# Manitowoc County, Wisconsin
# Hazard Mitigation Plan

## 2014

Prepared by:
Manitowoc County Hazard Mitigation Plan
Steering Committee

With Assistance From:
Bay-Lake Regional Planning Commission

BAY-LAKE
REGIONAL PLANNING COMMISSION
Brown•Door•Florence•Kewaunee•Manitowoc•Marinette•Oconto•Sheboygan

# Manitowoc County, Wisconsin

## Hazard Mitigation Steering Committee Members

| Member Name | Representing |
|---|---|
| Andrea Raymakers | Manitowoc County Planning & Zoning Dept |
| Angela Pierce | Bay-Lake Regional Planning Commission |
| Bob Weber | Village of Kellnersville - President |
| Chief Brad Busse | Village of Reedsville - Fire Department |
| Chief Karl Puestow | Village of Francis Creek - Police Department |
| Chief Ryan Gilbert | Village of Mishicot - Police Department |
| Chief Scott Schneider | City of Two Rivers Fire Department |
| Chief Wm. Riesterer | Village of Valders - Emergency Government Coordinator |
| Gary Kennedy | Manitowoc County Highway/Airport |
| James Blaha | County Health Department |
| Jeff Beyer | Manitowoc County Public Works |
| Jerold Korinek | Town Association Representative |
| Judy Rank | Manitowoc County Aging and Disability Resource Center |
| Nancy Crowley | Manitowoc County Emergency Management |
| Nita Catalano-Plank | Aurora Hospital |
| Pete Turnowski | Manitowoc County Planning & Zoning Dept |
| Randy Neils | City of Kiel - DPW |
| Rob Hermann | Manitowoc Sheriff's Department |
| Steve Bacalzo | City of Manitowoc Utilities |
| Steve Simons | Village of Cleveland - DPW |
| Theresa Bauer | Aurora Hospital |
| Tim Klein | Holy Family Memorial Hospital |
| Tim Ryan | Manitowoc County Planning & Zoning Dept - Director |
| Tom Bushman | City of Two Rivers Utilities |
| Chief Tim Herzog | City of Manitowoc Fire Department/EMS |
| Randy Fredrikson | School District |
| Travis Waack | American Red Cross |
| Chief Robert Downs | U.S. Coast Guard |
| Nancy Van Elzen | Village of Maribel |
| Kay Mueller | Village of St. Nazianz - Clerk |
| Chris Hill | Village of Whitelaw - Clerk |

# MANITOWOC COUNTY, WISCONSIN
# HAZARD MITIGATION PLAN

## ADOPTED:
## OCTOBER 14, 2014

Prepared by:

Bay-Lake Regional Planning Commission
425 S Adams Street, Suite 201
Green Bay, WI 54301
(920) 448-2820

*The preparation of this document was financed through contract # 13004-05 between Manitowoc County and the Bay-Lake Regional Planning Commission. The cost to develop this plan was paid for through a grant from the Federal Emergency Management Agency (FEMA) and Wisconsin Emergency Management (WEM) through the Pre-Disaster Mitigation program. A local match for the grant was provided through in-kind efforts by Manitowoc County.*

# RESOLUTION OF ADOPTION

No. 2014/2015- 47

**RESOLUTION ADOPTING HAZARD MITIGATION PLAN**

TO THE MANITOWOC COUNTY BOARD OF SUPERVISORS:

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

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

WHEREAS, adoption of a natural hazards mitigation plan is required as a condition of future grant funding for mitigation projects;

NOW, THEREFORE BE IT RESOLVED that the Manitowoc County Board of Supervisors hereby adopts the Manitowoc County, Wisconsin Hazard Mitigation Plan (2014) as an official plan; and

BE IT FURTHER RESOLVED that the County Clerk is directed to provide a certified copy of this resolution to the Bay-Lake Regional Planning Commission so that it can submit the Plan to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final approval, as required under the Hazard Mitigation Grant Program.

Dated this 14th day of October 2014.

Respectfully submitted by the
Planning and Park Commission

Melvin Waack, Chair

FISCAL IMPACT: None.

FISCAL NOTE: Reviewed and approved by Comptroller.

LEGAL NOTE: Reviewed and approved as to form by Corporation Counsel. SR

APPROVED: Bob Ziegelbauer, County Executive — Date: 10/14/14

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

FEMA

DEC 04 2014

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

Dear Ms. Sommers:

Thank you for submitting the adoption documentation for the Manitowoc County Hazard Mitigation Plan. The plan was reviewed based on the local plan criteria contained in 44 CFR Part 201, as authorized by the Disaster Mitigation Act of 2000. Manitowoc County met the required criteria for a multi-jurisdiction hazard mitigation plan and the plan is now approved for the County, the City of Two Rivers, and the villages of Cleveland, Valders, St. Nazianz, Mishicot, Kellnersville, Reedsville, and Maribel. Please submit the adoption resolutions for any remaining jurisdictions who participated in the planning process.

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

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

Please pass on our congratulations to Manitowoc County for this significant action. If you or the communities have any questions, please contact Kirstin Kuenzi at (312) 408-4460 or Kirstin.Kuenzi@fema.dhs.gov.

Sincerely,

Christine Stack

Christine Stack, Director
Mitigation Division

www.fema.gov

# STATE OF WISCONSIN

**DEPARTMENT OF MILITARY AFFAIRS**

**DIVISION OF EMERGENCY MANAGEMENT**

Brian M. Satula
Administrator

Scott Walker
Governor

December 16, 2014

Andrea Raymakers, GIS Specialist
Manitowoc County
4319 Expo Drive, PO Box 935
Manitowoc, WI 54221-0935

Dear Andrea:

It gives me great pleasure to inform you that the *Manitowoc County, Wisconsin Hazard Mitigation Plan* update has officially been approved by FEMA for the County and most participating jurisdictions. Approval for the remaining participating jurisdictions is contingent upon receipt of adoption resolutions from those jurisdictions. The Plan complies with the requirements of the Disaster Mitigation Act of 2000. The approved jurisdictions are eligible to apply for funding through the Hazard Mitigation Grant Program, Pre-Disaster Mitigation Program, and the Flood Mitigation Assistance Program through December 4, 2019, for projects identified in the Plan. Per the regulations, the Plan is required to be updated and resubmitted for approval every five years to remain eligible for mitigation funding.

With the Meets Requirements letter you received FEMA's Local Hazard Mitigation Plan Review Tool which includes recommended revisions for the five-year update.

Congratulations on the approval of the Plan! I also want to commend the County for its commitment to mitigation and reducing future disaster losses, and I look forward to working with you in the future.

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

Sincerely,

K Sommers

Katie Sommers
Disaster Response and Recovery Planner
Wisconsin Division of Emergency Management

Enclosure

Cc: Nancy Crowley, Manitowoc County Emergency Management Director
Steve Fenske, East Central Regional Emergency Management Director
Becky Powers, East Central Regional Office Operations Associate
Angela Pierce, Bay-Lake Regional Planning Commission

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

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## PLAN UPDATE SUMMARY

To aid in the identification of the changes that have been made to the *Manitowoc County All Hazards Mitigation Plan* (2009) in this current update, Table 0.1 lists the plan changes and the updates made to the identified mitigation strategies.

Table 0.1: Manitowoc County Hazard Mitigation Plan Update Summary

| Plan Chapter | Overview of Plan Update |
|---|---|
| Chapter 1: Introduction | Updated recent disasters, planning process participants, and public review information. Several updates were made to the original steering committee to reflect changes in positions since the last plan was adopted. The steering committee updated the prioritized order of the hazards to be addressed and added coastal hazards, landslide, subsidence, and dam failure. |
| Chapter 2: Planning Area | Updated demographic profile information using the 2010 Census. Updated land use information. |
| Chapter 3: Risk Assessment | All hazard profiles, occurrences, and probabilities were updated. In addition, the risk assessments were updated. Hazard occurrences were updated to include all from 1995 to 2011 (original plan covered 1990 to 2005). Hazard probabilities were updated based on updated occurrences. Update critical facilities and changed some categories names. A risk assessment was added for coastal hazards, landslide, subsidence, and dam failure. |
| Chapter 4: Mitigation Strategy | Updated the mitigation action plan to account for completed projects, updated timetables, and new project additions. Added specific municipal mitigation actions. |
| Chapter 5: Plan Maintenance and Adoption Process | Updated plan maintenance process and plan update schedule. |

Table 0.1 (cont'd): Manitowoc County Hazard Mitigation Plan Update Summary

| Project | Changes |
|---|---|
| **All Hazards** | |
| Establish Mutual Aid Agreements for utility and communications systems including 9-1-1 that are similar to the Mutual Aid Box Alarm System (MABAS) | Completed for communications systems, a similar effort has been completed for utilities |
| Develop a central data collection process to report hazard incidences and resulting deaths, injuries, and property or crop damages. | Addition |
| Add capability for the Dispatch Center to accept text messages. | Addition |
| Maintain Code Red (i.e. Reverse 911) capability. | Addition. Capability provided in 2013, $22K/year to maintain |
| Develop land use policies that guide development away from hazardous areas; reduce density in hazardous areas; and/or encourage greater development restrictions in hazardous areas | Completed |
| Update Comprehensive Plan and include land use policies that guide development away from hazardous areas; reduce density in hazardous areas; and/or encourage greater development restrictions in hazardous areas | Addition |
| Collect building footprints for all structures in the County to allow for analysis of where facilities/structures are located | Completed for City of Manitowoc + 3 miles. Priority changed from "Medium" to "Low" for the remaining of the county. Timetable changed from "2009-2010" to "2015-2020." |
| Collect building height data for all structures in the County | Priority changed from "Medium" to "Low." |
| Work with County, State, and Federal agencies to maintain a consistent critical facility database | Changed Responsible Party from "Manitowoc County Planning and Park Commission and Manitowoc County Emergency Management" to "Manitowoc County Hazard Mitigation Plan Steering Committee." Priority changed from "Low" to "High." |
| Acquire updated air photos and LIDAR data | Addition |
| Outage management software to help triage outage repairs | Addition |
| Ability to test individual sirens after repairs | Addition |
| Develop comprehensive safety plan for all municipal-owned buildings | Addition |
| **Tornado and Strong Wind** | |
| Assist personnel in schools and businesses, public facility managers, mobile home park managers, and citizens in determining "best available" tornado safety areas or need to construct safe rooms | Added "mobile home park manager" and "or need to construct safe rooms" to Project |
| Continued investment in state-of-the-art early warning systems | Combined with another project |
| Use of early warning system through pagers, NOAA weather radios, and sirens to first responders | Added "continued investment" and "social media and Code Red" to Project |
| Consider adoption of ordinances requiring construction of safe shelters for mobile home parks, fairgrounds, shopping malls, or other vulnerable public places | Removed "shopping malls" from Project and changed Timetable from "2008-2012" to "2015-2020" |
| Harden utility infrastructure to make more resistant to tornadoes and high winds (i.e., burying of telephone lines) | Removed |
| Review and update Comprehensive Safety Plan for all county buildings | Added "-owned" to Project |
| Revise and amend zoning and building ordinances to require anchoring of manufactured and mobile homes and exterior attachments (such as carports and porches) | Removed "..and exterior attachments (such as carports and porches)" from Project and changed Timetable from "2010" to "2015." Changed Estimated Cost from "~$25.00/mobile home for tie down and then additional costs for leveling and installation" to "Costs to be determined" |

Table 0.1 (cont'd): Manitowoc County Hazard Mitigation Plan Update Summary

| Project | Changes |
|---|---|
| **Tornado and Strong Wind (cont'd)** | |
| Inform public of severe weather | Changed project wording from "Disseminate severe weather safety information to the public" to "Inform public of severe weather" |
| **Hail** | |
| Harden utility infrastructure to make more resistant to hail (i.e., burying of telephone lines) | Changed Timetable from "2010-2012" to "2015-2020" and changed Responsible Party from "Manitowoc County Emergency Management Department, in conjunction with local utility companies" to "local utility companies, and local jurisdictions" |
| Animal protection | Added "Costs to be determined" for Estimated Cost |
| Promote purchase of hail crop insurance | For Project, replaced "Promote purchase of .." with "Provide information about..." Added "Covered by existing budgets" to Estimated Cost |
| **Winter Storms** | |
| Utilization of the media to disseminate emergency information | Added "highway depts" to Responsible Party |
| Provide educational materials to the public regarding safety during winter storm events | Changed Responsible Party from "Local highway departments and local law enforcement departments" to "County Emergency Management and State EM (readywisconsin.wi.gov)" |
| **Flooding** | Merged Dam Failure Flooding and Stormwater Flooding |
| Dissemination of instructions to the public through the media | Added "local jurisdictions" to the Responsible Party |
| Handle the evacuation of people and property in the case of a severe flood event | Added "County Emergency Management, County Highway Dept, County Aging Dept, and County Health Dept" to Responsible Party |
| Sand-bagging when necessary | Added "County Emergency Management, local public works depts" to Responsible Party. Changed Priority from "Low" to "Medium" |
| Protection of existing buildings and other structures | Changed Project to replace "existing" with "new" and added "…through floodplain zoning." Changed Priority from "Low" to "Medium" |
| Review and update floodplain zoning ordinances as necessary | Added Note "Updated in 2010; approved by FEMA and WDNR" |
| Land use planning | Added Note "Updated in 2008 with Comprehensive Planning; will update again in 10 years." Changed Timetable from "2008-2011" to "2018-2020." Changed Priority from "High" to "Low" |
| Promotion of the sale of flood insurance | Removed. Replace by actions that address NFIP. |
| Issue or deny floodplain development/building permits. | Addition to address NFIP Compliance |
| Inspect all development to assure compliance with local ordinance. | Addition to address NFIP Compliance |

Table 0.1 (cont'd): Manitowoc County Hazard Mitigation Plan Update Summary

| Project | Changes |
|---|---|
| **Flooding (cont'd)** | |
| Maintain records of floodplain development. | Addition to address NFIP Compliance |
| Assist in the preparation and revision of floodplain maps. | Addition to address NFIP Compliance |
| Help residents obtain information on flood hazard, floodplain map data, flood insurance, and proper construction measures. | Addition to address NFIP Compliance |
| Study effects of current and future development in the approximate floodplain and any other areas that have not yet been studied | Changed Estimated Cost of "$40,000-$50,000" with "Costs to be determined." Changed Responsible Party to replace "County Emergency Management" with "GIS" |
| Review and update floodplain zoning ordinances as necessary | Changed Priority from "Medium" to "Low". Changed Project Timetable from "As needed" to "Annually". |
| Stormwater protection planning | Changed Responsible Party to replace "County and Municipal Planning/Zoning" with "Wisconsin DNR and Public Works/Engineering" |
| Erosion control zoning | Changed Responsible Party to replace "County and Municipal Planning/Zoning" with "Wisconsin DNR" |
| Stormwater retention/detention facilities | Changed Responsible Party to replace "County and Municipal Planning/Zoning" with "Wisconsin DNR and Public Works/Engineering" |
| **Dam Failure Flooding** | |
| Review and update evacuation procedures for persons located in affected area as needed | Moved to "Flooding" |
| **Flooding (Stormwater)** | |
| Stormwater Protection Planning | Moved to "Flooding" |
| Erosion Control Zoning | Moved to "Flooding" |
| Stormwater Retention/Detention Facilities | Moved to "Flooding" |
| **Extreme Cold** | |
| Continue to provide safety information to the public during periods of extreme temperature | Added "County Emergency Management, and County Health Dept" to Responsible Party |
| **Extreme Heat** | |
| Continue to provide safety information to the public during periods of extreme temperature | Added "County Emergency Management, and County Health Dept" to Responsible Party |
| **Lightning** | |
| Protection of structures through use of fire resistant materials | For project, replaced "Protection of .." with "Provide information about protecting..." and added Fire Inspectors to Responsible Party |
| Disseminate severe weather safety information to the public | Removed as it's covered under "Inform public of severe weather" under Tornado and Strong Wind |
| Use of early warning system through pagers and NOAA weather radios | Moved to All Hazards. Removed "to first responders" in Project. |
| **Drought** | |
| Identification of areas with potential ground water level problems and inspection of shallow wells in those areas for adequate depth and construction | Changed Timetable from "2008-2012" to "2015-2020" |

Table 0.1 (cont'd): Manitowoc County Hazard Mitigation Plan Update Summary

| Project | Changes |
|---|---|
| **Dense Fog** | |
| Upkeep existing signage in areas of high fog event incidence | Changed Responsible Party from "Manitowoc County Traffic Safety Commission" to "County Highway Dept and local jurisdictions" |
| Additional fog warning signs along Interstate State 43 | Removed - Determined to be unnecessary. |
| **Wildland Fires** | |
| Coordinate public outreach efforts to promote such things as non-combustible roof covering, fire safe construction, safe burning, and the importance of clearing brush and grass away from buildings | Changed Priority from "Medium" to "Low". Removed "Local building inspectors" from Responsible Party |
| Develop local ordinances to require burn permits and restriction of campfires and outdoor burning | Changed Project Timetable from "2009-2012" to "2015-2020" |
| **Coastal Hazards** | |
| Continue to enforce greater setbacks for properties adjacent to Lake Michigan under the county shoreland zoning ordinance | Addition |
| **Land Subsidence** | Addition |
| Provide information to residents as needed | Addition |

# CHAPTER 1 - INTRODUCTION AND PLANNING PROCESS

## PURPOSE OF THE PLAN

The primary focus of the *Manitowoc County Hazard Mitigation Plan* is to evaluate the planning area's potential exposure to natural hazards and to identify appropriate mitigation strategies. Consistent with the Code of Federal Regulations (44 CFR Part 201.6), the County decided to limit the scope of this planning effort to natural hazards at this time, though this plan conforms to Federal Emergency Management Agency (FEMA) requirements for local hazards mitigation planning.

This plan provides County-level information on areas of risk, magnitude of risk, and strategies for reducing this risk. Through the process of developing this plan, the County addressed issues related to the protection of lives and property from natural hazards, the protection of critical facilities, and the reduction of community and taxpayer costs associated with disaster relief and rescue efforts. Completion and approval of the plan makes Manitowoc County eligible to apply for future FEMA disaster relief and mitigation project funds, helping the County to implement their recommended mitigation strategies.

### Disaster Mitigation Act of 2000

The development and update of the *Manitowoc County Hazard Mitigation Plan* is in response to passage of the Disaster Mitigation Act of 2000. This act was signed into law in October of 2000. The Act attempts to stem the losses from disasters, reduce future public and private expenditures, and speed up response and recovery from disasters. The Act (Public Law 106-390) was amended by the Robert T. Stafford Relief and Emergency Assistance Act. The following is a summary of the parts of the Disaster Mitigation Act of 2000 that pertain to local governments and tribal organizations:

- The Act establishes a new requirement for local governments and tribal organizations to prepare a hazard mitigation plan in order to be eligible for funding from FEMA through the Pre-Disaster Mitigation Assistance Program and the Hazard Mitigation Grant Program.
- The Act establishes a requirement that natural hazards need to be addressed in the risk assessment/vulnerability analysis part of a hazard mitigation plan. Man-made/technological hazards are encouraged, but not required, to be addressed.
- The Act authorizes up to seven percent of Hazard Mitigation Grant Program funds available to a state after a federal disaster to be used for development of state, local and tribal organization hazard mitigation plans.
- The Act established November 1, 2004, as the date by which local governments and tribal organizations are to prepare and adopt their respective plans in order to be eligible for the FEMA Hazard Mitigation Grant Program; this deadline was November 1, 2003, for the Pre-Disaster Mitigation Program.
- If a plan is not prepared by November 1, 2004, and a major disaster is declared, in order for a local government or tribal organization to be eligible to receive funding through the Hazard Mitigation Grant Program, they must agree to prepare a hazard mitigation plan within one year.

- In addition, by not having a current, FEMA-approved, and adopted hazard mitigation plan, local and tribal governments cannot utilize funding through the Pre-Disaster Mitigation Grant Program.

## Funding of the Hazard Mitigation Plan

In November 2012, the Manitowoc County received a planning grant to develop an update to their hazard mitigation plan in the amount of $50,888 from FEMA through Wisconsin Emergency Management (WEM) under disaster declaration FEMA-1966-DR. Through the grant (Agreement #: 1966.2), FEMA provided 75 percent of the funds ($38,166), Wisconsin Emergency Management provided 12.5 percent of the required match ($6,361), while the remaining 12.5 percent ($6,361) was required by Manitowoc County to meet the local match.

Manitowoc County entered into a contract (#13004-05) with the Bay-Lake Regional Planning Commission to prepare the update to the hazard mitigation plan. Development of the plan began in March 2013.

## Five Parts of this Natural Hazards Mitigation Plan

The *Manitowoc County Hazard Mitigation Plan* was divided into five chapters in order to address FEMA's local mitigation plan requirements. The five chapters are as follows:

- Chapter 1 – Introduction and Planning Process;
- Chapter 2 – Community Profile;
- Chapter 3 – Risk Assessment;
- Chapter 4 – Mitigation Strategy; and
- Chapter 5 – Plan Adoption and Maintenance.

## PLANNING PROCESS

Development of the *Manitowoc County Hazard Mitigation Plan* was based on the planning requirements and guidance provided by FEMA and WEM. Following these requirements and guidance, the plan meets the requirements of the Disaster Mitigation Act of 2000. Since the WEM guidance for hazard mitigation plans recommended that planning areas "be consistent with a community's comprehensive planning boundary," the planning area for this *Manitowoc County Hazard Mitigation Plan* includes all of Manitowoc County with its three cities (Manitowoc, Two Rivers, and Kiel), nine villages (Cleveland, Francis Creek, Kellnersville, Maribel, Mishicot, Reedsville, St. Nazianz, Valders, and Whitelaw), and eighteen towns.

The steering committee comprised of county, city, and village representatives, emergency management personnel, organizations, business, and citizens guided the plan development process over an 18-month timeframe beginning in March 2012. Professional planning support and facilitation was provided by the Bay-Lake Regional Planning Commission. Public review and input was encouraged at all meetings and through an Open House to present the plan goals, mitigation actions plan, and mapped hazard areas.

Development of the plan was structured along a five-phase planning process:

**Phase I: Pre-planning and review of steering committee appointments**

**Phase II: Reassessing risks and critical facilities**

**Phase III: Updating the mitigation action plan**

**Phase IV: Reviewing the policies and procedures for plan implementation**

**Phase V: Documenting the planning process and plan adoption**

Phase I involved initial conversations and meetings aimed at reviewing the previous steering committee appointments, reconvening the steering committee, and outlining the planning process and responsibilities of the steering committee.

Phase II was comprised of a meeting with the steering committee to reassess natural hazards and potential risks to the County, and reassessing identified critical facilities.

Phase III involved updating the mitigation action plan to address identified risks including removing completed task and adding new mitigation methods to address risks.

Phase IV involved reviewing the policies that affect plan implementation and the procedures that would be followed to implement the plan.

Phase V involved documenting the planning process, developing a complete draft of the plan, and plan adoption.

Plan development was completed with the adoption of the plan by resolution at the Manitowoc County Board meeting on October 14, 2014. The maps in the Planning Area and Risk Assessment chapters of the plan were completed using the Bay-Lake Regional Planning Commission's Geographic Information System (GIS), allowing greater manipulation and analysis from the use of a consistent base map. The FEMA HAZUS software was not utilized due to the availability of current local data and numerous differences between census boundaries and locally available map features. Maps included in this plan are for general planning purposes only, and are not for legal or formal survey purposes.

## Hazard Mitigation Plan Steering Committee

Manitowoc County established a Hazard Mitigation Plan Steering Committee (Table 1.1), which was responsible for providing input, helping to guide the planning process, and reviewing draft chapters of the plan.

