
	Winter Storms			

Action/Implementation Plan and Project Description:

Providing inspectors with additional and enhanced communications devices will assist with the efficiency of damage assessment during an event.

Mitigation Project: Burying utility infrastructure

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	City of Waukesha	City of Waukesha	High	2030	\$2,000,000	High
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source		
<p>To preserve life and minimize the potential for injuries or death.</p> <p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p>	<p>Hail</p> <p>Lightning</p> <p>Thunderstorms</p> <p>Tornadoes and High Winds</p> <p>Winter Storms</p> <p>Utility Failure</p>		<p>Minimize power outages during all types of storms or outages due to traffic accidents and natural disasters.</p>	<p>High</p>	<p>HMGP, BRIC</p>		

Action/Implementation Plan and Project Description:

The City of Waukesha is a densely populated central city area. When there are power outages several thousands of people are affected. In addition to the density, there are many vulnerable populations that live in the central city such as the elderly. These vulnerable populations are particularly hit hard during power outages. Burying utility infrastructure will greatly reduce the likelihood of outages during storms, natural disasters, and traffic accidents.

Mitigation Project: Provide funding to property owners in floodplains to take measures to flood-proof existing structures.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	City of Waukesha	City of Waukesha	Medium	2030	\$1,000,000	High
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
<p>To preserve life and minimize the potential for injuries or death.</p> <p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p> <p>Providing inspectors with additional and enhanced communications devices will assist with the efficiency of damage assessment during an event</p>	<p>Flood and Dam Failure</p> <p>Utility Failure</p>	<p>Reduce property loss during flood events</p>	<p>High</p>	<p>HMGP, BRIC, FMA</p>			
Action/Implementation Plan and Project Description:							

Mitigation Project: Provide training to city staff to become certified in floodplain management.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	City of Waukesha	City of Waukesha	Medium	2024	\$20,000	Medium
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source		
<p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p> <p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p> <p>Providing inspectors with additional and enhanced communications devices will assist with the efficiency of damage assessment during an event.</p>	<p>Flood and Dam Failure</p> <p>Utility Failure</p>	<p>Staff trained in floodplain management can make changes to appropriate city codes to minimize potential damage in flood-prone areas.</p>		High	HMGP, BRIC, FMA		
Action/Implementation Plan and Project Description:							
<p>The city does not have a certified/trained floodplain manager on staff. We would like to train 2 of the existing staff to fill this role. Once we have trained staff, they can review the city ordinances and make adjustments that will minimize damage from occurring in flood-prone areas. They will also be able to advise on variances to these code requirements.</p>							

Mitigation Project: Procure generators and appropriate hookups.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	City of Waukesha	City of Waukesha	Low	2022	\$150,000	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To preserve life and minimize the potential for injuries or death.		Utility Failure	In the event of a power outage or major destruction of dwellings, these facilities could be used as emergency shelters, heating/cooling facilities.		High	HMGP, BRIC	
Action/Implementation Plan and Project Description:							
The city would select buildings that are city-owned, such as parks facilities, which could be used as emergency shelter locations. The addition of the generators would create a safe location for those without power during extreme weather or those who become homeless due to a tornado or flooding.							

Mitigation Project: Purchase a portable generator to provide power at sewage pump stations.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	City of Waukesha	Public Works	High	2023	\$120,000	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.		Utility Failure	Avoid sewer overflows and basement backups during power outages.		High	Rate Payer, HMGP, BRIC, FMA	

To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.				
Action/Implementation Plan and Project Description:				
Purchase 2 additional 50-75KW Towable Generators to provide power at sewage pump stations during power outages or use for portable pump operation.				

Mitigation Project: Purchase and install an emergency backup generator at West Bluemound Lift Station							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	City of Waukesha	Public Works	Medium	Ongoing	\$110,000	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.		Utility Failure	Avoid sewer system overflow or backups during power outages.		High	HMGP, BRIC	
To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.							
Action/Implementation Plan and Project Description:							
Install an emergency backup generator at West Bluemound Lift Station for power outages. This station serves 190 acres of mixed residential/commercial along with 108 acres of commercial user relayed from Silvernail Lift Station.							

Mitigation Project: Purchase and install an emergency backup generator at Springbrook Lift Station							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	City of Waukesha	Public Works	Medium	Ongoing	\$90,000	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source		
To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.		Utility Failure	Avoid sewer system overflow and backups during power outages.	High	HMGP, BRIC, FMA		
To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.							
Action/Implementation Plan and Project Description:							
Install an emergency backup generator at Springbrook Lift Station for power outages. This station serves 233 acres of residential users.							

Mitigation Project: Purchase and install an emergency backup generator at East Bluemound Pump Station							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	City of Waukesha	Public Works	Medium	Ongoing	\$70,000	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source		
To preserve and enhance the quality of life throughout Waukesha County by identifying		Utility Failure	Avoid sewer system overflow or backups during power outages.	High	HMGP, BRIC		

potential property damage risks and recommending appropriate.				
To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.				
Action/Implementation Plan and Project Description:				
Install an emergency backup generator at East Bluemound Pump Station for power outages. This station services 42 acres of commercial development with 2 hotels				

Mitigation Project: Provide flood protection for sewer pump station at Waukesha Airport							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	City of Public Works	Public Works	Medium	Ongoing	\$45,000	High
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate. To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.	Flood and Dam Failure	Avoid stormwater inflow and/or sewage overflow from storms.	High	HMGP, BRIC, FMA			
Action/Implementation Plan and Project Description:							
Provide flood protection for sewer pump station at Waukesha Airport by raising concrete structures and grading.							

Mitigation Project: Purchase a 4" Diesel Towable Trash Pump for flooding and/or sewer bypass pumping							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	City of Waukesha	Public Works	Medium	Ongoing	\$44,000	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.		Flooding and Dam Failure Utility Failure	Avoid flood damage and sewer overflow.		High	HMGP, BRIC, FMA	
To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.							
Action/Implementation Plan and Project Description:							
Purchase a 4" Diesel Towable Trash Pump for flooding and/or sewer bypass pumping.							

Mitigation Project: Purchase a trash pump to support flood response capabilities							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	City of Waukesha	Public Works	Medium	Ongoing	\$55,000	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	

To preserve life and minimize the potential for injuries or death.	Flooding and Dam Failure	Avoid flood damage to property.	High	HMGP, BRIC, FMA
To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.	Utility Failure			

Action/Implementation Plan and Project Description:

Purchase a trash pump for dewatering during flood events.

Mitigation Project: Procure and install an emergency generator to provide power to the secondary treatment train (Bldg. 220)

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	City of Waukesha	Public Works	Medium	2025	\$400,000	High

Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source
To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.	Utility Failure	Eliminate the potential of partially treated effluent during power outages.	High	Rate Payers, HMGP, BRIC, FMA
To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.				

Action/Implementation Plan and Project Description:

Install an emergency generator to provide power to the secondary treatment train (Bldg. 220). This allows 100% of liquid treatment during power outages.

Mitigation Project: Study and procure land for a temporary debris storage and reduction site (TDSR)							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	City of Waukesha	Public Works	High	Ongoing	N/A	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source		
To preserve life and minimize the potential for injuries or death.		Earthquakes Flooding and Dam Failure Thunderstorms Tornadoes and High Winds Hazardous Material Release	Provide support to reduce and separate debris.	High	HMGP, BRIC, FMA		
To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.							
To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.							
Action/Implementation Plan and Project Description:							
Acquire land for a temporary debris storage and reduction site (TDSR) to reduce and separate debris.							

Mitigation Project: Upgrade and upsize storm sewers							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	City of Waukesha	Public Works	Medium	Ongoing	\$66,000,000	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis	Potential Funding Source		

			(Low, Medium, High)	
To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.	Flooding and Dam Failure	Prevent flood damage and improve safety.	High	HMGP, BRIC, FMA, CIP
To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.	Thunderstorms			
Action/Implementation Plan and Project Description:				
Upgrade and upsize storm sewers at various locations around the city identified in the city's 2014 and subsequent revisions Flood Mitigation Plan, including but not limited to the following areas: Greenmeadow, Michigan, Newhall, University, et al.				

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

Mitigation Project:							
The City of Waukesha would like to upgrade its ICP:							
<ul style="list-style-type: none"> ICP - Upgrade the ICP (tear out walls, add computers, CAD station, streaming video) 							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2009	City of Waukesha	City of Waukesha EM	High	Ongoing	<ul style="list-style-type: none"> \$9,000 (2009) \$20,000 (2010) 	Low

Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source
1	All Hazard	[Insert]	High	Grants
Action/Implementation Plan and Project Description:				
N/A				
2021 Update: This is budgeted for in 2022 (CIP).				

Mitigation Project:

Complete projects recommended in the City of Waukesha City-Wide Storm Management Plan in areas deemed vulnerable:

Drainage Area 1: Rolling Ridge Dr. and N. University Dr.

The stormwater infrastructure improvements resulting from the detailed modeling evaluations included a combination of additional stormwater conveyance capacity, and new pond storage. The increased conveyance capacity is to be accomplished with new storm sewers, new sewers parallel to existing sewers, replacing existing sewers with larger storm sewers, and replacing undersized culverts.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	City of Waukesha	City of Waukesha EM	High	Ongoing	\$2,000,000	N/A
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)		Potential Funding Source	
1		Flood and Dam Failure	[Insert]	High		Seeking Grants to fund these Capital Improvement Projects.	
Action/Implementation Plan and Project Description:							
In 2021 the second phase of this multi-phase project was completed with the re-grading of ditches following the upsizing of culvert pipes along Rolling Ridge Dr.							

Mitigation Project:

Complete projects recommended in the City of Waukesha City-Wide Storm Management Plan in areas deemed vulnerable:

- Drainage Area 2: N. University Dr., Darrell Dr., and Patrick Ln.
- The improvements resulting from the detailed modeling included a combination of additional stormwater conveyance capacity, and increased pond capacity. The increased conveyance capacity is to be accomplished with new sewers parallel to existing sewers and replacing existing sewers with larger storm sewers.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	City of Waukesha	City of Waukesha EM	High	Ongoing	N/A	N/A
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1		Flood and Dam Failure	[Insert]		High	Seeking Grants to fund these Capital Improvement Projects.	
Action/Implementation Plan and Project Description:							

Mitigation Project:

Complete projects recommended in the City of Waukesha City-Wide Storm Management Plan in areas deemed vulnerable:

- Drainage Area 3: Airport Business Park and Peters Dr.
- The modeled improvements for Area 3 included only minor areas of increased conveyance, including new sewers north of Peters Drive and parallel sewers east of Aviation Drive.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	City of Waukesha	City of Waukesha EM	High	Ongoing	N/A	N/A
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	

1	Flood and Dam Failure	N/A	High	Seeking Grants to fund these Capital Improvement Projects.
Action/Implementation Plan and Project Description:				
N/A				

Mitigation Project:

Complete projects recommended in the City of Waukesha City-Wide Storm Management Plan in areas deemed vulnerable:

- Drainage Area 4: Frame Park Creek at Harding Ave. and Anoka Ave.
- The modeled improvement for Area 4 was the addition of below-grade storage northeast of the intersection of Harding and Anoka Avenues.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	City of Waukesha	City of Waukesha EM	High	Ongoing	N/A	N/A
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
1	Flood and Dam Failure	N/A	High	Seeking Grants to fund these Capital Improvement Projects.			
Action/Implementation Plan and Project Description:							
N/A							

Mitigation Project:

Complete projects recommended in the City of Waukesha City-Wide Storm Management Plan in areas deemed vulnerable:

- Drainage Area 5: Lawndale Ave. and S. Washington Ave.
- Stormwater infrastructure improvements for Area 5 included underground storage at Waukesha Memorial Hospital and additional stormwater conveyance in the form of new and parallel storm sewers west and south of the new storage to convey flows toward an existing pond in Woodfield Park.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	City of Waukesha	City of Waukesha EM	High	Ongoing	\$2,000,000	N/A
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
1	Flood and Dam Failure	N/A	High	Seeking Grants to fund these Capital Improvement Projects.			

Action/Implementation Plan and Project Description:

Drainage improvements at, around and downstream of Waukesha Memorial hospital to the outfall in Woodfield Park have been completed. One phase of this project remains with the removal of an undersized culvert pipe at Woodfield Park South.

Mitigation Project:

Complete projects recommended in the City of Waukesha City-Wide Storm Management Plan in areas deemed vulnerable:

- Drainage Area 6: E. Moreland Blvd . at Wolf Rd.
- Several alternatives were considered for Area 6, including a storage alternative that involved multiple ponds, and a conveyance alternative that increased the capacity along existing storm sewer routes. A third alternative that added additional conveyance capacity while directing the water under Moreland Boulevard to the Fox River instead of west along Greenway Terrace was also developed and selected as the preferred alternative. This alternative included replacement sewers, parallel sewers and new sewers along Moreland Boulevard.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	City of Waukesha	City of Waukesha EM	High	Ongoing	N/A	N/A
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
1	Flood and Dam Failure	N/A	High	Seeking Grants to fund these Capital Improvement Projects.			

Action/Implementation Plan and Project Description:

Major project in area 6 have been completed with the installation of large diameter storm sewer between Wolf Rd down Moreland Blvd. to the Fox River

Mitigation Project:

Complete projects recommended in the City of Waukesha City-Wide Storm Management Plan in areas deemed vulnerable:

- Drainage Area 7: Summit Ave. and Michigan Ave.
- Stormwater infrastructure improvements for Area 7 included new stormwater ponds at of UW-Waukesha, Summit View Elementary School and Lowell Park. Increases in conveyance capacity are

accomplished with new, parallel, and replacement storm sewers, primarily located along Summit Avenue, Garland Avenue, Greenmeadow Drive and Michigan Avenue.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	City of Waukesha	City of Waukesha EM	High	Ongoing	N/A	N/A
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source		
1	Flood and Dam Failure	N/A		High	Seeking Grants to fund these Capital Improvement Projects.		

Action/Implementation Plan and Project Description:

Large diameter storm sewers were installed in Summit Ave during the reconstruction of the street. Multiple phases remain, including additional conveyance down Greenmeadow Dr, through Waukesha North High School, down Michigan and to the lake west of University Dr.

Mitigation Project:

Complete projects recommended in the City of Waukesha City-Wide Storm Management Plan in areas deemed vulnerable:

- Drainage Area 8: S. West Ave., S. Grand Ave., and S. East Ave. at W. Sunset Dr.
- The modeled improvements in Area 8 included storage and conveyance alternatives. The preferred alternative was a conveyance alternative that included replacement, parallel and new storm sewers. The storm sewers generally convey flows

from north to south and east to west along Tenny Avenue, Sunset Drive and East Avenue; Grand Avenue; Vitoria Drive Bard Street and West Avenue; and the former railway right-of-way.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	City of Waukesha	City of Waukesha EM	High	Ongoing	N/A	N/A
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1		Flood and Dam Failure	N/A		High	Seeking Grants to fund these Capital Improvement Projects.	

Action/Implementation Plan and Project Description:
 Several projects have been completed in this area including installation of additional conveyance in Sunset Dr, down S. East and Garfield to a new storm water pond.

Mitigation Project:

Complete projects recommended in the City of Waukesha City-Wide Storm Management Plan in areas deemed vulnerable:

- Drainage Area 9: W. Newhall Ave. at S. West Ave.
- Stormwater infrastructure improvements for Area 9 include a combination of new storage and conveyance. Replacement sewers are to be located along Newhall Avenue west toward the treatment plant, and new storage at the former location of Department of Motor Vehicle eludes building.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	City of Waukesha	City of Waukesha EM	High	Ongoing	N/A	N/A
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1		Flood and Dam Failure	N/A		High	Seeking Grants to fund these Capital Improvement Projects.	

Action/Implementation Plan and Project Description:

N/A

Mitigation Project:

Complete projects recommended in the City of Waukesha City-Wide Storm Management Plan in areas deemed vulnerable:

- Drainage Area 10: Merrill Crest Park
- The modeled improvements in Area 10 included a combination of new storage and additional conveyance. The modifications included parallel storm sewers along Shoshone Drive that drain into new storage in Merrill Crest Park.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	City of Waukesha	City of Waukesha EM	High	Ongoing	N/A	N/A
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
1	Flood and Dam Failure	N/A	High	Seeking Grants to fund these Capital Improvement Projects.			

Action/Implementation Plan and Project Description:

N/A

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

Mitigation Project: Waukesha County and the City of Waukesha would like to improve their communications systems to include:
 Buy additional portable radios for law enforcement and fire
 Equipment so that the communications system can patch VHF radios (used by mutual aid departments) to the county’s 800 MHz system

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority	Timeline/ Projected Completion Date	Est. Cost	Cost Analysis

				(Low, Medium, High)	(Short, Long-term, or Ongoing)		(Low, Medium, High)
Completed	2009	City of Waukesha	<ul style="list-style-type: none"> Office of Emergency Mgt City of Waukesha EM 	High	Completed (prior to 2015)	\$615,000	Medium
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)		Potential Funding Source
1		All Hazard	[Insert]		High		UASI grant

Action/Implementation Plan and Project Description:

The county completed (2009) a 4-tower VHF overlay system that provides redundancy to the 800 MHz system and will support interoperability with mutual aid responders.

2016: The county completed (2009) a 4-tower VHF overlay system that provides redundancy to the 800 MHz system and will support interoperability with mutual aid responders. Milwaukee County and Waukesha County are building a shared 800mhz P25 trunking system. The go-live date is expected in 2016.

Mitigation Project:

The City of Waukesha would like to install a river monitoring camera system to safely/remotely monitor the NWS river level gauges. The installation will be a three-phase project beginning in Aug. '09 and will end by Mar. '10. The system will have wireless cameras tied into a network that can be remotely monitored in the ICP and EOC.

The city applied for a CDBG for four more cameras.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Completed	2009	City of Waukesha	City of Waukesha EM	High	Complete	<ul style="list-style-type: none"> Stimulus Grant: \$20,000 CDBG: \$56,000 	Medium

						<ul style="list-style-type: none"> • CDBG: \$60,000 	
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
2	Flood and Dam Failure	[Insert]	High	<ul style="list-style-type: none"> • Stimulus Grant: \$20,000 • CDBG: \$56,000 • CDBG: \$60,000 			
Action/Implementation Plan and Project Description:							
The water can rise very quickly there, and the area is a chokepoint for water and is a good predictor of flooding.							

Mitigation Project: The City of Waukesha would like to have COOP-COG planning done that would plan for the loss of a city building.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Completed	2011	City of Waukesha	City of Waukesha Police Dept.	Low	Ongoing	\$15,000	Low
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
1	All Hazards	[Insert]		Low	N/A		
Action/Implementation Plan and Project Description:							
The plan should also consider alternate sites and the cost of relocation and operating from an alternate location (estimate \$150,000). The plan should discuss potential funding options and contingency contracts as part of the plan.							
2021 Update: Completed with new and upgraded locations at:							
<ul style="list-style-type: none"> • City hall • Parks, recreation, and forestry • Police Department • 10 newly located fire stations 							

Mitigation Project: The City of Waukesha would like to upgrade its Emergency Operations Center (EOC) to include:

- EOC – upgrade wireless, streaming video, data capabilities, phone and computer

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Completed	2012	City of Waukesha	City of Waukesha EM	High	Ongoing	N/A	N/A
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)		Potential Funding Source	
1	All Hazards		[Insert]	High		Grants	
Action/Implementation Plan and Project Description:							
N/A							
2021 Update: Complete - The new city hall has a full EOC and the PD and FD (Station #1) offer backup locations.							

Mitigation Project:

Complete the Flood Mitigation Study and explore opportunities in the two areas deemed vulnerable:

- W. College Ave., Maple Ave. and Harvey Ave.
- Pine St., Bel Ayr Dr., Summit Ave., Michigan Ave., N. University Dr.
- Rolling Ridge Dr & N University Dr; N University Dr, Darrell Dr, and Patrick Ln; Airport Business Park & Peters Dr; Frame Park Creek at Harding Ave and Anoka Ave; Lawndale Ave and S Washington Ave; E Moreland Blvd at Wolf Rd; Summit Ave and Michigan Ave; S West Ave, S Grand Ave, & S East Ave at W Sunset Dr; W Newhall Ave at S West Ave; Merrill Crest Park

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Completed	2011	City of Waukesha	City of Waukesha EM	Medium	Ongoing	N/A	Medium

Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source
1	Flood and Dam Failure	[Insert]	Medium	Covered by annual budget; Seeking grants to fund these capital improvement projects
Action/Implementation Plan and Project Description:				
2018: Use projects/locations recommended in the City of Waukesha Stormwater Management Plan in Attachment A				
2021 Update: Completed the plan with some modifications.				

Mitigation Project: The City of Waukesha would like to have a mobile generator to provide back-up power to critical municipal facilities.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Completed	2010	City of Waukesha	City of Waukesha EM	Medium	Ongoing	~\$345,000	Medium
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1		Utility Failure	[Insert]		Medium	UASI funding	
Action/Implementation Plan and Project Description:							
This was not funded by the UASI grant so in the short-term the City has allocated \$7,000 for upgrading the PD building's electrical wiring to take outside wiring and for an ongoing contingency contract with FABCO for a generator.							
2021 Update: Completed but could use two more.							

Big Bend Village

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Gaglione	Donald	Police Chief	Police Department	262-662-3782	dgaglione@villageofbigbend.com
Pedersen	Eric	DPW Director	DPW	262-662-4903	publicworks@villageofbigbend.com

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Big Bend Village	1	-	-	-	Yes	Yes	Yes

2021 Plan Participation and Involvement					
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities
Gaglione	Donald				Meeting/ Plan Item Development
Pedersen	Eric				Meeting/ Plan Item Development

Community Profile and Description

Date of Incorporation: 1928

Current Population: The population of Big Bend Village in the 2019 US Census ACS was 1,348.

Population Growth: According to the Wisconsin Department of Administration, the village's population is expected to grow to 1,110 in 2025, then 1,078 in 2025, and finally to 1,048 in 2035.

Location and Description: According to the US Census, the village has a total area of 3.15 square miles, of which, 3.11 square miles of it is land and 0.04 square miles is water. The Village of Big Bend is located on the banks of the Fox River.

Governing Body Format: The Village of Big Bend is governed by an elected Village Board consisting of a President and six Trustees.

Development Trends: N/A

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments

Codes, Ordinances & Requirements				
Building Code	Yes		State	
Zonings	Yes			
Subdivisions	Yes		State	
Stormwater Management	Yes		State	
Post Disaster Recovery	Yes	Yes		
Growth Management	Yes			
Public Health and Safety	-	Yes		
Planning Documents				
General or Comprehensive Plan	Yes			
Environmental Protection	-	Yes	State/WI DNR	
Transportation Plan	-	Yes	SEWRPC	
Parks Plan	Yes			
Trail Plan	Yes			
Response/Recovery Planning				
Comprehensive Emergency Management Plan	Yes	Yes		
WUI Plan	-			
Post-Disaster Recovery Plan	-			
Continuity of Operations Plan	Yes			

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
----------------------------------	-------------------	-----------------------------------

Planners or engineers with knowledge of land development and land management practices	Yes	Contracted
Engineers or professionals trained in building or infrastructure construction practices	Yes	Contracted
Planners or engineers with an understanding of natural hazards	Yes	Contracted
Staff with training in benefit/cost analysis	Yes	
Surveyors	Yes	Contracted
Personnel skilled or trained in GIS applications	Yes	Contracted
Emergency manager	Yes	
Grant writers	Yes	

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

What department is responsible for floodplain management in your jurisdiction?	
Are any certified floodplain managers on staff in your jurisdiction?	-
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	-
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	Yes, but updates may be needed
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Continuing Education
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No

TABLE: COMMUNITY CLASSIFICATIONS

	Participating?	Classification	Date Classified
NFIP	Yes		

Community Rating System	No		
StormReady	-		

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: New Mitigation Strategies for Waukesha County and All Participating Jurisdictions

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

Mitigation Project: Procure DPW and fire department backup generator and appropriate hookups							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Big Bend	Department of Public Works (DPW)	High	2023	\$30,000	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source		
<p>To preserve life and minimize the potential for injuries or death.</p> <p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p> <p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p>		Utility Failure	The Village government will be able to maintain response capabilities during adverse events to protect and save lives and property.	High	HMGP, BRIC		
Action/Implementation Plan and Project Description:							
<p>The DPW and fire department share a building that does not currently have a backup electrical power source. During adverse weather events, local utility power can be out of service for up to a week. The lack of power to this building impacts the Village's ability to maintain response vehicles and provide efficient response capability to emergent needs of the community, potentially impacting lives and property. A backup generator would be installed to provide uninterrupted electrical power to the building.</p>							

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

- This jurisdiction does not have any ongoing mitigation actions or actions that are still in progress as identified in previous plan updates.

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

- This jurisdiction does not have any completed mitigation actions.

Butler Village

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Tiarks	Patricia	President		262-781-6903	presidenttiarks@butlerwi.gov
Thorpe	Kayla	Village Administrator		262-783-2525, ext 1222	KThorpe@butlerwi.gov

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Butler Village	0	-	-	Yes	Yes	Yes	Not applicable

2021 Plan Participation and Involvement					
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities
Thorpe	Kayla				Meeting/ Plan Item Development

Community Profile and Description

Date of Incorporation: 1913

Current Population: The population of Butler Village in the 2019 US Census ACS was 1,821.

Population Growth: The current population size has surpassed the predictions made by the Wisconsin Department of Administration by a few hundred.

Location and Description: The Village of Butler has a total area of 0.79 square miles, of which, 0.78 square miles of it is land and 0.01 square miles is water.

Governing Body Format: Butler Village governing Board includes an elected Village President and Board of six Trustees.

Development Trends: N/A

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments
Codes, Ordinances & Requirements				

Building Code	Yes		State	
Zonings	Yes			
Subdivisions	Yes		State	
Stormwater Management	Yes		State	
Post Disaster Recovery	Yes	Yes		
Growth Management	Yes			
Public Health and Safety	-	Yes		
Planning Documents				
General or Comprehensive Plan	-	Yes		
Environmental Protection	-	Yes	State/WI DNR	
Transportation Plan	-	Yes	SEWRPC	
Parks Plan	Yes			
Trail Plan	Yes			
Response/Recovery Planning				
Comprehensive Emergency Management Plan	-	Yes		
WUI Plan	-			
Post-Disaster Recovery Plan	-			
Continuity of Operations Plan	Yes			

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Contracted by Village

Engineers or professionals trained in building or infrastructure construction practices	Yes	Contracted by Village
Planners or engineers with an understanding of natural hazards	Yes	Contracted by Village
Staff with training in benefit/cost analysis	Yes	Contracted by Village
Surveyors	Yes	Contracted by Village
Personnel skilled or trained in GIS applications	Yes	Contracted by Village
Emergency manager	Yes	Contracted by Village
Grant writers	Yes	Contracted by Village

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE	
What department is responsible for floodplain management in your jurisdiction?	
Are any certified floodplain managers on staff in your jurisdiction?	-
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	-
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	Yes, but updates may be needed
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Continuing Education
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No

TABLE: COMMUNITY CLASSIFICATIONS			
	Participating?	Classification	Date Classified
NFIP	Yes		
Community Rating System	No		
StormReady	-		

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: [New Mitigation Strategies for Waukesha County and All Participating Jurisdictions](#)

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

Mitigation Project: Provide shoreline erosion control and abatement to stabilize current riverbed and surrounding shoreline to minimize flooding potential and restore/maintain the environment for natural growth of vegetation and wildlife.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Butler Village	Butler Village	Medium	Ongoing	N/A	Medium
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	

<p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p> <p>To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.</p>	<p>Flood and Dam Failure</p>	<p>N/A</p>	<p>Medium</p>	<p>HMGP, BRIC, FMA</p>
<p>Action/Implementation Plan and Project Description:</p>				
<p>Provide shoreline erosion control and abatement to stabilize current riverbed and surrounding shoreline to minimize flooding potential and restore/maintain the environment for natural growth of vegetation and wildlife.</p>				

<p>Mitigation Project: Procure generator and appropriate hookups at critical facilities.</p>							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Butler Village	Village Administration	High	2024	N/A	Medium
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source		
<p>To preserve life and minimize the potential for injuries or death.</p> <p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p>	<p>Utility Failure</p>	<p>Maintain Village command, control, and ability to provide services to the public, including fire, police, public safety, and ability to restore public infrastructure.</p>		<p>High</p>	<p>HMGP, BRIC, FMA</p>		
<p>Action/Implementation Plan and Project Description:</p>							
<p>Add a backup electrical generation for the village hall, police department, and fire department which currently do not have backup power generation. Replace the Department of Public Works generator which is at the end of its expected life cycle.</p>							

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

- This jurisdiction does not have any ongoing mitigation actions or actions that are still in progress as identified in previous plan updates.

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

- This jurisdiction does not have any completed mitigation actions.

Chenequa Village

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Neumer	Dan	Police Chief/Village Administrator		262-367-2239	chief@chenequa.org

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Chenequa Village	0	Yes	Yes	Yes	Yes	Yes	Not applicable

2021 Plan Participation and Involvement						
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities	
Neumer	Dan	Yes		Yes - Approved annex		
Carney	Matthew	Yes				
Lincoln	Cody	Yes	Yes			
Villavicencio	Jo Ann	Yes				
Hagfors	Cody		Yes			

Community Profile and Description

Date of Incorporation: 1928

Current Population: The population of Cheneque Village in the 2019 US Census ACS was 560.

Population Growth: According to the Wisconsin Department of Administration, the village's population is expected to grow to 566 in 2025, then 562 in 2030, and finally to 559 in 2035.

Location and Description: The Village of Chenequa is located in the “lake country” portion of Waukesha County, which is roughly 30 miles west of Milwaukee, Wisconsin. The village surrounds the 703-acre Pine Lake and includes portions of Beaver Lake and North Lake.

Governing Body Format: Governed by a Village Board and Elected Officials.

Development Trends: N/A

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments

Codes, Ordinances & Requirements				
Building Code	Yes		State	
Zonings	Yes			
Subdivisions	Yes		State	
Stormwater Management	-	Yes	State	
Post Disaster Recovery	Yes	Yes		
Growth Management	Yes			
Public Health and Safety	-	Yes		
Planning Documents				
General or Comprehensive Plan	-			
Environmental Protection	-	Yes	State/WI DNR	
Transportation Plan	-	Yes	SEWRPC	
Parks Plan	-			
Trail Plan	-			
Response/Recovery Planning				
Comprehensive Emergency Management Plan	-	Yes		
WUI Plan	-			
Post-Disaster Recovery Plan	-			
Continuity of Operations Plan	-			

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
----------------------------------	-------------------	-----------------------------------

Planners or engineers with knowledge of land development and land management practices	No	
Engineers or professionals trained in building or infrastructure construction practices	Yes	Building Inspector
Planners or engineers with an understanding of natural hazards	-	
Staff with training in benefit/cost analysis	Yes	Village Administrator, Clerk/Treasurer
Surveyors	No	
Personnel skilled or trained in GIS applications	No	
Emergency manager	Yes	Police Chief/Village Administrator
Grant writers	Yes	Office Staff

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

What department is responsible for floodplain management in your jurisdiction?	N/A
Are any certified floodplain managers on staff in your jurisdiction?	No
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	No
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	-
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	No
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No

TABLE: COMMUNITY CLASSIFICATIONS

	Participating?	Classification	Date Classified
NFIP	No		

Community Rating System	No		
StormReady	-		

Jurisdiction-Specific Hazards

Hazards that represent a county-wide risk are addressed in Volume 1. This section only addresses the hazards and their associated impacts that are relevant and unique to the municipality.

Flooding: Highway 83, specifically from 5200-5600 block, can experience flooding during heavy rain events due to clogged sewer grates.

Forest and Wildfires: Chenequa is a heavily wooded community, causing the potential for severe clean-up after strong storms (summer or winter). Chenequa is mostly served by overhead power lines that can be damaged in storms. Most driveways are long, private drives with poorly maintained trees, making access potentially difficult.

Hazardous Materials Release: Railroads south of Hwy 16 and the main thoroughfares of Hwy 83 are trucking routes, which are vulnerable to a hazardous materials release.

Rail Transportation Incident: Railroads are present at the south end of the village, south of Hwy 16, are vulnerable to a rail transportation incident.

Thunderstorms: Heavily wooded communities can be severely affected by storms.

Tornados and High Winds: Heavily wooded communities can be severely affected by storms.

Utility Failure: Overhead power lines through wooded areas in the community can be susceptible to damage during storm events.

Winter Storms: Hilly terrain and long private driveways can be difficult to access throughout the village during winter storms. Damage to trees/forests can create debris due to ice/winter storms.

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: New Mitigation Strategies for Waukesha County and All Participating Jurisdictions

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

Mitigation Project: Conduct Tree Maintenance on all Public Roads							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Chenequa	Public Works	High	Ongoing	N/A	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	

<p>To preserve life and minimize the potential for injuries or death.</p> <p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p>	Thunderstorms	Safer road transportation, stronger trees resistant to storms, fewer power outages.	High	HMGP, BRIC
	Tornados			
	High Winds			
	Utility Failure			
	Winter Storms			
Action/Implementation Plan and Project Description:				
Tree maintenance on all public roadways; including, but not limited to, hazard tree removal, structural tree pruning, maintaining site lines, tree canopy raising.				

Mitigation Project: Provide Employee Hazard Training							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Chenequa	Village of Chenequa	Medium	Ongoing	N/A	Low
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source		
<p>To preserve life and minimize the potential for injuries or death.</p> <p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p> <p>To promote countywide coordination, planning, and training that avoids transferring the risk from</p>	<p>Hazardous Materials Release</p> <p>Rail Transportation Incident</p>	To identify hazards before they become a major problem.		Medium	HMGP, BRIC		

<p>one community to an adjacent community, where appropriate.</p> <p>Providing inspectors with additional and enhanced communications devices will assist with the efficiency of damage assessment during an event.</p>				
<p>Action/Implementation Plan and Project Description:</p>				
<p>The plan is to educate village employees to recognize hazards that may become a major issue without attention. For example, all employees will need to be able to identify potential cyber-attacks by reporting and not opening phishing emails. Training is the best way to reduce these hazard risks.</p>				

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

- This jurisdiction does not have any ongoing mitigation actions or actions that are still in progress as identified in previous plan updates.

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

- This jurisdiction does not have any completed mitigation actions.

Dousman Village

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Nissen	Jack	President		262-965-4286	nissenhwy@gmail.com
Meyer	Tim	Deputy Fire Chief		262-313-7304	tmeyer@westernlakesfd.org
Hall	Sharyl	Deputy Clerk		262-965-3792	sharyl.hall@villageofdousman.com

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Dousman Village	1	Yes	Yes	Yes	Yes	Yes	Not applicable

2021 Plan Participation and Involvement					
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities
Klein	Melissa	Yes			
Kitelinger	Joe		Yes		
Hall	Sharyl			Yes - Approved annex	

Community Profile and Description

Date of Incorporation: 1917

Current Population: The population of Dousman Village in the 2019 US Census ACS was 2,368.

Population Growth: Compared to the Wisconsin Department of Administration 2025-2035 population predictions, the village's population has grown exponentially and has exceeded those predictions.

Location and Description: The village has a total area of 2.68 square miles, of which, 2.58 square miles of it is land and 0.10 square miles is water.

Governing Body Format: Village Board with a President and four Trustees.

Development Trends: N/A

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments
Codes, Ordinances & Requirements				

Building Code	Yes		State	
Zonings	Yes			
Subdivisions	Yes		State	
Stormwater Management	Yes		State	
Post Disaster Recovery	Yes	Yes		
Growth Management	Yes			
Public Health and Safety	Yes	Yes		
Planning Documents				
General or Comprehensive Plan	Planning elements exist	Yes		
Environmental Protection	Yes	Yes	State/WI DNR	
Transportation Plan	Yes	Yes	SEWRPC	
Parks Plan	Yes			
Trail Plan	Yes			
Response/Recovery Planning				
Comprehensive Emergency Management Plan	Yes	Yes		
WUI Plan	N/A			
Post-Disaster Recovery Plan	Yes			
Continuity of Operations Plan	Yes			

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
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Planners or engineers with knowledge of land development and land management practices	Yes	Village Engineer Department/FO/PD
Engineers or professionals trained in building or infrastructure construction practices	Yes	Village Engineer Department
Planners or engineers with an understanding of natural hazards	Yes	Planning/Engineer Department
Staff with training in benefit/cost analysis	Yes	Planning/Engineer/Public Works
Surveyors	Yes	Engineer
Personnel skilled or trained in GIS applications	Capability exists, but is limited	Engineer/PD/FD
Emergency manager	Yes	PD/FD/DPW
Grant writers	Yes	Engineer

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

What department is responsible for floodplain management in your jurisdiction?	
Are any certified floodplain managers on staff in your jurisdiction?	-
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	-
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	Yes, but updates may be needed
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Continuing Education
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No

TABLE: COMMUNITY CLASSIFICATIONS

	Participating?	Classification	Date Classified
NFIP	Yes		

Community Rating System	No		
StormReady	Yes		2016

Jurisdiction-Specific Hazards

Hazards that represent a county-wide risk are addressed in Volume 1. This section only addresses the hazards and their associated impacts that are relevant and unique to the municipality.

Extreme Cold: There are shallow water lines that have frozen in the past. There is a need to identify locations (Warming Center or Shelters) for people to go in case of power failure to stay warm and receive other necessary emergency provisions.

Flooding: Some flooding occurs during heavy rain incidents, specifically in the Ludwig Estates Subdivision. This may be due to aging stormwater infrastructure and failing stormwater system.

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: New Mitigation Strategies for Waukesha County and All Participating Jurisdictions

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

Mitigation Project: Study and update aging water system and main, including, but not limited to associated connections to mains and valves.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Dousman	Dousman Utilities	High	Ongoing	\$3 million	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.		Utility Failure	Provide essential utilities and services		High	FEMA BRIC, HMGP, other grants	
Action/Implementation Plan and Project Description:							
Water main and related connections/valves need improvement, specifically in the Village Meadows subdivision.							

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

- This jurisdiction does not have any ongoing mitigation actions or actions that are still in progress as identified in previous plan updates.

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

- This jurisdiction does not have any completed mitigation actions.

Eagle Village

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Kugel	Scott	Fire Chief		262-594-3302 715-889-2317 cell	dcskugel@gmail.com

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Eagle Village	3	-	-	-	Yes	No new actions identified	Yes

2021 Plan Participation and Involvement					
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities
Kugel	Scott	-	-	-	Meeting with planning team

Community Profile and Description

Date of Incorporation: 1899

Current Population: The population of Eagle Village in the 2019 US Census ACS was 2,063.

Population Growth: According to the Wisconsin Department of Administration, the village’s population is expected to grow to 2,205 in 2025, then to 2,306 in 2035, and finally to 2,414 in 2035.

Location and Description: The village is located in southwest Waukesha County and has a total area of 1.33 square miles, all of it land.

Governing Body Format: Village Board with a President and a Board of Trustees.

Development Trends: N/A

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments
Codes, Ordinances & Requirements				

Building Code			State	
Zonings				
Subdivisions			State	
Stormwater Management			State	
Post Disaster Recovery		Yes		
Growth Management				
Public Health and Safety		Yes		
Planning Documents				
General or Comprehensive Plan				
Environmental Protection		Yes	State/WI DNR	
Transportation Plan		Yes	SEWRPC	
Parks Plan				
Trail Plan				
Response/Recovery Planning				
Comprehensive Emergency Management Plan		Yes		
WUI Plan				
Post-Disaster Recovery Plan				
Continuity of Operations Plan				

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices		

Engineers or professionals trained in building or infrastructure construction practices		
Planners or engineers with an understanding of natural hazards		
Staff with training in benefit/cost analysis		
Surveyors		
Personnel skilled or trained in GIS applications		
Emergency manager		
Grant writers		

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

What department is responsible for floodplain management in your jurisdiction?	-
Are any certified floodplain managers on staff in your jurisdiction?	No
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	N/A
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	-
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	No
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No; No

TABLE: COMMUNITY CLASSIFICATIONS

	Participating?	Classification	Date Classified
NFIP	No		
Community Rating System	No		

StormReady	-
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Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: [New Mitigation Strategies for Waukesha County and All Participating Jurisdictions](#)

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

- This jurisdiction does not have any new mitigation actions.

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

Mitigation Project: Look for an acceptable (environmentally, socially, cost-benefit, politically, etc.) solution for removing water from flood-prone areas, especially those areas that are basin/bowl shaped. Seek out funding sources (grants) to execute solutions.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2009	Eagle	Municipal elected office	High	Ongoing	N/A	High
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
1	Flood and Dam Failure	Mitigate Flooding	High	Covered by annual budget. (Some grants received through CDBG-EAP.) Seeking Grants to fund these Capital Improvement Projects. Approximately \$5,000,000			
Action/Implementation Plan and Project Description:							
Some of the potential solutions may include acquisitions, demolitions or floodproofing or moving water to surface streams. Changes in development have caused increased storm runoff problems, which in turn has caused flooding in existing residential homes and streets in specific neighborhoods. 2021: Ongoing							

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

- This jurisdiction does not have any completed mitigation actions.

Elm Grove Village

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
DeAngelis	David	Manager		262-782-6700	ddeangelis@elmgrovewi.org

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Elm Grove Village	0	Yes	Yes	Yes	Yes	Yes	Yes/No

2021 Plan Participation and Involvement						
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)		Other Participation Activities
DeAngelis	David	Yes	Yes			Meeting/ Plan Item Development

Community Profile and Description

Date of Incorporation: 1955

Current Population: The population of Elm Grove Village in the 2019 US Census ACS was 6,153.

Population Growth: The village's population has exceeded the Wisconsin Department of Administration's (DOA) predications. According to DOA, the Village of Elm Grove would reach 5,351 in 2035, however, based on the 2019 US Census ACS.

Location and Description: The village is located on the eastern edge of Waukesha County.

Governing Body Format: Village Board that includes an elected Village President and Board of Trustees. The Village uses the Village Manager form government.

Development Trends: N/A

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments
Codes, Ordinances & Requirements				

Building Code	Yes		State	
Zonings	Yes			
Subdivisions	Yes		State	
Stormwater Management	Yes		State	Subject MMSD rules and regulations, participating community
Post Disaster Recovery	Yes	Yes		
Growth Management	Yes			
Public Health and Safety	-	Yes		
Planning Documents				
General or Comprehensive Plan	Yes		x	Local and SEWRPC
Environmental Protection	-	Yes	State/WI DNR	
Transportation Plan	Yes	Yes	SEWRPC	Local, County and SEWRPC
Parks Plan	Yes			
Trail Plan	Yes			
Response/Recovery Planning				
Comprehensive Emergency Management Plan	Yes	Yes		
WUI Plan	-			
Post-Disaster Recovery Plan	-			
Continuity of Operations Plan	Yes			As part of the local CEMP

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY		
Staff/Personnel Resources	Available?	Department/Agency/Position

Planners or engineers with knowledge of land development and land management practices	Yes	
Engineers or professionals trained in building or infrastructure construction practices	Yes	Contracted
Planners or engineers with an understanding of natural hazards	Yes	Contracted
Staff with training in benefit/cost analysis	Yes	
Surveyors	Yes	Contracted
Personnel skilled or trained in GIS applications	Yes	
Emergency manager	Yes	
Grant writers	Yes	

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

What department is responsible for floodplain management in your jurisdiction?	Planning
Are any certified floodplain managers on staff in your jurisdiction?	Yes
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	-
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	Yes, but updates may be needed
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Continuing Education
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	Yes

TABLE: COMMUNITY CLASSIFICATIONS

	Participating?	Classification	Date Classified
NFIP	Yes		

Community Rating System	Yes	5	
StormReady	Yes		

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
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New Mitigation Actions

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The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: [New Mitigation Strategies for Waukesha County and All Participating Jurisdictions](#)

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

Mitigation Project: Study and implement mitigation measures to relocate and/or divert creek that is experiencing significant erosion.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Elm Grove	Village of Elm Grove	High	2022	\$450,000	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source		
<p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p> <p>To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.</p>		Utility Failure	Prevents catastrophic failure of 42" sanitary sewer line.	High	HMGP, BRIC		
Action/Implementation Plan and Project Description:							
Relocation of a creek that is currently eroding the substrata near the 42" sanitary interceptor line that serves the Village and part of the neighboring City of Brookfield. This project will protect local waterways from the accidental release of untreated sewage due to infrastructure failure.							

Mitigation Project: Relocating flow of the creek bed for flood control							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Elm Grove	Village of Elm Grove	High	2024	\$4,000,000-\$5,000,000	High

Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source
<p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p> <p>To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.</p>	Flood and Dam Failure	Removal of structure in the path of creek waterway to increase the flow.	High	Grants: Fish and Wildlife, Fund for Lake Michigan
Action/Implementation Plan and Project Description:				
Relocating flow of the creek bed that is currently constrained in a 9' x 9' deteriorating concrete box culvert flowing under a commercial structure. Moving the flow of the creek will reduce the likelihood of upstream flooding, reduce the likelihood of a catastrophic failure of the structure under the business, and reduce the overall impact to the community due to loss of commerce and forced relocation due to damaged homes.				

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

Mitigation Project: Relocating flow of the creek bed for flood control							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Elm Grove	Village of Elm Grove	High	2024	\$4,000,000-\$5,000,000	High

Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source
To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate. To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.	Flood and Dam Failure	Removal of structure in the path of creek waterway to increase the flow.	High	Grants: Fish and Wildlife, Fund for Lake Michigan
Action/Implementation Plan and Project Description:				
Relocating flow of the creek bed that is currently constrained in a 9' x 9' deteriorating concrete box culvert flowing under a commercial structure. Moving the flow of the creek will reduce the likelihood of upstream flooding, reduce the likelihood of a catastrophic failure of the structure under the business, and reduce the overall impact to the community due to loss of commerce and forced relocation due to damaged homes.				

Mitigation Project: Minor stormwater conveyance systems should be designed to provide protection from a ten-year recurrence interval event. Major stormwater conveyance systems should be designed to provide protection from a 100-year recurrence interval event.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Village of Elm Grove	Planning	Medium	Ongoing	Unknown	N/A
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
2		Flood and Dam Failure	[Insert]		Medium	TBD	
Action/Implementation Plan and Project Description:							
<ul style="list-style-type: none"> Regular maintenance by Department of Public Works Floodplain Mitigation Project - Completion Date: July 2009 Submitted to FEMA for FIRM remap: December 2007 							

Mitigation Project: Public and private drainage ways, both natural and man-made, should be kept free from obstructions. Easements should be obtained to protect drainage ways and allow access for maintenance. Ordinances should be adopted to enforce protection of and access to drainageways. A maintenance schedule has been developed to keep the stormwater system functioning.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Village of Elm Grove	Planning and Public Works	High	Ongoing	N/A	N/A
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
2		Flood and Dam Failure	[Insert]		High	Covered by annual budget	
Action/Implementation Plan and Project Description:							
Regular Maintenance							

Mitigation Project: A comprehensive process should be put in place to review filling and grading of public and private parcels to assure that all stormwater management issues are addressed. Public education needs to create an awareness of the problems that can occur with improper filling and grading by homeowners. Engineering review, permitting, inspection and enforcement will be incorporated into the development and redevelopment of property.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Village of Elm Grove	Planning and Public Works	Medium	Ongoing	N/A	N/A
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1 & 2		Flood and Dam Failure	[Insert]		Medium	Covered by annual budget	
Action/Implementation Plan and Project Description:							
<ul style="list-style-type: none"> Amended code recently from 400 cubic yards to 40 cubic yards requiring a permit (fill or excavation) On-going oversight by the Zoning Administrator/ Director of Public Works 							

2016: Ongoing oversight is still needed

Mitigation Project: As private wells provide a direct channel to the community’s water resource, wells should be brought into compliance with current WDNR regulations. This would include well casings that terminate at least twelve inches (12”) above the ground and twenty-four inches (24”) above the base flood elevations in flood hazard zones. Well caps should be sealed.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Village of Elm Grove	Planning and Public Works	Medium	Ongoing	N/A	N/A
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1&2		Flood and Dam Failure	[Insert]		Medium	Covered by annual budget	

Action/Implementation Plan and Project Description:

Studying municipal water opportunities and held referendum in April 2009 to allow creation of municipal water utility

Mitigation Project: Floodplain zoning ordinances should be actively enforced. Policies should be established to address structures located in flood hazard zones. Policies could include elevation of structures, flood proofing, removal of structures, the provision of detention storage and modification of stream channels and/or bridges. If these alternatives are not feasible, the structures should be isolated from the municipal sanitary sewer system.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Village of Elm Grove	Planning	Medium	Ongoing	N/A	N/A
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1,2,3		Flood and Dam Failure	[Insert]		Medium	Covered by Annual Budget	

Action/Implementation Plan and Project Description:

- Check floodplain status for all exterior building permits

- Review all exterior projects in the Village

Mitigation Project: A comprehensive Stormwater Management Plan, including development and evaluation of alternative plans to abate problems caused by flooding, inadequate drainage, and nonpoint source pollution; development of a recommended plan; and establishment of procedures for plan implementation, should be adopted.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Village of Elm Grove	Planning	High	Partially Completed; ongoing	N/A	N/A
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)		Potential Funding Source	
3		Flood and Dam Failure	[Insert]	High		Covered by annual budget	

Action/Implementation Plan and Project Description:

- Creation of Chapter 235 in Village of Elm Grove Code of Ordinances in order to meet Chapter NR 216 Requirements
- Has been sent to DNR for approval –will be adopted following their approval of ordinance language

Mitigation Project: Monitor severe thunderstorm weather advisories, since hailstorms tend to occur in conjunction with severe thunderstorms.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Village of Elm Grove	Emergency Response Agencies	Medium	Ongoing	N/A	N/A
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)		Potential Funding Source	
2		Hail	[Insert]	Medium		Covered by annual budget	

Action/Implementation Plan and Project Description:

N/A

Mitigation Project: Monitor severe thunderstorm weather advisories, since lightening tends to occur in conjunction with severe thunderstorms							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Village of Elm Grove	Emergency Response Agencies	Medium	Ongoing	N/A	N/A
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1		Lightning	[Insert]		Medium	Covered by annual budget	
Action/Implementation Plan and Project Description:							
N/A							

Mitigation Project: Monitor severe thunderstorm weather advisories.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Village of Elm Grove	Emergency Response Agencies	Medium	Ongoing	N/A	N/A
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
Thunderstorms		1	[Insert]		Medium	Covered by Dept annual budget	
Action/Implementation Plan and Project Description:							
N/A							

Mitigation Project: Monitor severe weather advisories if at risk for tornadoes.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Village of Elm Grove	Emergency Response Agencies	Medium	Ongoing	N/A	N/A
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)		Potential Funding Source	
1		Tornadoes and High Winds	[Insert]	Medium		Covered by annual budget	
Action/Implementation Plan and Project Description:							
N/A							

Mitigation Project: Continue active coordination with the Waukesha County Emergency Warning System.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Village of Elm Grove	Emergency Response Agencies	Medium	Ongoing	N/A	N/A
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)		Potential Funding Source	
1		Tornadoes and High Winds	[Insert]	Medium		Covered by annual budget	
Action/Implementation Plan and Project Description:							
The village currently receives warnings from the National Weather Service but would like to receive notification from the county also.							

Mitigation Project: Monitor severe weather advisories if at risk for winter storms.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Village of Elm Grove	Emergency Response Agencies	High	Ongoing	N/A	N/A
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1		Winter Storms	[Insert]		High	Covered by annual budget	
Action/Implementation Plan and Project Description:							
N/A							

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

Mitigation Project: Community-wide flood control project along the Underwood Creek							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Complete	2007	Village of Elm Grove	Village of Elm Grove	High	Long-term	N/A	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1, 2		Flood	Mitigate flooding		High	Various	
Action/Implementation Plan and Project Description:							

Community-wide flood control project along the Underwood Creek, including increasing flood storage capacity, creek bed enhancements, and flow bypass system through the Village downtown. Included in the project was the purchase and removal of home (one) and business (three), and an apartment complex (100 units), that were subject to frequent and recurring flood damage. Project completed in 2007 (9-year project).

Hartland Village

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Misko	Torin	Police Chief		262-367-2323	tmisko@villageofhartland.com

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Hartland Village	2	-	Yes	Yes	Yes	Yes	Not applicable

2021 Plan Participation and Involvement					
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities
Wallschlager	Ann		Yes		
Misko	Torin		Yes	Yes - Approved annex	
Meyers	Mike		Yes		
Kelsey	Stacy		Yes		
Jambretz	Dave		Yes		
Bailey	Ryan		Yes		

Community Profile and Description

Date of Incorporation: 1892

Current Population: The population of Hartland Village in the 2019 US Census ACS was 9,268.

Population Growth: There has been a documented increase of over 65 percent experienced in the Village of Hartland over roughly the last 40 years.

Location and Description: The Village of Hartland is located in the northwest quadrant of Waukesha County in southern Wisconsin. The land area of the village encompasses 501 square miles. According to the Wisconsin Department of Administration, Hartland Village's population is expected to grow to 10,149 in 2025, then to 10,601 in 2030, and finally to 11,088 in 2035.