Table 1.1: Manitowoc County Hazard Mitigation Plan Steering Committee

| Member Name | Representing |
|---|---|
| Andrea Raymakers | Manitowoc County Planning & Zoning Dept |
| Nancy Crowley | Manitowoc County Emergency Management |
| Angela Pierce | Bay-Lake Regional Planning Commission |
| Tim Ryan | Manitowoc County Planning & Zoning Dept - Director |
| Jeff Beyer | Manitowoc County Public Works |
| Judy Rank | Manitowoc County Aging Resources |
| Gary Kennedy | Manitowoc County Highway/Airport |
| Rob Hermann | Manitowoc Sheriff's Department |
| James Blaha | County Health Department |
| Chief Tim Herzog | City of Manitowoc Fire Department/EMS |
| Chief Scott Schneider | City of Two Rivers Fire Department |
| Nilaksh Kothari | City of Manitowoc Utilities |
| Tom Bushman | City of Two Rivers Utilities |
| Randy Fredrikson | School District |
| Sherry Rezba | American Red Cross |
| Jeffrey Olson | Salvation Army |
| Nyialong Yang | Hmong Mutual Assistance Association |
| Chief Robert Downs | U.S. Coast Guard |
| Tim Klein | Holy Family Memorial Hospital |
| Theresa Brauer | Aurora Hospital |
| Randy Neils | City of Kiel - DPW |
| Steve Simons | Village of Cleveland - DPW |
| Chief Karl Puestow | Village of Francis Creek - Police Department |
| Bob Weber | Village of Kellnersville - President |
| Nancy Van Elzen | Village of Maribel |
| Chief Ryan Gilbert | Village of Mishicot - Police Department |
| Chief Brad Busse | Village of Reedsville - Fire Department |
| Kay Mueller | Village of St. Nazianz - Clerk |
| Chief Wm. Riesterer | Village of Valders - Emergency Government Coordinator |
| Chris Hill | Village of Whitelaw - Clerk |
| Jerold Korinek | Town Association Representative |

During the assessment of natural hazard conditions, the plan steering committee reviewed the prioritization of the various potential natural hazards facing the planning area. The hazards addressed in this plan are listed below in order of priority.

1. Tornado and Strong Wind
2. Hail
3. Winter Storms
4. Flooding
5. Extreme Cold
6. Extreme Heat
7. Lightning
8. Drought
9. Dense Fog
10. Wildland Fires
11. Coastal Hazards
12. Land Subsidence

## Steering Committee Plan Review

The steering committee reviewed and analyzed each section of the plan, and subsequently Table 0.1 was developed to document the sections of the plan that were revised as part of the update process. The steering committee held four meetings to update the plan: May 6, 2013; June 20, 2013; and March 19, 2014. Additional plan review through E-mail occurred outside of these meetings. Copies of the sign-in sheets are included in Appendix A.

## Public Involvement

### Steering Committee Meetings

Opportunities for public comment during the drafting stage of the plan were held at all meetings of the steering committee, which were all open to the public. No comments were provided by the public at these meetings.

### Public Informational Meeting

An informational meeting was held for the public on April 9, 2014 at 6 PM at the Manitowoc County Office Complex at 4319 Expo Drive in Manitowoc. This meeting was held to provide additional opportunity for the public to review and comment on the draft plan and maps. No comments were provided by the public at this meeting.

Both the steering committee meetings and the public informational meeting were open to the public, notices were posted at County Office Complex, and notice was provided to local media.

### County Board Meeting

On October 14, 2014, the Manitowoc County Board adopted this hazard mitigation plan update at a public meeting. A copy of the resolution of adoption can be found at the front of this plan on page iii.

## Neighboring Jurisdictions

A final draft copy of the Manitowoc County Hazard Mitigation Plan and an invitation to the Open House was sent to the emergency management directors in adjacent counties to Manitowoc County including Sheboygan, Kewaunee, Calumet, and Brown counties for their review and comment. No comments were received.

## Contact Information

Nancy H. Crowley, RN, WCEM
Manitowoc County Emergency Management Director
1024 S. 9th Street, Room 113
Manitowoc, WI 54220
(920) 683-4207
nancycrowley@co.manitowoc.wi.us

# CHAPTER 2 - COMMUNITY PROFILE

## GENERAL GEOGRAPHY

The planning area for the *Manitowoc County Hazards Mitigation Plan* completely covers Manitowoc County and includes all of the municipalities within the county. The County has twelve incorporated communities (three cities and nine villages).

Map 2.1 illustrates the location of Manitowoc County and its municipalities. Table 2.1 indicates the geographical size of the County as well as the size of each municipality within the County.

Table 2.1: Manitowoc County Planning Area

| Municipality | Total Planning Area (Square Miles) |
|---|---|
| **CITIES** | |
| Kiel | 2.1 |
| Manitowoc | 18.1 |
| Two Rivers | 6.5 |
| **VILLAGES** | |
| Cleveland | 2.0 |
| Francis Creek | 1.2 |
| Kellnersville | 0.5 |
| Maribel | 1.1 |
| Mishicot | 2.5 |
| Reedsville | 1.2 |
| St. Nazianz | 0.8 |
| Valders | 1.4 |
| Whitelaw | 0.5 |
| **TOWNS** | |
| Cato | 34.9 |
| Centerville | 23.8 |
| Cooperstown | 35.1 |
| Eaton | 35.5 |
| Franklin | 36.2 |
| Gibson | 35.3 |
| Kossuth | 38.6 |
| Liberty | 35.5 |
| Manitowoc | 6.1 |
| Manitowoc Rapids | 27.3 |
| Maple Grove | 35.4 |
| Meeme | 36.3 |
| Mishicot | 27.6 |
| Newton | 34.4 |
| Rockland | 35.3 |
| Schleswig | 33.8 |
| Two Creeks | 14.9 |
| Two Rivers | 31.7 |
| **COUNTY TOTAL** | **595.9** |

Source: U.S. Bureau of the Census, 2010, and Bay-Lake Regional Planning Commission, 2013.
Note: Total Planning Area includes land areas only.

## HISTORICAL SETTING/COUNTY DESCRIPTION

Manitowoc was officially founded in 1836. In 1839, the county government was formed and the first courthouse followed a year later. Early county commissioners authorized the first roads to connect the farms and settlements of the area.

Manitowoc County is located in East Central Wisconsin encompassing an area of approximately 590 square miles, or approximately 380,000 acres. As of the 2000 Census, the county had a total population of 82,887 residents.

Manitowoc County provides the aesthetics of Lake Michigan along with picturesque farmlands, parks, and natural and cultural features. The county has a total of 30 municipalities that is comprised of 18 towns, nine (9) villages, and the cities of Manitowoc, Two Rivers, and Kiel. Brown and Kewaunee Counties serve as Manitowoc County's northern border; Calumet County is its western border; Sheboygan County is its southern border; and Lake Michigan makes up the county's entire eastern border. Map 2.1 provides a general location of Manitowoc County in Wisconsin.

## GENERAL DEVELOPMENT PATTERN

A detailed field inventory of land use in the county was conducted in 2008 by the Bay-Lake Regional Planning Commission (Map 2.2). Using GIS, land use types were tabulated to calculate the total area of Manitowoc County at 381,472 acres, or approximately 596 square miles (Table 2.2).

The vast majority of the county is comprised of agricultural land (specifically croplands) with 220,393 acres or 58 percent of the land. Natural areas (woodlands, water features) comprise 113,570 acres or 30 percent. Approximately 46,500 acres or about 13 percent of Manitowoc County is developed. Developed land is comprised of residential, commercial, industrial, transportation, communications/utilities, institutional/governmental, and recreation.

Table 2.2: Manitowoc County Land Use, 2008

| Land Use Type | Total Acres | Total Land (Percent) |
|---|---|---|
| Residential | 17,474 | 4.6 |
| Commercial | 1,730 | 0.5 |
| Industrial/Manufacturing | 3,493 | 0.9 |
| Transportation | 17,086 | 4.5 |
| Communications/Utilities | 632 | 0.2 |
| Institutional/Governmental | 1,611 | 0.4 |
| Recreational | 5,482 | 1.4 |
| Agricultural | 220,393 | 57.8 |
| Natural Areas | 113,570 | 29.8 |
| **Total Acres** | **381,472** | **100.0** |

Source: Bay-Lake Regional Planning Commission, 2009.

## DEMOGRAPHIC TRENDS

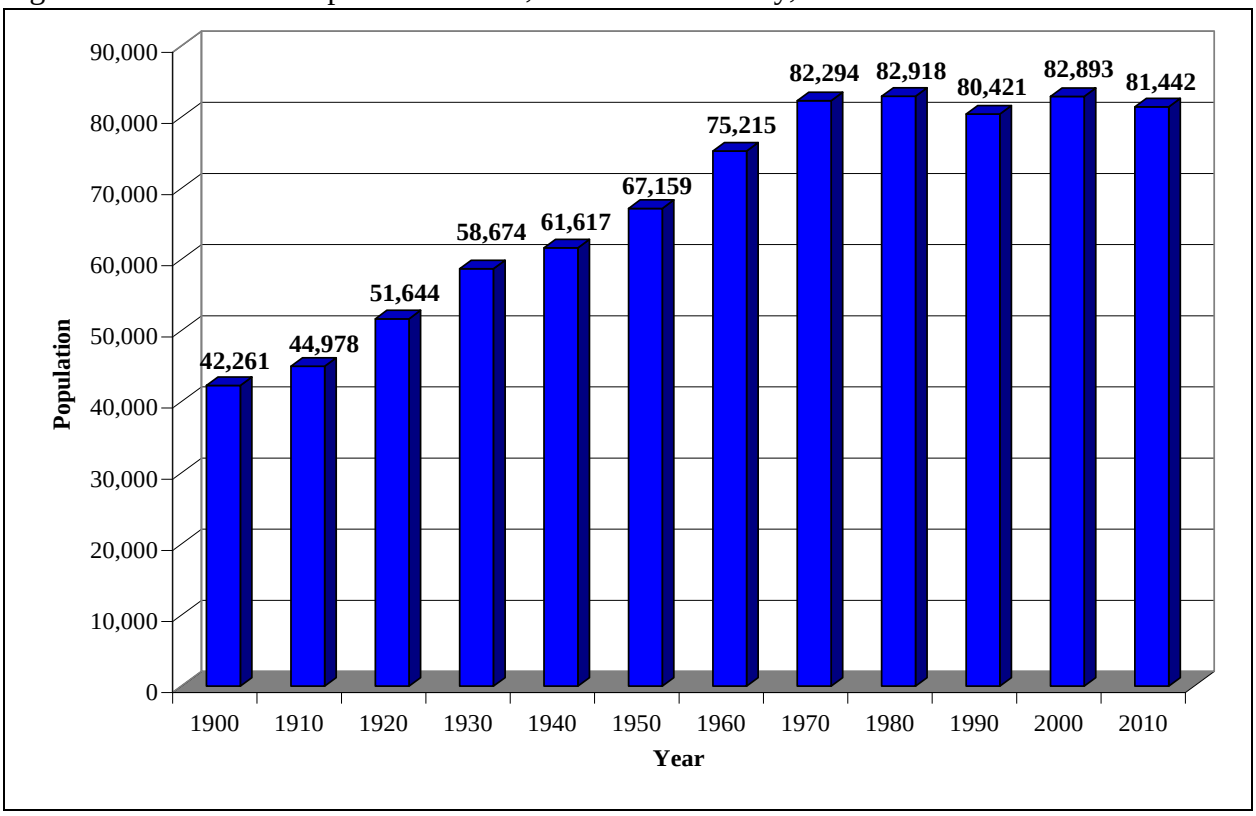
### Population Trends

During the past 110 years, Manitowoc County's population increased by 93 percent or 39,181 persons. The county's population increased every decade with the exception of a slight decline

between 1980 and 1990, and again between 2000 and 2010. The largest period of population increase in the county occurred between 1910 and 1920 with an increase of 14.8 percent.

Figure 2.1 illustrates Manitowoc County's population change between the years of 1900 and 2010, while Table 2.3 displays the county's population trends as well as the changes observed for Wisconsin during the same period.

Figure 2.1: Historical Population Levels, Manitowoc County, 1900-2000




Source: U.S. Bureau of the Census, General Population Characteristics 1840-1970, Bay-Lake Regional Planning Commission, December 1975; Census 2000-2010; and Bay-Lake Regional Planning Commission, 2013.

Table 2.3: Historical Population, Manitowoc County and Wisconsin, 1900-2010

| Year | Manitowoc County | % Change From Previous Decade | Wisconsin | % Change From Previous Decade |
|---|---|---|---|---|
| 1900 | 42,261 | - | 2,069,042 | - |
| 1910 | 44,978 | 6.4 | 2,333,860 | 12.8 |
| 1920 | 51,644 | 14.8 | 2,632,067 | 12.8 |
| 1930 | 58,674 | 13.6 | 2,939,006 | 11.7 |
| 1940 | 61,617 | 5.0 | 3,137,587 | 6.8 |
| 1950 | 67,159 | 9.0 | 3,434,575 | 9.5 |
| 1960 | 75,215 | 12.0 | 3,951,777 | 15.1 |
| 1970 | 82,294 | 9.4 | 4,417,731 | 11.8 |
| 1980 | 82,918 | 0.8 | 4,705,642 | 6.5 |
| 1990 | 80,421 | -3.0 | 4,891,769 | 4.0 |
| 2000 | 82,893 | 3.1 | 5,363,715 | 9.6 |
| 2010 | 81,442 | -1.8 | 5,686,986 | 6.0 |

Source: U.S. Bureau of the Census, General Population Characteristics 1840-1970, Bay-Lake Regional Planning Commission, December 1975; Census 2000-2010; and Bay-Lake Regional Planning Commission, 2013.

## Population Projections

Manitowoc County is projected to see a slow, but steady growth in its population from 2010 to 2030 and is projected to have a population of 91,622 by 2030, according to the Wisconsin Department of Administration (WDOA). This represents an increase of 10,180 persons, or 12.5 percent, from the 2010 Census count of 81,442 persons (Table 2.4 and Figure 2.2).

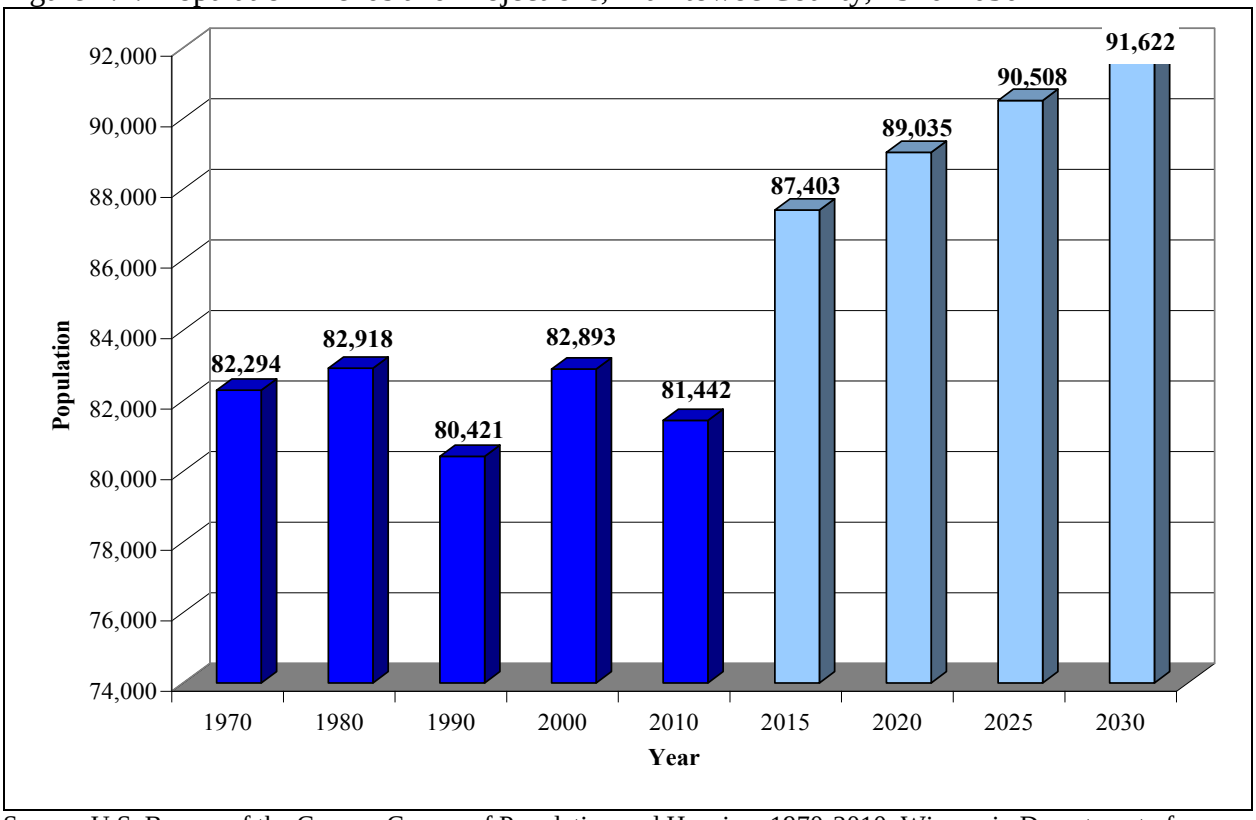
The WDOA projections are based on the 2000 Census, not the recent 2010 Census, so the population decrease seen in 2010 has not been factored into these projections. However, the WDOA projections have ended up quite accurate for the county and are only four percent greater than the actual 2010 Census.

Table 2.4: Population Projections, Manitowoc County and Wisconsin, 2010-2030

| Geographic Location | 2010 Census Population | Population Projections 2015 | 2020 | 2025 | 2030 | # Change 2010-2030 | % Change 2010-2030 |
|---|---|---|---|---|---|---|---|
| Manitowoc County | 81,442 | 87,403 | 89,035 | 90,508 | 91,622 | 10,180 | 12.5 |
| Wisconsin | 5,686,986 | 5,988,420 | 6,202,810 | 6,390,900 | 6,541,180 | 854,194 | 15.0 |

Source: U.S. Bureau of the Census, Census of Population and Housing, 2000; Wisconsin Department of Administration, Official Population Projections, 2008; and Bay-Lake Regional Planning Commission, 2013.

Figure 2.2: Population Trends and Projections, Manitowoc County, 1970-2030




Source: U.S. Bureau of the Census, Census of Population and Housing, 1970-2010; Wisconsin Department of Administration, Official Population Projections, 2008; Bay-Lake Regional Planning Commission, 2013.

## Housing Trends

From 2000 to 2010, Manitowoc County gained 2,536 housing units (Table 2.5). The county and the municipalities have seen a lot of fluctuation in the number of housing units from decade to decade.

Table 2.5: Housing Units, Manitowoc County, 1970-2010

| | Year | | | | | Percent Change | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Geographic Location | 1970 | 1980 | 1990 | 2000 | 2010 | 1970-1980 | 1980-1990 | 1990-2000 | 2000-2010 | 1970-2010 |
| Manitowoc County | 25,411 | 30,140 | 31,843 | 34,653 | 37,189 | 18.6 | 5.7 | 8.8 | 7.3 | 46.4 |
| Wisconsin | 1,472,466 | 1,863,897 | 2,055,774 | 2,321,157 | 2,624,358 | 26.6 | 10.3 | 12.9 | 13.1 | 78.2 |

Source: U.S. Bureau of the Census, General Population Characteristics 1970; Census 2000-2010; and Bay-Lake Regional Planning Commission, 2013.

## EMPLOYMENT CHARACTERISTICS

As a result of the recession that affected the entire country, there was a significant jump in the county's unemployed between 2008 and 2009, from which it has not yet fully recovered. The unemployment rate reached its highest level, 10.1 percent during this period (Table 2.6).

The civilian labor force is comprised of employed persons and those seeking employment, and excludes persons in the armed forces and those under age 16. Variations in the number of persons in the labor force are the result of many factors. Shifts in the age and gender characteristics of the population, changes in the number of residents aged 16 and over, and the proportion of this group working or seeking employment are all factors affecting the size of the labor force.

Table 2.6: Average Civilian Labor Force Estimates, 2000-2012, Manitowoc County

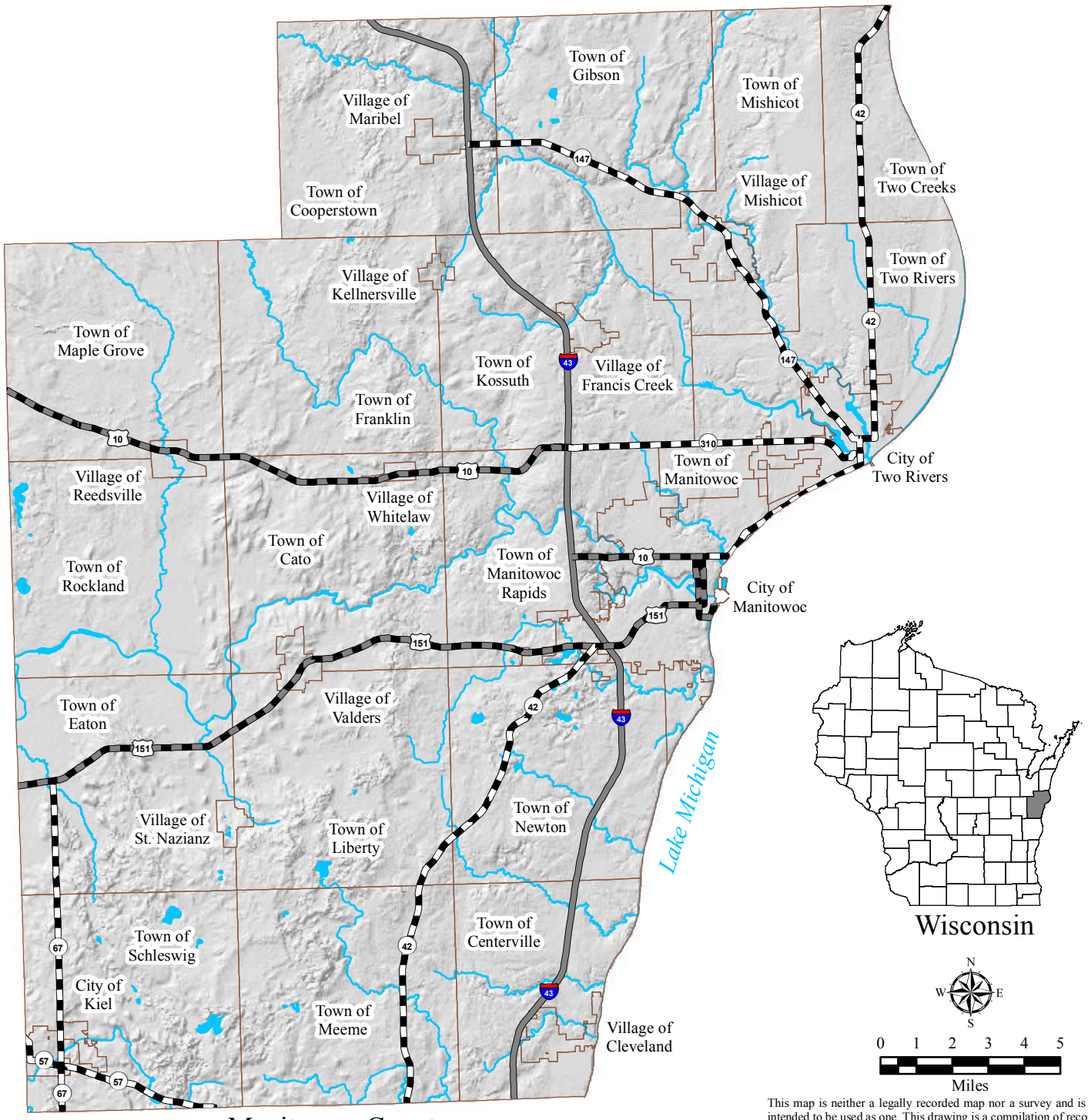
| Year | Total Civilian Labor Force | Employed | Unemployed | Unemployment Rate |
|---|---|---|---|---|
| 2000 | 47,189 | 45,674 | 1,515 | 3.2 |
| 2001 | 47,541 | 45,149 | 2,392 | 5.0 |
| 2002 | 46,232 | 43,443 | 2,789 | 6.0 |
| 2003 | 46,692 | 43,488 | 3,204 | 6.9 |
| 2004 | 45,631 | 42,882 | 2,749 | 6.0 |
| 2005 | 45,395 | 43,138 | 2,257 | 5.0 |
| 2006 | 45,519 | 43,267 | 2,252 | 4.9 |
| 2007 | 46,110 | 43,657 | 2,453 | 5.3 |
| 2008 | 44,603 | 42,415 | 2,188 | 4.9 |
| 2009 | 46,551 | 41,836 | 4,715 | 10.1 |
| 2010 | 44,742 | 40,432 | 4,310 | 9.6 |
| 2011 | 44,355 | 40,731 | 3,624 | 8.2 |
| 2012 | 43,677 | 40,346 | 3,331 | 7.6 |

Source: Wisconsin Department of Workforce Development, Local Area Unemployment Statistics (LAUS), 2000-2012.