Governing Body Format: The Village Board consists of the president and six trustees.

Development Trends: N/A

Capabilities Assessment

The assessment of the jurisdiction's legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction's fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction's administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community's National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments

Codes, Ordinances & Requirements				
Building Code	Yes		State	
Zonings	Yes			
Subdivisions	Yes		State	
Stormwater Management	Yes		State	
Post Disaster Recovery	-	Yes		
Growth Management	Yes			
Public Health and Safety	Yes, Public Safety	Yes		
Planning Documents				
General or Comprehensive Plan	Yes			
Environmental Protection	Yes	Yes	State/WI DNR	
Transportation Plan		Yes	SEWRPC	
Parks Plan	Yes			
Trail Plan	Yes			
Response/Recovery Planning				
Comprehensive Emergency Management Plan	Yes	Yes		
WUI Plan	-			
Post-Disaster Recovery Plan	-	Yes		
Continuity of Operations Plan	Yes			

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
----------------------------------	-------------------	-----------------------------------

Planners or engineers with knowledge of land development and land management practices	Yes	Contracted Service - R and M
Engineers or professionals trained in building or infrastructure construction practices	Yes	R and M
Planners or engineers with an understanding of natural hazards	Yes	R and M
Staff with training in benefit/cost analysis	Yes	Finance
Surveyors	Yes	Wisconsin Building Inspection
Personnel skilled or trained in GIS applications	Yes	DPW
Emergency manager	Yes	Police Chief
Grant writers	Yes	Many

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

What department is responsible for floodplain management in your jurisdiction?	DPW
Are any certified floodplain managers on staff in your jurisdiction?	Yes
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	-
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	Yes, but updates may be needed
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Continuing Education
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No

TABLE: COMMUNITY CLASSIFICATIONS

	Participating?	Classification	Date Classified
NFIP	Yes		

Community Rating System	No		
StormReady	-		

Jurisdiction-Specific Hazards

Hazards that represent a county-wide risk are addressed in Volume 1. This section only addresses the hazards and their associated impacts that are relevant and unique to the municipality.

Dam Failure: There are no dams in Hartland, however, the village is located downstream from a dam in the village of Merton.

Extreme Cold: Extreme cold can freeze pipes in assisted living facilities, the village hall, and the library. However, these facilities do have backup generators.

Extreme Heat: Village hall, the library, and assisted living facilities have backup generators to support the elderly population without A/C.

Flooding: Bark River runs north and south through the entire village, and the storm sewer can become blocked by debris on main roads.

Forest and Wildfires: Marsh in Hartland has the potential to start a fire. Conducting a controlled burn is needed.

Hazardous Materials Release: There are often railroad cars hauling hazardous materials within the city. For example, Medline Industries and Waste Management use hazardous materials. Water utility wells also contain hazardous chemicals.

Lightning: Combined lightning and thunderstorms could cause fire or downed powerlines.

Rail Transportation Incident: The railroad runs east and west through the entire village. Communication among rail companies and Fire Department will ensure proper response to materials being transported through the village.

Thunderstorms: Combined lightning and thunderstorms occur and could cause fire or downed powerlines.

Tornados and High Winds: Tornados and high winds cause damages to homes/businesses and down trees and powerlines. Weather alerts from NWS are put out on village social media and through cell phone weather alerts.

Utility Failure: Susceptible to utility failure include a pumphouse, well house, electric, and gas failures. Generators and alarms are in place in village-owned water utilities. There is communication with WE Energies to restore power.

Winter Storms: Traffic hazards from snow and ice occur every winter, and public works provide plowing and salting.

Political Hazards: Mutual Aid agreements with LE in place for civil disturbance and additional resources.

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to ***all participating jurisdictions*** can be accessed by going to the following section: New Mitigation Strategies for Waukesha County and All Participating Jurisdictions

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

Mitigation Project: Study and implement bank stabilization/erosion control projects							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Hartland	DPW	High	2023-2028 Long-term	\$100,000-\$1 Million	Medium/High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1, 2, and 3		Dam Failure, Flooding, Thunderstorms, Tornadoes and High Winds, Winter Storms	Flood risk management		High	Borrowing/grant	
Action/Implementation Plan and Project Description:							

Mitigation Project: Study and implement utility resilience measures, such as, but not limited to: burying powerlines							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Hartland	Village of Hartland Private sector partners	Medium	Long-term	TBD	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1, 2, and 3		Dam Failure, Flooding, Thunderstorms, Tornadoes and High Winds, Winter Storms	utility resilience		High	BRIC, HMGP, Private sector funds	
Action/Implementation Plan and Project Description:							

Mitigation Project: Obtain Storm Ready designation							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Hartland	Village of Hartland	Medium	Short-term	Staff time	Low
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1, 2, and 3	Flooding, Thunderstorms, Tornados and High Winds, Winter Storms		community resilience		Medium	Internal funds	
Action/Implementation Plan and Project Description:							

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

- This jurisdiction does not have any ongoing mitigation actions or actions that are still in progress as identified in previous plan updates.

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

- This jurisdiction does not have any completed mitigation actions.

Lac La Belle Village

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Bowen	Brad	Fire Chief	Western Lakes Fire Protection District	2662*567-8282	bbowen@westernlakesfd.org

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Lac La Belle Village	0	-	-	-	Yes	No new actions identified	Yes

2021 Plan Participation and Involvement						
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities	
Bowen	Brad				Meeting with planning team	

Community Profile and Description

Date of Incorporation: 1844

Current Population: The population of Lac La Belle Village in the 2019 US Census ACS was 294.

Population Growth: According to the Wisconsin Department of Administration, the village’s population is expected to grow to 401 in 2025, to 415 in 2030, then finally to 431 in 2035.

Location and Description: The village is located mostly within the town of Oconomowoc and has a total land area of 0.98 square miles.

Governing Body Format: The Village Board consists of the Village President and two Trustees.

Development Trends: N/A

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments
Codes, Ordinances & Requirements				

Building Code			State	
Zonings				
Subdivisions			State	
Stormwater Management			State	
Post Disaster Recovery		Yes		
Growth Management				
Public Health and Safety		Yes		
Planning Documents				
General or Comprehensive Plan				
Environmental Protection		Yes	State/WI DNR	
Transportation Plan		Yes	SEWRPC	
Parks Plan				
Trail Plan				
Response/Recovery Planning				
Comprehensive Emergency Management Plan		Yes		
WUI Plan				
Post-Disaster Recovery Plan				
Continuity of Operations Plan				

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices		

Engineers or professionals trained in building or infrastructure construction practices		
Planners or engineers with an understanding of natural hazards		
Staff with training in benefit/cost analysis		
Surveyors		
Personnel skilled or trained in GIS applications		
Emergency manager		
Grant writers		

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE	
What department is responsible for floodplain management in your jurisdiction?	
Are any certified floodplain managers on staff in your jurisdiction?	
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	-
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	Yes, but updates may be needed
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Continuing Education
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No

TABLE: COMMUNITY CLASSIFICATIONS			
	Participating?	Classification	Date Classified
NFIP	Yes		
Community Rating System	No		
StormReady	-		

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: [New Mitigation Strategies for Waukesha County and All Participating Jurisdictions](#)

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

- This jurisdiction does not have any new mitigation actions.

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

Mitigation Project: Look for an acceptable (environmentally, socially, cost-benefit, politically, etc.) solution for removing water from flood-prone areas, especially those areas that are basin/bowl shaped. Seek out funding sources (grants) to execute solutions.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority	Timeline/ Projected Completion Date	Est. Cost	Cost Analysis
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				(Low, Medium, High)	(Short, Long-term, or Ongoing)		(Low, Medium, High)
Ongoing	2009	Lac La Belle	Municipal elected office	High	Ongoing	N/A	High
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
1	Flood and Dam Failure	Mitigate flooding	High	Covered by annual budget. (Some grants received through CDBG-EAP.) Seeking Grants to fund these Capital Improvement Projects. Approximately \$5,000,000			
Action/Implementation Plan and Project Description:							
Some of the potential solutions may include acquisitions, demolitions or floodproofing or moving water to surface streams. Changes in development have caused increased storm runoff problems, which in turn has caused flooding in existing residential homes and streets in specific neighborhoods. 2021: Ongoing							

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

- This jurisdiction does not have any completed mitigation actions.

Lannon Village

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Bell	Dan	Police Chief		262-251-4930	police@villageoflannon.com

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Lannon Village	0	-	Yes	Yes	Yes	Yes	Yes

2021 Plan Participation and Involvement						
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities	
Bell	Dan		Yes		Meeting/ Plan Item Development	

Community Profile and Description

Date of Incorporation: 1930

Current Population: The population of Lannon Village in the 2019 US Census ACS was 1,213.

Population Growth: The population of Lannon Village has exceedingly grown past Wisconsin Department of Administration's (DOA) predictions by over 300. The DOA expected the population to only reach 856 by 2035, however, the current population is already over 350 of that number.

Location and Description: The village is located on the northeastern edge of the County. The village encompasses a total area of 2.46 square miles, of which, 2.44 square miles is land, and 0.02 square miles is water.

Governing Body Format: Village Board with a Board of six Trustees

Development Trends: N/A

Capabilities Assessment

The assessment of the jurisdiction's legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction's fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction's administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community's National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments

Codes, Ordinances & Requirements				
Building Code	Yes		State	
Zonings	Yes			
Subdivisions	Yes		State	
Stormwater Management	Yes		State	
Post Disaster Recovery	-	Yes		
Growth Management	-			SEWRPC
Public Health and Safety	-	Yes		
Planning Documents				
General or Comprehensive Plan	-			
Environmental Protection	-	Yes	State/WI DNR	
Transportation Plan	-	Yes	SEWRPC	
Parks Plan	Yes	Yes		
Trail Plan	-	Yes		
Response/Recovery Planning				
Comprehensive Emergency Management Plan	-	Yes		
WUI Plan	-			
Post-Disaster Recovery Plan	-			
Continuity of Operations Plan	-			

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
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Planners or engineers with knowledge of land development and land management practices	Yes	Contract
Engineers or professionals trained in building or infrastructure construction practices	Yes	Contract
Planners or engineers with an understanding of natural hazards	Yes	Contract
Staff with training in benefit/cost analysis	Yes	Contract
Surveyors	Yes	Contract
Personnel skilled or trained in GIS applications	Yes	Contract
Emergency manager	Yes	Police Chief
Grant writers		

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

What department is responsible for floodplain management in your jurisdiction?	Yes
Are any certified floodplain managers on staff in your jurisdiction?	No
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	No
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	Yes, but updates may be needed
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Continuing Education
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No

TABLE: COMMUNITY CLASSIFICATIONS

	Participating?	Classification	Date Classified
NFIP	Yes		

Community Rating System	No		
StormReady	-		

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: [New Mitigation Strategies for Waukesha County and All Participating Jurisdictions](#)

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

Mitigation Project: Procure and/or replace generator and appropriate hookups							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Lannon Village	Village Administration	High	Short	N/A	Medium
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To preserve life and minimize the potential for injuries or death		Utility Failure	N/A		High	HMGP	
Action/Implementation Plan and Project Description:							
Replace of aging backup electrical power generator on the municipal building which houses fire, police, and village administration.							

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

- This jurisdiction does not have any ongoing mitigation actions or actions that are still in progress as identified in previous plan updates.

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

- This jurisdiction does not have any completed mitigation actions.

Menomonee Falls Village

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Neyhart	Eugene	Police Captain		262-532-8703	eneyhart@menomonee-falls.org

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Menomonee Falls Village	5	Yes	Yes	Yes	Yes	Yes	Yes

2021 Plan Participation and Involvement						
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities	
Neyhart	Eugene	Yes	Yes	Yes - Approved annex		

Community Profile and Description

Date of Incorporation: 1892

Current Population: The population of Menomonee Falls Village in the 2019 US Census ACS was 37,160.

Population Growth: According to the Wisconsin Department of Administration, the village’s population is expected to grow to 37,696 in 2025, to 38,651 in 2030, then to 39,684 in 2035.

Location and Description: The village is located in northeast Waukesha County, and has a total area of 33.31 square miles, of which, 32.92 square miles of it is land and 0.39 square miles is water.

Governing Body Format: Board President and a six-member Board of Trustees

Development Trends: N/A

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments
Codes, Ordinances & Requirements				
Building Code	Yes		State	
Zonings	Yes			
Subdivisions	Yes		State	
Stormwater Management	Yes		State	

Post Disaster Recovery	Yes	Yes	Yes	
Growth Management	Yes			
Public Health and Safety	-	Yes		
Planning Documents				
General or Comprehensive Plan	Yes			
Environmental Protection	-	Yes	State/WI DNR	
Transportation Plan	-	Yes	SEWRPC	
Parks Plan	Yes	Yes		
Trail Plan	Yes	Yes		
Response/Recovery Planning				
Comprehensive Emergency Management Plan	Yes	Yes		
WUI Plan	-			
Post-Disaster Recovery Plan	Yes	Yes		
Continuity of Operations Plan	Yes			

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Engineering & Development
Engineers or professionals trained in building or infrastructure construction practices	Yes	Engineering & Development
Planners or engineers with an understanding of natural hazards	Yes	Engineering & Development
Staff with training in benefit/cost analysis	Yes	Engineering & Development
Surveyors	No	

Personnel skilled or trained in GIS applications	Yes	Engineering & Development
Emergency manager	Yes	Village Manager
Grant writers	Yes	Employees, as assigned

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

What department is responsible for floodplain management in your jurisdiction?	Engineering & Development
Are any certified floodplain managers on staff in your jurisdiction?	No
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	No
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	No, FEMA mapping in progress
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	No
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No, no

TABLE: COMMUNITY CLASSIFICATIONS

	Participating?	Classification	Date Classified
NFIP	Yes		
Community Rating System	No		
StormReady	No		

Jurisdiction-Specific Hazards

Hazards that represent a county-wide risk are addressed in Volume 1. This section only addresses the hazards and their associated impacts that are relevant and unique to the municipality.

Dam Failure: The scope of damage to the Lepper Dam (located in Mill Pond Park) is still yet to be determined. More information will be obtained next summer (22') when the DNR allows us to lower the water level of the pond. Significant cracking and pieces of the dam have been displaced and have dropped to the bottom of the spillway. We anticipate more cracking of the wall will be revealed once the water level is lowered.

Droughts and Dust Storms: The center area of the village has a large marsh. It caught fire because of a train-initiated fire/spark. Concerns or questions from the public about control burns for areas not burned to reduce future fire risk.

Flooding: East of W180 block of Menomonee Ave. always has standing water (better drainage needed). Lily Road/Mill Road is a low-lying area as well. There are elevation issues. Another issue is timely clean-up when housing is flooded, and property is set out curbside.

If the Lepper Dam completely failed, it could lead to flooding along with releasing a large amount of sediment downstream.

Hazardous Materials Release: Hazardous materials response team is regional. To increase available personnel and decrease response time, local training, and equipping MFFD personnel.

Rail Transportation Incident: Marsh fire was caused by a train, better environmental control/brush-vegetation cutting or control. Better/wider fire breaks.

Utility Failure: Power loss at village has caused issues. The village needs more robust generators to maintain or better maintain critical services. Cellular redundancy for major disasters needs to be created.

Winter Storms: Freeway/US highway crashes are a concern. Automated access closures during major crashes can save time and resources. Hand-controlled gates currently exist.

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
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- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: [New Mitigation Strategies for Waukesha County and All Participating Jurisdictions](#)

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

Mitigation Project: Study and implement appropriate improvements at Lepper Dam.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Menomonee Falls	Village of Menomonee Falls Public Works	High	Summer of 2023	N/A	

			Wisconsin DNR & Milwaukee Metropolitan Sewerage District (MMSD)			
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source		
To preserve life and minimize the potential for injuries or death. To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.	Dam Failure HAZMAT	There are numerous properties downstream, including outside the jurisdiction that are vulnerable to damages if the dam causes an emergency.	High	General Fund/Tax Revenue, HMGP, BRIC, FMA		
Action/Implementation Plan and Project Description:						
Make necessary improvements to the Lepper Dam so that it does not leak and become more damaged.						

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

- This jurisdiction does not have any ongoing mitigation actions or actions that are still in progress as identified in previous plan updates.

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

Mitigation Project: Raise the road(s) and increase the flow capacity of the road(s) that service the Silver Meadows subdivision (approximately 100 homes) on the west side of the village.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2012	Menomonee Falls	Engineering Department	Medium/ High	Completed (2012)	\$6,000 for the engineering study (in progress) and unknown additional funding for the project (will be based on findings of the study)	N/A
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
2	Flood and Dam Failure	[Insert]	Medium / High	N/A			
Action/Implementation Plan and Project Description:							
There are only two access roads to the subdivision and the cross culverts are filled causing the roads to overtop by up to 1½' of water that can close down the roads for 24 hours. There is a special needs child in the subdivision and all residents do not receive emergency services (fire, police, EMS) in floods.							

Merton Village

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Blawat	Bruce	Trustee		262-538-1409	blawat@villageofmerton.com
Balkowski	Jacob	Deputy Clerk-Treasurer	Village of Merton	262-343-0826	balkowski@villageofmerton.com

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Merton Village	1	-	Yes	Yes	Yes	Yes	Yes

2021 Plan Participation and Involvement					
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities
Balkowski	Jacob		Yes		Meeting/ Plan Item Development
Schwabe	Michael		Yes		

Community Profile and Description

Date of Incorporation: 1840

Current Population: The population of Merton Village in the 2019 US Census ACS was 3,672.

Population Growth: The current population size has already surpassed the predictions made by the Wisconsin Department of Administration by over 1,000.

Location and Description: The village has a total area of 3.07 square miles, of which 3.00 square miles is land and 0.07 square miles is water.

Governing Body Format: Village Board that includes an elected Village President and Board of Trustees.

Development Trends: N/A

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments
Codes, Ordinances & Requirements				

Building Code	Yes		State	
Zonings	Yes			
Subdivisions	Yes		State	
Stormwater Management	-	Yes	State	
Post Disaster Recovery	-	Yes		
Growth Management	Yes			
Public Health and Safety	Yes	Yes		
Planning Documents				
General or Comprehensive Plan	Yes			
Environmental Protection	-	Yes	State/WI DNR	
Transportation Plan	-	Yes	SEWRPC	
Parks Plan	Yes			
Trail Plan	Yes			
Response/Recovery Planning				
Comprehensive Emergency Management Plan		Yes		
WUI Plan	-			
Post-Disaster Recovery Plan	-			
Continuity of Operations Plan	-			

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices		

Engineers or professionals trained in building or infrastructure construction practices		
Planners or engineers with an understanding of natural hazards		
Staff with training in benefit/cost analysis		
Surveyors		
Personnel skilled or trained in GIS applications		
Emergency manager		
Grant writers		

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE	
What department is responsible for floodplain management in your jurisdiction?	
Are any certified floodplain managers on staff in your jurisdiction?	-
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	-
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	Yes, but updates may be needed
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Continuing Education
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No

TABLE: COMMUNITY CLASSIFICATIONS			
	Participating?	Classification	Date Classified
NFIP	Yes		
Community Rating System	No		
StormReady	-		

Jurisdiction-Specific Hazards

Hazards that represent a county-wide risk are addressed in Volume 1. This section only addresses the hazards and their associated impacts that are relevant and unique to the municipality.

Dam Failure: Mill Pond is susceptible to flooding if there was a dam failure incident.

Flooding: To mitigate flooding, there is cleaning storm drains on Main Street; and on Dorn Rd and Bark River, there are culvert sizing and debris traps.

Hazardous Materials Release: A rail accident north of the village is possible that can cause a hazardous materials release.

Utility Failure: Generator back up for village hall is needed.

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: New Mitigation Strategies for Waukesha County and All Participating Jurisdictions

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

Mitigation Project: Procure generator and appropriate hookups for Village Hall							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Merton	Village of Merton	High	2022 - Short	N/A	Medium
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.		Utility Failure	Provide electrical power to facilities during a utility failure incident.		High	HMGP, BRIC	
Action/Implementation Plan and Project Description:							
Purchase a new generator for Village Hall							

Mitigation Project: Obtain absorbent materials (pads, booms, dikes), and portable air monitoring devices to provide initial containment of spills and material releases							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Merton	Village of Merton	Medium	2022	10,000	Medium
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	

<p>To preserve life and minimize the potential for injuries or death.</p> <p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p> <p>To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.</p> <p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p>	<p>Hazardous Materials Release</p>	<p>Minimize hazardous materials releases to protect lives, property, and the environment</p>	<p>High</p>	<p>HMGP, BRIC</p>
<p>Action/Implementation Plan and Project Description:</p>				
<p>The Village of Merton seeks to obtain absorbent materials (pads, booms, dikes), and portable air monitoring devices to provide initial containment of spills and material releases. The materials would be housed and maintained by the fire department to provide first response capacity to fixed site facilities (e.g., Essential Industries, Inc., et al) and transportation incidents involving hazardous materials. The requested items would aid in the protection of life, preservation of property, and minimizing impacts to the environment.</p>				

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

- This jurisdiction does not have any ongoing mitigation actions or actions that are still in progress as identified in previous plan updates.

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

Mitigation Project: Complete tree removal and change the slopes of the embankment around the Merton Dam (67.08). Complete a dam failure analysis and a detailed Emergency Action Plan for the Merton Dam.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Village of Merton	Municipal officials and contracted engineers	High	Complete	\$30,000-\$50,000	Low
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)			Benefit Analysis (Low, Medium, High)	Potential Funding Source	
2,3	Flood and Dam Failure	[Insert]			High	N/A	
Action/Implementation Plan and Project Description:							
Under orders by the WI DNR to complete this by 7/30/2011.							

Mukwonago Village

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Stien	Jeff	Fire Chief		262-363-6420 ext 3401	chiefstien@mukwonagofire.org

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Mukwonago Village	17	Yes	Yes	Yes	Yes	Yes	Yes

2021 Plan Participation and Involvement						
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities	
Johnson	Darlene	Yes	Yes			
Bittner	Ron	Yes	Yes			
Streit	Daniel	Yes	Yes			
Fellows	John		Yes			
Brown	David		Yes			
Doherty	Diana		Yes			
Dykstra	Diana		Yes			

Stien	Jeffrey		Yes	
Castle	Wayne		Yes	
Demotto	Chris		Yes	

Community Profile and Description

Date of Incorporation: 1905

Current Population: The population of Mukwonago Village in the 2020 US Census population estimates was 8,196.

Population Growth: The Village of Mukwonago population has grown at a faster rate than that of Waukesha County. The most current estimates indicate that the Village exceeded the population projected by the Wisconsin Department of Administration by a few hundred.

Location and Description: The village is located on the southwestern side of Waukesha County, and covers slightly more than 5150 acres, or 8.1 square miles. There are two major transportation corridors accessible including, I-43 and STH 83, and the historical crossroads of STH 83 and CTH ES, which intersect in the Village’s Downtown.

Governing Body Format: Village Board that includes an elected Village President and Board of Trustees.

Development Trends: N/A

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments
Codes, Ordinances & Requirements				
Building Code	Yes		State	
Zonings	Yes			
Subdivisions	Yes		State	
Stormwater Management	Yes		State	
Post Disaster Recovery	Yes	Yes		
Growth Management	Yes			
Public Health and Safety	No	Yes		
Planning Documents				
General or Comprehensive Plan	Yes			
Environmental Protection	Yes	Yes	State/WI DNR	
Transportation Plan	No		SEWRPC	
Parks Plan	Yes			
Trail Plan	Yes			
Response/Recovery Planning				
Comprehensive Emergency Management Plan	Yes	Yes		
WUI Plan	No	Yes		

Post-Disaster Recovery Plan	No	Yes		
Continuity of Operations Plan	Yes	Yes		

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Village Planner
Engineers or professionals trained in building or infrastructure construction practices	No	
Planners or engineers with an understanding of natural hazards	Yes	Fire Chief
Staff with training in benefit/cost analysis	No	
Surveyors	No	
Personnel skilled or trained in GIS applications	No	
Emergency manager	Yes	Fire Chief/Emergency Management Director
Grant writers	No	

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

What department is responsible for floodplain management in your jurisdiction?	
Are any certified floodplain managers on staff in your jurisdiction?	-
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	-
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	Yes, but updates may be needed
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Continuing Education

Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No
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TABLE: COMMUNITY CLASSIFICATIONS			
	Participating?	Classification	Date Classified
NFIP	Yes		
Community Rating System	No		
StormReady	-		

Jurisdiction-Specific Hazards

Hazards that represent a county-wide risk are addressed in Volume 1. This section only addresses the hazards and their associated impacts that are relevant and unique to the municipality.

Dam Failure: There are several locations that would be impacted by dam failure. These include Two Rivers Subdivision, Meadow Park Subdivision, Highway 83, and South of Front Street. The south gate of the dam is leaking and may possibly impact waste treatment.

Extreme Cold: Effects from extreme cold are loss of power to DPW and water mains break.

Extreme Heat: Extreme heat poses the risk for power outages, brownouts, and water capacity.

Flooding: Flooding causes erosion along Phantom Lake. Bogs floating on the lake to the dam can cause overflow/dam break.

Forest and Wildfires: Forest and wildfires may cause the possible burning of Vernon Marsh or other natural lands within and surrounding the village.

Hail: Hail contributes to power outages and damages to building/equipment.

Hazardous Materials Release: There is concern with hazardous materials release incidents from railroad release, I-43 release, industrial facilities release.

Lightning: Lightning contributes to power outages, fires, building damage, and interruption of business, internet/village, and network/wireless.

Rail Transportation Incident: There is a possibility for a rail transportation incident to occur because double container railroad cars travel through the village.

Thunderstorms: Thunderstorms contribute to trees falling on utilities, the business district, and all over the village.

Tornados and High Winds: These hazards contribute to power outages, internet/village network/wireless, road closures, and property damage.

Utility Failure: This hazard brings forward communications disruptions, limitations to access to village/public buildings, and loss of crucial data. There is a lack of backup generators for the south water tower and other facilities such as public works, etc.

Winter Storms: Winter storms cause problems with road access, contribute to power outages, snow/ice damage, tree debris, and create ice dams at ES/Main and dam. There is no shelter plan for any type of hazard; i.e. tornado, fire, flood. A plan/move with other facilities/high school is needed.

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: New Mitigation Strategies for Waukesha County and All Participating Jurisdictions

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

Mitigation Project: Shore stabilization and erosion control measure							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Mukwonago	Village of Mukwonago	High	Ongoing	N/A	High
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
<p>To preserve life and minimize the potential for injuries or death.</p> <p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p> <p>To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.</p> <p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p>	Dam Failure, Flooding		To prevent separation of bogs which results in damage to dam and flooding.		High	HMGP, BRIC, FMA	
Action/Implementation Plan and Project Description:							
Shore stabilization and erosion control measure to prevent separation of bogs which results in damage to dam and flooding							

Mitigation Project: Develop an emergency shelter plan for the village.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Mukwonago	Village of Mukwonago	Medium	Ongoing	N/A	Low
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source		
<p>To preserve life and minimize the potential for injuries or death.</p> <p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p> <p>Providing inspectors with additional and enhanced communications devices will assist with the efficiency of damage assessment during an event.</p>		All Hazards	To provide a facility for residents who are not able to remain within their dwelling.	High	HMGP, BRIC, FMA		
Action/Implementation Plan and Project Description:							
Develop an emergency shelter plan for the village. Possibly with school district and/or other surrounding municipalities to provide a facility for residents who are not able to remain within their dwelling.							

Mitigation Project: Provide stormwater facilities in historic areas							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Mukwonago	Village of Mukwonago	High	Ongoing	N/A	High

Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source
<p>To preserve life and minimize the potential for injuries or death.</p> <p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p> <p>To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.</p> <p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p> <p>Providing inspectors with additional and enhanced communications devices will assist with the efficiency of damage assessment during an event.</p>	<p>Flooding, Thunderstorms, Utility Failure, Winter Storms</p>	<p>To mitigate stormwater runoff during storm events.</p>	<p>High</p>	<p>HMGP, BRIC, FMA</p>
<p>Action/Implementation Plan and Project Description:</p>				
<p>Provide stormwater facilities in the historic/original portion of the village with other projects (downtown water/sewer) to mitigate stormwater runoff during storm events.</p>				

Mitigation Project: Modify bridges to withstand flooding							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Mukwonago	Village of Mukwonago	Medium	Ongoing	N/A	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
<p>To preserve life and minimize the potential for injuries or death.</p> <p>To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.</p> <p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p>		Flooding, Rail Transportation Incident, Utility Failure	Help bridges withstand future flooding and other hazards to maintain emergency access/evacuation routes.		High	HMGP, BRIC, FMA	
Action/Implementation Plan and Project Description:							
Modify bridges within the village to withstand future flooding and other hazards to maintain emergency access/evacuation routes.							

Mitigation Project: Install backup generators							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Mukwonago	Village of Mukwonago	High	Short	N/A	Medium
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To preserve life and minimize the potential for injuries or death. To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.		Utility Failure	To allow operations to be maintained during a utility failure incident.		High	HMGP, BRIC	
Action/Implementation Plan and Project Description:							
Install backup generators for all water towers/stations that do not currently have such facilities to allow for operations to be maintained.							

Mitigation Project: Replace water and sewer lines.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Mukwonago	Village of Mukwonago	High	Ongoing	N/A	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	

To preserve life and minimize the potential for injuries or death.	Utility Failure	Better fire protection and reduced sewer backups when state rebuilds Hwy/ongoing transportation roads.	High	HMGP, BRIC
To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.				
To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.				

Action/Implementation Plan and Project Description:

Replace water and sewer lines in downtown area of the village.

Mitigation Project: Install generator

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Mukwonago	Public Works (PW)	High	Ongoing	N/A	Medium
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
To preserve life and minimize the potential for injuries or death.	Utility Failure	To operations, heat, power, and communication at PW facility.	High	HMGP, BRIC			

Action/Implementation Plan and Project Description:

Install generator at PW facility to maintain operations, heat, power, and communication.

Mitigation Project: Replace the south gate on the Phantom Lake Dam

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date	Est. Cost	Cost Analysis

					(Short, Long-term, or Ongoing)		(Low, Medium, High)
New	2021	Village of Mukwonago	Village of Mukwonago	High	Ongoing	High	
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.		Dam Failure, Flooding, Thunderstorms, Winter Storms	Prevent further erosion and damage to the dam.		High	HMGP, BRIC, FMA	
Action/Implementation Plan and Project Description:							
Replace the south gate on the Phantom Lake Dam. Gate is leaking and will eventually become inoperable.							

Mitigation Project: Develop a hazardous materials mitigation plan							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Mukwonago	Village of Mukwonago	Medium	Ongoing	N/A	Low
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To preserve life and minimize the potential for injuries or death. To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.		Hazardous Materials Release, Rail Transportation Incident	Plan and prepare for hazardous materials release, Rail and transportation incidents.		High	HMGP, BRIC	
Action/Implementation Plan and Project Description:							
Develop a mitigation plan for a possible derailment of railroad carrying possible hazardous materials.							

Mitigation Project: Cybersecurity response plan, procedures, and equipment							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Mukwonago	Village of Mukwonago	High	Ongoing	N/A	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.		Cyber attack	Plan and prepare for cybersecurity incidents.		High	HMGP, BRIC	
Action/Implementation Plan and Project Description:							
Develop a cybersecurity response plan, procedures, and acquire relevant equipment.							

Mitigation Project: Bury overhead powerlines							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Mukwonago	Department of Public Works	Medium	Ongoing	N/A	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To preserve life and minimize the potential for injuries or death.		Thunderstorms, Tornados and High Winds, Utility Failure, Winter Storms	Preserve utility power during winter and high wind events.		High	HMGP, BRIC, FMA	

To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.				
Action/Implementation Plan and Project Description:				
Bury overhead powerlines along (but not limited to) STH83 and CTHES to protect utility specifically to the police department, Village Hall, and the EOC				

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

Mitigation Project: The north bank of the Mukwonago River needs to be stabilized to control erosion from North Main (Hwy ES) to Highway 83.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2014	Village of Mukwonago	Municipal officials	High	Ongoing	\$132,000	Medium
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)		Potential Funding Source	
2	Flood and Dam Failure		[Insert]	High		N/A	
Action/Implementation Plan and Project Description:							
Goals of the project are to prevent erosion of the bank into the river, to establish a “no mow” area to filter water before it enters the river and to increase the aesthetic value of the land.							
2021 Update: Ongoing, 80 ft left							

Mitigation Project: The Village of Mukwonago would like to upgrade their old water utility pumps.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Village of Mukwonago	Mukwonago Water Utility	Low	Ongoing	Varies	N/A
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)		Potential Funding Source	
1	Utility Failure		[Insert]	Low		As funding available	
Action/Implementation Plan and Project Description:							
N/A							
2021 Update: Ongoing - Well 6, 7 upgrades							

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

Mitigation Project: Raise the gate in the Mukwonago Dam (on the Mukwonago River) so that when it is opened the water has more room to pass out.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2015	Village of Mukwonago	Municipal officials	High	Complete (2012)	\$380,000	Medium
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)		Potential Funding Source	

2	Flood and Dam Failure	[Insert]	High	WI DNR grant received for part of the work but is inadequate for the full extent of the project.
Action/Implementation Plan and Project Description:				
<p>Currently the gate does not go all of the way to the top of the dam, restricting flow. The new gate would also serve as a “relief valve” for the dam in major events.</p>				
<p>2016: The Village of Mukwonago completed a dam rehabilitation project in 2012. The project included concrete surface restoration, motorized gates and an earthen spillway located to the south of the dam. Gate elevations and sizes were not changed as a result of this project.</p>				

Nashotah Village

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Fennig	Matt	Fire Chief	Lake County Fire Dept.	262-646-6235	mfennig@lakecountryfire.com

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Nashotah Village	1	Yes	-	-	Yes	No new actions identified	Yes

2021 Plan Participation and Involvement						
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)		Other Participation Activities
Pfeifer	Cynthia	Yes				
Fennig	Matt			Yes - approved annex		Meeting with planning team

Community Profile and Description

Date of Incorporation: 1957

Current Population: The population of Nashotah Village in the 2019 US Census ACS was 1,219.

Population Growth: According to the Wisconsin Department of Administration, the village’s population is expected to grow to 1,941 in 2025, to 2,087 in 2030, then to 2,247 in 2035.

Location and Description: The village has a total area of 1.70 square miles, of which, 1.67 square miles of it is land and 0.03 square miles is water.

Governing Body Format: Governed through a Village Board and Board of Trustees.

Development Trends: N/A

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments
Codes, Ordinances & Requirements				

Building Code			State	
Zonings				
Subdivisions			State	
Stormwater Management			State	
Post Disaster Recovery		Yes		
Growth Management				
Public Health and Safety		Yes		
Planning Documents				
General or Comprehensive Plan				
Environmental Protection		Yes	State/WI DNR	
Transportation Plan		Yes	SEWRPC	
Parks Plan				
Trail Plan				
Response/Recovery Planning				
Comprehensive Emergency Management Plan		Yes		
WUI Plan				
Post-Disaster Recovery Plan				
Continuity of Operations Plan				

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices		

Engineers or professionals trained in building or infrastructure construction practices		
Planners or engineers with an understanding of natural hazards		
Staff with training in benefit/cost analysis		
Surveyors		
Personnel skilled or trained in GIS applications		
Emergency manager		
Grant writers		

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE	
What department is responsible for floodplain management in your jurisdiction?	-
Are any certified floodplain managers on staff in your jurisdiction?	-
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	-
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	-
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	No
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No

TABLE: COMMUNITY CLASSIFICATIONS			
	Participating?	Classification	Date Classified
NFIP	No		
Community Rating System	No		
StormReady	-		

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: [New Mitigation Strategies for Waukesha County and All Participating Jurisdictions](#)

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

- This jurisdiction does not have any new mitigation actions.

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

Mitigation Project: Look for an acceptable (environmentally, socially, cost-benefit, politically, etc.) solution for removing water from flood-prone areas, especially those areas that are basin/bowl shaped. Seek out funding sources (grants) to execute solutions.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority	Timeline/ Projected Completion Date	Est. Cost	Cost Analysis
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				(Low, Medium, High)	(Short, Long-term, or Ongoing)		(Low, Medium, High)
Ongoing	2009	Nashotah	Municipal elected office	High	Ongoing	N/A	High
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)		Potential Funding Source	
1	Flood and Dam Failure		Mitigate flooding	High		Covered by annual budget. (Some grants received through CDBG-EAP.) Seeking Grants to fund these Capital Improvement Projects. Approximately \$5,000,000	
Action/Implementation Plan and Project Description:							
Some of the potential solutions may include acquisitions, demolitions or floodproofing or moving water to surface streams. Changes in development have caused increased storm runoff problems, which in turn has caused flooding in existing residential homes and streets in specific neighborhoods.							
2021: Ongoing							

Mitigation Project: Work with the DNR on dam safety and flooding issues, including better communication and emergency plans.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011; 2016 modified to include all municipalities versus just a few	Lake Nagawicka (City of Delafield and Village of Nashotah)	Municipalities	Medium	Ongoing	N/A	Low
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)		Potential Funding Source	
3	Flood and Dam Failure		Mitigate flooding	Medium		Covered by annual budget	
Action/Implementation Plan and Project Description:							

- Four dams were overtopped by flood waters and the water was affecting bridges and roads. The munis were unaware that the DNR pulled the boards.
- DNR is looking to remove one dam and to create failure plans.

2021: Explore including all jurisdictions

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

- This jurisdiction does not have any completed mitigation actions.

North Prairie Village

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Bagley	Rhoda	Clerk		262-392-2271	rbagley@northprairie.net

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
North Prairie Village	2	Yes	Yes	Yes	Yes	Yes	Not applicable

2021 Plan Participation and Involvement						
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities	
Bagley	Rhoda	Yes				
Rewasiewicz	Frank		Yes			
Molitor	David		Yes			

Community Profile and Description

Date of Incorporation: 1919

Current Population: The population of North Prairie Village in the 2019 US Census ACS was 2,352.

Population Growth: The current population size has already surpassed the predictions made by the Wisconsin Department of Administration by 5 years in advance.

Location and Description: The village has a total area of 2.84 square miles, of which, 2.81 square miles of it is land and 0.03 square miles is water. The village is near the major highways Hwy 59 and Hwy E.

Governing Body Format: Village Board that includes an elected Village President and Board of Trustees.

Development Trends: N/A

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments

Codes, Ordinances & Requirements				
Building Code	Yes		State	
Zonings	Yes			
Subdivisions	Yes		State	
Stormwater Management	Yes	Yes	State	
Post Disaster Recovery	-	Yes		
Growth Management	Yes			
Public Health and Safety	-	Yes		
Planning Documents				
General or Comprehensive Plan	-	Yes		
Environmental Protection	-	Yes	State/WI DNR	
Transportation Plan	Yes	Yes	SEWRPC	Roads - Mitigation and repair
Parks Plan	Yes			
Trail Plan	Yes			
Response/Recovery Planning				
Comprehensive Emergency Management Plan	-	Yes		
WUI Plan	-	Yes		
Post-Disaster Recovery Plan	-			
Continuity of Operations Plan	-			

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
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Planners or engineers with knowledge of land development and land management practices		
Engineers or professionals trained in building or infrastructure construction practices		
Planners or engineers with an understanding of natural hazards		
Staff with training in benefit/cost analysis		
Surveyors		
Personnel skilled or trained in GIS applications		
Emergency manager		
Grant writers		

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

What department is responsible for floodplain management in your jurisdiction?	DPW
Are any certified floodplain managers on staff in your jurisdiction?	No
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	-
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	-
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	No
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No

TABLE: COMMUNITY CLASSIFICATIONS

	Participating?	Classification	Date Classified
NFIP	No		

Community Rating System	No		
StormReady	-		

Jurisdiction-Specific Hazards

Hazards that represent a county-wide risk are addressed in Volume 1. This section only addresses the hazards and their associated impacts that are relevant and unique to the municipality.

Droughts and Dust Storms: There is a shortage of water for fire protection and personal use due to dry weather.

Extreme Cold: The aging community is vulnerable to extreme cold due to the lack of power sources in emergencies.

Extreme Heat: The aging community is vulnerable to extreme heat due to the lack of power sources in emergencies.

Flooding: Flooding causes damage to ditches, property, and roadways from lack of drainage.

Hail: Hail contributes to damages on personal property during summer storms.

Hazardous Materials Release: Due to railroads in town with increased speeds, accidents, and possible spills are a concern.

Lightning: Lightning increases storms that cause power outages.

Rail Transportation Incident: Due to railroads in town with increased speeds, accidents and possible spills are a concern.

Thunderstorms: Thunderstorms increase power outages.

Tornados and High Winds: These hazards contribute to personal property damage, tree and limb damage, and debris removal. There are no warning horns/alerts available.

Utility Failure: High winds have caused pole breakage numerous times over the last 10 years. There are no backup generators for emergency services.

Winter Storms: There is more snow in the village than in neighboring communities and there are snow road removal issues, such as impassable roads and damaged equipment.

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: New Mitigation Strategies for Waukesha County and All Participating Jurisdictions

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

Mitigation Project: Procure generators and appropriate hookups for municipal buildings							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of North Prairie	Village of North Prairie	High	Short	Medium	

Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source
<p>To preserve life and minimize the potential for injuries or death.</p> <p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p> <p>To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.</p> <p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p> <p>Providing inspectors with additional and enhanced communications devices will assist with the efficiency of damage assessment during an event.</p>	Utility Failure	To maintain operations for municipal buildings during a utility failure incident.	High	HMGP, BRIC
Action/Implementation Plan and Project Description:				
Generators for municipal/public buildings to maintain operations during a utility failure incident.				

Mitigation Project: Study and procure an early warning siren to warn residents

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of North Prairie	Village of North Prairie	Medium	Ongoing	N/A	High

Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source
<p>To preserve life and minimize the potential for injuries or death.</p> <p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p> <p>To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.</p> <p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p> <p>Providing inspectors with additional and enhanced communications devices will assist with the efficiency of damage assessment during an event.</p>	<p>Hail, Lightning, Thunderstorms, Tornados and High Winds</p>	<p>Notifying the community of an emergency in a timely manner.</p>	<p>High</p>	<p>HMGP, BRIC</p>
<p>Action/Implementation Plan and Project Description:</p>				
<p>Add an early warning horn/siren to notify the community of an emergency.</p>				

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

- This jurisdiction does not have any ongoing mitigation actions or actions that are still in progress as identified in previous plan updates.

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

- This jurisdiction does not have any completed mitigation actions.

Oconomowoc Lake Village

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Fennig	Matthew	Fire Chief	Lake Country Fire	262*354*2454	mfennig@lakecountryfire.org

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Oconomowoc Lake Village	1	-	-	-	Yes	No new action identified	Yes

2021 Plan Participation and Involvement						
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)		Other Participation Activities
Fennig	Matthew	-	-	Yes - approved annex		Meeting with planning team

Community Profile and Description

Date of Incorporation: 1959

Current Population: The population of Oconomowoc Lake Village in the 2019 US Census ACS was 583.

Population Growth: According to the Wisconsin Department of Administration, the village’s population is expected to grow to 686 in 2025, to 696 in 2035, then to 707 in 2035.

Location and Description: The Village is bordered on the west by the City of Oconomowoc and has a total area of 3.30 square miles, of which, 1.98 square miles of it is land and 1.32 square miles is water. Major interstates that border the village include Interstate Highway 94 and State Trunk Highway 16.

Governing Body Format: Village Board that includes an elected Village President and Board of Trustees.

Development Trends: N/A

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments

Codes, Ordinances & Requirements				
Building Code			State	
Zonings				
Subdivisions			State	
Stormwater Management			State	
Post Disaster Recovery		Yes		
Growth Management				
Public Health and Safety		Yes		
Planning Documents				
General or Comprehensive Plan				
Environmental Protection		Yes	State/WI DNR	
Transportation Plan		Yes	SEWRPC	
Parks Plan				
Trail Plan				
Response/Recovery Planning				
Comprehensive Emergency Management Plan		Yes		
WUI Plan				
Post-Disaster Recovery Plan				
Continuity of Operations Plan				

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
----------------------------------	-------------------	-----------------------------------

Planners or engineers with knowledge of land development and land management practices		
Engineers or professionals trained in building or infrastructure construction practices		
Planners or engineers with an understanding of natural hazards		
Staff with training in benefit/cost analysis		
Surveyors		
Personnel skilled or trained in GIS applications		
Emergency manager		
Grant writers		

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

What department is responsible for floodplain management in your jurisdiction?	-
Are any certified floodplain managers on staff in your jurisdiction?	-
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	-
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	-
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	No
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No

TABLE: COMMUNITY CLASSIFICATIONS

	Participating?	Classification	Date Classified
NFIP	No		

Community Rating System	No		
StormReady	-		

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: New Mitigation Strategies for Waukesha County and All Participating Jurisdictions

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

- This jurisdiction does not have any new mitigation actions.

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

Mitigation Project: Look for an acceptable (environmentally, socially, cost-benefit, politically, etc.) solution for removing water from flood-prone areas, especially those areas that are basin/bowl shaped. Seek out funding sources (grants) to execute solutions.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2009	Oconomowoc Lake	Municipal elected office	High	Ongoing	N/A	High
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source		
1	Flood and Dam Failure		Mitigate Flooding	High	Covered by annual budget. (Some grants received through CDBG-EAP.) Seeking Grants to fund these Capital Improvement Projects. Approximately \$5,000,000		
Action/Implementation Plan and Project Description:							
Some of the potential solutions may include acquisitions, demolitions or floodproofing or moving water to surface streams. Changes in development have caused increased storm runoff problems, which in turn has caused flooding in existing residential homes and streets in specific neighborhoods.							
2021: Ongoing							

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

- This jurisdiction does not have any completed mitigation actions.

Pewaukee Village

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Garry	Mark	Police Lieutenant		262-691-5678 ext 232	mgarry@villageofpewaukee.com
Gosse	Scott	Administrator		262-691-5660 ext 222	sgosse@villageofpewaukee.com

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Pewaukee Village	5	Yes	Yes	Yes	Yes	Yes	Yes

2021 Plan Participation and Involvement					
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities
Garry	Mark	Yes	Yes		Meeting/ Plan Item Development
Gosse	Scott	Yes			Meeting/ Plan Item Development

Community Profile and Description

Date of Incorporation: 1876

Current Population: The population of Pewaukee Village in the 2019 US Census ACS was 8,164.

Population Growth: According to the Wisconsin Department of Administration, the village’s population is expected to grow to 10,902 in 2025, then to 11,462 in 2030, then finally to 12,068 in 2035.

Location and Description: The Village is located about 17 miles west of Milwaukee in the heart of the Lake Country area and is bisected by the Pewaukee River. The village also has a total area of 4.53 square miles, of which, 4.13 square miles of it is land and 0.40 square miles is water.

Governing Body Format: Village Board that includes an elected Village President and Board of Trustees.

Development Trends: N/A

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments

Codes, Ordinances & Requirements				
Building Code	Yes		State	Contract with City of Pewaukee
Zonings	Yes			
Subdivisions	Yes	Yes	State	County and State for approvals
Stormwater Management	Yes		State	DNR
Post Disaster Recovery	Yes	Yes		
Growth Management	Yes		X	SEWRPC
Public Health and Safety	-	Yes		
Planning Documents				
General or Comprehensive Plan	Yes			
Environmental Protection	Yes	Yes	State/WI DNR	In conjunction with County and DNR
Transportation Plan	Yes	Yes	SEWRPC	
Parks Plan	Yes	Yes		
Trail Plan	-	Yes		
Response/Recovery Planning				
Comprehensive Emergency Management Plan	Yes	Yes		
WUI Plan	-			
Post-Disaster Recovery Plan	-			
Continuity of Operations Plan	-			

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
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Planners or engineers with knowledge of land development and land management practices	Yes	Contracted and in house
Engineers or professionals trained in building or infrastructure construction practices	Yes	Contract for larger projects
Planners or engineers with an understanding of natural hazards	Yes	Contracted out
Staff with training in benefit/cost analysis	Yes	
Surveyors	Yes	Contract out
Personnel skilled or trained in GIS applications	Yes	Contract out
Emergency manager	Yes	
Grant writers	Yes	

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

What department is responsible for floodplain management in your jurisdiction?	Administration
Are any certified floodplain managers on staff in your jurisdiction?	No
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	No
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	Yes, but updates may be needed
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Yes, additional staff
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No

TABLE: COMMUNITY CLASSIFICATIONS

	Participating?	Classification	Date Classified
NFIP	Yes		

Community Rating System	No		
StormReady	-		

Jurisdiction-Specific Hazards

Hazards that represent a county-wide risk are addressed in Volume 1. This section only addresses the hazards and their associated impacts that are relevant and unique to the municipality.

Dam Failure: A dam failure incident will impact the downstream areas from the east end of Pewaukee Lake (downtown business district), the west portion of the village industrial park, the southern residential area, and into the City of Pewaukee and City of Waukesha.

Extreme Cold: Extreme cold events impact multiple multi-residential facilities (apartment complexes, senior-living complexes, assisted-living complexes).

Extreme Heat: Extreme heat events impact multiple multi-residential facilities (apartment complexes, senior-living complexes, assisted-living complexes).

Flooding: Flooding impacts the downtown area of the village (W. Wisconsin Ave, Oakton Ave, Hickory St., E Wisconsin Ave., Clark St.), and village facilities (VH, PD, DPW).

Hazardous Materials Release: This hazard's impacts are dependent on location.

Rail Transportation Incident: The CP Rail runs E-W dividing the village in half and poses a threat to the adjacent areas including, residential, industrial, downtown business, and natural resources (Pewaukee Lake).

Utility Failure: Utility failure impact residents' businesses, educational entities (PSD and WCTC), and commerce/transportation (STH 16, 164, 190).

Winter Storms: Winter storm events impact multiple multi-residential facilities (apartment complexes, senior-living complexes, assisted-living complexes).

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: New Mitigation Strategies for Waukesha County and All Participating Jurisdictions

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

Mitigation Project: Purchase generator and appropriate hookup at key sites, such as well #3							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2022	Village of Pewaukee	Village of Pewaukee	High	2023	\$200,000	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis	Potential Funding Source	

			(Low, Medium, High)	
<p>To preserve life and minimize the potential for injuries or death.</p>	<p>Utility Failure</p>	<p>Reduce the risk of water system failure due to electrical grid failure; maintain fire protection</p>		<p>HMGP, BRIC</p>
<p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p>				
<p>To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.</p>				
<p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p>				

Action/Implementation Plan and Project Description:

The Well #3 is currently without a backup electrical generator, primarily serving the industrial center of the Village for potable water, fire protection, and in manufacturing. Only two of the Village's five wells have backup electrical power by generator. During power outages, the existing power backup can be strained to meet the Village's domestic potable water needs and provide adequate fire flows for fire protection and operations. Installing a backup electrical generator on Well #3 would increase the Village's resiliency during power failures, ensuring public health by maintaining adequate water pressure and flow in the potable water system, and improve fire flows during power failures.

Mitigation Project: Develop COOP plan

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Pewaukee	Village of Pewaukee Police Department	High	2024	\$15,000	Low
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis	Potential Funding Source	

			(Low, Medium, High)	
To preserve life and minimize the potential for injuries or death.	All-Hazards	Prevent the loss of command and control due to incomplete continuity of operations.	High	HMGP, BRIC, FMA
To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.				
To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.				

Action/Implementation Plan and Project Description:

The Village of Pewaukee seeks to develop a complete Continuity of Operations (COOP) plan to address the various issues that could arise during a disruptive event impacting the leadership of the municipal government and its facilities necessary to conduct administrative and response operations. The plan should address all the legal, logistical, and operational elements necessary to ensure a seamless transfer of authority in a variety of situations, including key devolution events, alternate site(s) and/or appropriate mutual aid agreements/pacts, and reconstitution benchmarks for successfully reestablishing/resuming normal/pre-event operational and leadership status.

Mitigation Project: Develop an All-Hazards Emergency Operations Plan (EOP)

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Pewaukee	Village of Pewaukee Police Department	High	2024	\$15,000	Low
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	

<p>To preserve life and minimize the potential for injuries or death.</p> <p>To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.</p> <p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p>	<p>All-Hazards</p>	<p>Update and revise the Emergency Operations Plan (EOP) will improve the municipality's ability to remain agile and responsive to various disruptive events that may occur, protecting life, safety, and preserving property.</p>	<p>High</p>	<p>HMGP, BRIC, FMA</p>
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Action/Implementation Plan and Project Description:

Developing an All-Hazards Emergency Operations Plan (EOP) for the municipality will provide a uniform approach across all aspects of the Village of Pewaukee's jurisdictional operations to ensure the protection of life, safety, property, and viable commerce. The plan will provide an adaptable framework from which Village leadership can lead and direct municipal operations during disruptive events; a cadence for period training (tabletop and modified full-scale exercises), as well as periodic review and modification to maintain accurate and applicable information. The plan will incorporate elements of the COOP (when adopted) as well as necessary interactions between neighboring jurisdictions, Waukesha County Office of Emergency Management, Wisconsin Emergency Management (WEM), and FEMA.