# Location Map

## Manitowoc County Hazard Mitigation Planning Area

Manitowoc County, WI




This map is neither a legally recorded map nor a survey and is not intended to be used as one. This drawing is a compilation of records, information and data used for reference purposes only. Bay-Lake RPC is not responsible for any inaccuracies herein contained.

Base Map Features

- Interstate Highway
- U.S. Highway
- State Highway
- Surface Water

BAY-LAKE REGIONAL PLANNING COMMISSION

G:\Manitowoc\County\Hazard_Planning\Hazard_Plan_2013

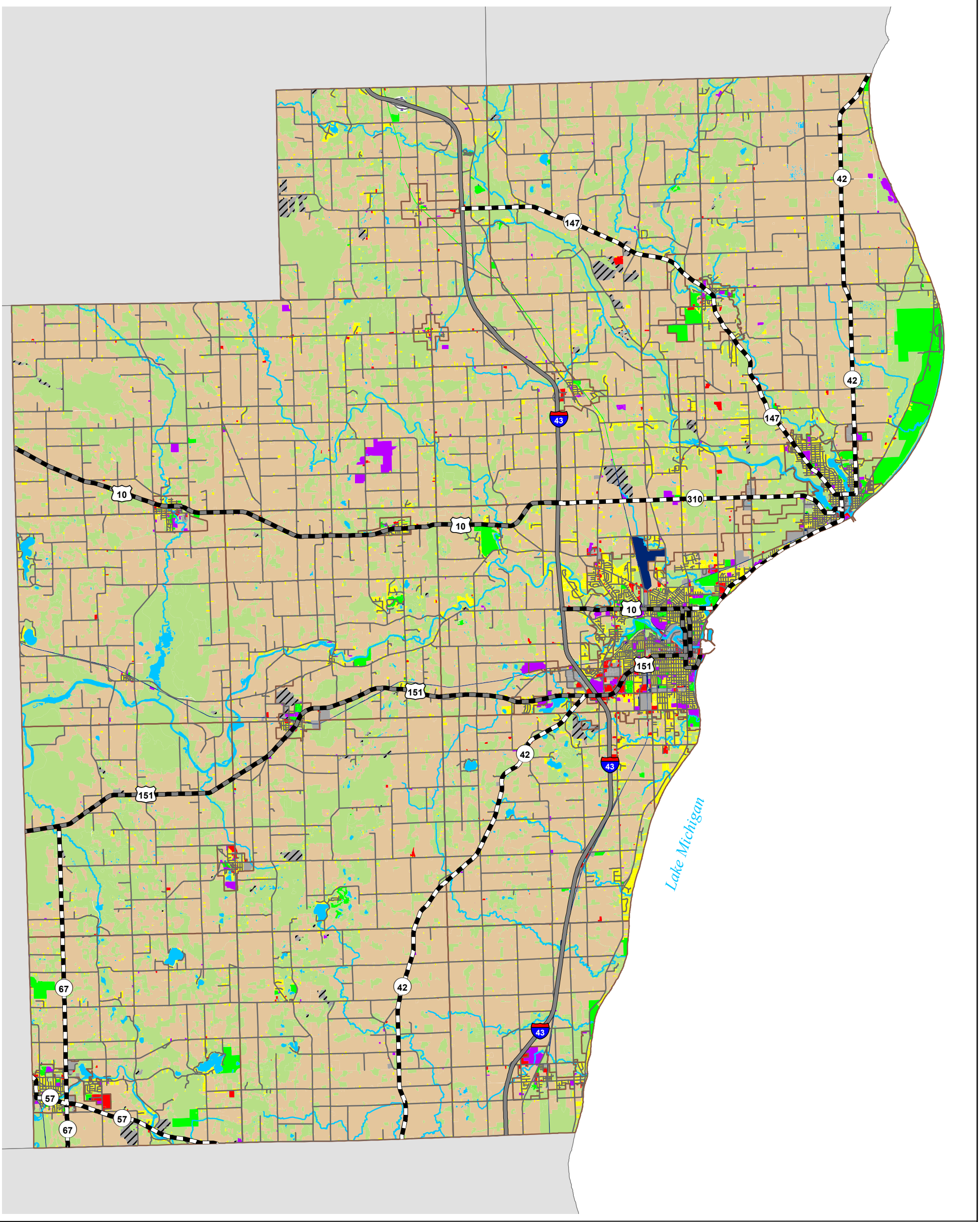
Source: WDOT, 2009; Manitowoc County, 2010; Bay-Lake Regional Planning Commission, 2013.

Map 2.2

# Land Use

## Manitowoc County Hazard Mitigation Planning Area

Manitowoc County, WI




Base Map Features

- Interstate Highway
- U.S. Highway
- State Highway
- County/Local Road
- Surface Water

- Residential
- Commercial
- Industrial
- Nonmetallic Mining
- Transportation
- Parks and Recreation
- Governmental/Institutional/Utilities
- Agricultural
- Woodlands/Natural Areas

N W E S

0 1 2 3 4

Miles

BAY-LAKE Regional Planning Commission

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Source: WDOT, 2009; Manitowoc County, 2010; Bay-Lake Regional Planning Commission, 2008, 2013.

# CHAPTER 3 - RISK ASSESSMENT

In order to more effectively evaluate potential hazard mitigation measures and develop useful strategies to address the risks associated with the identified natural hazards, a risk assessment has been prepared for Manitowoc County. The risk assessment identifies the natural hazards thought to pose the greatest risk to residents of the county, to profile the extent and severity of past natural hazard events that have affected the county, and to assess the vulnerability of the county to the risk of future natural hazard events.

## HAZARD IDENTIFICATION

Although the county could potentially be at risk from several distinct hazards, this plan focuses on addressing the natural hazards that pose the greatest risk to people and property in the county. Identification of the natural hazards to be addressed was based on a priority rank ordering of the many different natural hazards identified in the Resource Guide to All Hazards Mitigation Planning in Wisconsin (prepared by the Association of Wisconsin Regional Planning Commissions through funding provided by the State of Wisconsin Department of Military Affairs, Wisconsin Emergency Management, and the Federal Emergency Management Agency).

### Hazard Risk Assessment Ranking

To develop a hazard risk assessment ranking, a survey was conducted in 2007 and each plan steering committee member was asked to assign a risk rating of 1 point for low, 2 points for moderate, and 3 points for high to each of the following risk assessment criterion for each natural hazard:

- Frequency of past hazard occurrences
- Probability of hazard occurring in the future
- Degree of past hazard events causing injuries, sickness and/or deaths
- Degree of past hazard events causing damage to homes
- Degree of past hazard events causing damage to business and/or interruption of business trade
- Amount of local, state, and federal funds expended on past hazard recovery activities
- Amount of population still vulnerable to injury, sickness, and/or death from hazard
- Amount of homes still vulnerable to damage from hazard
- Amount of businesses still vulnerable to damage or interruption of business trade

The number of points for each criterion for each identified natural hazards was totaled and each natural hazard was ranked based on the total points.

During the plan update, the steering committee agreed by consensus at a meeting on May 6, 2013 to make some revisions to the hazard risk rankings based on historical hazard occurrence data. Table 3.1 shows the updated hazard risk assessment ranking for the plan.

Table 3.1: Risk Assessment Ranking

| Updated Plan | |
|---|---|
| **Ranking** | **Natural Hazards** |
| 1 | Tornado and Strong Wind |
| 2 | Hail |
| 3 | Winter Storms |
| 4 | Flooding |
| 5 | Extreme Cold |
| 6 | Extreme Heat |
| 7 | Lightning |
| 8 | Drought |
| 9 | Dense Fog |
| 10 | Wildland Fires |
| 11 | Coastal Hazards |
| 12 | Land Subsidence |

Source: Manitowoc County Hazard Mitigation Plan Steering Committee, 2013.

## Natural Hazard Events Historical Summary

The National Oceanic and Atmospheric Administration (NOAA) National Climatic Data Center (NCDC) publishes National Weather Service (NWS) data describing past weather events and the resulting deaths, injuries, and damages associated with each of these events. Event occurrence information is available at a local, county, or regional level – depending on the area covered by the hazard event. Historical hazard events were available from January 1, 2000 through January 31, 2013. The query for that time period resulted in 173 events recorded (Table 3.2).

The data from the NCDC shows that of the 173 events, the natural hazards occurring most frequently in Manitowoc County between January 2000 and February 2013 include: tornado and strong wind (65 events), winter storms (51 events), hail (32 events), and flooding (11 events). Other events occurring less than ten times in the county since 2000 include extreme cold (3 events), extreme heat (3 events), lightning (3 events), drought (3 events), and dense fog (2 events). Some of the recorded hazard events may not have been specific to the Manitowoc County, as they may have been recorded for a larger regional area, or statewide. Additionally, some of the common hazard events, such as lightning or dense fog, may only get reported to the NCDC if they are extreme events that cause property damage, injury, or death.

One death (from extreme heat) and thirty injuries (from two-inch hail combined with near 100 mph wind) have been reported in Manitowoc County from hazard events since 2000. The most costly hazard events in terms of property damage since 2000 has been hail ($57,180,000), flooding ($20,250,000), and tornadoes and strong winds ($1,656,500).

Table 3.2: Natural Hazard Occurrences Data, Manitowoc County 2000-2013

| Natural Hazard | # of Events[1] | Avg #/Year | Risk[2] | Deaths | Injuries | Property Damage[3,4] |
|---|---|---|---|---|---|---|
| Tornado and Strong Wind | 65 | 5 | high | 0 | 0 | $1,656,500 |
| Winter Storms | 51 | 4 | high | 0 | 0 | |
| Hail | 32 | 2 | high | 0 | 30 | $57,180,000 |
| Flooding | 11 | 1 | medium | 0 | 0 | $20,250,000 |
| Extreme Cold | 3 | 0.2[5] | low | 0 | 0 | |
| Extreme Heat | 3 | 0.2[5] | low | 1 | 0 | |
| Lightning | 3 | 0.2[5] | low | 0 | 0 | $3,100 |
| Drought | 3 | 0.2[5] | low | 0 | 0 | |
| Dense Fog | 2 | 0.2[5] | low | 0 | 0 | |
| Wildland Fires | No Records | - | low | - | - | - |
| Coastal Hazards | No Records | - | medium[6] | - | - | - |
| Land Subsidence | No Records | - | low | - | - | - |
| Total Events | 173 | -- | | 1 | 30 | $79,089,600 |

1. January 1, 2000 to January 31, 2013 (13 years, 1 month)
2. Risk based on occurences per year: High >1; Medium 0.5-1; and Low <0.5
3. Includes Crop Damages.
4. Does not factor in private loses for most occurrences.
5. Approximately one event every five years.
6. Based on information provided by *Resource Guide for Great Lakes Coastal Hazards in Wisconsin* (http://coastal.lic.wisc.edu/urpl999.htm#Section_4).

Source: NOAA-NCDC, 2013; and Bay-Lake Regional Planning Commission, 2013.

## Natural Hazards Prioritization

The plan steering committee identified the following ranked natural hazards to be the focus of the plan assessment and mitigation action strategies. Ranking the potential risks associated with each natural hazard helped the steering committee prioritize the mitigation action strategies that are addressed later in the plan. The following natural hazards combined more than one listing from the NCDC data for consistency (the additional listings are provided in parenthesis). The hazards are listed in order of their prioritized ranking.

1. Tornado and Strong Wind (includes funnel clouds, strong wind, high wind, and thunderstorm wind)
2. Hail
3. Winter Storms (includes blizzard, heavy snow and lake-effect snow)
4. Flooding (includes flash flood, and dam failure flooding)
5. Extreme Cold (includes wind chill, and cold)
6. Extreme Heat (includes heat)
7. Lightning
8. Drought
9. Dense Fog
10. Wildland Fires

11. Coastal Hazards (Bluff Erosion, Ice Shoves, etc.)
12. Land Subsidence (sink holes)

**Other Natural Hazards Determined Not to Pose a Significant Risk**

The following natural hazards were determined to have a minimal chance of occurring or pose minimal risk to the safety of residents or property in Manitowoc County. These natural hazards are excluded from the full assessment, but are briefly discussed here to meet the comprehensive requirements for developing a natural hazards mitigation plan under Federal law.

### Earthquakes

According to the U.S. Geological Survey (USGS), there have been 19 earthquake events in Wisconsin. The closest of these to Manitowoc County occurred in northern Ozaukee County (Lake Church) in 1956, as well as in Fond du Lac County in 1922. Where readings were available, these events were relatively small, most being 3.0 to 4.2 on the Richter Scale in intensity, and the largest being an intensity of 5.3 (Beloit, 1909), which may be strong enough to crack some plaster, but typically does not cause serious damage. Due to the lack of recent events, some geologists question whether many of these events were true earthquakes, but rather were quarry collapses, blasts, etc.

The nearest active earthquake fault outside of Wisconsin is the New Madrid Fault, which stretches from northeast Arkansas to southern Illinois. Manitowoc County falls within the lowest earthquake hazard shaking area, which represents the levels of horizontal shaking which have a 1-in-50 chance of being exceeded in a 50 year period. Similarly, Manitowoc County falls within a 0%g to 1%g peak ground acceleration (PGA) zone as shown on the USGS PGA values map with a 10 percent chance of being exceeded over 50 years. Therefore, the county is considered unlikely to be substantially affected by earthquakes in the long-term future. The earthquake threat to the county is considered very low.

### Landslides

The term “landslide” includes a wide range of ground movement, including rock falls, deep failure of slopes and shallow debris flows. Although gravity acting on an overly steep slope is the primary reason for a landslide, there can be other contributing factors, such as erosion by rivers, excess weight from the accumulation of rain or snow, or man-made and other structures stressing weak slopes to the point of failure. In addition, slope material that becomes saturated with water may develop a debris flow or mudflow.

The U.S. Geological Survey *Landslide Overview Map of the Coterminous United States* identifies low landslide risks for all of Manitowoc County. The majority of the land within Manitowoc County does not involve steep slopes and does not pose a landslide risk. While there are steeper portions of the county, the soils involved pose more of a gradual erosion risk, as opposed to the sudden, large-scale movement of ground associated with landslide hazards. Hillside erosion (minor landslides) within the county is very uncommon, and is the result of man-made impacts, such as the removal of vegetation. Hillside erosion has not posed substantial risk to life or property, and has been largely mitigated through subdivision law, site plan review and erosion control plans for construction sites.

There are no records of substantial damage or injury from large landslides within Manitowoc County, and these hazard threats are considered low.

## RISK AND VULNERABILITY ASSESSMENT

The risk and vulnerability assessment is intended to describe the frequency, severity, and probability of future occurrence of natural hazards that could impact the planning area. The following hazard profiles attempt to historically describe the characteristics of each natural hazard and how they have affected the population, infrastructure, and environment of the planning area, and the potential risk to the population and property that could occur because of each of these natural hazards.

### Critical Facilities

Although the risk assessment focuses on the risk potential to the overall planning area, critical facilities are of particular concern. Critical facilities are necessary to preserve health, welfare, and quality of life in the county, and fulfill important public safety, emergency response, and/or disaster recovery functions, or they house vulnerable populations (such as schools, childcare, and mobile home parks).

Critical facilities in the planning area have been identified and mapped, and are illustrated in Map 3.3. Table 3.3 lists the types and number of critical facilities within the county. Table 3.4 lists the critical facilities by municipality.

Table 3.3: Number of Critical Facilities by Type, Manitowoc County

| Critical Facility Type | Count |
|---|---|
| Bridge | 266 |
| Communication Facility | 121 |
| Licensed Healthcare Facility | 62 |
| Wastewater Treatment Facility | 59 |
| School | 54 |
| Post-Disaster Recovery Site | 51 |
| Administrative Building | 47 |
| Fire and Safety | 43 |
| Water Supply | 38 |
| Power Facility/Bulk Fuel Storage | 33 |
| Licensed Childcare Facility | 32 |
| Mobile Home Park | 12 |
| Dam | 8 |
| Military Installation | 3 |
| Transportation Facility | 3 |
| **Total** | **832** |

Source: Bay-Lake Regional Planning Commission, 2014.

Table 3.4: Number of Critical Facilities by Municipality, Manitowoc County

| Muncipality | # of Critical Facilities |
|---|---|
| City of Manitowoc | 180 |
| City of Two Rivers | 75 |
| Town of Kossuth | 45 |
| Town of Cooperstown | 44 |
| City of Kiel | 35 |
| Town of Newton | 35 |
| Town of Manitowoc Rapids | 31 |
| Village of Mishicot | 31 |
| Town of Centerville | 30 |
| Village of Cleveland | 30 |
| Town of Gibson | 27 |
| Village of Reedsville | 24 |
| Town of Schleswig | 20 |
| Town of Two Rivers | 20 |
| Village of Valders | 20 |
| Town of Maple Grove | 18 |
| Town of Meeme | 18 |
| Town of Mishicot | 18 |
| Town of Cato | 16 |
| Town of Franklin | 16 |
| Town of Two Creeks | 16 |
| Town of Liberty | 15 |
| Town of Rockland | 15 |
| Village of St. Nazianz | 11 |
| Town of Eaton | 10 |
| Town of Manitowoc | 7 |
| Village of Kellnersville | 7 |
| Village of Francis Creek | 6 |
| Village of Maribel | 6 |
| Village of Whitelaw | 6 |
| **Total** | **832** |

Source: Bay-Lake Regional Planning Commission; 2014.

## HAZARD PROFILES

Hazard profiles are intended to describe the frequency, severity, and probability of future natural hazards that could have an impact on Manitowoc County. These hazard profiles attempt to historically describe the cause and characteristics of each natural hazard and how they have impacted the population, infrastructure, and environment of the county. These potential risks are evaluated to determine their likelihood of reoccurrence and to gauge the impacts to the existing (or planned) population and property that could occur as a result of these hazards.

Hazard probabilities are represented as high, medium, and low. High probability hazards are defined as hazards that occur an average of more than once per year; medium probability hazards are those that occur an average of more than once every two years, but not more than once per year; and low probability hazards occur less frequently than once every two years.

## Tornado and Strong Wind

### Description of Hazard

A tornado is a relatively short-lived storm comprised of an intense rotating column of air, extending from a thunderstorm cloud system. It is nearly always visible as a funnel, although its lower end does not necessarily touch the ground. Average winds in a tornado, although never accurately measured, are between 100 and 200 miles per hour, but some tornadoes may have winds in excess of 300 miles per hour.

A tornado path averages four miles, but may reach up to 300 miles in length. Widths average 300 to 400 yards, but severe tornadoes have cut swaths a mile or more in width, or have formed groups of two or three funnels traveling together. On average, tornadoes move between 25 and 45 miles per hour, but speeds over land of up to 70 miles per hour have been recorded. Tornadoes rarely last more than a couple of minutes in a single location or more than 15 to 20 minutes in a ten mile area, but their short periods of existence do not limit their devastation of an area.

Table 3.5 shows the Enhanced Fujita Scale (EF Scale), which is recognized as the acceptable tornado magnitude measurement rating.

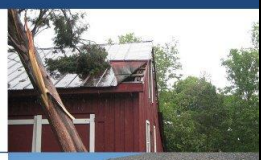
The destructive power of the tornado results primarily from strong wind velocities and sudden changes in pressure. Wind and pressure differentials probably account for 90 percent of the damage caused by tornadoes. Since tornadoes are generally associated with severe storm systems, they are usually accompanied by hail, torrential rain, and intense lightning. Depending on their intensity, tornadoes can uproot trees, down power lines and destroy buildings. Flying debris can cause serious injury and death.

On the basis of 40 years of tornado history and more than 100 years of hurricane history, the United States has been divided into four zones that geographically reflect the number and strength of extreme wind storms. The zone which includes most of the southern two-thirds of Wisconsin (known as Zone IV) has experienced the most and the strongest tornado activity that has affected the entire U.S., with wind speeds of up to 250 miles per hour being recorded at some point. This zone includes the entire county for this Natural Hazards Mitigation Plan.

Wisconsin lies along the northern edge of the nation's maximum frequency belt for tornadoes (commonly known as "tornado alley"), which extends northeastward from Oklahoma into Iowa and then across to Michigan and Ohio. Generally, the southern and western portions of Wisconsin have a higher frequency of tornadoes; however, every county in Wisconsin has had tornadoes and is considered to be susceptible to a tornado disaster. Tornadoes have occurred in Wisconsin in every month except February.

Wisconsin's tornado season runs from the beginning of April through September. The most severe tornadoes statewide typically occur during the months of April, May, and June. Many tornadoes strike in late afternoon or early evening. However, tornadoes have occurred during other times of the day. Personal property damage, deaths, and injuries have and will continue to occur due to tornado events in Wisconsin.

Table 3.5: Tornado Magnitude Measurement, EF Scale

| EF Rating | Wind Speeds | Expected Damage | |
|---|---|---|---|
| EF-0 | 65-85 mph | 'Minor' damage: shingles blown off or parts of a roof peeled off, damage to gutters/siding, branches broken off trees, shallow rooted trees toppled. |   |
| EF-1 | 86-110 mph | 'Moderate' damage: more significant roof damage, windows broken, exterior doors damaged or lost, mobile homes overturned or badly damaged. |   |
| EF-2 | 111-135 mph | 'Considerable' damage: roofs torn off well constructed homes, homes shifted off their foundation, mobile homes completely destroyed, large trees snapped or uprooted, cars can be tossed. |   |
| EF-3 | 136-165 mph | 'Severe' damage: entire stories of well constructed homes destroyed, significant damage done to large buildings, homes with weak foundations can be blown away, trees begin to lose their bark. |   |
| EF-4 | 166-200 mph | 'Extreme' damage: Well constructed homes are leveled, cars are thrown significant distances, top story exterior walls of masonry buildings would likely collapse. |   |
| EF-5 | > 200 mph | 'Massive/incredible' damage: Well constructed homes are swept away, steel-reinforced concrete structures are critically damaged, high-rise buildings sustain severe structural damage, trees are usually completely debarked, stripped of branches and snapped. |   |

Source: NOAA National Weather Service, 2011.

Strong winds, including thunderstorm winds and high winds can often be just as damaging as a tornado. Strong winds are most likely to happen in the spring and summer months and during the afternoon and evening hours, but can occur throughout the year and at all hours.

Strong winds include downburst winds and high winds. Downburst winds are strong, concentrated, straight-line winds created by falling rain and sinking air that can reach speeds of 125 miles per hour. High winds are high speeds winds that can be as damaging as a tornado, but remaining nearly straight line and are not the rotating column of air that is characteristic of a tornado.

The National Weather Service classifies a thunderstorm as severe if its winds reach or exceed 58 miles per hour, produces a tornado, or drops surface hail at least 0.75 inch in diameter. Compared with other atmospheric hazards (such as tropical cyclones and winter low pressure systems), individual thunderstorms affect relatively small geographic areas. The average thunderstorm system is approximately 15 miles in diameter, covers 75 square miles, and lasts less than 30 minutes at a single location. However, weather monitoring reports indicate that coherent thunderstorm systems can travel intact for distances in excess of 600 miles.

### Previous Significant Hazard Occurrences

According to National Climatic Data Center (NCDC), Manitowoc County has experienced 65 significant tornado and strong wind events (including funnel clouds, strong wind, high wind, and thunderstorm wind) over the last 13 years from January 1, 2000 to January 31, 2013.