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

<p>Mitigation Project: Install a back-up generator at Well #3 in the Village of Pewaukee.</p>							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Village of Pewaukee	Municipal Water Department	Medium to High	Ongoing	\$300,000	Low
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	

1	Utility Failure	[Insert]	Medium to High	As available
Action/Implementation Plan and Project Description:				
The computer system panel that manages the whole water utility system is in that well house and the system would not be able to be monitored and controlled if power was lost at that location				

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

- 2010 Reconstruction of the dam gates

Mitigation Project:							
Continue working on existing hazard mitigation activities at the Waukesha County Technical College (WCTC), including:							
<ul style="list-style-type: none"> • Installing a water retention pond at the base of a hill that separates WCTC’s property from the Pewaukee High School. • Meeting with local residents with concerns over walking trails eroded by rain in 2008-09 and described some planned repairs. 							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Complete	2011	WCTC, Village of Pewaukee	WCTC Facilities Services	Medium to High	Ongoing	N/A	Low
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1,2	Flood and Dam Failure		[Insert]		Medium to High	Covered by Dept annual budget	
Action/Implementation Plan and Project Description:							
Also working on community and environmental projects such as:							

- Work with the City of Brookfield’s Fox River Water Pollution Control Center to monitor and maintain safe water discharge levels as part of the Slug Prevention Plan.
- Working with the DNR to update the Air Pollution Control Registration Permit.

Mitigation Project: WCTC would like to add five additional storm water retention basins as part of the Master Facilities Plan.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Complete	2009	WCTC, Village of Pewaukee	WCTC Facilities Services	Low to Medium	Ongoing	\$600,000	Low
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
2	Flood and Dam Failure	[Insert]	Low to Medium	N/A			

Action/Implementation Plan and Project Description:

- Also working on an environmental project, which is an engineering study to see if a “green roof” can be installed on an existing building. The planned roof would be planted with approximately 6 inches of soil and native grasses.
- See maps in Appendix A for proposed site locations

Summit Village

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Wraalstad	Brian	Police Sergeant		262-567-1134	bwraalstad@summitpolice.org

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Summit Village	0	Yes	Yes	Yes	Yes	Yes	Yes

2021 Plan Participation and Involvement						
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities	
Hartert	Michael	Yes	Yes	Yes		

Community Profile and Description

Date of Incorporation: 2010

Current Population: The population of Summit Village in the 2019 US Census ACS was 5,040.

Population Growth: According to the Wisconsin Department of Administration, the village's population is expected to grow to 5,870 in 2025, to 6,053 in 2030, and then to 6,250 in 2035.

Location and Description: The village has a total area of 24.24 square miles, of which, 21.2 square miles of it is land and 3.04 square miles is water.

Governing Body Format: Village Board that includes an elected Village President and Board of Trustees.

Development Trends: Several new subdivisions are being constructed.

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments
Codes, Ordinances & Requirements				
Building Code	Yes		State	
Zonings	Yes			
Subdivisions	Yes	Yes	State	
Stormwater Management	Yes		State	

Post Disaster Recovery	Yes	Yes		
Growth Management	Yes			
Public Health and Safety	Yes	Yes		
Planning Documents				
General or Comprehensive Plan	Yes			
Environmental Protection	Yes	Yes	State/WI DNR	
Transportation Plan	Yes	Yes	SEWRPC	
Parks Plan	Yes	Yes		
Trail Plan	Yes	Yes		
Response/Recovery Planning				
Comprehensive Emergency Management Plan	Yes	Yes	Yes	Partner with Western Lakes Fire District
WUI Plan	-			
Post-Disaster Recovery Plan	-			
Continuity of Operations Plan	Yes			

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Village Planner
Engineers or professionals trained in building or infrastructure construction practices	No	
Planners or engineers with an understanding of natural hazards	Yes	Village Planner
Staff with training in benefit/cost analysis	No	
Surveyors	No	Contract out if needed

Personnel skilled or trained in GIS applications	No	Contract out if needed
Emergency manager	Yes	In partnership with Western Lakes Fire District
Grant writers	No	No assigned writers-Various departments will write a proposal

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

What department is responsible for floodplain management in your jurisdiction?	Village Planner
Are any certified floodplain managers on staff in your jurisdiction?	Yes (Part-time)
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	-
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	Yes, but updates may be needed
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Continuing Education
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No

TABLE: COMMUNITY CLASSIFICATIONS

	Participating?	Classification	Date Classified
NFIP	Yes		
Community Rating System	No		
StormReady	No		

Jurisdiction-Specific Hazards

Hazards that represent a county-wide risk are addressed in Volume 1. This section only addresses the hazards and their associated impacts that are relevant and unique to the municipality.

Dam Failure: There is one small dam on Waterville Lake.

Flooding: There have been incidents of extreme past flooding from Upper Nemahbin Lake. There is common flooding during rain events that close Venice Beach Road. Past high-water events from Middle/Lower Genesee Lakes flooded Genesee Lake Road have occurred.

Hazardous Materials Release: Aurora Hospital has HAZMAT materials on site which poses a threat to the facility and surrounding areas and populations.

Tornados and High Winds: These hazards pose a threat to the many old trees including a rustic road running through the village including old, large trees overhanging the road.

Political Hazards: There have been two cybersecurity attacks events.

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: New Mitigation Strategies for Waukesha County and All Participating Jurisdictions

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

Mitigation Project: Establish tree management program. Conduct tree pruning near power lines and removal of dead/diseased trees							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Summit	Public Works	Medium	Ongoing	N/A	Medium
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)			Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To preserve life and minimize the potential for injuries or death.	Thunderstorms Tornados High Winds Winter Storms	Reduction of trees falling on powerlines/blocking roadways/falling on homes			High	HMGP, BRIC	
To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.							
To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.							
To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.							
Providing inspectors with additional and enhanced communications devices will assist							

with the efficiency of damage assessment during an event.				
Action/Implementation Plan and Project Description:				
Conduct tree pruning near power lines and removal of dead/diseased trees to reduce tree failings on powerlines or homes and prevent blocking of roadways.				

Mitigation Project: Create a hazardous materials release plan							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Summit	Western Lake Fire District	High	Ongoing	N/A	Low
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
<p>To preserve life and minimize the potential for injuries or death.</p> <p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p> <p>To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.</p> <p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p>		Hazardous Materials Release	Saves lives due to a HazMat Incident		High	HMGP, BRIC	

Providing inspectors with additional and enhanced communications devices will assist with the efficiency of damage assessment during an event.				
Action/Implementation Plan and Project Description:				
Create a hazardous materials release plan.				

Mitigation Project: Study, develop, and implement a fuel shortage plan and strategy.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Summit	Public Works	High	Ongoing	N/A	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source		
To preserve life and minimize the potential for injuries or death.		All-Hazards	Continuity of services	High	HMGP, BRIC		
To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.							
To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.							
To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.							

Providing inspectors with additional and enhanced communications devices will assist with the efficiency of damage assessment during an event.				
Action/Implementation Plan and Project Description:				

Mitigation Project: Develop power outage plan/strategy and implement measures to ensure power is available at key facilities during a prolonged power outage situation. Measures include, but are not limited to:

- Harden utilities to ensure greater resiliency to natural and manmade hazards
- Procure generators and hookups for key facilities
- Study and explore sustainable microgrid alternatives to ensure continuity of power

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Summit	Public Works	High	Ongoing	N/A	Medium
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To preserve life and minimize the potential for injuries or death.	All-Hazards		Continuity of services		High	HMGP, BRIC	
To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.							
To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.							

<p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p> <p>Providing inspectors with additional and enhanced communications devices will assist with the efficiency of damage assessment during an event.</p>				
Action/Implementation Plan and Project Description:				
Continuation of power due to extreme weather events.				

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

Mitigation Project: Ongoing maintenance and enforcement of the Mitigation Handbook. Distribute handbook to residents, as needed							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2015	Village of Summit	Village of Summit	High	Ongoing	TBD	N/A
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
2		Flood and Dam Failure	Shoreland mitigation and protection		High	Local Funds	
Action/Implementation Plan and Project Description:							

Ongoing maintenance and enforcement of the Mitigation Handbook. Distribute handbook to residents, as needed.

<http://www.summitvillage.org/uploads/ckfiles/files/town-code/Shoreland%202013/Summit%20Mitigation%20Handbook.pdf>

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

Mitigation Project: Seek an acceptable (environmentally, socially, cost-benefit, politically, etc.) solution for removing water from the Genesee Lake system and the Genesee Lake Farms subdivision. Seek out funding sources (grants) to execute solutions.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2012	Summit	Municipal elected officials	High	Complete (2013)	N/A	N/A
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
2,5		Flood and Dam Failure	[Insert]		High	Covered in annual budget	
Action/Implementation Plan and Project Description:							
<ul style="list-style-type: none"> The Town submitted a pre-application for 404 dollars from FEMA-1768- DR-WI, which was denied due to not having a mitigation plan. The Town was awarded \$506,000 from the Community Development Block Grant – Emergency Assistance Program for the installation of an outlet pipe from Lower Genesee Lake to regulate the high-water levels. 							

Sussex Village

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Grod	Kris	Fire Chief	Sussex Fire	262-246-5235	kgrod@villagesussex.org

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Sussex Village	4	Yes	Yes	Yes	Yes	Yes	Yes

2021 Plan Participation and Involvement						
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities	
Grod	Kristopher	Yes	Yes			
Panas	Lisa			Yes - Approved annex		

Community Profile and Description

Date of Incorporation: 1924

Current Population: The population of Sussex Village in the 2019 US Census ACS was 10,833.

Population Growth: The current population is below what the Wisconsin Department of Administration (DOA) has predicted to be. However, according to the Wisconsin DOA, the village's population is expected to grow to 13,412 in 2025, to 14,399 in 2030, then to 15,480 in 2035.

Location and Description: The Village of Sussex is ideally located in the northeastern section of Waukesha County. Major highways that are accessible include State Highway 164 and I-94. The total area of the village is 7.62 square miles, of which, 7.57 square miles of it is land and 0.05 square miles is water.

Governing Body Format: Governed by a Village President, six Village Trustees, and Village Administrator form of government.

Development Trends: N/A

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments
Codes, Ordinances & Requirements				
Building Code	Yes		State	
Zonings	Yes			
Subdivisions	Yes		State	

Stormwater Management	Yes		State	
Post Disaster Recovery	Yes	Yes		
Growth Management	Yes			
Public Health and Safety	Yes	Yes		
Planning Documents				
General or Comprehensive Plan	Yes	Yes		
Environmental Protection	-	Yes	State/WI DNR	
Transportation Plan	-	Yes	SEWRPC	
Parks Plan	Yes	No		
Trail Plan	Yes	No		
Response/Recovery Planning				
Comprehensive Emergency Management Plan	Yes	Yes		
WUI Plan	Yes	Yes		
Post-Disaster Recovery Plan	-	No		
Continuity of Operations Plan	-	No		

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Engineering/Village
Engineers or professionals trained in building or infrastructure construction practices	Yes	Engineering/Village
Planners or engineers with an understanding of natural hazards	Yes	
Staff with training in benefit/cost analysis	Yes	Accountant

Surveyors	Yes	Zoning
Personnel skilled or trained in GIS applications	Yes	Zoning
Emergency manager	Yes	Fire/Police
Grant writers	Yes	Clerical/Fire

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE	
What department is responsible for floodplain management in your jurisdiction?	
Are any certified floodplain managers on staff in your jurisdiction?	-
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	-
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	Yes, but updates may be needed
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Continuing Education
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No

TABLE: COMMUNITY CLASSIFICATIONS			
	Participating?	Classification	Date Classified
NFIP	Yes		
Community Rating System	No		
StormReady	-		

Jurisdiction-Specific Hazards

Hazards that represent a county-wide risk are addressed in Volume 1. This section only addresses the hazards and their associated impacts that are relevant and unique to the municipality.

Flooding: Redford North of Lisbon floods on regular basis. Common flooding areas that occur in Village Park include in buildings and underground parking garages of apartment buildings that contain utilities.

Forest and Wildfires: Wildland interface fires occurring near subdivisions along Canadian National (North/South) and Union Pacific (East/West) rail lines.

Hazardous Materials Release: Industrial areas that have HAZMAT products, sharp packaging across from school district, and rail transportation on Canadian National or Union Pacific rail lines may all contribute to a release.

Rail Transportation Incident: Incident on tracks would prevent the first responder's ability to respond.

Thunderstorms: Thunderstorms contribute to the need for debris management.

Tornados and High Winds: These hazards contribute to the need for debris management.

Utility Failure: The current public safety building and civic campus generator are not adequate. There is a need to bury all utility lines to mitigate utility failure incidents that may also affect a courtyard at Sussex Living Facility (110 units and 103,999 square foot facility) that inhabit oxygen dependent residents.

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: New Mitigation Strategies for Waukesha County and All Participating Jurisdictions

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

Mitigation Project: Study and relocate, if necessary, buildings vulnerable to flooding. Sites include, but are not limited to: Parks Buildings							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Sussex	Village of Sussex	Medium	Ongoing	N/A	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.		Flooding	Avoid flooding.		High	HMGP, BRIC, FMA	
Action/Implementation Plan and Project Description:							
Moving of parks buildings to avoid flooding in Village Park							

Mitigation Project: Purchase generators and appropriate hookups							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Sussex	Village of Sussex	High	Ongoing	\$600,000	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis	Potential Funding Source	

			(Low, Medium, High)	
To preserve life and minimize the potential for injuries or death.				
To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.	Utility Failure	Avoid the loss of power to public buildings.	High	HMGP, BRIC
Action/Implementation Plan and Project Description:				
Purchase generators for the Public Safety Building (\$250,000), the Civic Campus (\$250,000), and the Public Works Building (\$100,000).				

Mitigation Project: Study and implement water looping measures for certain portions of the Village.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Sussex	Village of Sussex	Medium	Ongoing	\$2,000,000	High
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.	Utility Failure	Avoids water loss to residents.	High	HMGP, BRIC			
To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.							
Action/Implementation Plan and Project Description:							

Water looping avoids water loss to a certain portion of the Village. Existing conditions would have certain residents without water in the case of a power outage.

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

Mitigation Project: Install a back-up generator in the Village of Sussex public safety building.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	N/A	Village of Sussex	Engineering Department	High	Ongoing	\$100,000	Low
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1		Utility Failure	[Insert]		High	As available	
Action/Implementation Plan and Project Description:							
The County Sheriff has an office in the building as well as the village EOC and fire department. The fire department has an undersized generator that will power their side but not the newly expanded other portions of the building 2021 Update: Estimated cost increased from \$60,000-70,000 to \$100,000.							

Mitigation Project: Generator for Public Safety Building							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2015	Village of Sussex	Village of Sussex	High	Ongoing	\$52,000.00	N/A
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1		ALL	EOC is housed in the Public Safety building.		High	Federal Grants	
Action/Implementation Plan and Project Description:							

The current generator was purchased and intended for the Fire House, but subsequent additions of the Police Station require a new generator that can supply power for both entities.

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

- This jurisdiction does not have any completed mitigation actions.

Vernon Village

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Felde	Alex	Fire Chief		262-662-2079	afelde3@live.com

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Vernon Village	8	-	Yes	Yes	Yes	No new action identified	Not applicable

2021 Plan Participation and Involvement						
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities	
Hays	Patrick		Yes			

Community Profile and Description

Date of Incorporation: 2020 (formally Town of Vernon)

Current Population: The population of Vernon Village in the 2019 US Census ACS was 7,658.

Population Growth: The current population size has already surpassed the predictions made by the Wisconsin Department of Administration by a few hundred.

Location and Description: The village has a total area of 32.7 square miles, of which, 32.2 square miles of it is land and 0.5 square miles of it is water.

Governing Body Format: Village Board that includes an elected Village President and Board of Trustees.

Development Trends: N/A

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments
Codes, Ordinances & Requirements				

Building Code	Yes		State	
Zonings	Yes			
Subdivisions	Yes		State	
Stormwater Management	-	Yes	State	
Post Disaster Recovery	Yes	Yes		
Growth Management	-			
Public Health and Safety	-	Yes		
Planning Documents				
General or Comprehensive Plan	-			
Environmental Protection	-	Yes	State/WI DNR	
Transportation Plan	-	Yes	SEWRPC	
Parks Plan	-			
Trail Plan	-			
Response/Recovery Planning				
Comprehensive Emergency Management Plan	-	Yes		
WUI Plan	-			
Post-Disaster Recovery Plan	-			
Continuity of Operations Plan	-			

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	

Engineers or professionals trained in building or infrastructure construction practices	Yes	
Planners or engineers with an understanding of natural hazards		
Staff with training in benefit/cost analysis		
Surveyors		
Personnel skilled or trained in GIS applications		
Emergency manager	Yes	
Grant writers	Yes	

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE	
What department is responsible for floodplain management in your jurisdiction?	-
Are any certified floodplain managers on staff in your jurisdiction?	No
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	No
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	-
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	-
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No

TABLE: COMMUNITY CLASSIFICATIONS			
	Participating?	Classification	Date Classified
NFIP	No		
Community Rating System	No		
StormReady	-		

Jurisdiction-Specific Hazards

Hazards that represent a county-wide risk are addressed in Volume 1. This section only addresses the hazards and their associated impacts that are relevant and unique to the municipality.

Dam Failure: There are no dams in the village, but there are upriver in Mukwonago. There is potential for damages on the dam upriver which started to drain the lakes above into the Fox, causing flooding along the river (Riverside St) back in 2008. There is possible flooding over bridges and possible damage due to debris on Center Avenue Bridge.

Forest and Wildfires: With the Vernon MARSH and areas around the Fox River, there are multiple areas that could begin to burn and get out of control spreading to residential areas.

Rail Transportation Incident: The railroad line runs through the Vernon MARSH. There have been crash incidents with vehicles and trains. These types of incidents could cause derailments and hazards in the MARSH waterways.

Tornado and High Winds: Due to the rural nature of the area, there are multiple large trees/debris down, possibly blocking state, county, local roads, and highways. High winds could cause overturned vehicles and trucks blocking highways.

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: New Mitigation Strategies for Waukesha County and All Participating Jurisdictions

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

- This jurisdiction does not have any new mitigation actions.

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

Mitigation Project: Raise roads that get overtopped by water. Study and implement flood mitigation measures.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Vernon Village	County Highway	High	Ongoing	TBD	High
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
2	Flood and Dam Failure	Mitigate flooding	High	As available			
Action/Implementation Plan and Project Description:							
2021: Ongoing							

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

- This jurisdiction does not have any completed mitigation actions.

Wales Village

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Tamez	Gail	Administrator Clerk		262-968-3968	walesclerk@bizwi.rr.com
Fitzsimmons	Theresa	Lead Maintenance		262-349-6531	walesgrounds@gmail.com

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Wales Village	52	Yes	Yes	Yes	Yes	Yes	Yes

2021 Plan Participation and Involvement						
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities	
Tamez	Gail	Yes	Yes			
Fitzsimmons	Theresa		Yes			

Community Profile and Description

Date of Incorporation: 1922

Current Population: The population of Wales Village in the 2019 US Census ACS was 2,581.

Population Growth: The current population size has already surpassed the predictions made by the Wisconsin Department of Administration.

Location and Description: The Village of Wales study area has located in the center of Waukesha County. And encompasses approximately 3.29 square miles. The village is located in the central portion of Waukesha County.

Governing Body Format: Village Board that includes an elected Village President and Board of Trustees.

Development Trends: N/A

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments
Codes, Ordinances & Requirements				

Building Code	Yes		State	
Zonings	Yes			
Subdivisions	Yes		State	
Stormwater Management	Yes		State	
Post Disaster Recovery	-	Yes		
Growth Management	Yes			
Public Health and Safety	-	Yes		
Planning Documents				
General or Comprehensive Plan	Yes			
Environmental Protection	-	Yes	State/WI DNR	
Transportation Plan	-	Yes	SEWRPC	
Parks Plan	Yes			
Trail Plan	Yes			
Response/Recovery Planning				
Comprehensive Emergency Management Plan	-	Yes		
WUI Plan	No			
Post-Disaster Recovery Plan	-	Yes		
Continuity of Operations Plan	No			

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	SEH Contract

Engineers or professionals trained in building or infrastructure construction practices	Yes	SEH Contract
Planners or engineers with an understanding of natural hazards	Yes	SEH Contract
Staff with training in benefit/cost analysis	Yes	Administration and Trustees
Surveyors	Yes	SEH Contract
Personnel skilled or trained in GIS applications	Yes	SEH Contract
Emergency manager	No	
Grant writers	No	

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

What department is responsible for floodplain management in your jurisdiction?	Contract SEH
Are any certified floodplain managers on staff in your jurisdiction?	SEH
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	No
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	Yes, but updates may be needed
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	No
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No

TABLE: COMMUNITY CLASSIFICATIONS

	Participating?	Classification	Date Classified
NFIP	Yes		
Community Rating System	No		
StormReady	No		

Jurisdiction-Specific Hazards

Hazards that represent a county-wide risk are addressed in Volume 1. This section only addresses the hazards and their associated impacts that are relevant and unique to the municipality.

Extreme Cold: The aging population, high school, and elementary schools in the jurisdiction are vulnerable to extreme cold events.

Extreme Heat: The aging population, high school, and elementary schools in the jurisdiction are vulnerable to extreme cold events.

Flooding: Breconshire Park and subdivision have experienced prior flooding from winter storms. Oak Crest Drive has also experienced prior flooding due to winter storms.

Forest and Wildfires: Possible risk of forest and wildfires may occur on the west side of the Village because it contains wooded subdivisions and lots of community park open nature areas.

Hazardous Materials Release: Highway 18 and Highway 83 are high areas of truck transport with two gas stations in the same area.

Tornados and High Winds: Wales, in general, has experienced tornados and high winds in the past.

Utility Failure: The sewer pumphouse on Highway 18 and Highway 83 has backup natural gas generator allowing to continue operation of government.

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

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Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

Mitigation Project: Install generator and appropriate hookups at the community building							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Wales	Municipal officials	Medium	2022 - Short	\$20,000-25,000	Medium
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.		Utility Failure	Allow for the continued operation of the village during a utility failure incident.		High	HMGP, BRIC, tax dollars	
Action/Implementation Plan and Project Description:							
The village would like to install a permanent generator at the community building.							

Mitigation Project: Maintain and clean storm basins and implement a culvert replacement strategy to mitigate flooding							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Wales	Municipal officials	Low	Ongoing	N/A	Medium
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.		Flooding	Prevent flooding		High	HMGP, BRIC, FMA Tax dollars	
Action/Implementation Plan and Project Description:							
To prevent flooding, the village would like to continue to clean storm basins at the Community and Breconshire Park. Culverts are needed to be replaced and cleaned, especially on Dylan Rd. and Brandy Brook.							

Mitigation Project: Improve public awareness and education, including, but not limited to: updating Village website to include county, state, and federal emergency management and preparedness sites, and increase presence on social media.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Wales	Municipal officials	Low	Ongoing	under \$1,000	Low
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To preserve life and minimize the potential for injuries or death.		Tornados and High Winds	Prevent the loss of life-property damage		High	HMGP, BRIC Tax dollars	

<p>To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.</p> <p>Providing inspectors with additional and enhanced communications devices will assist with the efficiency of damage assessment during an event.</p>				
Action/Implementation Plan and Project Description:				

Mitigation Project: Procure funds and build a salt shed to increase winter weather response and safety capabilities							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Wales	Municipal officials	Medium	2022 - Short	\$300,000	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To preserve life and minimize the potential for injuries or death.		Winter Storms	Preserve life and property		High	Local funds, grants	
Action/Implementation Plan and Project Description:							
Build a salt shed							

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

Mitigation Project: Remove old, diseased or damaged trees that are a risk for damaging property in a severe storm.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Village of Wales	Municipal Officials	Medium	Ongoing	\$10,000 over three years	Low
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1	Thunderstorms, Tornadoes and High Winds, Winter Storms, Utility Failure		[Insert]		Medium	Municipally Funded	
Action/Implementation Plan and Project Description:							
The 2010 contract is for \$3,000							
2021 update: The 2021 contract is for \$5,000. Ongoing							

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

- This jurisdiction does not have any completed mitigation actions.

Waukesha Village

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Bledsoe	Brandon	Clerk		262-542-5030	bbledsoe@villageofwaukesha.com
Stolldorf	Andrew	Fire Inspector	Village of Waukesha FD	262-542-3199	fireinspect@villageofwaukesha.com
Doerr	Michael	Village President			mdoerr@villageofwaukesha.com
Noelle	Jerry	Public Works Director			jnoelle@villageofwaukesha.com

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Waukesha Village	10	-	Yes	Yes	Yes	Yes	Not applicable

2021 Plan Participation and Involvement					
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities
Stolldorf	Andrew		Yes		Meeting/ Plan Item Development

Community Profile and Description

Date of Incorporation: 2020

Current Population: The population of Waukesha Village in the 2020 Census (or US Census ACS) was 8,829.

Population Growth: According to the Wisconsin Department of Administration, the village's population is expected to grow to 9,354 in 2025, to 9,493 in 2030, then finally to 9,646 in 2035.

Location and Description: The village is located in south-central Waukesha County, and has a total area of 23.0 square miles, of which, 22.9 square miles of it is land and 0.1 square miles of it is water.

Governing Body Format: The village is governed by a Village Board which consists of the President and four Trustees.

Development Trends:

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments

Codes, Ordinances & Requirements				
Building Code	Yes		State	
Zonings	Yes			
Subdivisions	-		State	
Stormwater Management	-		State	
Post Disaster Recovery	-	Yes		
Growth Management	Yes			
Public Health and Safety	-	Yes		
Planning Documents				
General or Comprehensive Plan	Yes			
Environmental Protection	-	Yes	State/WI DNR	
Transportation Plan	-	Yes	SEWRPC	
Parks Plan	-			
Trail Plan	-			
Response/Recovery Planning				
Comprehensive Emergency Management Plan	-	Yes		
WUI Plan	-			
Post-Disaster Recovery Plan	-			
Continuity of Operations Plan	-			

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
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Planners or engineers with knowledge of land development and land management practices	Yes	
Engineers or professionals trained in building or infrastructure construction practices	Yes	
Planners or engineers with an understanding of natural hazards		
Staff with training in benefit/cost analysis		
Surveyors		
Personnel skilled or trained in GIS applications	Yes	Waukesha County
Emergency manager		
Grant writers		

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

What department is responsible for floodplain management in your jurisdiction?	-
Are any certified floodplain managers on staff in your jurisdiction?	-
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	-
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	-
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	No
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No

TABLE: COMMUNITY CLASSIFICATIONS

	Participating?	Classification	Date Classified
NFIP	No		

Community Rating System	No		
StormReady	-		

Jurisdiction-Specific Hazards

Hazards that represent a county-wide risk are addressed in Volume 1. This section only addresses the hazards and their associated impacts that are relevant and unique to the municipality.

Flooding: There is a need to replace failing and undersized culverts to prevent flooding.

Forest and Wildfires: Large areas in the southern part of the community with large fields are capable of spreading fires quickly.

Hazardous Materials Release: Higher transport via bypass 18.

Rail Transportation Incident: There are multiple rail transportation crossings near multiple waterways or wetlands. A couple of crossings are unguarded; Oakdale Dr., Glendale Dr., Sunset Dr.

Thunderstorms: There is a need to replace failing and undersized culverts to prevent flooding caused by thunderstorms.

Utility Failure: There is no backup power solution at the public building to continue or address emergency situations or provide a space for citizens to seek shelter in the event of a utility failure incident.

Winter Storms: Places with minimal staff and an aging fleet with outside storage can be susceptible to effects from winter storms which can cause delays possibly.

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: New Mitigation Strategies for Waukesha County and All Participating Jurisdictions

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

Mitigation Project: Establish shelter and procure equipment for extreme heat/cold and winter storms events							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Waukesha	Village of Waukesha	High	Ongoing	N/A	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To preserve life and minimize the potential for injuries or death.		extreme heat/cold winter storms	Prevent damages and losses from extreme heat/cold and winter storms events.		High	HMGP, BRIC	
To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.							

<p>To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.</p> <p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p> <p>Providing inspectors with additional and enhanced communications devices will assist with the efficiency of damage assessment during an event.</p>				
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Action/Implementation Plan and Project Description:

Address, establish, build means of addressing extreme heat/cold and winter storms/heavy snow emergencies which include places to shelter with trained staff as well as adequately store equipment that is needed during emergencies.

Mitigation Project: Study and fix/replace undersized or failing culverts to mitigate flooding issues

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Waukesha	Village of Waukesha	High	Ongoing	N/A	High
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
<p>To preserve life and minimize the potential for injuries or death.</p> <p>To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.</p>	Winter storms		Prevent the loss of property and life from winter storm events.		High	HMGP, BRIC, FMA	

<p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p> <p>Providing inspectors with additional and enhanced communications devices will assist with the efficiency of damage assessment during an event.</p>				
Action/Implementation Plan and Project Description:				
Address, fix or replace undersized or failing culverts to prevent stormwater/flooding issues.				

Mitigation Project: Establish emergency backup power. Procure generators and appropriate hookups, and implement mitigation measures to ensure power supply and equipment are resilient to surge and lightning.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Village of Waukesha	Village of Waukesha	High	Ongoing	N/A	Medium
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source		
To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.		Utility Failure	Maintain operations to municipal buildings during a utility failure event.	High	HMGP, BRIC		
Action/Implementation Plan and Project Description:							
Establish emergency backup power to municipal buildings as well as adequate lightning and surge protection.							

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

- This jurisdiction does not have any ongoing mitigation actions or actions that are still in progress as identified in previous plan updates.

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

- This jurisdiction does not have any completed mitigation actions.

Brookfield Town

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Hagie	Tom	Administrator		262-796-3788	administrator@townofbrookfield

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Brookfield Town	7	Yes	Yes	Yes	Yes	Yes	Yes

2021 Plan Participation and Involvement						
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities	
Hagie	Tom	Yes	Yes			
Smerz	Andrew		Yes			
Henderson	Keith		Yes			

Community Profile and Description

Date of Incorporation: 1843

Current Population: The population of Brookfield Town in the 2019 US Census ACS was 6,517.

Population Growth: According to the Wisconsin Department of Administration, the town’s population is expected to grow to 7,782 in 2025, then to 8,055 in 2030, and finally to 8,349 in 2035.

Location and Description: The town has a total area of 5.5 square miles, all of it land.

Governing Body Format: The town’s elected officials include an elected Chairman, Board of Supervisors, and Municipal Judge.

Development Trends: N/A

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments
Codes, Ordinances & Requirements				
Building Code	Yes	-	State	

Zonings	Yes	Yes		Shoreland Zone through County
Subdivisions	Yes	-	State	
Stormwater Management	Yes	Yes	State	
Post Disaster Recovery	-	Yes		
Growth Management	Yes	Yes		In progress with comprehensive plan update
Public Health and Safety	Yes	Yes		
Planning Documents				
General or Comprehensive Plan	Yes	Yes		In progress with comprehensive plan update
Environmental Protection	Yes	Yes	State/WI DNR	
Transportation Plan	Yes	Yes	SEWRPC	
Parks Plan	Yes	Yes		
Trail Plan	Yes	Yes		
Response/Recovery Planning				
Comprehensive Emergency Management Plan	-	Yes		
WUI Plan	-	-		
Post-Disaster Recovery Plan	-	-		
Continuity of Operations Plan	-	-		

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
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Planners or engineers with knowledge of land development and land management practices	Yes	Development Services, Consultants (Town Engineer); Dept Park and Land Use, Planning and Zoning Staff
Engineers or professionals trained in building or infrastructure construction practices	Yes	Development Services, Town Engineer; Dept of Public Works
Planners or engineers with an understanding of natural hazards	Yes	Town Engineer; Dept Park and Land Use
Staff with training in benefit/cost analysis	Yes	Dept Park and Land Use
Surveyors	Yes	Town Engineer; Dept Park and Land Use
Personnel skilled or trained in GIS applications	Yes	Town Engineer; Dept Park and Land Use
Emergency manager	Yes	Administrator
Grant writers	Yes	Department Heads, Town Engineer

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

What department is responsible for floodplain management in your jurisdiction?	Development Services, Dept Park and Land Use
Are any certified floodplain managers on staff in your jurisdiction?	No
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	No
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	Yes, but updates may be needed
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Continuing Education
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No

TABLE: COMMUNITY CLASSIFICATIONS

	Participating?	Classification	Date Classified
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NFIP	The county participates, but towns do not		
Community Rating System	No		
StormReady	-		

Jurisdiction-Specific Hazards

Hazards that represent a county-wide risk are addressed in Volume 1. This section only addresses the hazards and their associated impacts that are relevant and unique to the municipality.

Flooding: Flood-prone areas include: Barker Road/Poplar Creek, Deer Creek, Dousman Ditch/Underwood Creek, Briar Ridge Drive/Timberline Drive, Brook Park Drive/Gray Fox Drive, I-94/Springdale Road.

Thunderstorms: There are chronic power outages in Summit Lawn Estates, Black Forest Knoll, and Brookhill Estates Subdivisions.

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: New Mitigation Strategies for Waukesha County and All Participating Jurisdictions

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

Mitigation Project: Study and implement electric/powerline relocation or improvements to mitigate power outages in Summit Lawn Estates/Black Forest Knoll/Brookhill Estates subdivisions.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Town of Brookfield	Town of Brookfield	High	Ongoing	N/A	High
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.	Thunderstorms, Tornados and High Winds, Utility Failure, Winter Storms		Reliable power, reduce property loss (i.e., flood)		High	HMGP, BRIC	
Action/Implementation Plan and Project Description:							
Electric line relocation to prevent chronic power outages in the Summit Lawn Estates/Black Forest Knoll/Brookhill Estates subdivisions.							

Mitigation Project: Purchase backup generators and appropriate hookups							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Town of Brookfield	Town of Brookfield	High	Ongoing	N/A	Medium

Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source
To preserve life and minimize the potential for injuries or death.	All Hazards	Provide constant power during disaster events	High	HMGP, BRIC
To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.				
Action/Implementation Plan and Project Description:				
Backup generators for municipal buildings/utilities				

Mitigation Project: Study and implement flood mitigation alternatives in high-risk areas, such as, but not limited to:

- Barker Rd/Poplar Creek, Deer Creek Corridor, Dousman Ditch/Underwood Creek Corridor, Briar Ridge Dr/Timberline Dr, Brook Park Subdivision, I-94/Springdale Road

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Town of Brookfield/City of Brookfield	Town of Brookfield/City of Brookfield	Medium	Ongoing	N/A	High
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.	Flooding	Property loss	High	HMGP, BRIC, FMA			
Action/Implementation Plan and Project Description:							

Flood mitigation in flood-prone areas: Barker Rd/Poplar Creek, Deer Creek Corridor, Dousman Ditch/Underwood Creek Corridor, Briar Ridge Dr/Timberline Dr, Brook Park Subdivision, I-94/Springdale Road

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

- The town does not have any ongoing actions.

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

Mitigation Project: Brook Park Pond Outlet structure emergency improvements to address flood/erosion issues.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Complete	2016	Brookfield Town	Brookfield Town	High	Long-term	TBD	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1, 2		flooding	Mitigate Flooding		High	BRIC, HMGP, Local Funds	
Action/Implementation Plan and Project Description:							

Mitigation Project: Brook Park Pond Dr/Gray Fox Drive reconstruction to address flooding issues							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Complete	2016	Brookfield Town	Brookfield Town	High	Long-term	TBD	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1, 2		Flooding	Mitigate Flooding		High	HMGP, BRIC, Local Funds	
Action/Implementation Plan and Project Description:							

Mitigation Project: Poplar Creek Streambank stabilization and restoration to address erosion and flooding issues.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Complete	2016	Brookfield Town	Brookfield Town	High	Long-term	TBD	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
1, 2		Flooding	Mitigate Flooding		High	HMGP, BRIC, Local Funds	
Action/Implementation Plan and Project Description:							

Delafield Town

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Fennig	Matt	Fire Chief		262-646-6235	mfennig@lakecountryfire.com
Green	Daniel	Administrator	Town of Delafield	262-646-2398	dgreen@townofdelafield.org

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Delafield Town	5	Yes	Yes	Yes	Yes	Yes	Not applicable

2021 Plan Participation and Involvement						
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities	
Green	Daniel	Yes	Yes			
Barbeau	Tim		Yes			

Community Profile and Description

Date of Incorporation: 1959

Current Population: The population of Delafield Town in the 2019 US Census ACS was 8,713.

Population Growth: According to the Wisconsin Department of Administration (DOA), the town’s population is expected to grow to 10,949 in 2025, then to 11,603 in 2030, then finally to 12,313 in 2035. However, the DOA's predictions for the town's population are over what the current population is in 2021.

Location and Description: Delafield is located in the Lake Country area of Waukesha County. The town has a total area of 18.34 square miles.

Governing Body Format: The Town Board consists of four Supervisors and a Chairperson.

Development Trends: N/A

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments
Codes, Ordinances & Requirements				

Building Code	Yes	No	State	
Zonings	-	Yes		Shoreland
Subdivisions	Yes	Yes	State	Shoreland
Stormwater Management	-	Yes	State	
Post Disaster Recovery	-	Yes	Lake Country Fire	
Growth Management	-	Yes		Comprehensive Plan
Public Health and Safety	-	Yes	Lake Country Fire	
Planning Documents				
General or Comprehensive Plan	Yes	Yes		
Environmental Protection	Yes	Yes	Lake Pewaukee Sanitary District; State/WI DNR	
Transportation Plan	Yes	Yes	SEWRPC	
Parks Plan	Yes	Yes		
Trail Plan	Yes	Yes		
Response/Recovery Planning				
Comprehensive Emergency Management Plan	-	Yes	Lake Country Fire	
WUI Plan	-	-		
Post-Disaster Recovery Plan	-	Yes	Lake Country Fire	
Continuity of Operations Plan	-	-		

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
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Planners or engineers with knowledge of land development and land management practices	Yes	RA Smith - Engineer
Engineers or professionals trained in building or infrastructure construction practices	Yes	Safebuilt-Building Inspector
Planners or engineers with an understanding of natural hazards	Yes	Dept. of Parks and Land Use staff are a resource
Staff with training in benefit/cost analysis	Yes	Dept. of Parks and Land Use staff are a resource
Surveyors	Yes	RA Smith
Personnel skilled or trained in GIS applications	Yes	RA Smith
Emergency manager	Yes	Lake Country Fire
Grant writers	Yes	RA Smith

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

What department is responsible for floodplain management in your jurisdiction?	Waukesha County
Are any certified floodplain managers on staff in your jurisdiction?	RA Smith
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	No
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	No
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Continuing Education
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No

TABLE: COMMUNITY CLASSIFICATIONS

	Participating?	Classification	Date Classified
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NFIP	The county participates, but towns do not		
Community Rating System	No		
StormReady	-		

Jurisdiction-Specific Hazards

Hazards that represent a county-wide risk are addressed in Volume 1. This section only addresses the hazards and their associated impacts that are relevant and unique to the municipality.

Dam Failure: Waukesha County designated Zion Creek near Elmhurst Road to have potential dam failure. This extends across I-94 to Western Lakes Golf Course.

Flooding: Water flows over Cushing Park Road near Highway 18 during heavy rainfalls. Hills of Delafield Subdivision have an increased risk of backyard flooding. These homes are along the south side of Glacier Pass. Flooding along Lakeside Road, Stormwater, and Springs run over the road and into properties along the lake.

Forest and Wildfires: Lapham peak is vulnerable to this hazard and the consequence of fire would be an immediate hazard to homes in the area.

Hazardous Materials Release: There is the potential of hazardous materials entering Lake Pewaukee.

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: New Mitigation Strategies for Waukesha County and All Participating Jurisdictions

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

Mitigation Project: Study and implement improvements on Elmhurst Road, such as increasing the culvert capacity, to mitigate future flooding.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Town of Delafield	Waukesha County	High	Ongoing	N/A	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To preserve life and minimize the potential for injuries or death.		Dam Failure, Flooding	Avoid the potential of flooding.		High	HMGP, BRIC, FMA	
To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.							
To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.							

Action/Implementation Plan and Project Description:

There is the potential for dam failure because the culvert under Elmhurst Road near Silvernail and under I-94 needs to be expanded.

Mitigation Project: Mitigate flooding on Cushing Park Road

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Town of Delafield	Waukesha County	Medium	Ongoing	N/A	High
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
To preserve life and minimize the potential for injuries or death. To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate. To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.	Flooding	Avoid road damage and flooding	High	HMGP, BRIC, FMA			

Action/Implementation Plan and Project Description:

Cushing Park Road needs to be raised and a larger culvert installed to prevent flooding. This is where scuppernong runs underneath.

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

- This jurisdiction does not have any ongoing mitigation actions or actions that are still in progress as identified in previous plan updates.

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

- This jurisdiction does not have any completed mitigation actions.

Eagle Town

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Kugel	Scott	Fire Chief		262-594-3302 ext 2 715-889-2317 cell	dcskugel.eafd@gmail.com

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Eagle Town	3	-	Yes	No	Yes	Yes	Not applicable

2021 Plan Participation and Involvement					
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities
Mommaerts	Chris		Yes		

Community Profile and Description

Date of Incorporation: 1836

Current Population: The population of Eagle Town in the 2019 US Census ACS was 3,556.

Population Growth: According to the Wisconsin Department of Administration, the town’s population is expected to grow to 4,793 in 2025, then to 5,156 in 2030, then finally to 5,554 in 2035.

Location and Description: The town has a total area of 35.1 square miles, of which, 34.6 square miles of it is land and 0.4 square miles of it is water.

Governing Body Format: The Town of Eagle Town Board consists of four supervisors and one chairman.

Development Trends: N/A

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments
Codes, Ordinances & Requirements				
Building Code	Yes	-	State	
Zonings	-	Yes		
Subdivisions	Yes	Yes	State	
Stormwater Management	Yes	Yes	State	

Post Disaster Recovery	-	-		
Growth Management	-	Yes		
Public Health and Safety	Yes	Yes		
Planning Documents				
General or Comprehensive Plan	Yes	Yes		
Environmental Protection	Yes	Yes	State/WI DNR	
Transportation Plan	Yes	Yes	SEWRPC	
Parks Plan	Yes	Yes		
Trail Plan	Yes	Yes		
Response/Recovery Planning				
Comprehensive Emergency Management Plan	-	Yes		
WUI Plan	-	-		
Post-Disaster Recovery Plan	-	-		
Continuity of Operations Plan	-	-		

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Dept of Park and Land Use, Planning and Zoning Staff
Engineers or professionals trained in building or infrastructure construction practices	Yes	Dept. of Public Works
Planners or engineers with an understanding of natural hazards	Yes	Dept of Park and Land Use staff
Staff with training in benefit/cost analysis	Yes	Dept of Park and Land Use staff
Surveyors	Yes	Dept. of Public Works

Personnel skilled or trained in GIS applications	Yes	Dept of Park and Land Use
Emergency manager	-	
Grant writers	-	

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

What department is responsible for floodplain management in your jurisdiction?	Dept of Park and Land Use
Are any certified floodplain managers on staff in your jurisdiction?	No
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	No
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	Yes, but updates may be needed
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Continuing Education
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No

TABLE: COMMUNITY CLASSIFICATIONS

	Participating?	Classification	Date Classified
NFIP	The county participates, but towns do not		
Community Rating System	No		
StormReady	-		

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: New Mitigation Strategies for Waukesha County and All Participating Jurisdictions

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

Mitigation Project: Establish and promote a public education program							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long- term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Eagle, Town	Town of Eagle	High	2022	TBD	Low
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis	Potential Funding Source			

			(Low, Medium, High)	
<p>To preserve life and minimize the potential for injuries or death.</p> <p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p> <p>To promote countywide coordination, planning, and training that avoids transferring the risk from on community to an adjacent community, where app</p> <p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p> <p>Increase Public Awareness</p>	All Hazards	<p>Establish and promote a public education program (in-person, printed material, website/social media), to instruct and educate the public of appropriate actions for preparedness, during a disaster, and after a disaster; the program seeks to save lives and preserve property and minimize unnecessary losses.</p>	High	HMGP, BRIC, FMA
Action/Implementation Plan and Project Description:				

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

- This jurisdiction does not have any ongoing mitigation actions or actions that are still in progress as identified in previous plan updates.

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

- This jurisdiction does not have any completed mitigation actions.

Genesee Town

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Herrmann	Jeff	Administrator	Town of Genesee	262-968-3656	jeffh@towngenesee.org
Majeskie	Meri	Clerk	Town of Genesee	262-968-3656	merim@towngenesee.org

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Town of Genesee	15	Yes	Yes	Yes	Yes	Yes	Not applicable

2021 Plan Participation and Involvement						
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities	
Gibson	William	Yes	Yes			
Houston	Buck	Yes				
Majeskie	Meri	Yes	Yes			
Berg	Mike		Yes			

Community Profile and Description

Date of Incorporation: 1843

Current Population: The population of Genesee Town in the 2019 US Census ACS was 7,315.

Population Growth: Growth in the Town has generally followed the rapid growth trends found in other Towns in Waukesha County. According to the Wisconsin Department of Administration, the town’s population is expected to grow to 8,971 in 2025, to 9,305 in 2030, then finally to 9,664 in 2035.

Location and Description: Genesee Township is located near the center of Waukesha County. The town has an area of 32.0 square miles, of which, 31.9 square miles of it is land and 0.1 square miles of it is water.

Governing Body Format: The Town of Genesee Town Board consists of four supervisors and one chairman.

Development Trends: N/A

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments

Codes, Ordinances & Requirements				
Building Code	Yes	-	State	
Zonings	-	Yes		
Subdivisions	Yes	Yes	State	
Stormwater Management	-	Yes	State	
Post Disaster Recovery	-	Yes		
Growth Management	-	Yes		
Public Health and Safety	Yes	Yes		Fire Department is regional
Planning Documents				
General or Comprehensive Plan	Yes	Yes		
Environmental Protection	Yes	Yes	State/WI DNR	
Transportation Plan	Yes	Yes	SEWRPC	Waukesha County
Parks Plan	Yes	Yes		Official maps/roads
Trail Plan	Yes	Yes		Official maps/roads
Response/Recovery Planning				
Comprehensive Emergency Management Plan	-	Yes		
WUI Plan	-	-		
Post-Disaster Recovery Plan	-	-		
Continuity of Operations Plan	-	-		

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
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Planners or engineers with knowledge of land development and land management practices	Yes	Admin/planner or staff
Engineers or professionals trained in building or infrastructure construction practices	Yes	SEH Engineering
Planners or engineers with an understanding of natural hazards	Yes	
Staff with training in benefit/cost analysis	Yes	Dept of Park and Land Use
Surveyors	Yes	SEH Engineering
Personnel skilled or trained in GIS applications	Yes	Admin/planner
Emergency manager	Yes	Fire Chief
Grant writers	Yes	Park Board Chairman/SEH and staff

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

What department is responsible for floodplain management in your jurisdiction?	Waukesha County
Are any certified floodplain managers on staff in your jurisdiction?	No
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	No
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	Yes, but updates may be needed
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Continuing Education
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No

TABLE: COMMUNITY CLASSIFICATIONS

	Participating?	Classification	Date Classified
NFIP	The county participates, but towns do not		

Community Rating System	No		
StormReady	No		

Jurisdiction-Specific Hazards

Hazards that represent a county-wide risk are addressed in Volume 1. This section only addresses the hazards and their associated impacts that are relevant and unique to the municipality.

Dam Failure: A breach in Saylesville Dam could cause property damage and impact people downstream.

Extreme Cold: Extreme cold contributes to power outages which impact the aging population in town. This will require the need of generators.

Extreme Heat: Extreme cold contributes to power outages which impact the aging population in town. This will require the need of generators. Extreme heat also impacts trees and roads may buckle.

Flooding: Flooding is prone to happen in the following locations: Gush Road, Point Road, Hillside Holiday Road, Quail Run, Bartell, Spring Ridge, Road X, St Davids Road, Morris Road, Old Village Road.

Thunderstorms: Thunderstorms can cause trees and powerlines to go down which results in the need to help residents with cleanup and tree removal.

Tornados and High Winds: There are no sirens to warn of this hazard. Tornados and high winds also increase the chances of trees and powerlines to fall down and cause more damages to homes/buildings. The older population without cellphones or without weather radios are susceptible to this hazard given they do not have many ways of communication to be notified of the emergency.

Utility Failure: There is a need for a backup generator to be placed at all town properties.

Winter Storm: Winter storms contribute to blocked roads and ice.

Political Hazards: Cyberattack threats cause the need to upgrade internet and wiring, antivirus, and routers.

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
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- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: New Mitigation Strategies for Waukesha County and All Participating Jurisdictions

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

Mitigation Project: Implement measures to prepare town for tornados and high winds, such as, but not limited to: removing trees, hardening utilities, and better educating residents.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Town of Genesee	Town of Genesee	High	Ongoing	N/A	Medium
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	

<p>To preserve life and minimize the potential for injuries or death.</p> <p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p> <p>To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.</p> <p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p> <p>Providing inspectors with additional and enhanced communications devices will assist with the efficiency of damage assessment during an event.</p>	<p>Tornados</p> <p>High Winds</p>	<p>Prevent the loss of property and life.</p>	<p>High</p>	<p>HMGP, BRIC</p>
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Action/Implementation Plan and Project Description:
 Prepare for tornados and high winds by using a bucket truck to remove trees, and provide weather radios for residents

Mitigation Project: Upgrade internet wiring, routers and broadband infrastructure to build resiliency against cyberattacks

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Town of Genesee	Town of Genesee	Medium	Ongoing	N/A	Medium
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	

<p>To preserve life and minimize the potential for injuries or death.</p> <p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p> <p>To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.</p> <p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p> <p>Providing inspectors with additional and enhanced communications devices will assist with the efficiency of damage assessment during an event.</p>	Political hazards	Prevent the loss and secure cyber data.	High	HMGP, BRIC
Action/Implementation Plan and Project Description:				
Upgrade internet wiring, routers, etc to prepare for cyberattacks.				

Mitigation Project: Purchase generators and appropriate hookups in all town buildings							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Town of Genesee	Town of Genesee	High	Short	N/A	Medium
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source		

To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.	Utility Failure	Maintain operations during a utility failure event.	High	HMGP, BRIC, FMA
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Action/Implementation Plan and Project Description:

Purchase and place generators in all town buildings and backup buildings in case of emergencies.

Mitigation Project: Mitigate concerns and issues on Saylesville Dam

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Town of Genesee	Town of Genesee	High	Ongoing	N/A	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To preserve life and minimize the potential for injuries or death.		Dam Failure Flooding	Prevent the loss of property and life.		High	HMGP, BRIC, FMA	

Action/Implementation Plan and Project Description:

N/A

Mitigation Project: Study and improve road infrastructure (i.e. roads and culverts) to mitigate flooding and potential for washouts. Areas of concern include, but are not limited to: Grush Road, Paint Rd, Hillside Rd, Holiday Rd, Quail Run, Bartell Rd, Spring Ridge, St Davids Rd, Morris Rd, and Old Village Rd.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Town of Genesee	Town of Genesee	High	Ongoing	N/A	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To preserve life and minimize the potential for injuries or death.			Prevent the loss of life and property.		High	HMGP, BRIC	

Action/Implementation Plan and Project Description:

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

- This jurisdiction does not have any ongoing mitigation actions or actions that are still in progress as identified in previous plan updates.

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

- This jurisdiction does not have any completed mitigation actions.

Lisbon Town

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Osterman	Joseph	Chairperson	Lisbon	262-264-6100 ext 1200	josterman@townoflisbonwi.com
Nickolaus	Kathy	Administrator	Lisbon	262-264-6100	knickolaus@townoflisbon.com

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Lisbon Town	11	-	Yes	Yes	Yes	Yes	Yes

2021 Plan Participation and Involvement						
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities	
Nickolaus	Kathy		Yes			

Community Profile and Description

Current Population: The population of Lisbon Town in the 2019 US Census ACS was 10,810.

Population Growth: The population of Lisbon Town has grown past what the Wisconsin Department of Administration predicted by over 15 years

Location and Description: The Town of Lisbon is located in north-central Waukesha County. The town has a total area of 29.6 square miles, of which, 29.5 square miles of it is land and 0.04 square miles of it is water.

Governing Body Format: The Town Board consists of five elected Supervisors members.