One significant tornado of note was an EF-1 in the Town of Cato that occurred on July 13, 2004 causing $1.6 million in damage.

### Hazard Frequency

Based on previous hazard occurrences as reported by the NCDC, Manitowoc County experiences approximately five significant tornado/strong wind events per year.

### Probability of Hazard Occurring in the Future

Based on the hazard frequency, Manitowoc County is considered to have a **high** probability of experiencing a tornado/strong wind event in any given year.

### Areas at Greatest Risk

Tornadoes have no defined hazard area within the county. Past events have been relatively uniform across the planning area; however, mobile home residents are often most vulnerable to death, injury, and property damage from tornadoes. Therefore, mobile home parks in the planning area are the areas of greatest risk from this hazard.

### Impacts from Hazard

#### *Death and Injury*

No deaths or injuries have been reported from tornado/strong wind events for Manitowoc County over the last 13 years from January 1, 2000 to January 31, 2013, according to NCDC data.

#### *Structures at Risk*

Although tornadoes strike at random, making all buildings vulnerable, there are three types of structures that are most likely to sustain damage. These structure types include mobile homes, homes on crawlspaces (because they are more susceptible to lift), and buildings with large spans (such as airplane hangars, gymnasiums, warehouses, and factories).

Structures within the direct path of a tornado vortex are often reduced to rubble. However, structures adjacent to the path of the tornado are often severely damaged by high winds flowing into the tornado vortex (these winds are known as inflow winds). It is here, adjacent to the tornado's path, where the building type and construction techniques are critical to the structure's survival.

Similar to severe thunderstorms, street signs often face disrepair after tornadoes, and debris often litter streets and highways following a tornado, requiring clean-up. Downed trees caused by tornadoes can be problematic in terms of impacting infrastructure (transportation, sewer, water, etc.) as well as critical facilities.

#### *Critical Facilities*

Hospitals can see increases in patient load following tornadoes. Schools can sustain damage, and if they do not sustain damage, they often function as temporary shelters in the aftermath of tornadoes. Police and fire departments often see an increased workload during and after tornadoes. Powerlines and communication towers are at risk of being blown down.

Any critical facility in the planning area is capable of being hit. However, schools are a main concern for two reasons: (1) they have large numbers of people present, either during school or as a storm shelter; and (2) they have large span areas, such as gyms and theaters.

### *Economic Impacts*

A tornado can have a significant economic impact to a local economy due to irrecoverable businesses and infrastructure damages. A heavily damaged business, especially one that was struggling to make a profit, often never reopens after the hazard event.

Infrastructure damage is usually limited to above ground utilities, such as power lines. Damage to utility lines can usually be repaired or replaced relatively quickly. Damage to roads and to railroads is also localized; if these facilities cannot be repaired promptly, alternate transportation routes are usually available.

Public expenditures include search and rescue, shelters, and emergency protection measures. The greatest public expenditures for a community result from repairs to public facilities, and clean up and disposal of debris. Most public facilities are insured, so the economic impact on the local treasury is likely to be small. Clean up and disposal can be a larger problem, especially if there is limited landfill capacity near the damage site.

Property Damage

Reported property damage from significant tornadoes/strong winds for Manitowoc County has totaled approximately $1.7 million in public property and crop damages over the last 13 years from January 1, 2000 to January 31, 2013 according to NCDC data.

### Estimate of Potential Dollar Losses

Since mobile homes are especially vulnerable to tornadoes, a "worst case scenario" for this hazard would involve the total destruction of all mobile homes in the county. In such a "worst case scenario," the total destruction of all buildings and facilities in the 14 mobile home parks in the County would result in estimated dollar losses of approximately $6.1 million plus with an additional estimated value of building contents of $3.0 million (calculated as 50 percent of the building value), for total estimate of potential dollar losses of $9.1 million.

## Hail

### Description of Hazard

A severe thunderstorm can produce frozen precipitation, or hail. Hailstones are ice crystals that form within a low-pressure front due to warm air rising rapidly into the upper atmosphere and the subsequent cooling of the air mass. Frozen droplets gradually accumulate on the ice crystals until they develop sufficient weight and fall as precipitation. The size of hailstones is a direct function of the severity and size of the storm. Significant damage does not result until the hailstones reach 1.5 inches in diameter, which occurs in less than half of all hailstorms. Hail in Wisconsin ranges from pea-sized to golf ball-sized. Area coverage of individual hailstorms is highly variable and spotty because of the unstable nature of cumulonimbus clouds.

### Previous Significant Hazard Occurrences

According to National Climatic Data Center (NCDC), Manitowoc County has experienced 32 significant hail storm events over the last 13 years from January 1, 2000 to January 31, 2013. Some of these reported occurrences may not have been specific to Manitowoc County, and may have been recorded for a larger regional area.

### Hazard Frequency

Based on previous hazard occurrences as reported by the NCDC, Manitowoc County experiences approximately two significant hail storm events per year.

### Probability of Hazard Occurring in the Future

Based on the hazard frequency, Manitowoc County is considered to have a **high** probability of experiencing a significant hail storm event in any given year.

### Areas at Greatest Risk

Hail storms have no defined hazard area within the planning area. Past events have been relatively uniform across the planning area or the larger regional area.

### Impacts from Hazard

#### *Death and Injury*

No death, but 30 injuries have been reported from hail events in Manitowoc County over the last 13 years from January 1, 2000 to January 31, 2013, according to NCDC data.

All 30 injuries occurred during one hail event in St. Nazianz on May 12, 2000 as a result of two-inch hail combined with near 100 mph wind.

#### *Structures at Risk*

Hail can inflict severe damage to roofs, windows, and siding, depending on hailstone size and winds.

#### *Critical Facilities*

Hail can inflict severe damage to roofs, windows, and siding of critical facilities, depending on hailstone size and winds.

#### *Economic Impacts*

Hail can damage or destroy crops. Taller crops, such as corn are particularly vulnerable to hail. Costly damage can occur to roofs, windows, and siding, as well as automobiles, RVs, and boats (including the body, paint and windshields and other windows).

Property Damage

Reported property damage from significant hail events for Manitowoc County has totaled over $57 million in public property and crop damages over the last 13 years from January 1, 2000 to January 31, 2013 according to NCDC data.

$50 million in property and crop damages occurred during one hail event in St. Nazianz on May 12, 2000 as a result of two-inch hail combined with near 100 mph wind.

### Estimate of Potential Dollar Losses

An estimate of potential dollar losses cannot be calculated for hail storm events, since no vulnerable structures have been identified.

## Winter Storms

### Description of Hazard

Winter storms can vary in size and strength, and can include heavy snow storms, blizzards, freezing rain, sleet, ice storms, and blowing and drifting snow. Extremely cold temperatures accompanied by strong winds can result in wind chills that cause bodily injury such as frostbite

and hypothermia. Winter storms can occur as a single event or they can occur in combination, which can make an event more severe. For example, a moderate snowfall could create severe conditions if it were followed by a freezing rain and subsequent extremely cold temperatures. The aftermath of a winter storm can impact a community or region for weeks, and even months.

A variety of weather phenomena and conditions can occur during winter storms. For purposes of classification, the following are National Weather Service descriptions of winter storm elements:

Heavy Snowfall – the accumulation of six or more inches of snow in a 12-hour period, or eight or more inches in a 24-hour period.

Winter Storm – the occurrence of heavy snowfall accompanied by significant blowing snow, low wind chills, sleet or freezing rain.

Blizzard – the occurrence of sustained wind speeds in excess of 35 miles per hour accompanied by heavy snowfall or large amounts of blowing or drifting snow.

Ice Storm – an occurrence where rain falls from warmer upper layers of the atmosphere to the colder ground, freezing upon contact with the ground and exposed objects near the ground.

Freezing drizzle/freezing rain – the effect of drizzle or rain freezing upon impact on objects that have a temperature of 32 degrees Fahrenheit or below.

Sleet – solid grains or pellets of ice formed by the freezing of raindrops or the refreezing of largely melted snowflakes. This ice does not cling to surfaces.

Wind chill – an apparent temperature that describes the combined effect of wind and low air temperatures on exposed skin.

Much of the snowfall in Wisconsin occurs in small amounts of between one and three inches per occurrence. Heavy snowfalls (producing at least eight to ten inches of accumulation) happen on the average about five times per season. True blizzards are rare in Wisconsin, and are more likely to occur in northwestern Wisconsin than in southern portions of the state, even though heavy snowfalls are more frequent in southeastern Wisconsin. However, blizzard-like conditions often exist during heavy snow storms when gusty winds cause the severe blowing and drifting of snow.

Both ice and sleet storms can occur at any time throughout the winter season from October into April. Early- and late-season ice and sleet storms are generally restricted to northern Wisconsin. Otherwise, the majority of these storms occur in southern Wisconsin. In a typical winter season, there are three to five freezing rain events, and a major ice storm occurs on a frequency of about once every other year. If a half inch of rain freezes on trees and utility wires, extensive damage can occur, especially if accompanied by high winds that compound the effects of the added weight of the ice. There are also between three and five instances of glazing (less than one quarter inch of ice) throughout Wisconsin during a normal winter.

Winter storms present a serious threat to the health and safety of affected citizens, and can result in significant damage to property. This can occur when the heavy snow or accumulated ice causes structural collapse of buildings, downs power lines, severely affects electrical power distribution, or cuts off people from assistance or services.

Winter storms in Wisconsin are typically caused by Canadian and Arctic cold fronts that push snow and ice deep into the interior of the United States.

### Previous Significant Hazard Occurrences

According to National Climatic Data Center (NCDC), Manitowoc County has experienced 51 significant winter storm events over the last 13 years from January 1, 2000 to January 31, 2013 (including blizzard, heavy snow, and lake-effect snow). Many of these hazard events may not have been specific to Manitowoc County, and may have been recorded for a larger regional area.

### Hazard Frequency

Based on previous hazard occurrences as reported by the NCDC, Manitowoc County experiences approximately four significant winter storm events per year.

### Probability of Hazards Occurring in the Future

Based on the hazard frequency, Manitowoc County is considered to have a **high** probability of experiencing a winter storm event in any given year.

Winter storms tend to be a regional phenomenon in that they affect much of northeastern Wisconsin on nearly all of the occasions in which they affect Manitowoc County.

### Areas at Greatest Risk

Winter storms have no defined hazard area within the planning area. Past events have been relatively uniform across the planning area or the larger regional area.

### Impacts from Hazard

#### *Death and Injury*

No deaths or injuries have been reported from significant winter storm events for Manitowoc County over the last 13 years from January 1, 2000 to January 31, 2013 according to NCDC data.

#### *Structures at Risk*

Occasionally, heavy snow or accumulated ice will cause structural collapse of buildings (particularly roofs), but most buildings are now constructed with low temperatures, snow loads and ice storms in mind. In addition, with the modern focus on energy conservation, buildings are much better insulated than they were in the past. Therefore, for the most part, winter storms do not have a major impact on buildings in the planning area.

The major impacts of winter storms on infrastructure are to utilities and roads. Power lines and tree limbs can be coated with heavy ice in some winter storms, resulting in disrupted power and telephone service, often for days. Cable and satellite television services can also be negatively impacted in certain winter storm events. In the case of transportation, even small accumulations of ice can be extremely dangerous to motorists and pedestrians. Bridges and overpasses are particularly dangerous because they freeze before other surfaces.

#### *Critical Facilities*

Street and road crews have an increased burden of snow removal (and salting in the case of ice storms) during and after winter storms. In some cases, winter storms can be so severe that these crews have to be called off the road for a period of time.

Hospitals and clinics can treat additional patients for frostbite, pedestrian and vehicular accident injuries, and conditions resulting from the shoveling of heavy snow during and following winter storms. Sometimes, these very hospitals and clinics have difficulty getting their own staff to

report to work because of the storm, which increases the work load for the staff who is already there (double shifts, etc.).

Police department staff needs to respond to more accidents. Utility and telephone companies need to respond to downed electrical and telephone lines, especially in the case of ice storms. Rescue services can receive more calls because of accidents or health related circumstances. Schools may need to have early dismissal or cancel classes altogether. Shelters may take in additional homeless persons during winter storm events as well, although this has been less of an issue in Manitowoc than it has been in larger cities.

### *Economic Impacts*

Loss of power often means that businesses and manufacturing concerns must close down. Loss of access due to snow or ice covered roads can have a similar effect, especially when trucks cannot travel on major thoroughfares to make "just in time" deliveries to business and industry in the planning area. The effects are particularly difficult when the storm is widespread.

Additional economic costs of winter storms include snow removal (exceeds $2 billion/yr for U.S.), road closures that cause lost retail trade, wages, and tax revenue (exceeds $10 billion/day for closures in eastern U.S.), flight delays ($3.2 billion annually for U.S. carriers), damage to utilities (up to $2 billion per event), flooding from snowmelt ($4.3 billion for 1997 floods), and cost to agriculture and timber from frost and ice (up to $1.6 billion per ice storm). (*Source: Adams, R., Houston, L., Weiher, R., The Value of Snow and Snow Information Services, Report prepared for NOAA's National Operational Hydrological Remote Sensing Center, August, 2004*).

Property Damage

No significant public property damages have been reported from winter storm events for Manitowoc County over the last 13 years from January 1, 2000 to January 31, 2013 according to NCDC data.

### Estimate of Potential Dollar Losses

An estimate of potential dollar losses cannot be calculated for winter storm events, since no vulnerable structures have been identified. Based on previous damages reported by the NCDC, property damages from winter storms has been minimal over the past 13 years.

## Flooding

### Description of Hazard

Floods happen when the water draining from a watershed, whether from rainfall or melting snow, exceeds the capacity of the river or stream channel to hold it. Water overflows onto the nearby low-lying lands (floodplains). In hilly and mountainous areas flooding is likely to be rapid, deep, and dangerous. In relatively flat floodplains, land may stay covered with shallow, slow moving water for days or even weeks.

### *Stormwater Flooding*

Flooding often occurs in urban areas due to stormwater management issues. Stormwater drainage systems have been designed to manage most storms. However, occasionally larger storms that occur in a short time period, such as flash floods, are of such intensity that the drains cannot handle all the stormwater and flooding occurs. Such intense storms are generally beyond the capacity of any drain, and it would not be economically feasible to design drains to cater for these very large, but infrequent storms. Localized stormwater flooding can also occur if drains in

the area are blocked. It is important to keep the drainage system clear of litter and debris to avoid blocked drains. This is also necessary to protect and improve the health of waterways.

Today, new developments and redevelopments incorporate stormwater management measures such as stormwater detention and retention basins that provide greater flood protection. Detention basins slow the flow of stormwater being carried in the drainage system by storing it for a time, while retention basins (i.e. ponds) hold water during most of the year. Detention basins often double as parks and playing fields.

### *Dam Failure Flooding*

Flooding can also result from dam failure. A "dam" is an artificial barrier, together with its appurtenant works, constructed in or across a waterway for the primary purpose of impounding or diverting water. Dam failure can occur for a number of reasons, including overtopping caused by floods that exceed the capacity of the dam, deliberate acts of sabotage, structural failure of materials used in dam construction, movement and/or failure of the foundation supporting the dam, settlement and cracking of concrete or embankment dams, piping and internal erosion of soil in embankment dams, or inadequate maintenance and upkeep. In extreme cases, dam failure can occur with little warning and can result in the loss of life and significant property damage in areas downstream of the dam. Other failures and breaches can take much longer to occur.

As identified by the WDNR, there are a total of 24 dams in Manitowoc County. Of these, nine are classified as large dams. A large dam has 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. The rest of the dams located in the county are regarded as small dams. Map 3.6 displays the large dams in the county. (Source: WDNR; http://dnr.wi.gov/topic/dams/damfacts.html).

The WDNR assigns hazard ratings to large dams within the state based on existing land use and land use controls (zoning) downstream of the dam. The hazard rating is not based on the physical attributes, quality, or strength of the dam itself, but rather the potential for loss of life or property damage should the dam fail. A high hazard rating indicates that a failure would put lives at risk. A significant hazard rating indicates that a failure could result in significant property damage. A low hazard rating is given when a failure would result in only minimal property damage and loss of life is unlikely. In Manitowoc County there is one large dam with a high hazard rating, and one large dam with a significant hazard rating.

The areas of greatest risk from dam failure are those areas within the hydraulic shadow of dam of these two high and significant risk dams. The hydraulic shadow of the dam is the area of land downstream from a dam that would be inundated by water upon failure of the dam during the regional flood (100-year flood).

### Previous Significant Hazard Occurrences

According to National Climatic Data Center (NCDC), Manitowoc County has experienced 11 significant flooding events (including flash floods, and dam failure flooding) over the last 13 years from January 1, 2000 to January 31, 2013. Some of these reported occurrences may not have been specific to Manitowoc County, and may have been recorded for a larger regional area.

### Hazard Frequency

Based on previous hazard occurrences as reported by the NCDC, Manitowoc County experiences approximately one significant flooding event every year.

### Probability of Hazard Occurring in the Future

FEMA uses the "base" flood as the basis for its regulatory requirements and flood insurance ratings. The hazards mitigation plan also uses the base flood for planning purposes. The base flood is the one percent chance flood, or the flood that has a one percent (one out of 100) chance of occurring in any given year. The one percent chance flood is commonly referred to as the "100-year flood."

Based on the hazard frequency, Manitowoc County is considered to have a **medium** probability of sustaining a 100-year flood in any given year.

### Areas at Greatest Risk

The areas at greatest risk from flooding include the "100-year floodplain" areas of Manitowoc County. FEMA Flood Insurance Rate Maps also call this the Special Flood Hazard Area, or "A Zone." The base floodplains for the planning area are shown in Map 3.1. Properties that potentially lie within the floodplain and would be affected by the 100-year flood are shown in Map 3.2.

### Impacts from Hazard

#### *Death and Injury*

No death or injuries from flooding has been reported for Manitowoc County over the last 13 years from January 1, 2000 to January 31, 2013, according to NCDC data.

#### *Structures at Risk*

Analysis of the data used to produce Map 3.2 indicates that 2,788 buildings could potentially be impacted by the base flood in the planning area.

A review of FEMA flood insurance claims from January 1, 1978 through April 30, 2013, indicates that there were six paid claims in Manitowoc County in the amount of $37,766.97 (NFIP, WR2C1040).

#### *Repetitive Loss Properties*

Repetitive loss structure is a term that is usually associated with the National Flood Insurance Program (NFIP) to describe a structure, covered by a contract of flood insurance under the NFIP, that has suffered flood damage on two or more occasions over a 10-year period ending on the date when a second claim is made, in which the cost to repair the flood damage, on average, equals or exceeds 25 percent of the market-value of the structure at the time of each flood loss event. For the Community Rating System (CRS) of the NFIP, a repetitive loss property is any property, which the NFIP has paid two or more flood claims of $1,000 or more in any, given 10-year period since 1978. A repetitive loss structure is important to the NFIP, since structures that flood frequently put a strain on the flood insurance fund. It should also be important to a community because residents' lives are disrupted and may be threatened by the continual flooding.

According to FEMA, there are no repetitive loss properties in Manitowoc County.

#### *Critical Facilities*

Analysis of the GIS data used to produce Map 3.4, indicates that there are 176 critical facilities located within 100-year floodplains in Manitowoc County. However, 171 of these critical facilities are dependent on being in close proximity to water, so just five critical facilities are

located unnecessarily in the floodplain. Table 3.6 lists the critical facility types of those facilities potentially within the 100-year floodplains.

Table 3.6: Critical Facility Types within the 100-Year Floodplains

| Critical Facility Type | Count |
|---|---|
| Bridge | 154 |
| Dam | 8 |
| Sewage Lift Station | 5 |
| Dry Hydrant | 3 |
| Administrative Building | 1 |
| Emergency Siren | 1 |
| Fire Station | 1 |
| Gravel Pit | 1 |
| School | 1 |
| Water Pumping Station | 1 |
| **Total** | **176** |

Source: Bay-Lake Regional Planning Commission, 2013.

### *Economic Impacts*

Property Damage

Reported significant public property and crop damage from flooding in Manitowoc County has totaled $20,250,000 over the last 13 years from January 1, 2000 to January 31, 2013 according to NCDC data.

Most of the damage cost ($20 million) was to crops on June 12, 2008 when torrential rain, including over five inches in Valders, caused the Manitowoc River to rise three feet in four hours.

Value of Structures at Risk

The value of all at-risk structures is estimated at $394.6 million. This information was obtained from Manitowoc County database on improved values of real property. The parcel map and the 100-year floodplains were merged to determine at-risk structures in the planning area.

Transportation Route Interruptions

Loss of road access is a major flood impact that affects all residents and businesses, not just those who own property in the floodplain. Sometimes, the loss is temporary, such as during a flood. However, on some occasions, the loss of transportation lasts well after the disaster. When roads, bridges, or railroads are washed out by a flood, it can be weeks or months before they are repaired and reusable. A key evacuation and safety concern is when roads and bridges go under water. Generally, the larger the road, the more likely it will not flood, but this is not always the case.

Analysis of the GIS data used to produce Map 3.5, indicates that there are 154 bridges that could potentially be underwater during a base flood. In addition to the sites shown on the map, there may be a number of additional bridges in areas that are not included in the mapped 100-year flood zones, such as areas located along small tributary streams.

### Estimate of Potential Dollar Losses

"Vulnerable structures" are those structures located in the 100-year flood hazard area identified in Map 3.1. Since there is no reliable building height data for buildings in these flood hazard areas, a "worst case scenario" of total structural damage for buildings in all of the flood zones of the planning area was assumed in estimating potential dollar losses to vulnerable structures. Building height/elevation data should be collected in the future in order to better assess the risks of damage to structures because of the flood hazard.

It is estimated that over $394.6 million in losses would occur with the 100-year flood in zones projected to be impacted by the 100-year flood in a "worst case scenario" of total structural damage for all buildings in the county flood zones.

This information was obtained from a Manitowoc County database on assessed values of real property. This only involves damage to structures themselves, and may not account for damage to personal property inside or adjacent to vulnerable structures.

In addition, there may be areas outside the 100-year flood zones that will flood during an event of that magnitude (or even of lesser magnitude); this planning process has no way of knowing the susceptibility of flooding outside of flood events that have been previously mapped by other governmental agencies.

### Development in Areas Subject to Flooding

Development in floodplains, watersheds, and natural resource areas are kept to a minimum through zoning. Manitowoc County has shoreland and floodplain zoning. This ordinance is a useful tool in keeping inappropriate development out of flood hazard zones in the county.

### NFIP Participation

Manitowoc County has participated in the FEMA National Floodplain Insurance Program (NFIP) since September 1978 by adopting and enforcing floodplain management ordinances to reduce future flood damage. In exchange, the NFIP makes federally backed flood insurance available to homeowners, renters, and business owners in the county.

Additionally, the following incorporated communities are also participating in the NFIP:

- City of Manitowoc since April 1977
- City of Two Rivers since April 1978
- City of Kiel since January 1985
- Village of Cleveland since May 1978
- Village of Francis Creek since August 2011
- Village of Kellnersville since August 2011
- Village of Mishicot since May 1972
- Village of Reedsville since September 1988

#### *Not Participating in NFIP*

The villages of Maribel, St. Nazianz, Valders and Whitelaw are not participating in NFIP. Since there are no special flood hazard areas (SFHAs) within their municipal boundaries, these communities were not provided a floodplain map, and have not been asked to participate in the NFIP.

## Extreme Cold

### Description of Hazard

Dangerously cold conditions can be the result of extremely cold temperatures, or the combination of cold temperatures and high winds. The combination of cold temperatures and wind creates a perceived temperature known as "wind chill." Whenever temperatures drop well below normal and as wind speed increases, heat can leave your body more rapidly. As winds increase, heat is carried away from the body at a faster rate, driving down both the skin temperature and eventually the internal body temperature. This weather related condition may lead to serious health problems. Extreme cold is a dangerous situation that can cause health emergencies for susceptible people, such as those without shelter, those who are stranded outdoors or in a disabled car, or those who live in a home that is poorly insulated or without heat.