Development Trends: N/A

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments
Codes, Ordinances & Requirements				
Building Code	Yes	-	State	
Zonings	-	Yes		
Subdivisions	Yes	Yes	State	
Stormwater Management	-	Yes	State	

Post Disaster Recovery	-	-		
Growth Management		-Yes		
Public Health and Safety	Yes	Yes		
Planning Documents				
General or Comprehensive Plan	Yes	Yes		
Environmental Protection	Yes	Yes	State/WI DNR	
Transportation Plan	Yes	Yes	SEWRPC	
Parks Plan	Yes	Yes		
Trail Plan	Yes	Yes		
Response/Recovery Planning				
Comprehensive Emergency Management Plan	Yes	Yes		
WUI Plan	-	-		
Post-Disaster Recovery Plan	-	-		
Continuity of Operations Plan	-	-		

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Dept of Park and Land Use, Planning and Zoning
Engineers or professionals trained in building or infrastructure construction practices	Yes	Dept of Public Works
Planners or engineers with an understanding of natural hazards	Yes	Dept of Park and Land Use
Staff with training in benefit/cost analysis	Yes	Dept of Park and Land Use
Surveyors	Yes	Dept of Public Works

Personnel skilled or trained in GIS applications	Yes	Dept of Park and Land Use
Emergency manager	-	
Grant writers	-	

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

What department is responsible for floodplain management in your jurisdiction?	Dept of Park and Land Use
Are any certified floodplain managers on staff in your jurisdiction?	No
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	No
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	Yes, but updates may be needed
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Continuing Education
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No

TABLE: COMMUNITY CLASSIFICATIONS

	Participating?	Classification	Date Classified
NFIP	The county participates, but towns do not		
Community Rating System	No		
StormReady	-		

Jurisdiction-Specific Hazards

Hazards that represent a county-wide risk are addressed in Volume 1. This section only addresses the hazards and their associated impacts that are relevant and unique to the municipality.

Extreme Cold: If power outages occur during extremely cold weather, the senior housing, and the mobile home park are a reason for portable generators or large generators to keep the power on for the entire park.

Flooding: The creation of green space by removing homes in the floodplain, as well as building park plans and portable pumps to remove water in basements would help mitigate against flooding.

Forest and Wildfires: Grass fires are a concern due to weather or rail. There is a need for a grass truck upgrade for a newer, faster pump.

Rail Transportation Incident: There is potential for a derailment due to not having a bridge on Hwy K that can cut off emergency vehicles to reach the east side of town. There is also a concern for a major fire. Removal of vegetation within 10 ft of the track to prevent a fire after a derailment may be needed.

Tornado and High Winds: Senior mobile home parks are vulnerable to this hazard because they are in need of water when high winds take out power lines and when the water pump shuts off. Removal of above ground powerlines and burying them in areas that have the most outages are mitigation actions against this hazard.

Utility Failure: This hazard calls for the placement of a generator for town hall, our emergency management headquarters, and the senior housing apartment (mobile home). Tree removal around all lines is also a mitigation action against this hazard.

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process

- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: New Mitigation Strategies for Waukesha County and All Participating Jurisdictions

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

Mitigation Project: Procure generators and appropriate hookups for key locations, such as, but not limited to: Mobile Home Park and Town Hall							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Lisbon Town	Lisbon Town	Medium	Short	N/A	Medium
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To preserve life and minimize the potential for injuries or death. To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.		Utility Failure	Maintain operations during a utility failure event.		High	HMGP, BRIC	
Action/Implementation Plan and Project Description:							
Generators for the mobile home park (senior housing) to allow water to flow, and for the Town Hall as it is the designated emergency services headquarters.							

Mitigation Project: Update railroad crossing to ensure safety and improved access. Study and implement appropriate measures, such as consideration for a bridge.							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Lisbon, Sussex	Lisbon, Sussex	High	Ongoing	N/A	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
<p>To preserve life and minimize the potential for injuries or death.</p> <p>To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.</p> <p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p>		Rail Transportation Incident	Maintain operations and transportation accessibility during an emergency.		High	HMGP, BRIC	
Action/Implementation Plan and Project Description:							
Update infrastructure access at the railroad crossing at Hwy K, which needs a bridge.							

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

Mitigation Project: Continue working on the acquisition and demolition project on Maple Avenue in the Town of Lisbon							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2011	Town of Lisbon	Town of Lisbon	High	Ongoing	N/A	N/A
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
2		Flood and Dam Failure	[Insert]		High	HMGP grant funding	
Action/Implementation Plan and Project Description:							
Project under way							
2021 Update: Purchased 3 houses and razed them. Created green space. Still need funding for park equipment.							

Mitigation Project: Property Acquisition							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2015	Town of Lisbon	Town of Lisbon	High	Ongoing	TBD	N/A
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
2		Flood and Dam Failure	[Insert]		Medium	Unobligated funds from disasters that were declared in fiscal years 2010-2013. Grant would be 75% federally funded through FEMA, 12.5% state funded through Wisconsin Emergency Management, and remaining 12.5% is local match.	
Action/Implementation Plan and Project Description:							
Acquire and demolish the property located near the two properties acquired in the previous approved grant.							

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

- This jurisdiction does not have any completed mitigation actions.

Merton Town

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Bowen	Brad	Fire Chief	Western Lakes Fire Protection District	262-567-8282	bbowen@westernlakesfd.org

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Merton Town	2	-	-	-	Yes	Yes	Not applicable

2021 Plan Participation and Involvement						
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities	
Bowen	Brad	-	-	-	Meeting with Planning Team	

Community Profile and Description

Current Population: The population of Merton Town in the 2019 US Census ACS) was 8,556.

Population Growth: According to the Wisconsin Department of Administration, the town's population is expected to grow to 9,804 in 2025, then to 10,162 in 2030, then finally to 10,546 in 2035.

Location and Description: The town has a total area of 28.3 square miles of which 25.7 square miles (66.7 km²) is land and 2.5 square miles (6.5 km²) (8.88%) is water.

Governing Body Format: The town's elected officials include an elected Chairman and Board of Supervisors.

Development Trends: N/A

Capabilities Assessment

The assessment of the jurisdiction's legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction's fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction's administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community's National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments
Codes, Ordinances & Requirements				
Building Code	Yes	-	State	

Zonings	-	Yes		
Subdivisions	Yes	Yes	State	
Stormwater Management	Yes	Yes	State	
Post Disaster Recovery	-	-		
Growth Management	-	Yes		
Public Health and Safety	Yes	Yes		
Planning Documents				
General or Comprehensive Plan	Yes	Yes		
Environmental Protection	Yes	Yes	State/WI DNR	
Transportation Plan	Yes	Yes	SEWRPC	
Parks Plan	Yes	Yes		
Trail Plan	Yes	Yes		
Response/Recovery Planning				
Comprehensive Emergency Management Plan	-	Yes		
WUI Plan	-	-		
Post-Disaster Recovery Plan	-	-		
Continuity of Operations Plan	-	-		

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Dept of Park and Land Use, Planning and Zoning Staff

Engineers or professionals trained in building or infrastructure construction practices	Yes	Dept. of Public Works
Planners or engineers with an understanding of natural hazards	Yes	Dept of Park and Land Use staff
Staff with training in benefit/cost analysis	Yes	Dept of Park and Land Use staff
Surveyors	Yes	Dept. of Public Works
Personnel skilled or trained in GIS applications	Yes	Dept of Park and Land Use
Emergency manager	-	
Grant writers	-	

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

What department is responsible for floodplain management in your jurisdiction?	Dept of Park and Land Use
Are any certified floodplain managers on staff in your jurisdiction?	No
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	No
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	Yes, but updates may be needed
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Continuing Education
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No

TABLE: COMMUNITY CLASSIFICATIONS

	Participating?	Classification	Date Classified
NFIP	The county participates, but towns do not		
Community Rating System	No		

StormReady

-

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: [New Mitigation Strategies for Waukesha County and All Participating Jurisdictions](#)

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

Mitigation Project: Establish and promote a public education program							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)

New	2021	Merton, Town	Town of Merton, Western Lakes Fire District	High	2022	TBD	Low
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source		
<p>To preserve life and minimize the potential for injuries or death.</p> <p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p> <p>To promote countywide coordination, planning, and training that avoids transferring the risk from on community to an adjacent community, where app</p> <p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p> <p>Increase Public Awareness</p>		All Hazards	Establish and promote a public education program (in-person, printed material, website/social media), to instruct and educate the public of appropriate actions for preparedness, during a disaster, and after a disaster; the program seeks to save lives and preserve property and minimize unnecessary losses.	High	HMGP, BRIC, FMA		
Action/Implementation Plan and Project Description:							
<p>Communities of western Waukesha County have fire and EMS protection from the Western Lakes Fire District. As part of its emergency management responsibilities, Western Lakes Fire District seeks to establish a public education program focused on emergency preparedness through multiple channels (in-person, printed materials, website/social media) that will develop an ongoing contact/engagement with all sectors of the community (residents, businesses, political leadership, intergovernmental) to provide timely and accurate information based on recognized "best practices" for emergency preparedness actions to preserve lives and property, and to minimize unnecessary losses. The program would be a multi-year effort, and would include a means for the public to provide feedback about the efficacy of the program (survey, interviews gauging</p>							

level of awareness/knowledge pre- and post-outreach [to be developed]). The goal is to provide a robust presence in all communities served by the Western Lakes Fire District to increase the public's ability to be better prepared for emergencies and disasters caused by all hazards.

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

- This jurisdiction does not have any ongoing mitigation actions or actions that are still in progress as identified in previous plan updates.

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

- This jurisdiction does not have any completed mitigation actions.

Mukwonago Town

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Stien	Jeff	Fire Chief		262-363-6426	chiefstien@mukwonagofire.org
Peterson	Rick	Public Works Superintendent		262-470-5582	rpeterson@townofmukwonago.us

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Mukwonago Town	90	-	Yes	Yes	Yes	Yes	Yes

2021 Plan Participation and Involvement						
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities	
Yerke	Gail		Yes			

Community Profile and Description

Current Population: The population of Mukwonago Town in the 2019 US Census ACS was 8,112.

Population Growth: According to the Wisconsin Department of Administration, the town’s population is expected to grow to 8,765 in 2025, to 9,153 in 2030, then finally 9,571 in 2035

Location and Description: The town has a total area of 32.0 square miles, of which, 30.9 square miles of it is land and 1.0 square miles of it is water.

Governing Body Format: The Town of Mukwonago is governed by a five-member Board consisting of a Chairperson and four Supervisors.

Development Trends: N/A

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments
Codes, Ordinances & Requirements				
Building Code	Yes	-	State	

Zonings	-	Yes		
Subdivisions	Yes	Yes	State	
Stormwater Management	-	Yes	State	
Post Disaster Recovery	-	Yes		
Growth Management	-	Yes		
Public Health and Safety	Yes	Yes		
Planning Documents				
General or Comprehensive Plan	Yes	Yes		
Environmental Protection	Yes	Yes	State/WI DNR	
Transportation Plan	Yes	Yes	SEWRPC	
Parks Plan	Yes	Yes		
Trail Plan	Yes	Yes		
Response/Recovery Planning				
Comprehensive Emergency Management Plan	Yes	Yes		
WUI Plan	-	-		
Post-Disaster Recovery Plan	-	-		
Continuity of Operations Plan	-	-		

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Outsourced; Dept of Park and Land Use

Engineers or professionals trained in building or infrastructure construction practices	Yes	Outsourced; Dept of Public Works
Planners or engineers with an understanding of natural hazards	Yes	Outsourced; Dept of Park and Land Use
Staff with training in benefit/cost analysis	Yes	Administrator; Dept of Park and Land Use
Surveyors	Yes	Outsourced; Dept of Public Works
Personnel skilled or trained in GIS applications	Yes	Dept of Park and Land Use
Emergency manager	Yes	
Grant writers	Yes	Outsourced, if needed

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

What department is responsible for floodplain management in your jurisdiction?	Dept of Park and Land Use
Are any certified floodplain managers on staff in your jurisdiction?	No
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	No
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	Yes, but updates may be needed
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Continuing Education
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No

TABLE: COMMUNITY CLASSIFICATIONS

	Participating?	Classification	Date Classified
NFIP	The county participates, but towns do not		
Community Rating System	No		

StormReady	-
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Jurisdiction-Specific Hazards

Hazards that represent a county-wide risk are addressed in Volume 1. This section only addresses the hazards and their associated impacts that are relevant and unique to the municipality.

Droughts and Dust Storms: Farm operations in the township are impacted by drought.

Flooding: Country Bliss Subdivision has mitigated against flooding by having an elevated groundwater pumping system project to move water from flooded roads. Beulah Road is susceptible to flooding. Undersized culverts, the potential for dam failure, and the Mukwonago River contribute to the possibility for flooding.

Tornados and High Winds: A tree removal program can help against tornado and high wind events. Older trees along roadways (trees down after storms block roadways in some areas) are vulnerable to these hazards. Two elementary schools are also vulnerable to these hazards and require a safe room for weather events and a generator for extended period of operations.

Utility Failure: Generators are needed for critical infrastructures; including, town hall, police department, firehouse to mitigate against utility failure events.

Winter Storm: Generators are needed for critical infrastructures; including, town hall, police department, firehouse to mitigate against winter storm events.

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: New Mitigation Strategies for Waukesha County and All Participating Jurisdictions

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

Mitigation Project: Obtain generators and provide safe rooms at town hall and elementary schools							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Town of Mukwonago	Town of Mukwonago	High	2023	15,000	high
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To preserve life and minimize the potential for injuries or death.							
To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.	Lightning, Thunderstorms, Tornados and High Winds, Winter Storms, Utility Failure		Maintaining command and control of town operations; maintaining the public's ability to seek relief/help during disasters; gathering point for displaced residents seeking shelter.		High	HMGP, BRIC	
To identify potential funding sources for mitigation projects							

and form the basis for FEMA project grant applications.

Action/Implementation Plan and Project Description:

The town seeks the installation of a backup electrical generator to maintain power during disruptive events. The town hall serves as a local rallying point for multiple services, including assistance information, a gathering point for long-term shelter transportation, and temporary shelter, in addition to the ability of the Town to maintain command and control functions. This project seeks to save lives and preserve property by maintaining the continuation of local government operations and minimizing additional losses.

Mitigation Project: Tree removal program along roadways

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Town of Mukwonago	Town of Mukwonago	Medium/High	Ongoing	N/A	High
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
<p>To preserve life and minimize the potential for injuries or death.</p> <p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p> <p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p>	Lightning, Tornados and High Winds, Winter Storms	Safety during storms, road blockage	High	HMGP, BRIC			

Action/Implementation Plan and Project Description:

Tree removal program along roadways because town roads have many older trees that are susceptible to fall during a weather emergency.

Mitigation Project: Review, replace, and assess undersized culverts							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Town of Mukwonago	Town of Mukwonago	Medium/High	Ongoing	N/A	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To preserve life and minimize the potential for injuries or death.		Flooding	Prevent flooding.		High	HMGP, BRIC, FMA	
To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.							
To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.							
Action/Implementation Plan and Project Description:							
Review, replace, and assess undersized culverts to include, but not limited to, Hwy E							

Mitigation Project: Pond Staging							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2022	Town of Mukwonago	Town of Mukwonago	High	2021	\$300,000	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis	Potential Funding Source	

			(Low, Medium, High)	
To preserve life and minimize the potential for injuries or death.	Flood and Dam Failure	Constructing a pond at the end of the adjacent subdivision (Stone Brook Hollow) provides a place for the town to run water towards for flood mitigation.	High	HMGP, BRIC, FMA

Action/Implementation Plan and Project Description:

The town is to condemn a 2-acre parcel from Spaight's farmland located at the end of Campfire Lane. The process includes opening a cut 12-inch HDPE from Country Bliss Subdivision to the end of Campfire Lane and acquiring a 30-foot easement from Stonebrook Hollow Subdivision for the final 1,000 feet of pipe. Following, create a french drain type trench at the end of the pipe on a 30 ft easement. The pond would then be constructed on the 2 acre parcel for storage of excess water. If a french drain-type trench is not possible, then we will run the pipe directly into a pond on the 2 acre parcel. The Town Board has voted to approve the construction of a pond in the 2-acre parcel.

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

Mitigation Project: Address flooding and roadway improvements associated with the Country Bliss subdivision. The preliminary solution is to install a force main and pumping station to take accumulated water out of a natural basin and pump it out.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2010	Town of Mukwonago	Municipal elected officials	High	Ongoing	\$575,000	High
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
2	Flood and Dam Failure	[Insert]	High	Community Development Block Grant – Emergency Assistance Program			

Action/Implementation Plan and Project Description:

The accumulating water makes a few roads impassable and impacts a few properties. The flooding is primarily caused by elevated groundwater levels.

2021 Update: Cost is now higher

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

- This jurisdiction does not have any completed mitigation actions.

Oconomowoc Town

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Herrmann	Jeff	Administrator/Planner		920-474-4449	Jherrmann@townoconomowoc.com
Opitz	Lori	Clerk/Treasurer		920-474-4449	clerk@townoconomowoc.com

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Oconomowoc Town	3	Yes	Yes	Yes	Yes	Yes	Not applicable

2021 Plan Participation and Involvement						
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities	
Salzman	Sam	Yes	Yes			
Herrmann	Jeffrey	Yes	Yes			
Wraalstad	Kristin		Yes			
Opitz	Lori		Yes			

Community Profile and Description

Date of Incorporation: 1844

Current Population: The population of Oconomowoc Town as of 2021 was 8,777.

Population Growth: The population of the Town of Oconomowoc has surpassed the Wisconsin Department of Administration's prediction.

Location and Description: The town has a total area of 32.6 square miles, of which, 29.3 square miles of it is land and 3.3 square miles of it is water.

Governing Body Format: The town's elected officials include an elected Chairman and Board of Supervisors.

Development Trends: N/A

Capabilities Assessment

The assessment of the jurisdiction's legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction's fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction's administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community's National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments
Codes, Ordinances & Requirements				

Building Code	Yes	-	State	
Zonings	-	Yes		County zoning code and county shoreland and floodland protection ordinance
Subdivisions	Yes	Yes (Shoreland Ordinance)	State	Town and County have land division ordinances
Stormwater Management	-	Yes	State	County stormwater and erosion control ordinance
Post Disaster Recovery	-	-		
Growth Management	-	Yes		Part of Comprehensive Plan
Public Health and Safety	Yes	Yes		
Planning Documents				
General or Comprehensive Plan	Yes	Yes	SEWRPC	
Environmental Protection	Yes	Yes	State/WI DNR	
Transportation Plan	-	Yes	SEWRPC	Regional Transportation Plan (SEWRPC)
Parks Plan	Yes	Yes		
Trail Plan	Yes	Yes		
Response/Recovery Planning				
Comprehensive Emergency Management Plan	-	Yes		
WUI Plan	-			
Post-Disaster Recovery Plan	-			
Continuity of Operations Plan	-			

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
---------------------------	------------	----------------------------

Planners or engineers with knowledge of land development and land management practices	Yes	Staff and Town Engineer
Engineers or professionals trained in building or infrastructure construction practices	Yes	Town Engineer
Planners or engineers with an understanding of natural hazards	Yes	Town Engineer
Staff with training in benefit/cost analysis	No	
Surveyors	Yes	Town Engineer
Personnel skilled or trained in GIS applications	Yes	Jeff Herrmann
Emergency manager	Yes	Fire Chief
Grant writers	Yes	Staff and Town Engineers

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

What department is responsible for floodplain management in your jurisdiction?	Waukesha County
Are any certified floodplain managers on staff in your jurisdiction?	No staff
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	No
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	Yes, but updates may be needed
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Continuing Education
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No, there are few structures in the floodplain

TABLE: COMMUNITY CLASSIFICATIONS

	Participating?	Classification	Date Classified
NFIP	The county participates, but towns do not		

Community Rating System	No		
StormReady	-		

Jurisdiction-Specific Hazards

Hazards that represent a county-wide risk are addressed in Volume 1. This section only addresses the hazards and their associated impacts that are relevant and unique to the municipality.

Dam Failure: Oconomowoc Dam may contribute to the loss of property and loss of life and pose a threat to nearby railways.

Flooding: Blackhawk Drive and Nokoma are vulnerable to flooding.

Utility Failure: Possible power outages are caused by utility failure, therefore purchasing a generator for the town hall and DPW Building, community center, and soccer park is needed.

Political Hazards: Cyberattacks are a threat.

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: New Mitigation Strategies for Waukesha County and All Participating Jurisdictions

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

Mitigation Project: Place powerlines underground in the Okauchee area							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Town of Oconomowoc	WE Energies	High	Ongoing	\$2.4 Million	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
<p>To preserve life and minimize the potential for injuries or death.</p> <p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p> <p>To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.</p> <p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p> <p>Providing inspectors with additional and enhanced communications devices will assist</p>		All Hazards	Prevent frequent power outages and maintain operations.		High	HMGP, BRIC, FMA	

with the efficiency of damage assessment during an event.				
Action/Implementation Plan and Project Description:				
New powerlines in the Okauchee area will be put underground due to power outages.				

Mitigation Project: Procure generators and appropriate hookups for all town facilities							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Town of Oconomowoc	Town of Oconomowoc	High	Short	N/A	Medium
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To preserve life and minimize the potential for injuries or death. To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.		Utility Failure	Continue and maintain operations of town facilities during a utility failure event.		High	HMGP, BRIC	
Action/Implementation Plan and Project Description:							
Generators for all town facilities							

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

- This jurisdiction does not have any ongoing mitigation actions or actions that are still in progress as identified in previous plan updates.

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

- This jurisdiction does not have any completed mitigation actions.

Ottawa Town

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Rupp	Cheryl	Chairperson		262-965-3228	cruppottawa@gmail.com
Klein	Melissa	Clerk	Town of Ottawa		

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Ottawa Town	4	Yes	Yes	Yes	Yes	Yes	Not applicable

2021 Plan Participation and Involvement						
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities	
Klein	Melissa	Yes	Yes	Yes		
Rupp	Cheryl	Yes	Yes			

Community Profile and Description

Date of Incorporation: 1843

Current Population: The population of Ottawa Town in the 2019 US Census ACS was 3,904.

Population Growth: According to the Wisconsin Department of Administration, the town’s population is expected to grow to 4,497 in 2025, to 4,641 in 2030, then to 4,795 in 2035.

Location and Description: The town has a total area of 34.9 square miles, of which, 34.3 square miles of it is land and 0.6 square miles of it is water.

Governing Body Format: The town’s elected officials include an elected Chairman and Board of Supervisors.

Development Trends: N/A

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments
Codes, Ordinances & Requirements				

Building Code	Yes	-	State	
Zonings	-	Yes		County zoning code and county shoreland and floodland protection ordinance
Subdivisions	Yes	Yes (Shoreland Ordinance)	State	Town and County have land division ordinances
Stormwater Management	-	Yes	State	County stormwater and erosion control ordinance
Post Disaster Recovery	Yes	-		
Growth Management	-	Yes		Part of Comprehensive Plan
Public Health and Safety	Yes	Yes		
Planning Documents				
General or Comprehensive Plan	Yes	Yes	SEWRPC	
Environmental Protection	Yes	Yes	State/WI DNR	
Transportation Plan	-	Yes	SEWRPC	Regional Transportation Plan (SEWRPC)
Parks Plan	Yes	Yes		
Trail Plan	Yes	Yes		
Response/Recovery Planning				
Comprehensive Emergency Management Plan	Yes	Yes		
WUI Plan	-	-		
Post-Disaster Recovery Plan	-	-		
Continuity of Operations Plan	-	-		

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
---------------------------	------------	----------------------------

Planners or engineers with knowledge of land development and land management practices	Yes	R/M Engineering/Sean Sullivan/Waukesha County
Engineers or professionals trained in building or infrastructure construction practices	Yes	R/M Engineering
Planners or engineers with an understanding of natural hazards	Yes	R/M Engineering and Waukesha County
Staff with training in benefit/cost analysis	Yes	Dept of Parks and Land Use
Surveyors	Yes	R/M Engineering
Personnel skilled or trained in GIS applications	Yes	R/M Engineering
Emergency manager	-	
Grant writers	-	

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

What department is responsible for floodplain management in your jurisdiction?	Waukesha County
Are any certified floodplain managers on staff in your jurisdiction?	No
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	No
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	Yes, but updates may be needed
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	Continuing Education
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	No, there are few structures in the floodplain

TABLE: COMMUNITY CLASSIFICATIONS

	Participating?	Classification	Date Classified
NFIP	The county participates, but towns do not		

Community Rating System	No		
StormReady	-		

Jurisdiction-Specific Hazards

Hazards that represent a county-wide risk are addressed in Volume 1. This section only addresses the hazards and their associated impacts that are relevant and unique to the municipality.

Dam Failure: Stopped logs on dams can be damaged by vandals which can contribute to further dam failure. Mill Pond Bridge is located at the school section. Lake inspected per state is needed to look for potential dam failure.

Flooding: Waterville Road south of Holland Lane, located on the east side, is susceptible to flooding. Meadow Trail east of Hawks Hollow is also susceptible to flooding. Culverts under Gramling Lane are to be replaced this fall. Scuppernong Creek flows through the town and may flood other roads, crossings in town.

Hazardous Materials Release: Townhall is susceptible to hazardous material release due to continuous oil collection and anti-freeze handling.

Tornados and High Winds: Two tornados in two years have been reported before that were followed by a storm with high winds that caused lots of tree damage. Similar incidents are to be expected.

Utility Failure: Power outages more common in some areas in the town. Overhead wires get caught by trees which contribute to utility failure events. A generator should be placed at the town hall in the event of a power outage and extreme weather.

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process

- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: New Mitigation Strategies for Waukesha County and All Participating Jurisdictions

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

Mitigation Project: Continue to review and monitor stop logs for damage on Mill Pond Dam							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Ottawa Town	Ottawa Town	Medium	Ongoing		
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)		Potential Funding Source	
To preserve life and minimize the potential for injuries or death.		Dam Failure	Prevent flooding to downstream homes	High		HMGP, BRIC	
Action/Implementation Plan and Project Description:							
Continue to review stop logs for damage on Mill Pond Dam							

Mitigation Project: Procure generator and appropriate hookups for Town Hall							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Ottawa Town	Ottawa Town	Low	Short	N/A	Medium
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.		Extreme Cold, Extreme Heat, Utility Failure	Maintain operations during an emergency.		High	HMGP, BRIC, FMA	
Action/Implementation Plan and Project Description:							
Place a generator for the town hall.							

Mitigation Project: Study and replace culverts under Gramling Lane to mitigate flooding							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Town of Ottawa	Town of Ottawa	Medium/High	Oct 2021 - Short	\$220,000	Medium
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To preserve life and minimize the potential for injuries or death.		Dam Failure (culvert failure)	Long-term road shutdown		High	HMGP, BRIC	
To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.							
Action/Implementation Plan and Project Description:							

Replacing culverts under Gramling Lane. Culverts are aged metals and are in dire need of replacement with new concrete culverts.

Mitigation Project: Implement mitigation for undersized or clogged culverts.

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Town of Ottawa	Town of Ottawa	Medium	Ongoing	N/A	High
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.	Flooding		To keep roads open		High	HMGP, BRIC, FMA	
Action/Implementation Plan and Project Description:							
Implement mitigation for undersized or clogged culverts.							

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

- This jurisdiction does not have any ongoing mitigation actions or actions that are still in progress as identified in previous plan updates.

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

- This jurisdiction does not have any completed mitigation actions.

Lake Country Fire Dept

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Fennig	Matthew	Fire Chief	Lake Country Fire Department	262-354-2454	mfennig@lakecountryfire.com

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Lake Country Fire Dept	0	-	Yes	Yes	Yes	Yes	-

2021 Plan Participation and Involvement						
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities	
Fennig	Matt		Yes		Meeting/ Plan Item Development	

Community Profile and Description

Date of Incorporation: Fire Department incorporated January 1, 2010. Expanded by four communities on January 1, 2021.

Current Population: The population served was 28,505 according to the 2020 Census (or US Census ACS).

Population Growth: Anticipated growth is approximately 2% based on historic trends.

Location and Description: Department serves an area in western Waukesha County, Wisconsin, providing fire, emergency medical services, rescue, and related emergency response services to seven communities, covering 75 square miles, with an assessed value of \$5.3 billion, 12,634 properties of which 10,002 are residential. The department operates out of 5 stations with 25 career staff and 75 paid-on-call personnel.

Governing Body Format: Board of Directors, 2 members are appointed to the board from each participating community.

Development Trends: Recently added protection for 4 additional communities as of January 1, 2021, with the potential for additional communities to join the fire protection district.

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments

Codes, Ordinances & Requirements				
Building Code	-		State	Participating communities
Zonings	-		Yes	Participating communities
Subdivisions	-		State	Participating communities
Stormwater Management	-		State	Participating communities
Post Disaster Recovery	-	Yes	Yes	Participating communities
Growth Management	-		Yes	Participating communities
Public Health and Safety	-	Yes	Yes	Participating communities
Planning Documents				
General or Comprehensive Plan	Yes		Yes	Developed by department, approved by communities
Environmental Protection	-	Yes	State/WI DNR	Participating communities
Transportation Plan	-	Yes	SEWRPC	
Parks Plan	-	Yes		
Trail Plan	-	Yes		
Response/Recovery Planning				
Comprehensive Emergency Management Plan	Yes	Yes		Developed by department, approved by communities
WUI Plan	-			
Post-Disaster Recovery Plan	Yes			Collaboratively with communities.
Continuity of Operations Plan	Yes			Developed by department, approved by communities

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Through participating communities
Engineers or professionals trained in building or infrastructure construction practices	Yes	Through participating communities
Planners or engineers with an understanding of natural hazards	Yes	Through participating communities
Staff with training in benefit/cost analysis	Yes	Chief of Department
Surveyors	Yes	Contract Out
Personnel skilled or trained in GIS applications	Yes	Contract Out
Emergency manager	Yes	Chief of Department
Grant writers	Yes	Department member as assigned

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE	
What department is responsible for floodplain management in your jurisdiction?	N/A
Are any certified floodplain managers on staff in your jurisdiction?	N/A
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	N/A
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	N/A
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	N/A
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	N/A

TABLE: COMMUNITY CLASSIFICATIONS			
	Participating?	Classification	Date Classified

NFIP	N/A		
Community Rating System	N/A		
StormReady	N/A		

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
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New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: New Mitigation Strategies for Waukesha County and All Participating Jurisdictions

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

Mitigation Project: Replace/install backup electrical generators							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Lake County Fire District	Lake County Fire District	High	2023-2024	\$90,000	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
To preserve life and minimize the potential for injuries or death.		All Hazards Utility Failure	Shelter, Emergency Response, Emergency Management, Maintaining Response Posture		High	HMGP, BRIC	
To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.							
To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.							
Action/Implementation Plan and Project Description:							

Mitigation Project: Purchase towable backup electric generators							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Lake County Fire District	Lake County Fire District	High	2022	\$150,000	High

Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source
<p>To preserve life and minimize the potential for injuries or death.</p> <p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p> <p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p>	<p>Severe Temperature</p> <p>Lightning</p> <p>Thunderstorms</p> <p>Tornadoes and High Winds</p> <p>Winter Storms</p> <p>Utility Failure</p>	<p>Prevents the relocation of sensitive populations (seniors, confined persons, AFN populations) due to utility failures into congregate or other shelter locations; prevents property damage due to municipal utility system (lift stations, potable water pumps) outages due to electrical utility failure.</p>	<p>High</p>	<p>HMGP, BRIC</p>
Action/Implementation Plan and Project Description:				

Mitigation Project: Establish and promote a public education program							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Lake County Fire District	Lake County Fire District	High	2022	\$20,000	Low
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			

<p>To preserve life and minimize the potential for injuries or death.</p> <p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p> <p>To promote countywide coordination, planning, and training that avoids transferring the risk from on community to an adjacent community, where app</p> <p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p> <p>Increase Public Awareness</p>	<p>All Hazards</p>	<p>Establish and promote a public education program (in-person, printed material, website/social media), to instruct and educate the public of appropriate actions for preparedness, during a disaster, and after a disaster; the program seeks to save lives and preserve property, and minimize unnecessary losses.</p>	<p>High</p>	<p>HMGP, BRIC, FMA</p>
<p>Action/Implementation Plan and Project Description:</p>				
<p> </p>				

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

- This jurisdiction does not have any ongoing mitigation actions or actions that are still in progress as identified in previous plan updates.

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

- This jurisdiction does not have any completed mitigation actions.

Eagle Springs Lake Management District

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Jensen	Peter		Eagle Springs Lake Management District	414-791-5751	p.jensen@eagleweather.com

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Eagle Springs	0	Yes	-	Yes	Yes	Yes	Yes

2021 Plan Participation and Involvement						
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities	
Jensen	Peter R	Yes			Meeting/ Plan Item Development	

Community Profile and Description

Date of Incorporation: 1955

Current Population: The population of 438 in the 2020 Census (or US Census ACS).

Population Growth: Steady growth projection, with less than 0.01% variation year to year.

Location and Description: The town of Eagle in Waukesha County, Wisconsin.

Governing Body Format: Elected Commissioners, lake district that retains the powers of a sanitary district, formed under WI SS Ch. 33 & 60.

Development Trends: Transitioning from seasonal housing to year-round housing.

Capabilities Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments
Codes, Ordinances & Requirements				
Building Code	-		State	Town of Eagle

Zonings	-	Yes		
Subdivisions	-	Yes	State	
Stormwater Management	-	Yes	State	
Post Disaster Recovery	Yes	Yes	Yes	In conjunction with Town of Eagle
Growth Management	-	Yes		
Public Health and Safety	-	Yes		
Planning Documents				
General or Comprehensive Plan	-	Yes		
Environmental Protection	Yes	Yes	State/WI DNR	In conjunction with State of Wisconsin
Transportation Plan	-	Yes	SEWRPC	
Parks Plan	-	Yes		
Trail Plan	-	Yes		
Response/Recovery Planning				
Comprehensive Emergency Management Plan	Yes	Yes		
WUI Plan	-			
Post-Disaster Recovery Plan	Yes			
Continuity of Operations Plan	Yes			

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Contract out

Engineers or professionals trained in building or infrastructure construction practices	Yes	Contract out
Planners or engineers with an understanding of natural hazards	Yes	Contract out
Staff with training in benefit/cost analysis	Yes	Lake District
Surveyors	Yes	Contract out
Personnel skilled or trained in GIS applications	Yes	Waukesha County
Emergency manager	Yes	Lake District
Grant writers	Yes	Lake District

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

What department is responsible for floodplain management in your jurisdiction?	N/A
Are any certified floodplain managers on staff in your jurisdiction?	N/A
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	N/A
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	N/A
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	N/A
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	N/A

TABLE: COMMUNITY CLASSIFICATIONS

	Participating?	Classification	Date Classified
NFIP	N/A		
Community Rating System	N/A		
StormReady	N/A		

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: New Mitigation Strategies for Waukesha County and All Participating Jurisdictions

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

Mitigation Project: Rehabilitation of existing dry hydrant system							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Eagle Springs Lake Management District	Eagle Springs Lake Management District	Medium	2022	\$15,000	Medium

Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source
<p>To preserve life and minimize the potential for injuries or death.</p> <p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p> <p>To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where appropriate.</p>	Forest and Wildfires	Enhanced water supply stability to support firefighting operations.	High	HMGP, BRIC
Action/Implementation Plan and Project Description:				
Rehabilitation of existing dry hydrant system that supplies drafting operations for firefighting water tender operations. This system serves as a source point for the surrounding area for water supply from the standing body of water.				

Mitigation Project: Conduct Dam Failure Analysis							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Eagle Springs Lake Management District	Eagle Springs Lake Management District	High	2023	\$50,000	High
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
<p>To preserve life and minimize the potential for injuries or death.</p> <p>To promote countywide coordination, planning, and training that avoids transferring</p>	Flood and Dam Failure	Update dam hazard rating and failure inundation zones.			HMGP, BRIC, FMA		

<p>the risk from one community to an adjacent community, where appropriate.</p> <p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p> <p>Providing inspectors with additional and enhanced communications devices will assist with the efficiency of damage assessment during an event.</p>				
Action/Implementation Plan and Project Description:				
<p>The analysis is ordered by Wisconsin Department of Natural Resources that will better identify key areas of risk for technical improvement (dam structure and downstream flowage), update inundation areas for possible mitigation, and provide updated information for targeted public outreach and education about hazards/risks.</p>				

Mitigation Project: Improve and replace aging segments of the water control systems							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Eagle Springs Lake Management District	Eagle Springs Lake Management District	High	2023	\$400,000	High
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source		
<p>To preserve life and minimize the potential for injuries or death.</p> <p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p>	Flood and Dam Failure		Improved safety and increased dam structural stability.	High	HMGP, BRIC, FMA		
Action/Implementation Plan and Project Description:							

Improve and replace aging segments of the water control systems for the dam. Improve the design and technology in the upgraded components. Re-engineer the entire gate control system to minimize failure during high water events, therefore improving downstream safety of residents and property.

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

Three properties have been identified for buy-out in the event of flooding. All were identified and submitted to Kathy Schwei 3-4 years ago.

Mitigation Project: Improve Kroll Outlet Discharge System							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
Ongoing	2018	Town of Eagle & Eagle Spring Lake Management District	Eagle Spring Lake Management District	High	As funding is available	N/A	N/A
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)			Benefit Analysis (Low, Medium, High)	Potential Funding Source	
Improve discharge system to handle a 500-year flood event	Flood and Dam Failure	Reduces threat to infrastructure downstream including bridges, roadways, natural gas distribution systems, and communications systems. Reduces threat of loss of access to 911 emergency call systems. Reduces threat to Kettle Moraine Park locations and Rainbow Springs Golf Course.			N/A	Mitigation grants; private grants; ESLMD matching funds	
Action/Implementation Plan and Project Description:							

Allow full implementation of the release requirements to meet a 500-year flood event through improvements to the Kroll Outlet discharge system including, but not limited to, actions identified above in Applicable Objectives.

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

- This jurisdiction does not have any completed mitigation actions.

Western Lakes Fire District

Volume 2: Waukesha County Hazard Mitigation Plan

2021 Hazard Mitigation Plan Update: Local Mitigation Planning Team Representative(s) and Contact Information

Local Mitigation Planning Team					
Last Name	First Name	Title/Position	Organization	Phone Number	E-mail
Bowen	Brad	Fire Chief	Western Lakes Fire District	262-567-8282	bbowen@westernlakesfd.org

Documentation of Participation in the 2021 Hazard Mitigation Plan Update

2021 Jurisdiction Participation Checklist							
Jurisdiction	Community Mitigation Survey Participation (includes participation from general public)	Represented at a Webinar	Represented at a Workshop/Meeting(s)	Submitted a Hazard Analysis for the Jurisdiction	Submitted Capability Assessment	Submitted at least one (1) New Mitigation Project	Reviewed/Updated Past Mitigation Project(s), as applicable
Western Lakes Fire District	0	Yes	-	-	Yes	No new action identified	Not applicable

2021 Plan Participation and Involvement						
Last Name	First Name	Webinar	Workshop/Meeting(s) Attendance	Provided Feedback on the Plan (via the KMS comment tool or other mechanism)	Other Participation Activities	
Bowen	Brad	Yes			Meeting/ Plan Item Development	

Community Profile and Description

Date of Incorporation: Fire Department incorporated January 1, 2015.

Current Population: The population served was 48,000 according to the 2020 Census (or US Census ACS).

Population Growth: Anticipated growth is approximately 2% based on historic trends.

Location and Description: The Western Lakes Fire District (WLFD) provides fire prevention and suppression, rescue, and Critical Care Paramedic-level Emergency Medical Services to eleven municipalities in Waukesha, Dodge, and Jefferson counties. WLFD proudly serves the Town of Ashippun, Town of Concord, Village of Dousman, Village of Lac La Belle, Town of Merton, City of Oconomowoc, Town of Oconomowoc, Town of Ottawa, Town of Sullivan, Village of Sullivan, and the Village of Summit

WLFD serves over 45,000 residents and covers 215 square miles with an annual call volume of over 5,500 calls. WLFD employs 24 full-time and approximately 190 part-time and paid-on-call personnel out of six stations that are located to provide the best service to the communities.

The Fire Chief of the WLFD has been designated the emergency manager by the City of Oconomowoc, the Village of Lac La Belle, and the Town of Merton.

Governing Body Format: The governing body consists of having a board of directors with representation from all communities.

Development Trends: N/A

Capabilities Assessment

The assessment of the jurisdiction's legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction's fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction's administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community's National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

TABLE: LEGAL AND REGULATORY CAPABILITY				
	Local Authority	County Authority	Other Jurisdictional Authority	Comments
Codes, Ordinances & Requirements				
Building Code	-		State	Participating communities
Zonings	-		Yes	Participating communities
Subdivisions	-		State	Participating communities
Stormwater Management	-		State	Participating communities
Post Disaster Recovery	-	Yes	Yes	Participating communities
Growth Management	-		Yes	Participating communities
Public Health and Safety	-	Yes	Yes	Participating communities
Planning Documents				
General or Comprehensive Plan	Yes		Yes	Developed by department, approved by communities
Environmental Protection	-	Yes	State/WI DNR	Participating communities
Transportation Plan	-	Yes	SEWRPC	
Parks Plan	-	Yes		
Trail Plan	-	Yes		
Response/Recovery Planning				
Comprehensive Emergency Management Plan	Yes	Yes		Developed by department, approved by communities
WUI Plan	-			

Post-Disaster Recovery Plan	Yes		Collaboratively with communities.
Continuity of Operations Plan	Yes		Developed by department, approved by communities

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Through participating communities
Engineers or professionals trained in building or infrastructure construction practices	Yes	Through participating communities
Planners or engineers with an understanding of natural hazards	Yes	Through participating communities
Staff with training in benefit/cost analysis	Yes	Chief of Department
Surveyors	Yes	Contract Out
Personnel skilled or trained in GIS applications	Yes	Contract Out
Emergency manager	Yes	Chief of Department
Grant writers	Yes	Department member as assigned

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

What department is responsible for floodplain management in your jurisdiction?	N/A
Are any certified floodplain managers on staff in your jurisdiction?	N/A
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	N/A
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	N/A
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	N/A

Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	N/A
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TABLE: COMMUNITY CLASSIFICATIONS			
	Participating?	Classification	Date Classified
NFIP	N/A		
Community Rating System	N/A		
StormReady	N/A		

Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2021 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2011.

New Mitigation Actions

The following are "New Mitigation Actions" identified during this 2021 update process.

The new mitigation strategies for the 2021 Plan update that apply to **all participating jurisdictions** can be accessed by going to the following section: [New Mitigation Strategies for Waukesha County and All Participating Jurisdictions](#)

Note: In some instances, communities may have identified these actions as their own "new" or "ongoing" initiatives; however, because of the actions' broad applicability across all jurisdictions and to minimize redundancy, the actions are organized under "all participating jurisdictions".

Mitigation Project: Replace/install backup electrical generators							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Western Lakes Fire District	Western Lakes Fire District	High	2023-2024	\$90,000	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
<p>To preserve life and minimize the potential for injuries or death.</p> <p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p> <p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p>		<p>All Hazards</p> <p>Utility Failure</p>	<p>Shelter, Emergency Response, Emergency Management, Maintaining Response Posture</p>		High	HMGP, BRIC	
Action/Implementation Plan and Project Description:							
<p>Communities in western Waukesha County receive fire and EMS protection from the Western Lakes Fire District. To maintain an effective response posture during all hazards and during utility failure, this program would replace/install backup electrical generators at Fire Station 2 (Dousman), Fire Station 3 (Oconomowoc), Fire Station 5 (Okaukeee), and Fire Station 6 (Stone Bank), along with the necessary switching equipment to provide immediate power supply upon failure of the electrical utility. A number of fire stations have backup generators, but all are older than 10 years old and are becoming more maintenance-intensive to maintain in an operational condition. This project would allow for all stations to serve the intended public use of fire and EMS response, but would also provide additional physical locations for emergency management and temporary shelters.</p>							

Mitigation Project: Obtain various materials designed to contain, absorb, and slow hazardous materials from contaminating the environment							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Western Lakes Fire District	Western Lakes Fire District	High	2022	\$20,000	Medium
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
<p>To preserve life and minimize the potential for injuries or death.</p> <p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p> <p>To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community</p> <p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p>		<p>Hazardous Materials Release</p> <p>Rail Transportation Incident</p>	<p>Hazardous materials spill control, prevention of environmental damage, prevent contamination of water, protection of public health</p>		High	HMGP, BRIC	
Action/Implementation Plan and Project Description:							
<p>Communities of western Waukesha County have fire and EMS protection from the Western Lakes Fire District. The WLFD responds to hazardous materials incidents from fixed sites, rail, and over-the-road transportation. The project seeks to obtain various materials designed to contain, absorb, and slow hazardous materials from contaminating the environment (ground, bodies of water, rivers/streams).</p>							

Mitigation Project: Purchase towable backup electric generators							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Western Lakes Fire District	Western Lakes Fire District	High	2022	\$150,000	High
Goal		Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source		
To preserve life and minimize the potential for injuries or death.		Severe Temperature	Prevents the relocation of sensitive populations (seniors, confined persons, AFN populations) due to utility failures into congregate or other shelter locations; prevents property damage due to municipal utility system (lift stations, potable water pumps) outages due to electrical utility failure.	High	HMGP, BRIC		
To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.		Lightning					
		Thunderstorms					
		Tornadoes and High Winds					
To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.		Winter Storms					
		Utility Failure					
Action/Implementation Plan and Project Description:							
Communities of western Waukesha County have fire and EMS protection from the Western Lakes Fire District. During adverse events affecting the stability of the electrical supply, WLFD would need to coordinate the relocation of sensitive populations into shelters. Trailer mounted portable electrical generators would allow for these citizens to remain in their congregate living settings by supporting their buildings' electrical needs, avoiding the need to establish a shelter and relocation operation. This would allow for WLFD to concentrate its response efforts to a broader section of the community and rely less on other outside resources. The project seeks to purchase up to three (3) trailer-mounted portable generators that would be strategically placed within WLFD fire stations, would be maintained by WLFD, and deployed by WLFD when necessary.							

These generators would also be capable of supporting those buildings/facilities that would be utilized as a public shelter, and provide more resiliency in emergency management planning for shelter locations.

Mitigation Project: Procure Portable Changeable Message (PCM) signs for public notification							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Western Lakes Fire District	Western Lakes Fire District	High	2022	\$100,000	High
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)			Benefit Analysis (Low, Medium, High)	Potential Funding Source	
<p>To preserve life and minimize the potential for injuries or death.</p> <p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate..</p> <p>TO promote coordination, planning, and training that avoids transferring the risk form one community to an adjacent community, where app</p> <p>To identify potential funding sources for mitigation projects</p>	<p>Drought and Dust Storm</p> <p>Flooding and Dam Failure</p> <p>Forrest and Wildfires</p> <p>Severe Temperature</p> <p>Thunderstorms</p> <p>Tornadoes and High Winds</p> <p>Winter Storms</p>	<p>Portable Changeable Message (PCM) signs for public notification of emergency messages at key locations during fluid disruptive events to optimize safe and efficient movement of civilian populations away from high hazard areas.</p>			High	HMGP, BRIC, FMA	

and form the basis for FEMA project grant applications.	Hazardous Materials Release			
Increase public awareness	Utility Failure			
	Rail Transportation Incident			

Action/Implementation Plan and Project Description:

Communities of western Waukesha County have fire and EMS protection from the Western Lakes Fire District. During adverse events effecting the community where accurate information needs to be conveyed to the public at and with extremely local detail, portable changeable message (PCM) signs will be utilized to direct civilian populations. The PCM's would be utilized to announce closures and detours, direction of travel to specific emergency shelters, and other pertinent and timely messages at the direction of emergency management. Due to the nature of the hazards that require flexible and sometimes quickly evolving actions, the PCMs would enhance the ability of emergency management to save lives, protect property, and minimize unnecessary additional impacts. These five (5) signs would be housed and maintained by the Western Lakes Fire District.

Mitigation Project: Identify and procure a debris removal site for the temporary holding of debris

Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Western Lakes Fire District	Western Lakes Fire District	Medium	2025	\$150,000	High
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)	Benefit Analysis (Low, Medium, High)	Potential Funding Source			
To preserve life and minimize the potential for injuries or death.	Thunderstorms	Identify and procure a debris removal site for the temporary holding of debris from disaster events; minimize ongoing risks to the communities from debris piles on streets and roadsides post-disaster; permits proper sorting and appropriate disposal to protect the environment; provide	Medium	HMGP, BRIC			

<p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p> <p>To promote countywide coordination, planning, and training that avoids transferring the risk from one community to an adjacent community, where app</p> <p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p>	<p>Tornadoes and High Winds</p>	<p>better financial control of the debris management process in the immediate aftermath of a disaster.</p>		
<p>Action/Implementation Plan and Project Description:</p>				
<p>Communities of western Waukesha County have fire and EMS protection from the Western Lakes Fire District. During adverse events effecting the area, a centrally located, multi-jurisdictional temporary debris collection, transfer, and management site should be developed. The site would allow for the efficient removal of debris from stricken areas in the communities which would enhance life safety and property preservation, promote better public health by removing potential vectors for vermin infestation and mold related health concerns; proper management of debris into final disposition (recycling and landfill operations) to protect the environment; better fiscal management of the debris removal process in the immediate aftermath of the disaster. The site would be shared by all communities in Waukesha county. Site location would be determined by Western Lakes Fire District emergency management in consultation with partner communities and agencies.</p>				

Mitigation Project: Establish and promote a public education program							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Western Lakes Fire District	Western Lakes Fire District	High	2022	\$20,000	Low
Goal	Hazard(s) Mitigated	Benefits (Description of Loss Avoided)			Benefit Analysis (Low, Medium, High)	Potential Funding Source	
<p>To preserve life and minimize the potential for injuries or death.</p> <p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p> <p>To promote countywide coordination, planning, and training that avoids transferring the risk from on community to an adjacent community, where app</p> <p>To identify potential funding sources for mitigation projects and form the basis for FEMA project grant applications.</p>	All Hazards	<p>Establish and promote a public education program (in-person, printed material, website/social media), to instruct and educate the public of appropriate actions for preparedness, during a disaster, and after a disaster; the program seeks to save lives and preserve property, and minimize unnecessary losses.</p>			High	HMGP, BRIC, FMA	

Increase Public Awareness				
Action/Implementation Plan and Project Description:				
<p>Communities of western Waukesha County have fire and EMS protection from the Western Lakes Fire District. As part of its emergency management responsibilities, Western Lakes Fire District seeks to establish a public education program focused on emergency preparedness through multiple channels (in-person, printed materials, website/social media) that will develop an ongoing contact/engagement with all sectors of the community (residents, businesses, political leadership, intergovernmental) to provide timely and accurate information based on recognized "best practices" for emergency preparedness actions to preserve lives and property, and to minimize unnecessary losses. The program would be a multi-year effort, and would include a means for the public to provide feedback about the efficacy of the program (survey, interviews gauging level of awareness/knowledge pre- and post-outreach [to be developed]). The goal is to provide a robust presence in all communities served by the Western Lakes Fire District to increase the public's ability to be better prepared for emergencies and disasters caused by all hazards.</p>				

Mitigation Project: Purchase portable hazardous materials air monitors to identify air quality							
Status	Year Initiated	Applicable Jurisdiction	Lead Agency/Organization	Priority (Low, Medium, High)	Timeline/ Projected Completion Date (Short, Long-term, or Ongoing)	Est. Cost	Cost Analysis (Low, Medium, High)
New	2021	Western Lakes Fire District	Western Lakes Fire District	High	2022	\$10,000	Low
Goal	Hazard(s) Mitigated		Benefits (Description of Loss Avoided)		Benefit Analysis (Low, Medium, High)	Potential Funding Source	
<p>To preserve life and minimize the potential for injuries or death.</p> <p>To preserve and enhance the quality of life throughout Waukesha County by identifying potential property damage risks and recommending appropriate.</p> <p>To identify potential funding sources for mitigation projects</p>	<p>Hazardous Materials Release</p> <p>Rail Transportation Incident</p>		<p>Portable hazardous materials air monitors to identify air quality following a suspected release; provide accurate information to better protect lives and property; allow for a better assessment of potential environmental impact.</p>		High	HMGP, BRIC	

and form the basis for FEMA project grant applications.				
Action/Implementation Plan and Project Description:				
<p>Communities of western Waukesha County have fire and EMS protection from the Western Lakes Fire District. During hazardous materials releases (fixed site and transportation-related) and during rail transportation incidents, identifying the quality of the air for known and unknown pollutants is critical for both first responder and civilian safety. The requested monitors would be equipped to monitor air quality for known fixed-site hazards and be capable of providing accurate information regarding air quality for initially unknown substances. The monitoring equipment would be maintained on the primary response units for hazardous materials by Western Lakes Fire District and would be available to all communities to request for response. Proper identification of poor air quality/hazardous environments will save lives through the rapid identification of a negative condition, allowing for a proper emergency management decision regarding appropriate civilian actions. Early identification of an airborne release will help to protect the environment from an unnoticed leak during suspected hazardous materials incidents.</p>				

Ongoing Mitigation Actions

Ongoing Mitigation Actions - These are ongoing actions with no definitive end or that are still in progress. During the 2021 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

- This jurisdiction does not have any ongoing mitigation actions or actions that are still in progress as identified in previous plan updates.

Completed Mitigation Actions

Completed Mitigation Actions—These are completed actions since 2011. Completed actions also included a brief description of the “Resulting Reduction or Limitation of Hazard Impact(s) Achieved” in order to show the resulting benefits of implementing the mitigation initiative.

- This jurisdiction does not have any completed mitigation actions.