### Previous Significant Hazard Occurrences

According to National Climatic Data Center (NCDC), Manitowoc County has experienced three significant extreme cold events over the last 13 years from January 1, 2000 to January 31, 2013.

### Hazard Frequency

Based on previous hazard occurrences as reported by the NCDC, Manitowoc County experiences approximately one significant extreme cold event every five years.

### Probability of Hazard Occurring in the Future

Based on the hazard frequency, Manitowoc County is considered to have a **low** probability of experiencing an extreme cold event in any given year.

### Areas at Greatest Risk

Extreme cold events have no defined hazard area within the planning area. Past events have been relatively uniform across the planning area.

### Impacts from Hazard

#### *Death and Injury*

No deaths or injuries have been reported from significant extreme cold events for Manitowoc County over the last 13 years from January 1, 2000 to January 31, 2013 according to NCDC data.

#### *Structures at Risk*

Extreme cold conditions can result in burst water pipes. In addition, it is more expensive to heat homes and other buildings during extreme cold events. Sometimes, residents of the planning area might consider use of space heaters during an extreme cold event. However, use of space heaters comes with its own risks, including a higher probability of fire to a structure if used improperly.

Public domain water pipes can burst in extreme cold conditions, which can also ruin the street above the water pipes. In addition, damage to fiber optic cables can occur during extreme cold episodes, which can negatively affect commerce and hospitals in the planning area.

#### *Critical Facilities*

All buildings involving critical facilities will have greater heating expenses during an extreme cold event. Increased demand will also affect electric and natural gas utilities. Hospitals and clinics may be asked to treat patients exposed to the extreme cold conditions. Emergency shelters

may take in additional individuals during the extreme cold event. Area schools may cancel classes or call for early dismissal in extreme cold events. Water utilities may need to repair damaged water mains caused by the extreme cold. Local fire departments and rescue services may also deal with direct or indirect consequences of the extreme cold event.

***Economic Impacts***

Economic impacts of extreme cold events can include lack of motivation to participate in the local economy unless absolutely necessary during the event. Utility bills following the event will be higher, which will give the consumer less ability to purchase discretionary goods about a month after the event (unless that consumer is on a monthly even payment plan with the local utility). If area school districts need to call off school early on extremely cold days, there may be expenses involved with early busing and with paying staff for a full day while only having the benefit of a partial day of instruction. Non-profit organizations will incur expenses in the provision of emergency shelters. The private sector incurs economic losses and production decreases during an extreme cold event.

Property Damage

No significant public property damages have been reported from extreme cold events for Manitowoc County over the last 13 years from January 1, 2000 to January 31, 2013 according to NCDC data.

**Estimate of Potential Dollar Losses**

An estimate of potential dollar losses cannot be calculated for extreme cold events, since no vulnerable structures have been identified. Based on previous damages reported by the NCDC, property damages from extreme cold has been minimal over the past 13 years.

## Extreme Heat

**Description of Hazard**

Extreme heat (often referred to as a heat wave) is primarily a public health concern. During extended periods of very high temperatures or high temperatures with high humidity, individuals can suffer from several ailments, including heat exhaustion and heat stroke. Heat stroke is a particularly life-threatening condition that requires immediate medical attention. In addition to posing a public health hazard, periods of excessive heat usually result in high electrical consumption, which can cause power outages and brown outs. A by-product of this hazard in Manitowoc County often involves periods of high heat with loss of power. The elderly, disabled, and other vulnerable populations are especially susceptible to extreme heat.

**Previous Significant Hazard Occurrences**

According to National Climatic Data Center (NCDC), Manitowoc County has experienced three significant extreme heat events over the last 13 years from January 1, 2000 to January 31, 2013.

**Hazard Frequency**

Based on previous hazard occurrences as reported by the NCDC, Manitowoc County experiences approximately one significant extreme cold event every five years.

**Probability of Hazard Occurring in the Future**

Based on the hazard frequency, Manitowoc County is considered to have a **low** probability of experiencing an extreme heat event in any given year.

### Areas at Greatest Risk

Extreme heat events have no defined hazard area within the planning area. Past events have been relatively uniform across the planning area.

### Impacts from Hazard

#### *Death and Injury*

One death (of an elderly lady), and no injuries, has been reported from significant extreme heat events for Manitowoc County over the last 13 years from January 1, 2000 to January 31, 2013 according to NCDC data.

#### *Structures at Risk*

While there are no direct impacts on buildings, periods of excessive heat can impact the ability of buildings to be comfortable and safe for human habitation. Periods of excessive heat usually result in high electrical consumption for air conditioning, which can cause power outages and brown outs.

There are few impacts of extreme heat on publicly owned infrastructure. One impact that extreme heat can have on publicly owned infrastructure involves the buckling of certain streets and highways, which need to be repaired immediately.

#### *Critical Facilities*

Utilities may see peak demand for electricity during extreme heat episodes. There have been fears that an extreme heat episode could cause the power grid to collapse. Hospitals and clinics will like experience an increased demand due to heat related illnesses during an extreme heat episode. In some cases, rescue services will experience an increased demand due to these same heat related illnesses. If school is in session during the extreme heat episode, area school districts may dismiss classes early in the day, at least in older schools without air conditioning. Emergency shelters will experience higher demand during the extreme heat episode, with some emergency shelters being set up specifically in response to the episode. Finally, there is likely to be increased water demand during the episode, both for human consumption as well as for lawn watering in the event that the extreme heat episode includes a drought.

#### *Economic Impacts*

Economic impacts of an extreme heat episode which can affect private businesses and consumers include higher electrical consumption and increased demands for medical treatment. Local governments may need to incur expenses when repairing streets and highways in the planning area that have been damaged due to buckling. If area school districts need to call off school early on extreme heat days, there may be expenses involved with early busing and with paying staff for a full day while only having the benefit of a partial day of instruction. Non-profit organizations will incur expenses in the provision of emergency shelters. Water utilities will incur the expenses involved with additional demand for water during extreme heat episodes, and these expenses will be passed on to area consumers.

One less tangible economic impact of extreme heat involves lower productivity from persons who must work outside or in less than ideal conditions. In addition, people will be less motivated to shop at local businesses and may defer non-essential activities until the heat episode is over, negatively impacting the local economy. Extreme heat can negatively impact agriculture in the surrounding area when combined with drought.

Property Damage

No significant public property damages have been reported from extreme heat events for Manitowoc County over the last 13 years from January 1, 2000 to January 31, 2013 according to NCDC data.

### Estimate of Potential Dollar Losses

An estimate of potential dollar losses cannot be calculated for extreme heat events, since no vulnerable structures have been identified. Based on previous damages reported by the NCDC, property damages from extreme heat has been minimal over the past 13 years.

## Lightning

### Description of Hazard

Lightning, which occurs during all thunderstorms, can strike anywhere. Generated by the buildup of charged ions in a thundercloud, the discharge of a lightning bolt interacts with the best conducting object or surface on the ground. The air in the channel of a lightning strike reaches temperatures higher than 50,000 degrees Fahrenheit. The rapid heating and cooling of the air near the channel causes a shock wave which produces thunder.

Lightning primarily occurs when warm air is mixed with colder air masses resulting in atmospheric disturbances necessary for polarizing the atmosphere. However, it can also occur during dust storms, forest fires, tornadoes, volcanic eruptions, and even in the cold of winter, where the lightning is known as thundersnow.

### Previous Significant Hazard Occurrences

According to National Climatic Data Center (NCDC), Manitowoc County has experienced three significant lightning events over the last 13 years from January 1, 2000 to January 31, 2013.

### Hazard Frequency

Based on previous hazard occurrences as reported by the NCDC, Manitowoc County experiences approximately one significant lightning event every five years.

### Probability of Hazard Occurring in the Future

Based on the hazard frequency, Manitowoc County is considered to have a low probability of experiencing a lightning storm and/or thunderstorm event in any given year.

### Areas at Greatest Risk

Based on review of the historic patterns of lightning event occurrences, there are no specific areas that are a higher than average risk. The events are relatively uniform throughout Manitowoc County.

### Impacts from Hazard

#### *Death and Injury*

No deaths or injuries from lightning storms or thunderstorms have been reported for Manitowoc County over the last 13 years from January 1, 2000 to January 31, 2013, according to NCDC data.

#### *Structures at Risk*

Lightning can cause direct damage to structures, especially those without lightning protection systems. Buildings or tall structures hit by lightning may be damaged as the lightning seeks

unintended paths to ground. By safely conducting a lightning strike to ground, a lightning protection system can greatly reduce the probability of severe property damage. Lightning strikes can result in fires that damage structures, property, and land.

### *Critical Facilities*

Hospitals can see increases in patient load with sufficiently severe lightning events. Schools can sustain damage, and if they do not sustain damage. Police and fire departments often see an increased workload during and after lightning events. Emergency operations can be disrupted as lightning events affect radio and cellular communications, as antennas are a prime target for lightning.

### *Economic Impacts*

Nationwide, lightning causes $4 to 5 billion in losses each year (*Source: Kithil, R., 21st Century Lightning Safety for Facilities & Structures, 2002*) and about $2 billion annually in airline operating costs and passenger delays (*Source: Northeast States Emergency Consortium, Wakefield, Mass., 2002*).

Property Damage

Reported property damage from significant lightning for Manitowoc County has totaled approximately $3,100 over the last 13 years from January 1, 2000 to January 31, 2013 according to NCDC data.

### Estimate of Potential Dollar Losses

An estimate of potential dollar losses cannot be calculated for lightning events, since no vulnerable structures have been identified. Based on previous damages reported by the NCDC, property damages from extreme heat has been minimal over the past 13 years.

## Drought

### Description of Hazard

A drought is an extended period of unusually dry weather, which may be accompanied by extreme heat. There are basically two types of drought in Wisconsin: agricultural drought and hydrologic drought. Agricultural drought is a dry period of sufficient length and intensity that markedly reduces crop yields. Hydrologic drought is a dry period of sufficient length and intensity to affect lake and stream levels as well as the height of the groundwater table. These two types of drought may, but do not necessarily, occur at the same time. The severity of a drought depends on a number of factors including duration, intensity, geographic extent, and regional water supply demands by humans and vegetation.

In general, droughts have the greatest impact on agriculture. Small droughts of limited duration can significantly reduce crop growth and yields. More substantial drought events can decimate croplands and can result in a total loss. Droughts can also greatly increase the risk of forest fires and wildfires because of extreme dryness. In addition, the loss of vegetation in the absence of sufficient water can result in flooding, even from average rainfall, following drought conditions.

### Previous Significant Hazard Occurrences

According to National Climatic Data Center (NCDC), Manitowoc County has experienced three significant drought events over the last 13 years from January 1, 2000 to January 31, 2013.

### Hazard Frequency

Based on previous hazard occurrences as reported by the NCDC, Manitowoc County experiences approximately one significant drought event every five years.

### Probability of Hazards Occurring in the Future

The future incidence of drought is highly unpredictable, as its occurrence is based on weather patterns, making it difficult to determine probability with any accuracy. Droughts tend to be a regional phenomenon in that it affects much of eastern Wisconsin on nearly all of the occasions in which it affects Manitowoc County. However, based strictly on the hazard frequency, Manitowoc County is considered to have a **low** probability of experiencing a drought event in any given year.

### Areas at Greatest Risk

Droughts have no defined hazard area within the planning area. Past events have been relatively uniform across the planning area. However, agricultural croplands are most vulnerable to losses from drought events. Manitowoc County contains 220,393 acres of agricultural lands (based on land use data shown in Table 2.2).

### Impacts from Hazard

#### *Death and Injury*

No deaths or injuries have been reported from significant drought events for Manitowoc County over the last 13 years from January 1, 2000 to January 31, 2013, according to NCDC data.

#### *Structures at Risk*

There are no direct impacts to structures from a drought event. In terms of infrastructure, droughts have the most impact on municipal water supplies. Droughts will likely cause a shortage of water for human, industrial, and agricultural consumption, as wells and other water reserves may dry up. Also, water quality is often an issue before and after a drought event, which may place an additional burden on wastewater treatment facilities.

#### *Critical Facilities*

In drought conditions, water shortages may occur and affect the amount of water available for human consumption. Hospitals may be called upon to treat individuals suffering from dehydration as a result. Parks that provide recreational water facilities are likely to experience increased usage during times of drought as well.

There are few other direct impacts on critical facilities as a result of drought conditions. However, droughts can trigger other hazards, such as wildfires and post-drought flooding, which can have an impact on these facilities.

#### *Economic Impacts*

Wisconsin is most susceptible to agricultural drought. Even small droughts of limited duration can significantly reduce crop growth and yields, which adversely affects farm income. Substantial drought events can lead to complete crop decimation, resulting in total loss. During severe drought periods farmers are often forced to seek financial assistance from the government to supplement lost income.

Livestock can also be adversely affected by droughts. Lack of water can lead to animal deaths. In addition, as drought conditions are often accompanied by periods of prolonged sun and high

temperatures, animals are at risk to overexposure and heatstroke. Death of livestock can also lead to substantial loss of income for farmers.

Drought can also affect local commercial and industrial businesses. During times of severe drought, limitations are often placed on water usage. These limitations could have a negative impact on businesses such as car washes and landscapers as they will likely be unable to provide services to their customers. It is also likely that areas depending on tourism will see fewer people traveling to their area in times of drought. Industries which utilize large amounts of water in processing materials may also be subject to these limitations, which could potentially reduce their production capabilities.

Property Damage

No significant public property damages have been reported from drought events for Manitowoc County over the last 13 years from January 1, 2000 to January 31, 2013 according to NCDC data.

### Estimate of Potential Dollar Losses

Agricultural croplands are most vulnerable to losses from drought events. A "worst case scenario" would involve the total destruction of all 220,393 acres of agricultural lands in the county (based on land use data shown in Table 2.2). The USDA conducts a Census of Agriculture every 5 years based on a sample of farms to estimate the market value of agricultural land and buildings. Based on the 2007 Census of Agriculture, the average value per acre of agricultural land in Manitowoc County was $3,493 (USDA, 2009). Therefore, it can be estimated that if this "worst case scenario" were to occur, the total destruction of all agricultural land in Manitowoc County would cause a loss of $769,832,749.

## Dense Fog

### Description of Hazard

Fog is a collection of liquid water droplets or ice crystals suspended in the air at or near the ground. While fog is a type of stratus cloud, the term "fog" is typically distinguished from the more generic term "cloud" in that fog is low-lying, and the moisture in the fog is often generated locally (such as from a nearby body of water, like a lake or stream, or from nearby moist ground or marshes). Fog is distinguished from mist because it has greater density and lower visibility than mist.

Fog is a hazard mainly because of reduced visibility. Airport delays, automobile accidents, ship wrecks, plane crashes, and many other problems are frequently caused by fog. The National Weather Service forecasts fog and issues dense fog advisories when visibility is decreased to less than one quarter of a mile. These advisories alert travelers to potentially dangerous conditions. Traveling in fog requires reduced speed and careful navigation. At night, traveling in fog is especially dangerous because darkness combines with fog to reduce visibility even more. In addition, light from automobile headlights and other navigational lights is scattered off the water droplets of the fog, limiting sight to only a short distance. In response to this problem, automobiles are often equipped with specially designed lights that illuminate a usually dry (and therefore clear) area just above the roadway surface.

### Previous Significant Hazard Occurrences

According to National Climatic Data Center (NCDC), Manitowoc County has experienced two significant dense fog events over the last 13 years from January 1, 2000 to January 31, 2013.

### Hazard Frequency

Based on previous hazard occurrences as reported by the NCDC, Manitowoc County experiences approximately one significant dense fog event every five years.

### Probability of Hazard Occurring in the Future

Based on the hazard frequency, Manitowoc County is considered to have a **low** probability of experiencing a significant dense fog event in any given year.

### Areas at Greatest Risk

Portions of the planning area along waterways, wetlands, and low lying areas can be at greater risk for fog under certain meteorological conditions. However, no portion of the planning area is free of the possibility of experiencing fog events. Fog events can often be a regional phenomenon in that they affect much of the eastern Wisconsin on many of the occasions in which they affect Manitowoc County, especially near Lake Michigan.

### Impacts from Hazard

#### *Death and Injury*

No deaths or injuries have been reported from significant fog events for Manitowoc County over the last 13 years from January 1, 2000 to January 31, 2013, according to NCDC data.

#### *Structures at Risk*

There are no direct impacts to buildings from a fog event. The main structures impacted are those associated with infrastructure during a fog event from vehicle accidents. This can result in rescue services helping injured drivers and passengers, clean-up of the affected portions of the street and highway network, and temporary rerouting of motorists after some incidents. In addition, motorists often must travel at slower speeds when fog is in the area, which adds travel time and can lead to vehicular congestion in cases where it would normally not occur.

In fog events during the winter, icing can sometimes be a problem. Power lines and tree limbs can be coated with heavy ice in some winter fog events, resulting in disrupted power and telephone service. In addition, in fog events during the winter, even small accumulations of ice can be extremely dangerous to motorists and pedestrians. Bridges and overpasses are particularly dangerous because they freeze before other surfaces.

#### *Critical Facilities*

Law enforcement will be asked to respond to an increased number of accidents during many fog events. Hospitals and clinics may be asked to treat individuals injured in accidents that likely would have not occurred in the absence of the fog event. Rescue services may be called to respond to accidents that resulted from the fog event. The starting time for schools may be delayed by the fog event for the safety of students and all involved. Courtrooms may see increased adjudication of traffic law violations resulting from accidents occurring during the fog event. Municipal public works and county highway departments may need to perform emergency repairs to streets and highways in worst-case scenario accidents resulting from the fog event. Airports can experience flight delays and cancellations during certain fog events.

#### *Economic Impacts*

There are economic costs in the accidents caused by fog events. Vehicular accidents almost always involve property damage, and some vehicular accidents during fog events involve

injuries and/or fatalities. All of these consequences to vehicular accidents have costs both to the individual involved and to society. Fog events can also cost businesses in lost time involving late workers and/or late shipments. If area school districts need to delay school during a fog event, there may be expenses involved with delayed busing and with paying staff for a full day while only having the benefit of a partial day of instruction. Airline delays due to fog have economic impacts for travelers as well as for commerce. There are additional economic impacts if the fog event occurs in conjunction with the icing of power lines in cases where the power lines are damaged and residents lose power.

Property Damage

No significant public property damages have been reported from dense fog events for Manitowoc County over the last 13 years from January 1, 2000 to January 31, 2013 according to NCDC data.

### Estimate of Potential Dollar Losses

An estimate of potential dollar losses cannot be calculated for dense fog events, since no vulnerable structures have been identified. Based on previous damages reported by the NCDC, property damages from fog have been minimal over the past 13 years.

## Wildland Fires

### Description of Hazard

A wildland fire is any instance of unplanned burning in brush, marshes, grasslands, or field lands. Typical causes of these fires are lightning, human carelessness, or arson. The county has large expanses of forested areas that could be susceptible to wildland fires. Wildland fires can occur at any time of the year and during any time of the day. The primary factors that can contribute to the start of a wildland fire are land use, vegetation, amount of combustible materials present, and weather conditions such as wind, low humidity, and lack of precipitation. Generally, fires are more likely when vegetation is dry from a winter with little snow or a spring and summer with sparse rainfall. As fires remain a possibility, fire stations in the county are prepared to respond in accordance with established response procedures, while local zoning setback controls and building codes provide additional mitigation measures.

### Previous Significant Hazard Occurrences

There have been no significant wildland fires in Manitowoc County since 1995.

### Hazard Frequency

No adequate records are available at this time in order to determine a hazard frequency.

### Probability of Hazard Occurring in the Future

According to the U.S. Forest Service Wildland Fire Assessment System, Manitowoc County regularly falls within a low to moderate fire danger class. A low rating indicates that fuels do not ignite readily from small firebrands, while a moderate rating means that fires will likely start from most accidental causes With the exception of lightning fires in some areas, the number of starts is generally low. Additionally, because Manitowoc County is not extensively forested and does not contain the hazards and risks necessary to warrant intensive or extensive fire protection, it is designated as a Cooperative Fire Protection Area. Therefore, there are no Wisconsin DNR ranger stations or suppression resources located in the county.

Additionally, the Forestry Division of the Wisconsin DNR has determines that there are no "Communities-at-Risk" and no "Communities-of-Concern" within Manitowoc County (September 2008).

The likelihood that any wildland fire in Manitowoc County would be catastrophic is **low** as most susceptible areas lack enough acreage to allow for continuous burning.

### Areas at Greatest Risk

Manitowoc County contains approximately 77,314 acres of woodlands (based on current land use). Of these, few contain timbers that are very susceptible to burning. Therefore, lands covered in grass fuels pose the highest risk for the planning area. Furthermore, grasslands that abut heavy residential development present an even greater danger, especially when residents practice unapproved outdoor burning of leaves, garbage, and other items which they wish to dispose of by incineration.

Point Beach State Forest, the county's largest area of contiguous woodlands with more than 2,500 acres of forestlands, poses some risk for wildland fire.

### Impacts from Hazard

#### *Death and Injury*

No data on deaths or injuries is available for significant wildland fire events for Manitowoc County over the last 13 years from January 1, 2000 to January 31, 2013.

#### *Structures at Risk*

Homes and other structures located within the Wildland Urban Interface (WUI) are at high risk to damage from wildland fires. The WUI refers to the zone of transition between forestland/wildland and human development. The wildland fire risk increases in the WUI because buildings are typically surrounded by fuel sources such as unmowed grass, unraked leaves, flammable vegetation, and dead branches. Structures constructed from materials that may melt or ignite when exposed to a fire present a high risk. In general, the potential for property damage from wildland fires increases as more development occurs on wooded lands.

Residential housing is typically the most dominant type of structure found within the WUI. Though many parts of a home can be affected by wildfire damage, the roof is the most exposed portion of the building and is more at risk from flying embers. Attics may also be affected by airborne embers that enter through open eaves and vents. Structures attached to homes, such as decks, garages, and fences, can also carry a fire into a home.

#### *Critical Facilities*

Police, fire, and emergency response personnel are greatly affected by wildland fires – suffering increased workloads during and after events. Hospitals can see increases in patient load resulting from burn related injuries and individuals suffering from the effects of smoke inhalation. Schools, if not affected by a fire, could potentially be used as temporary shelter for individuals that can not return to their homes. All critical facilities located in the path of a wildland fire can be affected structurally and functionally if evacuation is deemed necessary.

#### *Economic Impacts*

Fires can have an extensive impact on the economy of an affected area by causing thousands of dollars in damages to citizens through loss of private property. Major direct costs associated with

wildland fires are incurred by the salvage and removal of downed timber and debris; restoration of the burned area; and reconstruction. Wildland fires can also have a significant impact on local agriculture. Fires will strip the land of vegetation as well as harm the soil, waterways, and the land itself. Soil exposed to intense heat may lose its capability to absorb moisture and support life.

Property Damage

No property damage data is available for wildland fire events for Manitowoc County over the last 13 years from January 1, 2000 to January 31, 2013.

### Estimate of Potential Dollar Losses

An estimate of potential dollar losses is not needed for the wildland fire hazard as no specific vulnerable structures or geographic areas have been identified.

## Coastal Hazards

### Description of Hazard

In northeastern Wisconsin, coastal hazards can be described as natural hazards occurring along the shores of Lake Michigan. The coastal hazards of concern in Wisconsin include:

- Erosion of coastal bluffs, banks, beaches and near shore lake beds (including erosion from freezing and thawing of lake ice);
- Flooding from upland runoff, high lake levels and storm-induced surge (temporary water level changes); and
- Damage to shorelines and shoreline structures from storm waves and ice shoves and dams.

### Previous Significant Hazard Occurrences

There is no record of significant coastal hazards for Manitowoc County and sources for past coastal hazard occurrences could not be found. However, Manitowoc County has experienced occurrences of ice shoves along Lake Michigan.

### Hazard Frequency

There is no record of significant coastal hazards for Manitowoc County in order to develop a hazard frequency.

### Probability of Hazard Occurring in the Future

According to the *Resource Guide for Great Lakes Coastal Hazards in Wisconsin* website (http://coastal.lic.wisc.edu/urpl999.htm), Manitowoc County is most at risk for coastal erosion. Overall, the probability of coastal hazards is **medium** for the planning area.

### Areas at Greatest Risk

Portions of the county situated along Lake Michigan are at risk for coastal hazards.

### Impacts from Hazard

#### *Death and Injury*

No data on deaths or injuries is available for significant coastal hazard events for Manitowoc County over the last 13 years from January 1, 2000 to January 31, 2013.

### *Structures at Risk*

Homes and other structures located along Lake Michigan are at risk to damage from coastal hazards. This risk increases where structures are closer to the shoreline, especially over high bluffs. There are 213 improved privately-owned structures directly adjacent to Lake Michigan in Manitowoc County.

### *Critical Facilities*

There are 18 critical facilities located along Lake Michigan at risk of damage from coastal hazards. Most of these facilities are intentionally located adjacent to Lake Michigan; however, there are three critical facilities that are not dependent on a location with proximity to the lake. Two of the critical facilities are administrative buildings in the City of Two Rivers, including a public works facility and a maintenance shop. The third is a childcare facility in the City of Manitowoc, the YMCA Child Development Center Daycare.

### *Economic Impacts*

Coastal hazards can have an extensive impact on the economy of an affected area by causing thousands of dollars in damages to public property and structures, as well a private property and houses.

Property Damage

No significant public property damages have been reported from coastal hazard events for Manitowoc County over the last 13 years from January 1, 2000 to January 31, 2013 according to NCDC data.

### Estimate of Potential Dollar Losses

A "worst case scenario" for potential dollar losses from coastal hazards in Manitowoc County would involve the total destruction of all private structures along Lake Michigan, which would cause a loss of $46.4 in private damages. There are no assessed values available for public properties.

This information was obtained from the Manitowoc County database on assessed values of real property (structures and land). This only involves damage to structures themselves, and may not account for damage to personal property inside or adjacent to vulnerable structures.

## Land Subsidence

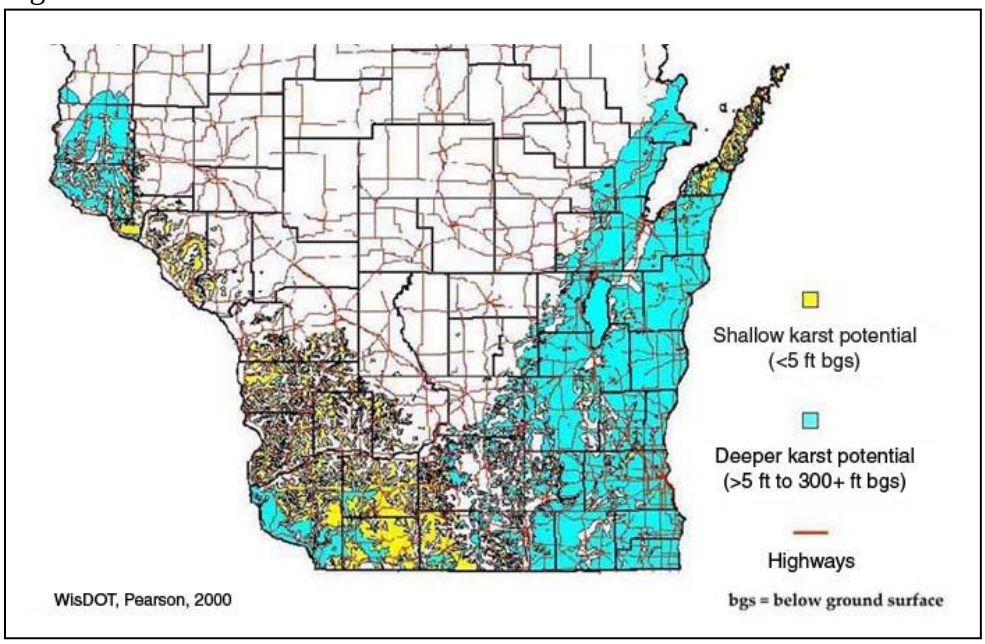
### Description of Hazard

Land subsidence is an event in which a portion of the land surface collapses or settles. Subsidence or sinkholes in Wisconsin typically occurs in areas of karst terrain (dolomite and limestone bedrock areas). Subsidence in karst terrains occurs where dissolution of bedrock by groundwater flow causes the creation of voids (i.e. caves). The land above these underground voids often appears normal until a critical amount below has been washed away and the soil surface can no longer support the weight and collapses, causing subsidence at the surface (i.e. sinkholes).

Manitowoc County lies within the area of risk in Wisconsin that has been identified by the Wisconsin Geologic and Natural History Survey. This area is delineated as a V-shaped swath across Wisconsin that extends southeast from St. Croix County along the Mississippi River, across the bottom two tiers of counties, and northeast along Lake Michigan up to Marinette County (Figure 1).

Wisconsin subsidence occurrences are unlikely to be significant events. Sinkholes in Wisconsin are relatively small – they tend to be smaller than 10 feet across. The depth of sinkholes can be highly variable, although most are about as deep as they are wide.

Figure 3: Wisconsin's Karst Risk Area




**Previous Significant Hazard Occurrences**

There is no record of significant subsidence occurrences for Manitowoc County and sources for past subsidence occurrences could not be found.

**Hazard Frequency**

There is no record of significant subsidence occurrences for Manitowoc County in order to develop a hazard frequency.

**Probability of Hazard Occurring in the Future**

Although Manitowoc County is within the area of risk for subsidence in Wisconsin as identified by the Wisconsin Geologic and Natural History Survey (Figure 1), being in an area of deeper karst potential (instead of the shallow karst areas) with dolomite bedrock reduces the risk of subsidence in the county. Overall, the probability of a significant subsidence occurrence is **low** for the planning area.

**Areas at Greatest Risk**

The deeper karst potential is mostly uniform throughout Manitowoc County; therefore, the risk for subsidence is uniform throughout the county.

**Impacts from Hazard**

***Death and Injury***

No data on deaths or injuries is available for significant subsidence occurrences for Manitowoc County over the last 13 years from January 1, 2000 to January 31, 2013.

### *Structures at Risk*

Although subsidence occurrences in other parts of the world can be large enough to swallow structures, in Wisconsin subsidence sinkholes are relatively small due to the differences in geology. In Wisconsin, the karst bedrock forms in dolomite. Dolomite is much less easily dissolved than the limestone that forms large subsidence occurrences in other areas. As a result, Wisconsin has fewer and smaller subsidence occurrences and there is minimal risk to structures.

However, the cracks and crevasses in karst act as direct conduits for pollutants to enter groundwater, wells, springs, and streams. Therefore, mindfulness of what is being spread or put on the ground in these areas is warranted to prevent groundwater contamination.

### *Critical Facilities*

There are no critical facilities at a greater risk for damage from subsidence than any other structures in the county.

### *Economic Impacts*

Subsidence can have an impact on the economy of an affected area by causing groundwater contamination that can be costly to treat and affect a large area of groundwater dependent businesses and residents.

### Estimate of Potential Dollar Losses

An estimate of potential dollar losses cannot be calculated for subsidence, since no vulnerable structures have been identified.

## NATURAL HAZARDS AND CLIMATE CHANGE

Hazard profiles provide information and predictions based on past hazard occurrence data. Climate change may make past trends unreliable sources for predicting future impacts, frequency, probability, and vulnerabilities. Climate change has and will continue to impact average annual temperatures causing increased frequency in heat waves; increased frequency of severe rainstorms; shorter, warmer winters with decreased lake ice cover; increased drought frequency, and other impacts. In general, Manitowoc County, along with most of Wisconsin, will grow warmer and drier during this century, especially in the summer. It is projected that over the next 30-50 years, Manitowoc's climate will resemble that of current Detroit, Michigan according to the Wisconsin Initiative on Climate Change Impacts (WICCI) interactive mapping tool, which averages results from a number of climate models (Source: http://www.wicci.wisc.edu/climate-map.php).

### Vulnerabilities

WICCI working groups identified vulnerabilities communities could face from potential changes in Wisconsin's climate. Some of the potential vulnerabilities for Manitowoc County include:

- Residential and commercial structures and property on the coast are vulnerable to erosion and flooding. The migration of the Ordinary High Water Mark (OHWM) towards the lake during extended periods of low lake levels may encourage development in hazardous areas.
- Harbors and marinas are susceptible to extreme water levels.
- Industrial facilities such as power plants and water/sewer treatment facilities are vulnerable to extreme water levels that exceed their design.
- Infrastructure such as roads and drainage are susceptible to erosion and flooding.

- Shore protection structures need to be maintained over time and may not be effective if lake levels extend beyond their design parameters.
- Water intakes may be impacted by low water levels.
- Beach health and aesthetics may impact tourism in coastal communities.
- Changes in water temperatures and circulation patterns could affect mixing patterns in coastal waters.
- More intense coastal storms could impact dredging and re-suspend contaminated sediments.

**Potential Impacts**

WICCI working groups have investigated how potential changes in Wisconsin's climate might impact natural and human systems around the state. Some of the potential impacts of concern for Manitowoc County include:

- Climate change may cause the water levels on Lake Michigan to extend beyond the range measured since 1860.
- An increase in intense precipitation and storm events along with the impacts of warmer and wetter winters (more freeze/thaw cycles and less lake ice cover) could increase coastal erosion and may lead to more frequent episoidal deep-seated landslides.
- Warmer nighttime temperatures might lead to more extreme heat waves, increasing the risk for heat stroke in some populations. At the same time, observed and projected trends show fewer cold temperature extremes, which may mean reduced health risks due to exposure in the winters.
- Municipal infrastructure is designed using standards based on rainfall data from the latter half of the 20th century. By having assumed "stationarity" of climate in the design of infrastructure, communities are now vulnerable to the following impacts from more frequent and intense rainfall events and elevated groundwater:
    - Conveyance systems filled beyond capacity cause flooded homes and urban streets;
    - Roadways and bridges wash-out or become impassable;
    - Groundwater flooding of property and cropland increases;
    - Rural residential wellheads contaminated by flood waters and high groundwater;
    - Impoundments and stormwater detention ponds fail more frequently;
    - Raingardens and other biofiltration BMPs fail due to saturated soil conditions;
    - Increased erosion of slopes by intense rainfall events leads to high sediment and phosphorus loading to surface waters;
    - Runoff of manure from fields, and accompanying fish kills, are more frequent;
    - Stormwater inflow and groundwater infiltration to sanitary sewers, results in untreated municipal wastewater flowing into to lakes and streams.
- Air pollution, increasing temperatures, changing circulation patterns, and other processes combine to increase ground-level ozone, which affects respiratory health.

- Heavy rains and flooding can overwhelm sewer and stormwater systems, leading to a rise in water pollution and the risk of waterborne diseases such as cryptosporidium and giardia. An increase in extreme precipitation events is already being seen in Wisconsin.
- Changes in temperatures and precipitation could result in an increase in disease-carrying insects, including ticks and mosquitoes. This means people may be at a greater risk for contracting vector-borne diseases, such as Lyme disease and West Nile encephalitis.
- Changes in temperature and precipitation could affect growing seasons, crop yields, weed and pest infestations, and dairy productivity.

**Solutions/Adaptations**

Although the impacts of climate change are already being seen in Wisconsin, there are things Manitowoc County policymakers, business leaders, and residents can do to help reduce potential impacts from climate change. The development of climate change mitigation programs can help decrease the impacts from climate change while advancing other community priorities. Examples include implementing cost-effective clean energy policies and programs, and reducing carbon emissions. Climate change and clean energy policies and programs can reduce greenhouse gas emissions, lower energy costs, improve air quality and public health, and help achieve economic development goals. The following are some solutions or adaptations to climate change impacts that could be employed in Manitowoc County. Many of the identified solutions/adaptations were developed by the WICCI working groups.

- Strengthen public health response and warning systems.
- Increase energy efficiency.
- Switch to renewable energy sources such as wind, solar, geothermal, and biomass.
- Increase vehicle fuel economy.
- Invest in clean transportation choices.
- Encourage bicycle and pedestrian transportation and expand availability options.
- Implement beach improvement projects that reduce stormwater runoff to beaches and nearshore waters and integrate natural infiltration features such as dunes and vegetated swales.
- Improve or restore natural shore protection features (beaches, dunes, nearshore shoals, and islands).
- Protect floodplains, wetlands, and other natural "green infrastructure" features that can hold flood waters and enable water infiltration.
- Implement development setbacks based on defensible scientific data.
- Relocate structures that are threatened by flooding or erosion.
- Education for developers, bankers, and insurance agents.
- Ongoing comprehensive planning and improved implementation of existing plans.
- Use best management practices for site design to control stormwater runoff.
- Develop plans for bluff stability enhancement, e.g. slow erosion by planting vegetation on bluffs.

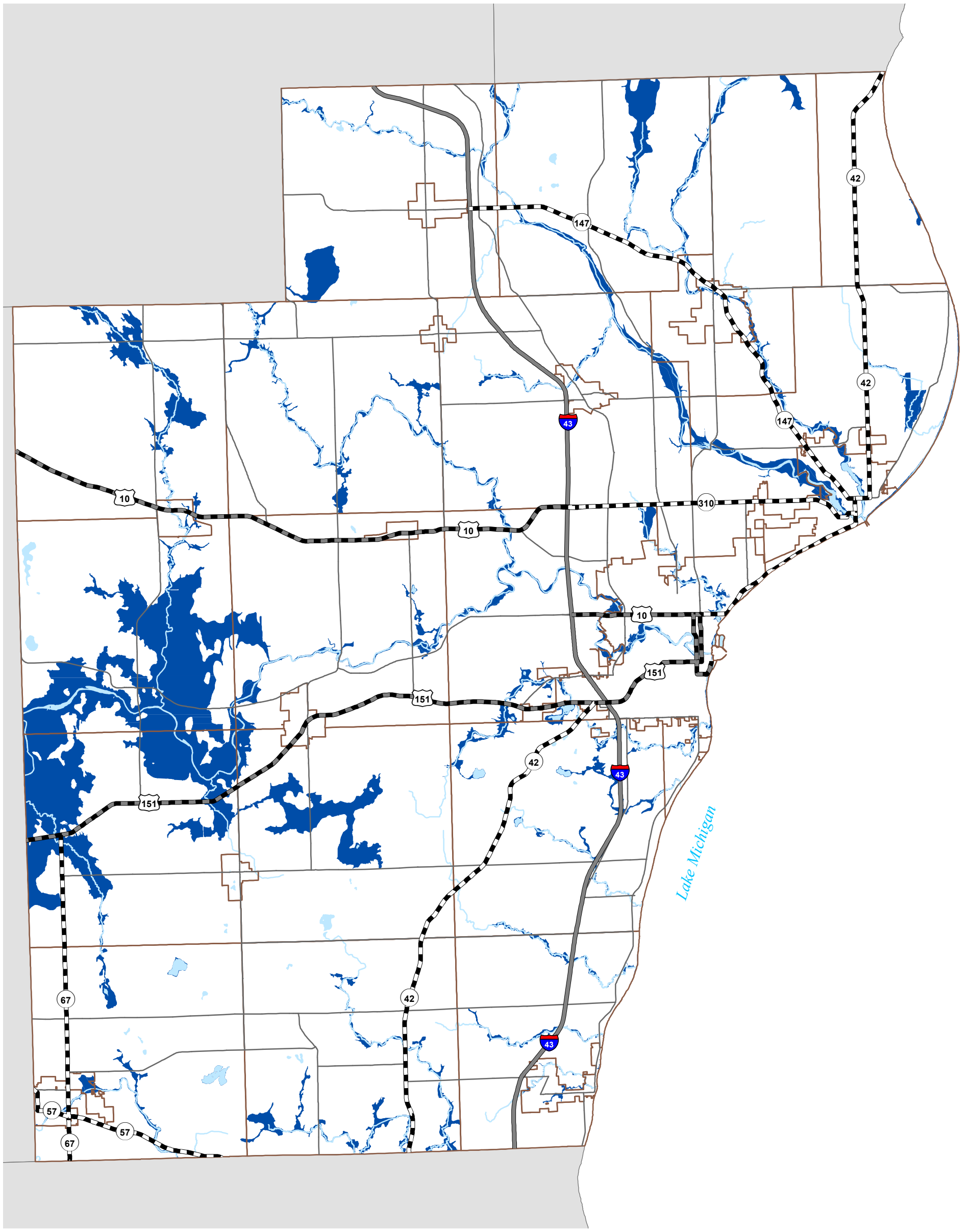
- Design port and harbor infrastructure that can accommodate increased variability in lake levels, e.g. harbor slips that float.
- Use risk/consequence approaches to evaluating and modifying existing infrastructure to accommodate observed and predicted changes in climate.
- Develop and evaluate alternative tools and strategies for the design of stormwater-related infrastructure, using a collaborative process that includes climate scientists, water resource managers, design engineers, and regulators, and members of relevant business communities.

Map 3.1

# 100-Year Floodplains

## Manitowoc County Hazard Mitigation Planning Area

Manitowoc County, WI




Base Map Features

- Interstate Highway
- U.S. Highway
- State Highway
- County Road
- Surface Water

FEMA DFIRM 100-Year Floodplain

N
W E
S

0 1 2 3 4

Miles

BAY-LAKE REGIONAL PLANNING COMMISSION

G:\Manitowoc\County\Hazard_Planning\Hazard_Plan_2013

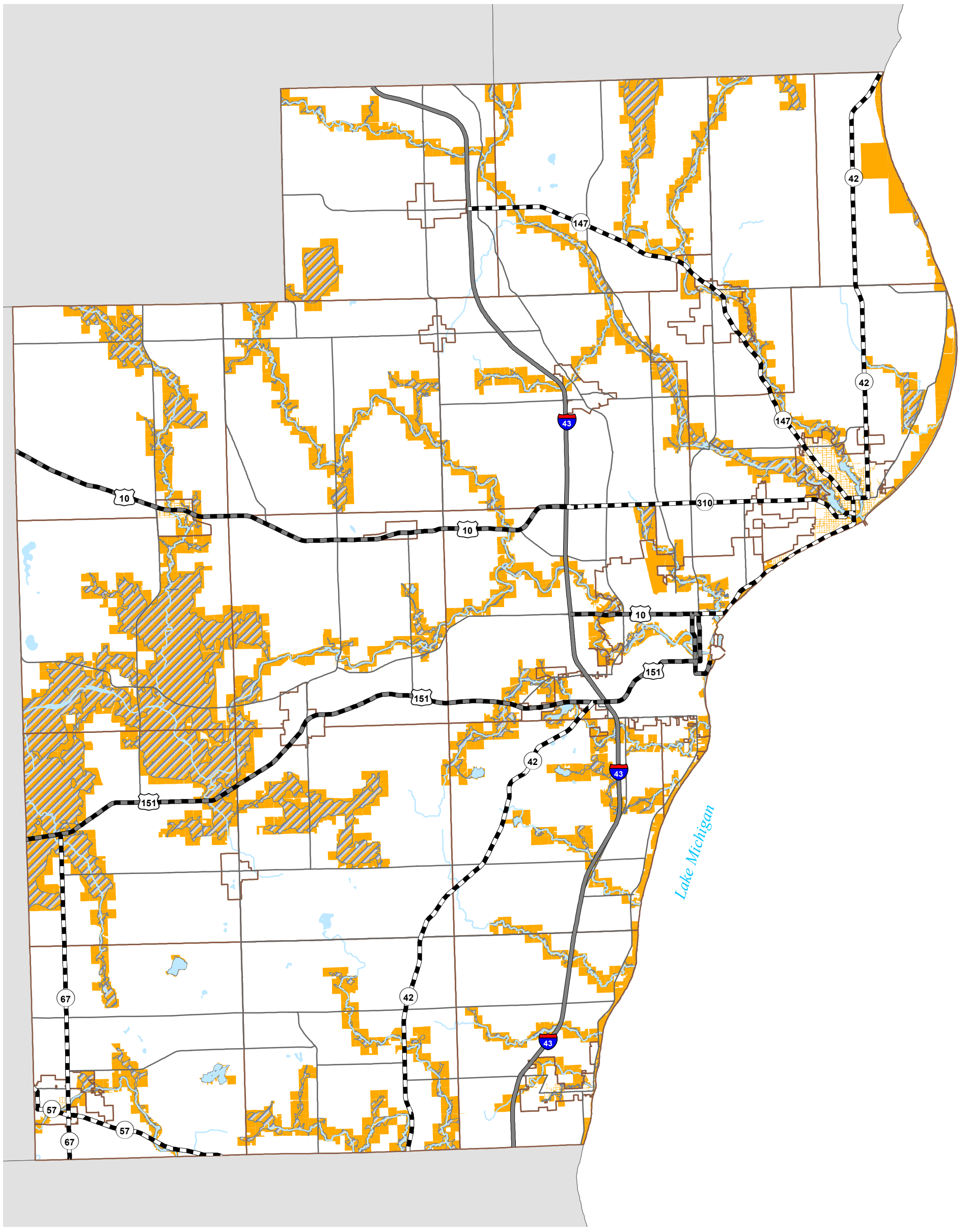
Source: WDOT, 2009; Manitowoc County, 2010; FEMA, 2011; Bay-Lake Regional Planning Commission, 2008, 2013.

Map 3.2

# Properties within the 100-Year Floodplains

## Manitowoc County Hazard Mitigation Planning Area

Manitowoc County, WI




Base Map Features

- Interstate Highway
- U.S. Highway
- State Highway
- County Road
- Surface Water

- Properties Potentially in the 100-Year Floodplain
- FEMA DFIRM 100-Year Floodplain

N W E S

0 1 2 3 4

Miles

BAY-LAKE Regional Planning Commission

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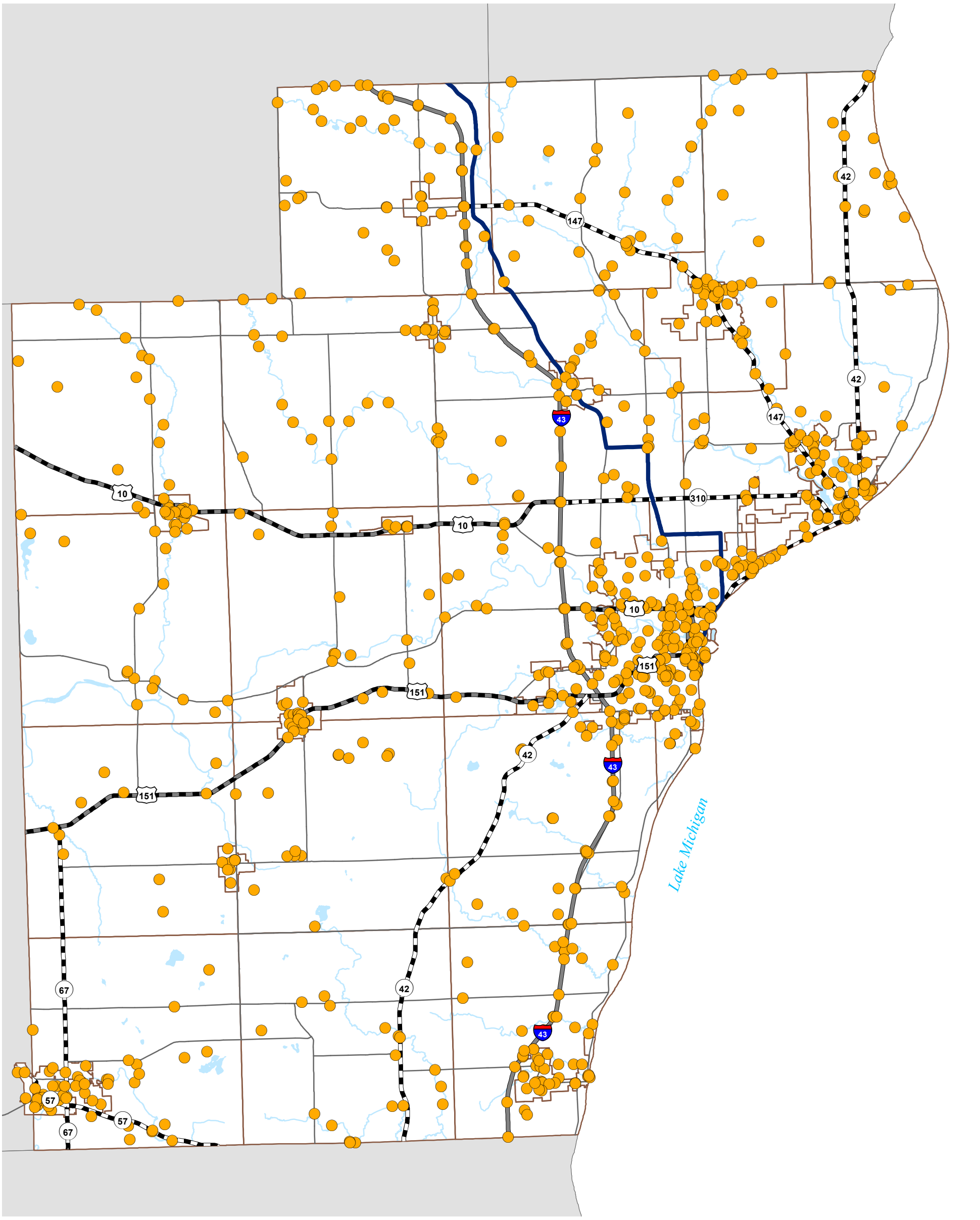
Source: WDOT, 2009; Manitowoc County, 2010; FEMA, 2011; Bay-Lake Regional Planning Commission, 2008, 2013.

Map 3.3

# Critical Facilites

## Manitowoc County Hazard Mitigation Planning Area

Manitowoc County, WI




Base Map Features

- Interstate Highway
- U.S. Highway
- State Highway
- County Road
- Surface Water

- Critical Facilities
- Brown County Water Authority Pipeline

N W E S

0 1 2 3 4

Miles

This map is neither a legally recorded map nor a survey and is not intended to be used as one. This drawing is a compilation of records, information and data used for reference purposes only. Bay-Lake RPC is not responsible for any inaccuracies herein contained.

BAY-LAKE REGIONAL PLANNING COMMISSION

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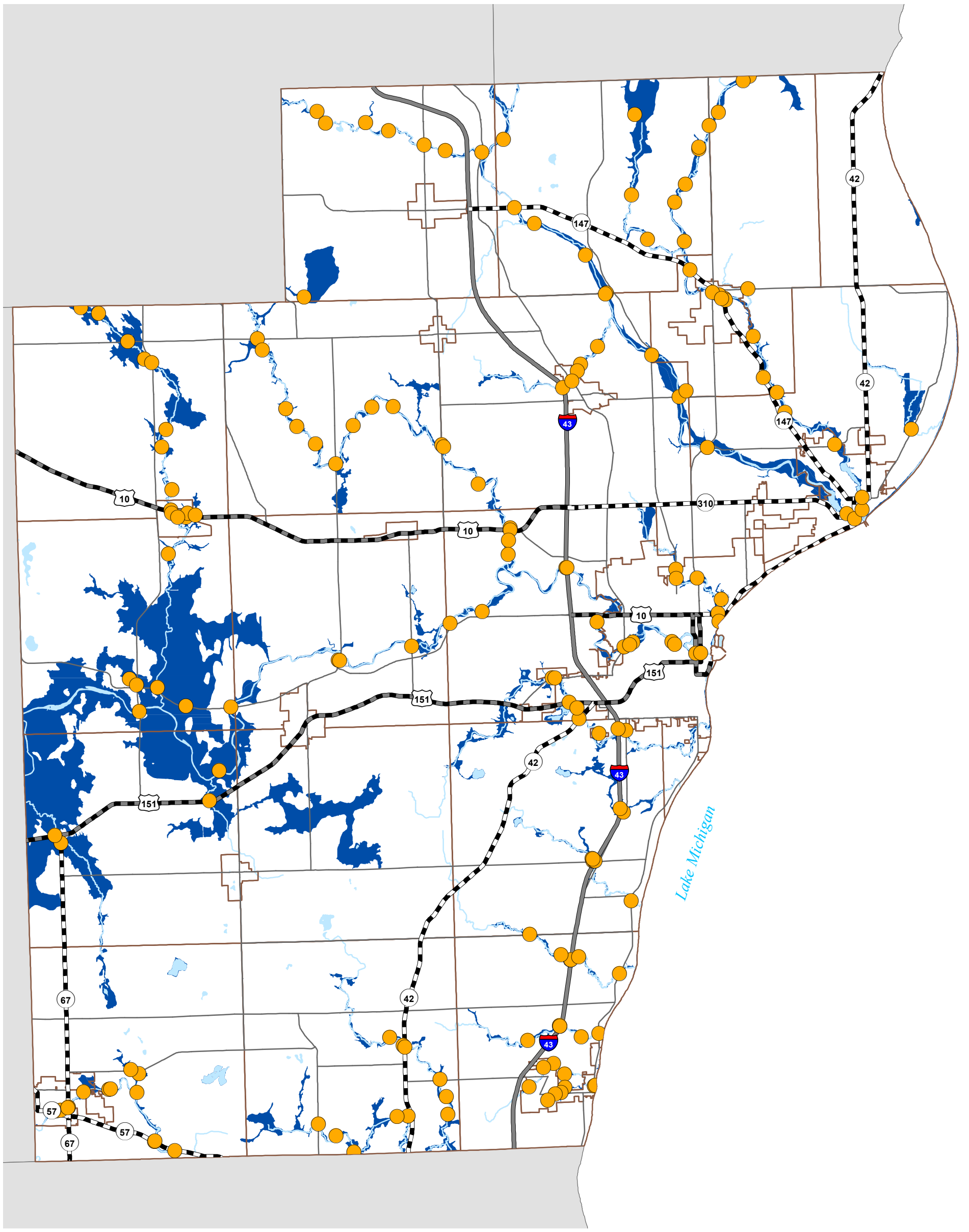
Source: WDOT, 2009; Manitowoc County, 2010; Bay-Lake Regional Planning Commission, 2008, 2013.

Map 3.4

# Critical Facilities within the 100-Year Floodplains

## Manitowoc County Hazard Mitigation Planning Area

Manitowoc County, WI




Base Map Features

- Interstate Highway
- U.S. Highway
- State Highway
- County Road
- Surface Water

- Critical Facilities Potentially in the 100-Year Floodplain
- FEMA DFIRM 100-Year Floodplain

N W E S

0 1 2 3 4

Miles

BAY-LAKE Regional Planning Commission

G:\Manitowoc\County\Hazard_Planning\Hazard_Plan_2013

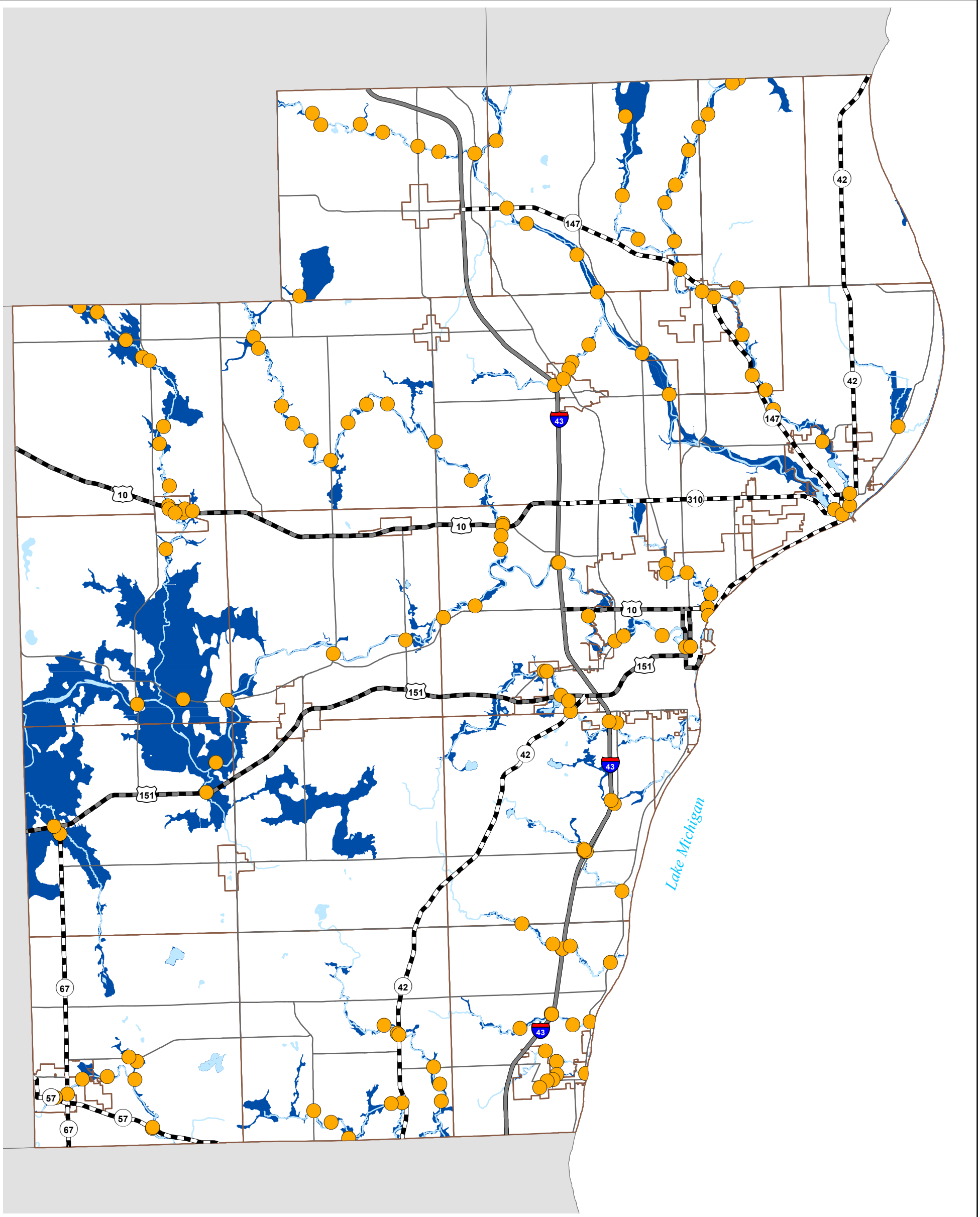
Source: WDOT, 2009; Manitowoc County, 2010; Bay-Lake Regional Planning Commission, 2008, 2013.

Map 3.5

# Bridge Crossings within the 100-Year Floodplains

## Manitowoc County Hazard Mitigation Planning Area

Manitowoc County, WI




Base Map Features

- Interstate Highway
- U.S. Highway
- State Highway
- County Road
- Surface Water

- Bridges Potentially in the 100-Year Floodplain
- FEMA DFIRM 100-Year Floodplain

N W E S

0 1 2 3 4

Miles

BAY-LAKE Regional Planning Commission

G:\Manitowoc\County\Hazard_Planning\Hazard_Plan_2013

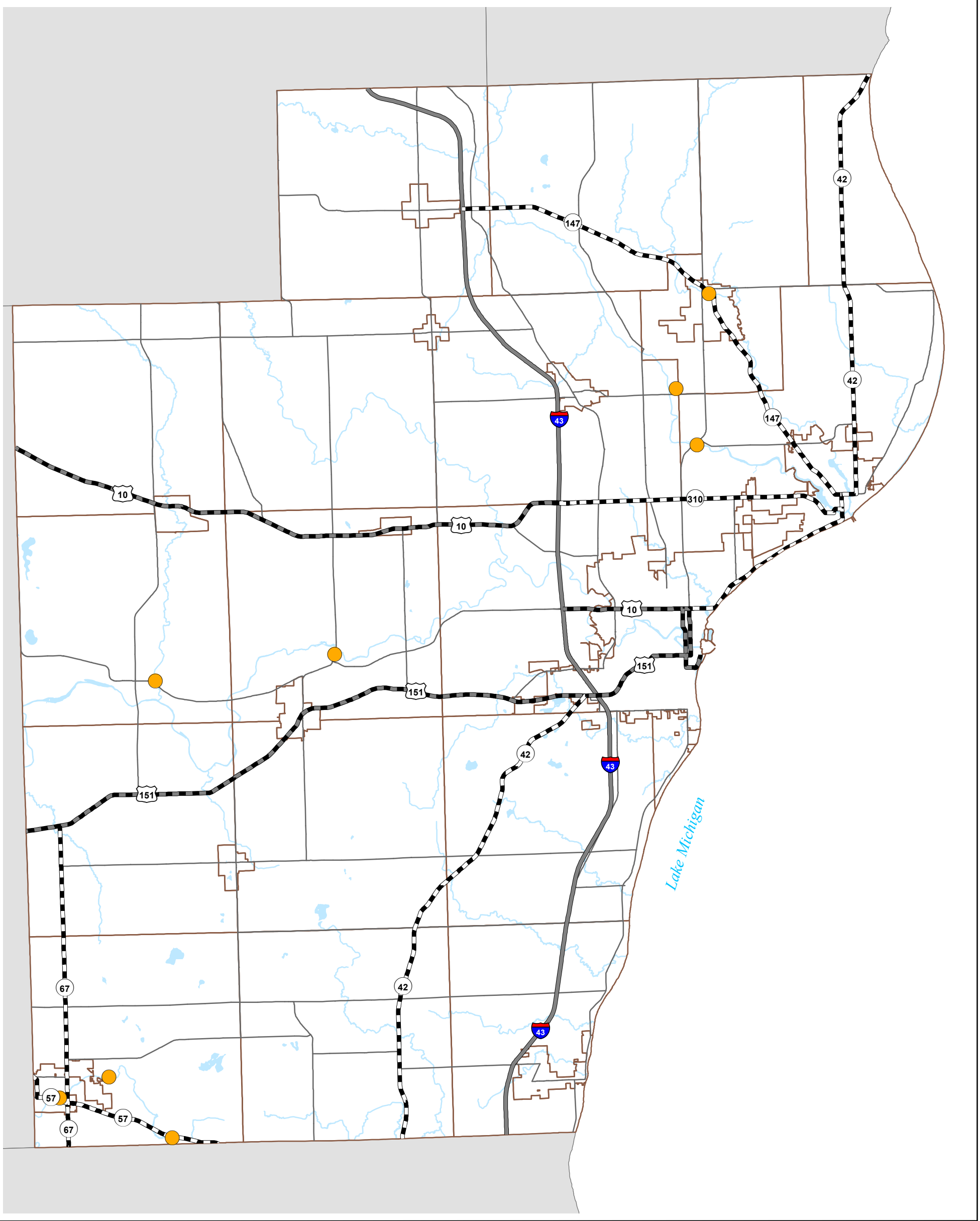
Source: WDOT, 2009; Manitowoc County, 2010; FEMA, 2011; Bay-Lake Regional Planning Commission, 2008, 2013.

Map 3.6

# Dams

## Manitowoc County Hazard Mitigation Planning Area

Manitowoc County, WI




Base Map Features

- Interstate Highway
- U.S. Highway
- State Highway
- County Road
- Surface Water

Dam

N W E S

0 1 2 3 4

Miles

BAY-LAKE REGIONAL PLANNING COMMISSION

G:\Manitowoc\County\Hazard_Planning\Hazard_Plan_2013

Source: WDOT, 2009; Manitowoc County, 2010; Bay-Lake Regional Planning Commission, 2008, 2013.

# CHAPTER 4 - MITIGATION STRATEGY

## INTRODUCTION

As defined by the Disaster Mitigation Act of 2000, mitigation is a "sustained action that reduces or eliminates long-term risk to people and property from natural hazards and their effects." Mitigation planning is the systematic process of learning about the hazards that can affect the planning area, setting clear goals, identifying appropriate actions, and following through with an effective mitigation strategy. Mitigation encourages long-term reduction of hazard vulnerability and can reduce the enormous cost of disasters to the government and property owners. Mitigation can also protect critical community facilities and infrastructure; reduce exposure to liability; and minimize community disruption.

The mitigation strategy outlines the general goals to be achieved through the implementation of the Manitowoc County hazard mitigation plan. From the identified hazard mitigation goals, a mitigation strategy was developed to identify specific projects and activities that could help achieve the County's hazard mitigation goals to make them safer and better prepared for disasters.

This chapter includes a discussion of the mitigation efforts that are currently underway, the County's plan to implement the mitigation actions, an assessment of the County's pre- and post-disaster hazard management policies, programs, and capability to mitigate hazards, and an evaluation of the current and potential sources of federal, state, or private funding to implement mitigation activities.

## MITIGATION GOALS

The following mitigation goals are intended to be used by public officials and emergency response personnel as general guidelines to mitigate the hazards identified in Chapter 3. These goals are broad in order to apply to all of the hazards addressed in the plan.

Goal #1: Implement policies and programs that are designed to reduce or eliminate the impacts of hazards on people and property.

Goal #2: Collect and utilize data needed to improve policy making and the identification of appropriate mitigation projects.

Goal #3: Build and support local capacity and commitment to continuously lessen the impacts of hazards on people and property.

Goal #4: Enhance enforcement measures to reduce the impacts of hazards on people and property.

Goal #5: Enhance the use of natural resource protection measures as a means to reduce the impacts of hazards on people and property.

Goal #6: Obtain and maximize additional resources that are necessary to reduce the impact of hazards on people and property.

Goal #7: Enhance training, education and outreach efforts that describe potential effects of hazards and ways to reduce their impact.

Goal #8: Promote intergovernmental coordination and cooperation in planning for and implementing hazard mitigation strategies.

## MITIGATION ACTION PLAN

Mitigation actions form the core of the mitigation plan. Table 4.1 lists the mitigation action plan developed for Manitowoc County. The table lists the hazard type, associated mitigation actions, the estimated costs of each project (where known), responsible agencies, the project timetable, and potential funding sources available for each mitigation action identified. The identified actions and projects address reducing the effects of hazards on the population, services, and existing and new buildings and infrastructure.

The County Emergency Management Department will track the implementation of mitigation actions over time. Information on completed or revised actions will be documented in future five-year updates of the County hazard mitigation plan.

### Prioritization Process

In developing this mitigation strategy, members of the plan steering committee considered, from their perspective, the various proposed action items and came to consensus on how each would be ranked, "high," "medium" or "low," based on need, funding, cost-benefit, and anticipated political support.

### Cost-Benefit Review

In developing this mitigation strategy, members of the plan steering committee considered, from their perspective, the costs and benefits of the various proposed action items. The cost-benefit review was a factor of the prioritization process. Full-blown cost-benefit calculations were not prepared for each action item included in the plan. The cost effectiveness of each action item will be addressed and completed through the project development process.

## COMPLETED MITIGATION ACTIONS

Since the preparation of the 2009 hazard mitigation plan for Manitowoc County, some of mitigation actions identified in the action plan have been completed. The following lists those actions that have been completed in Manitowoc County.

- Mutual Aid Agreements have been established for communications systems.
- Building footprints have been collected for all structures in the City of Manitowoc (plus three miles) to allow for analysis of facility/structure locations.
- Code Red (i.e. Reverse 911) capability was acquired in 2013.

Table 4.1: Manitowoc County Mitigation Action Plan

| All Hazards | | | | | |
|---|---|---|---|---|---|
| ***Project*** | ***Priority*** | ***Project Timetable*** | ***Estimated Cost*** | ***Responsible Party*** | ***Notes*** |
| Add capability for the Dispatch Center to accept text messages | High | 2015 | Costs to be determined | County Emergency Management | |
| Acquire updated air photos and LIDAR data | High | 2015 | $200,000 - $300,000 | Land Information Officer | |
| Outage management software to help triage outage repairs | High | 2015 | Costs to be determined | Manitowoc, Two Rivers, and Kiel public utilities | |
| Maintain Code Red (i.e. Reverse 911) capability | High | Ongoing | $22,000/year | Joint Dispatch Center | |
| Work with County, State, and Federal agencies to maintain a consistent critical facility database | High | Ongoing | Costs to be determined | Manitowoc County Hazard Mitigation Plan Steering Committee | |
| Acquire and promote use of NOAA weather radios which continually broadcast National Weather Service forecasts, warnings, and other crucial weather information as well as warnings regarding natural, man-made, or technological hazards | High | Ongoing | No cost; radios are purchased and sold at cost | County Emergency Management and American Red Cross | |
| Develop a central data collection process to report hazard incidences and resulting deaths, injuries, and property or crop damages | Medium | 2015-2020 | Covered by existing budgets | County Emergency Management | |
| Develop comprehensive safety plan for all municipal-owned buildings | Medium | 2015-2020 | Covered by existing budgets | local jurisdictions | |
| Update Comprehensive Plan and include land use policies that guide development away from hazardous areas; reduce density in hazardous areas; and/or encourage greater development restrictions in hazardous areas | Medium | 2020 | Costs to be determined | Manitowoc County Planning and Park Commission and Local Officials | |
| Encourage residents to prepare themselves by stocking up with necessary items and planning for how family members should respond if any emergency or disaster events strike | Medium | Ongoing | Covered by existing budgets | County Emergency Management, American Red Cross, and County Health Department | |
| Collect building footprints for all structures in the County to allow for analysis of where facilities/structures are located | Low | 2015-2020 | Costs to be determined | County Planning and Park Commission | |
| Collect building height data for all structures in the County | Low | 2015-2020 | Costs to be determined | County Planning and Park Commission | |

Table 4.1: Manitowoc County Mitigation Action Plan (cont'd)

| All Hazards (cont'd) | | | | | |
|---|---|---|---|---|---|
| ***Project*** | ***Priority*** | ***Project Timetable*** | ***Estimated Cost*** | ***Responsible Party*** | ***Notes*** |
| Use of early warning system through pagers and NOAA weather radios | Medium | As needed | Covered by existing budgets | County Emergency Management, Joint Dispatch Center, fire depts, EMS, and law enforcement | |
| Ability to test individual sirens after repairs | Medium | 2015-2020 | Costs to be determined | County Public Works, local jurisdictions | |
| **Tornado and Strong Wind** | | | | | |
| ***Project*** | ***Priority*** | ***Project Timetable*** | ***Estimated Cost*** | ***Responsible Party*** | ***Notes*** |
| Inform public of severe weather | High | As needed | Covered by existing budgets | National Weather Service and Joint Dispatch Center | |
| Extensive media coverage during Tornado Awareness Week | High | Ongoing | Covered by existing budgets | County Emergency Management | |
| Continue to hold tornado safety drill | High | Ongoing | Covered by existing budgets | County Emergency Management | |
| Continue to test and oversee outdoor warning system | High | Ongoing | Covered by existing budgets | County Emergency Management, County Sheriff's Dept, and local jurisdictions | |
| Revise and amend zoning and building ordinances to require anchoring of manufactured and mobile homes | Medium | 2015 | Costs to be determined | All participating jurisdictions | |
| Assist National Weather Service in conducting tornado spotter training programs and organizing local tornado spotter networks | Medium | Ongoing | Covered by existing budgets | County Emergency Management and National Weather Service | |
| Continued investment and use of early warning system through pagers, NOAA weather radios, sirens, social media, and Code Red | Medium | Ongoing | Covered by existing budgets | County Emergency Management, Joint Dispatch Center, local fire depts and EMTs, and County Sheriff's Dept | |

Table 4.1: Manitowoc County Mitigation Action Plan (cont'd)

| Tornado and Strong Wind (cont'd) | | | | | |
|---|---|---|---|---|---|
| ***Project*** | ***Priority*** | ***Project Timetable*** | ***Estimated Cost*** | ***Responsible Party*** | ***Notes*** |
| Assist personnel in schools and businesses, public facility managers, mobile home park managers, and citizens in determining "best available" tornado safety areas or need to construct safe rooms | Medium | As needed | Covered by existing budgets | County Emergency Management and American Red Cross | A plan is in place for the fairgrounds as of 2011 |
| Review and update Comprehensive Safety Plan for all county-owned buildings | Medium | As needed | Covered by existing budgets | County Emergency Management | Last updated in 2013 |
| Consider adoption of ordinances requiring construction of safe shelters for mobile home parks, fairgrounds, or other vulnerable public places | Low | 2015-2020 | Covered by existing budgets | County Planning and Park Commission and local zoning officials | |
| Educate public to secure loose items (such as yard and patio furniture) before tornado or high wind events | Low | Ongoing | Covered by existing budgets | County Emergency Management | |
| **Winter Storms** | | | | | |
| ***Project*** | ***Priority*** | ***Storms*** | ***Estimated Cost*** | ***Responsible Party*** | ***Notes*** |
| Ensure that plow and sanding equipment is operational and available | High | Ongoing | Covered by existing budgets | County Highway Dept and local public works departments | |
| Utilization of the media to disseminate emergency information | High | As needed | Covered by existing budgets | National Weather Service, Joint Dispatch Center, highway depts, and all participating jurisdictions | |
| Provide educational materials to the public regarding safety during winter storm events | Medium | Ongoing | Covered by existing budgets | County Emergency Management and State EM (readywisconsin.wi.gov) | |
| **Hail** | | | | | |
| ***Project*** | ***Priority*** | ***Project Timetable*** | ***Estimated Cost*** | ***Responsible Party*** | ***Notes*** |
| Harden utility infrastructure to make more resistant to hail (i.e., burying of telephone lines) | High | 2015-2020 | Costs to be determined | local utility companies, and local jurisdictions | |
| Animal protection | High | Ongoing | Costs to be determined | County UW-Extension and Farm Service Agency | |
| Provide information about hail crop insurance | Medium | Ongoing | Covered by existing budgets | County UW-Extension and Farm Service Agency | |

Table 4.1: Manitowoc County Mitigation Action Plan (cont'd)

| Flooding | | | | | |
|---|---|---|---|---|---|
| ***Project*** | ***Priority*** | ***Project Timetable*** | ***Estimated Cost*** | ***Responsible Party*** | ***Notes*** |
| Land use planning | Low | 2018 - 2020 | Covered by existing budgets | All participating jurisdictions with assistance (when feasible) from County Planning and Resources Department | Updated in 2008 with Comprehensive Planning; will update again in 10 years |
| Study effects of current and future development in the approximate floodplain and any other areas that have not yet been studied | High | As funding is available | Costs to be determined | County Planning and Park Commission and GIS | Updated, but still unstudied areas. Need LIDAR and 2' contours. |
| Maintain information regarding, and coordination of, congregate care facilities | High | Ongoing | Covered by existing budgets | County Emergency Management and American Red Cross | |
| Continue to issue early warnings through flood advisory bulletins | High | Ongoing | Covered by existing budgets | National Weather Service and Joint Dispatch Center | |
| Stormwater protection planning | High | Ongoing | Covered by existing budgets | Wisconsin DNR and public works/engineering | |
| Stormwater retention/detention facilities | High | Ongoing | Costs to be determined based on specific project | Wisconsin DNR and public works/engineering | |
| Erosion control zoning | High | Ongoing | Covered by existing budgets | Wisconsin DNR | |
| Dissemination of instructions to the public through the media | High | As needed | Covered by existing budgets | National Weather Service, Joint Dispatch Center, and local jurisdictions | |
| Handle the evacuation of people and property in the case of a severe flood event | High | As needed | Covered by existing budgets | Local law enforcement, fire depts, County Emergency Management, County Highway Dept, County Aging Dept, and County Health Dept | |
| Review and update floodplain zoning ordinances as necessary | Medium | As needed | Covered by existing budgets | County Planning and Park Commission | Updated in 2010; approved by FEMA and WDNR |

Table 4.1: Manitowoc County Mitigation Action Plan (cont'd)

| Flooding (cont'd) | | | | | |
|---|---|---|---|---|---|
| ***Project*** | ***Priority*** | ***Project Timetable*** | ***Estimated Cost*** | ***Responsible Party*** | ***Notes*** |
| Sand-bagging when necessary | Medium | As needed | Covered by existing budgets | County Highway Dept, County Emergency Management, local public works depts | |
| Protection of new buildings and other structures through floodplain zoning | Medium | As needed | Costs to be determined based on specific project | County Planning and Park Commission | |
| Review and update evacuation procedures for persons located in affected area as needed | Low | Annually | Covered by existing budgets | County Emergency Management | |
| Issue or deny floodplain development/building permits | Medium | Ongoing | Covered by existing budgets | County Planning and Park Commission, and cities and villages | Addresses NFIP Compliance |
| Inspect all development to assure compliance with local ordinance | Medium | Ongoing | Covered by existing budgets | County Planning and Park Commission, and cities and villages | Addresses NFIP Compliance |
| Maintain records of floodplain development | Medium | Ongoing | Covered by existing budgets | County Planning and Park Commission, and cities and villages | Addresses NFIP Compliance |
| Assist in the preparation and revision of floodplain maps | Medium | Ongoing | Covered by existing budgets | County Planning and Park Commission, and cities and villages | Addresses NFIP Compliance |
| Help residents obtain information on flood hazard, floodplain map data, flood insurance, and proper construction measures | Medium | Ongoing | Covered by existing budgets | County Planning and Park Commission, and cities and villages | Addresses NFIP Compliance |
| **Extreme Cold** | | | | | |
| ***Project*** | ***Priority*** | ***Project Timetable*** | ***Estimated Cost*** | ***Responsible Party*** | ***Notes*** |
| Continue to provide safety information to the public during periods of extreme temperature | Medium | Ongoing | Covered by existing budgets | American Red Cross, County Emergency Management, and County Health Dept | |
| Organize outreach to vulnerable populations during periods of extreme temperature, including the establishment and promotion of accessible heating or cooling centers in the community | Medium | As needed | Covered by existing budgets | County Health Dept, American Red Cross, and local jurisdictions | |

Table 4.1: Manitowoc County Mitigation Action Plan (cont'd)

| Extreme Heat | | | | | |
|---|---|---|---|---|---|
| ***Project*** | ***Priority*** | ***Project Timetable*** | ***Estimated Cost*** | ***Responsible Party*** | ***Notes*** |
| Continue to provide safety information to the public during periods of extreme temperature | Medium | Ongoing | Covered by existing budgets | American Red Cross, County Emergency Management, and County Health Dept | |
| Organize outreach to vulnerable populations during periods of extreme temperature, including the establishment and promotion of accessible heating or cooling centers in the community | Medium | As needed | Covered by existing budgets | County Health Dept, American Red Cross, and local jurisdictions | |
| **Lightning** | | | | | |
| ***Project*** | ***Priority*** | ***Project Timetable*** | ***Estimated Cost*** | ***Responsible Party*** | ***Notes*** |
| Continue to distribute awareness/educational materials to inform public of safety procedures to follow in a lightning storm | Medium | Ongoing | Covered by existing budgets | County Emergency Management and American Red Cross | |
| Provide information about protecting structures through use of fire resistant materials | Low | Ongoing | Costs to be determined based on project and jurisdiction | Local Building and Fire Inspectors | |
| **Drought** | | | | | |
| ***Project*** | ***Priority*** | ***Project Timetable*** | ***Estimated Cost*** | ***Responsible Party*** | ***Notes*** |
| Identification of areas with potential ground water level problems and inspection of shallow wells in those areas for adequate depth and construction | Low | 2015-2020 | Costs to be determined based on pending studies | WDNR, UW-Extension, County Land and Water Conservation Dept | |
| Development of water usage regulations during periods of drought by local communities | Low | As needed | Covered by existing budgets | All participating jurisdictions | |
| Encourage citizens to take water-saving measures during periods of drought where regulations are not in place | Low | As needed | Covered by existing budgets | All participating jurisdictions | |

Table 4.1: Manitowoc County Mitigation Action Plan (cont'd)

| Dense Fog | | | | | |
|---|---|---|---|---|---|
| ***Project*** | ***Priority*** | ***Project Timetable*** | ***Estimated Cost*** | ***Responsible Party*** | ***Notes*** |
| Dissemination of fog advisories | High | As needed | Covered by existing budgets | National Weather Service | |
| Upkeep existing signage in areas of high fog event incidence | Medium | As needed | Covered by existing budgets and/or highway safety grants | County Traffic Safety Commission | |
| **Wildland Fires** | | | | | |
| ***Project*** | ***Priority*** | ***Project Timetable*** | ***Estimated Cost*** | ***Responsible Party*** | ***Notes*** |
| Encourage citizens to install and maintain smoke detectors and fire extinguishers on each floor of their homes or other buildings | High | Ongoing | Covered by existing budgets | Local fire depts, all participating jurisdictions, and building inspectors | |
| Schedule regular training and exercise sessions for response personnel | High | Ongoing | Covered by existing budgets | All participating jurisdictions and WDNR | |
| Develop local ordinances to require burn permits and restriction of campfires and outdoor burning | Medium | 2015-2020 | Costs to be determined based on needs of jurisdiction | All participating jurisdictions and WDNR | |
| Coordinate public outreach efforts to promote such things as non-combustible roof covering, fire safe construction, safe burning, and the importance of clearing brush and grass away from buildings | Low | As needed | Covered by existing budgets | Local fire depts, and all participating jurisdictions | |
| **Coastal Hazards** | | | | | |
| ***Project*** | ***Priority*** | ***Project Timetable*** | ***Estimated Cost*** | ***Responsible Party*** | ***Notes*** |
| Review and update evacuation procedures for persons located in affected area as needed | Medium | As needed | Covered by existing budgets | County Emergency Management | |
| Continue to enforce greater setbacks for properties adjacent to Lake Michigan under the county shoreland zoning ordinance | Medium | As needed | Covered by existing budgets | County Planning Department | |
| **Land Subsidence** | | | | | |
| ***Project*** | ***Priority*** | ***Project Timetable*** | ***Estimated Cost*** | ***Responsible Party*** | ***Notes*** |
| Provide information to residents as needed | Low | Ongoing | Covered by existing budgets | Dependent on assistance needed | |

Table 4.2: Municipal Mitigation Actions

| Hazard Type | Mitigation Measures | Costs of Project | Responsible Parties | Project Timetable | Priority |
|---|---|---|---|---|---|
| **City of Manitowoc** | | | | | |
| All Hazards | Acquire, promote and make available 10-year smoke detectors and 7-year CO detectors to in-need residents | $10,000 initial startup, then $3,000/year | Manitowoc City Fire Department | 2014, Ongoing | Medium |
| All Hazards | Standby power generation for drinking water facilities | $3,000,000 | Manitowoc Public Utilities | 2018 | Medium |
| Extreme Cold | Add protection against frazil ice and water intake freezing | $2,500,000 | Manitowoc Public Utilities | 2018 | Medium |
| **City of Two Rivers** | | | | | |
| All Hazards | Increase the number of warming shelters with working kitchens and sufficient restrooms and showers | $46,771 | City of Two Rives and Two Rivers Water & Light | 2015 | High |
| **City of Kiel** | | | | | |
| All Hazards | Severe weather education; promote planning by residents on how to respond, protect and endure emergency weather events | Covered by existing budgets | City of Kiel Emergency Management, Fire Department, and Police Department | Ongoing | Medium |
| **Village of Cleveland** | | | | | |
| All Hazards | Install motion sensors at wells No. 1 and 2 and the water tower | To be determined | Village of Cleveland Public Works | 2020 | Medium |
| **Village of Francis Creek** | | | | | |
| All Hazards | Utilize media for emergency information | Covered by existing budgets | Village President/Clerk | Ongoing | Low |
| **Village of Kellnersville** | | | | | |
| All Hazards | Expand and harden fire station to be used as emergency shelter/center | To be determined | Village of Kellnersville, Kellnersville Fire Department, and EMS Volunteer Responder | 2020 | High |
| **Village of Maribel** | | | | | |
| All Hazards | Acquire and promote the use of NOAA weather radios | $1,000 | Village of Maribel and Manitowoc County Emergency Management | Ongoing | High |
| **Village of Mishicot** | | | | | |
| Extreme Heat/Cold | Organize outreach to vulnerable populations during periods of extreme temperature, including the establishment and promotion of accessible heating or cooling centers in the community | Covered by existing budgets | Village of Mishicot and Mishicot Police Department | As needed | Medium |
| **Village of Reedsville** | | | | | |
| Tornado and Strong Wind | Continue to hold tornado safety drills, with siren testing, and schools practicing tornado safety | Covered by existing budgets | County Emergency Management, Reedsville Fire and Police Departments, and First Responders | Yearly in Spring | High |
| **Village of St. Nazianz** | | | | | |
| All Hazards | Install a second storm siren (received from closed Kewaunee Nuclear plant) | To be determined | Village of St. Nazianz and St. Nazianz Fire Department | 2014 | Medium |
| **Village of Valders** | | | | | |
| Flooding | Dredge creek along Eisenhower Street to remove debris | $250,000 | Valders Police Department | 2015 | Medium |
| Flooding | Create stormwater runoff waterway along field north of Kennedy Street | $50,000 | Valders Police Department | 2015 | Medium |
| **Village of Whitelaw** | | | | | |
| All Hazards | Continued investment in state of the art early warning system | $3,000 | Village of Whitelaw and Whitelaw Fire Department | 2015 | Medium |

**Policies, Programs, and Resources for Mitigation**

Manitowoc County has a number of authorities that enforce polices, execute programs, and provide resources that support the mitigation action plan for reducing potential losses identified in the risk assessment. These authorities have been identified under the responsible parties (where applicable) in the mitigation action plan (Table 4.1), and include the following;

- Manitowoc County Planning and Park Commission
  - → Relevant policies and programs include planning and zoning (including enforcement of county shoreland and floodplain management regulations).
- Manitowoc County Emergency Management
  - → Relevant policies and programs include coordinating effective disaster response and recovery efforts in the county through response, recovery, planning, training, and exercises, and mitigation.
- Fire Departments and Emergency Medical Services
  - → Relevant policies and programs include coordinating emergency preparedness, mitigation, response, and recovery efforts.
- Law Enforcement
  - → Relevant policies and programs include coordinating emergency preparedness, mitigation, response, and recovery efforts.
- Manitowoc County Joint Dispatch Center
  - → Relevant policies and programs include coordinating emergency response and recovery efforts with regard to communication between the public and police, fire, and EMS.
- Manitowoc County Highway Department
  - → Relevant policies and programs include road maintenance, stormwater management, and management of salt storage for winter storms.
- Manitowoc County Health Department
  - → Relevant policies and programs focus on protecting and promoting the health and safety of the people in the county in cooperation with community partners (includes assisting citizens with emergency preparedness).
- Wisconsin Emergency Management
  - → Relevant policies and programs include supporting effective disaster response and recovery efforts in support of local government through planning, training, and exercises.
- Wisconsin Department of Natural Resources
  - → Relevant policies and programs include regulation enforcement of state shoreland and floodplain management rules, and wildland fire response and education.

- Power Utilities (Manitowoc Public Utilities, Kiel Utilities, Two Rivers Water & Light, Wisconsin Public Service, WE Energies)
  - → Relevant policies and programs include maintaining electrical power and transmission facilities.
- American Red Cross
  - → Relevant policies and programs include disaster relief and educational programs that promote health and safety.
- National Weather Service (Green Bay Regional Office)
  - → Relevant policies and programs include publicizing information, and providing outreach and education about hazardous weather.

These authorities have the ability to expand or modify their programs when needed to improve existing tools to address mitigation. Manitowoc County has taxing authority through property taxes to raise funds for the purpose hazard mitigation. Additional funding sources for hazard mitigation actions are available from a number of federal and state grant programs.

**Potential Funding Sources for Mitigation Activities**

Funding for hazard mitigation programs and projects can come from a number of sources both public and private. Non-local funding can come from a number of sources, either in the form of a grant or a loan. The following text provides a description of a number of potential grant programs available to Manitowoc County (or other entities seeking to carry out hazard mitigation actions) in funding future mitigation actions identified in this plan:

**Federal Programs**

***EDA Public Works and Development Facilities***

These funds are available for local units of government to enhance regional competitiveness and promote long-term economic development in regions experiencing substantial economic distress. EDA provides Public Works investments to help distressed communities and regions revitalize, expand, and upgrade their physical infrastructure to attract new industry, encourage business expansion, diversify local economies, and generate or retain long-term private sector jobs and investment.

***FEMA Assistance to Firefighters Grant***

The primary goal of the Assistance to Firefighters Grants (AFG) is to meet the firefighting and emergency response needs of fire departments and nonaffiliated emergency medical services organizations. The AFG program has helps firefighters and other first responders to obtain critically needed equipment, protective gear, emergency vehicles, training, and other resources needed to protect the public and emergency personnel from fire and related hazards. The National Preparedness Directorate in the Federal Emergency Management Agency administers the grants in cooperation with the U.S. Fire Administration.

The Fire Prevention and Safety Grants (FP&S) are part of the Assistance to Firefighters Grants (AFG) and are under the purview of the National Preparedness Directorate in the Federal Emergency Management Agency. FP&S grants support projects that enhance the safety of the public and firefighters from fire and related hazards. The primary goal is to target high-risk populations and mitigate high incidences of death and injury.

### *FEMA Flood Mitigation Assistance Program*

The Flood Mitigation Assistance (FMA) program was created as part of the National Flood Insurance Reform Act (NFIRA) of 1994 with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). FEMA provides FMA funds to assist States and communities implement measures that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the National Flood Insurance Program. Eligible activities include: acquisition, relocation, elevation, and flood-proofing of flood-prone insured properties; flood mitigation planning; and technical assistance. In order to be eligible for funding through this program the local government must be in compliance with the National Flood Insurance Program.

### *FEMA Hazard Mitigation Grant Program*

The Hazard Mitigation Grant Program (HMGP) provides grants to States and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. Eligible activities include: flood proofing; acquisition and relocation of flood prone properties; elevation of flood prone properties; retrofitting properties to be wind resistant; stormwater improvements; and education and awareness. In order to be eligible for funding through this program, the local government must be in compliance with the National Flood Insurance Program. All projects must be cost-effective, environmentally sound, and solve a problem. Funds area available anytime after a Presidential Disaster Declaration has been made in the State of Wisconsin.

### *FEMA Pre-Disaster Mitigation Program*

The Pre-Disaster Mitigation (PDM) program provides funds to states, territories, Indian tribal governments, communities, and universities for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event. Funding these plans and projects reduces overall risks to the population and structures, while also reducing reliance on funding from actual disaster declarations. PDM grants are to be awarded on a competitive basis and without reference to state allocations, quotas, or other formula-based allocation of funds. Grant funds can be used to cover management costs, information dissemination, planning, technical assistance, and mitigation projects. In order to be eligible for funding through this program the local government must be in compliance with the National Flood Insurance Program. All projects must be cost-effective and environmentally sound.

### *Pipeline and Hazardous Materials Safety Administration, Hazardous Materials Emergency Preparedness*

The Hazardous Materials Emergency Preparedness (HMEP) grant program is intended to provide financial and technical assistance as well as national direction and guidance to enhance State, Territorial, Tribal, and local hazardous materials emergency planning and training. The HMEP Grant Program distributes fees collected from shippers and carriers of hazardous materials to emergency responders for hazmat training and to Local Emergency Planning Committees (LEPCs) for hazmat planning.

### *U.S. Department of Education School Emergency Response and Crisis Management Plan Discretionary Grant Program*

This grant program is designed to provide funds to Local Education Agencies (LEA) to strengthen and improve their emergency response and crisis plans, at the district and school-building level. Grantees are required to address all four phases of crisis planning: prevention and mitigation, preparedness, response, and recovery. In addition, LEAs are required to form partnerships and collaborate with community organizations, local law enforcement agencies, heads of local governments, and offices of public safety, health, and mental health as they review and revise school crisis plans. Plans must be coordinated with state or local homeland security plans and support implementation of the National Incident Management System (NIMS). Grant funds may be used for the following activities: training school safety teams and students; conducting building and facilities audits; communicating emergency response policies to parents and guardians; implementing an Incident Command System (ICS); purchasing school safety equipment (to a limited extent); conducting drills and tabletop simulation exercises; and preparing and distributing copies of crisis plans.

## State of Wisconsin Programs

### *WDNR Lake Planning Grant Program*

Counties, towns, cities, villages, tribes, qualified non-profit conservation organizations, qualified lake associations, school districts (in partnership with another eligible party), public inland lake protection and rehabilitation districts, town sanitary districts, and other local governmental units that are established for the purpose of lake management, are eligible to apply for funding to collect and analyze information needed to protect and restore lakes and their watersheds.

Eligible activities include: gathering and analysis of physical, chemical, and biological information on lakes; describing present and potential land uses within lake watersheds and on shorelines; reviewing jurisdictional boundaries and evaluating ordinances that relate to zoning, sanitation, or pollution control or surface use; assessments of fish, aquatic life, wildlife, and their habitats; and developing, evaluating, publishing, and distributing alternative courses of action and recommendations in a lake management plan.

### *WDNR Municipal Flood Control Grant Program*

The Wisconsin Department of Natural Resources, Bureau of Community Financial Assistance and Bureau of Watershed Management, offers this grant assistance package to all cities, villages, towns, Indian Tribes, and metropolitan sewerage districts concerned with municipal flood control management in the State of Wisconsin. Assistance is provided with the availability of Acquisition and Development grants to purchase property or vacant land, structure removal, construction or other development costs and with Local Assistance Grants for providing administrative support activities.

### *WDNR River Planning Grant Program*

Under this grant program, counties, cities, towns, villages, tribes, other local governmental units, qualified river management organizations, and qualified nonprofit conservation organizations are eligible to apply for funding under this program. Projects funded by this program must be designed to collect, assess and disseminate information on riverine ecosystems; assist in developing organizations to help manage rivers; assist the public in understanding riverine ecosystems; and/or create management plans for the long term protection and improvement of

riverine ecosystems. Eligible activities include: organizational development for existing river protection/improvement organizations; assistance with the formation of a qualified river management organization; public education projects; and planning and assessment projects. Capital improvement projects are not eligible for funding under this grant.

***WDNR Volunteer Fire Assistance Grant***

Volunteer Fire Assistance (VFA) grants are available to Wisconsin county/area fire associations statewide. Grant funding is intended to support wildland fire suppression capabilities in an area through broad-ranging projects of benefit to all of the local fire departments. Successful applications will have a positive impact on the prevention, detection, and suppression of wildland fires in all of the communities served by a county/area fire association. Grant funds can be used for: fire fighter safety; fire fighter training; fire prevention (particularly in the Wildland Urban Interface); dry hydrants and other water resources; mapping; enhanced communications; wildland fire suppression equipment; and the organization of a new fire department.

***WDOA Comprehensive Planning Grant Program***

The Division of Intergovernmental Relations administers the Wisconsin Comprehensive Planning Grant Program to assist local governments in the development and adoption of comprehensive plans. The Comprehensive Planning Grant Program has established a framework that promotes cooperation, collaboration and the exchange of ideas relating to planning and land use issues.

***WDOA, Division of Housing and Intergovernmental Relations, Emergency Housing Grant Program***

This program makes available funds for acquisition, rehabilitation, and/or demolition projects after a disaster event has occurred. These funds can be used as a local match to receive FEMA mitigation funds. The project must be used to benefit low and moderate income individuals.

# CHAPTER 5 - PLAN ADOPTION AND MAINTENANCE

## PLAN ADOPTION PROCESS

The Manitowoc County Hazard Mitigation Plan development process was guided by the County Hazard Mitigation Plan Steering Committee over an 18-month timeframe, with professional planning support from the Bay-Lake Regional Planning Commission. A list of Steering Committee members is located in Chapter 1 - Introduction of this document.

Both WEM and FEMA reviewed a final draft of the County's hazard mitigation plan prior to adoption by the Manitowoc County Board. Comments received from WEM and FEMA were reviewed by the Steering Committee and necessary revisions were made. The plan was adopted by resolution by the Manitowoc County Board on October 14, 2014. The resolution adopting the plan can be found on page iii, just before the Table of Contents. After the plan was adopted by the Manitowoc County Board, it was approved by WEM and FEMA. Approval letters from WEM and FEMA can be found on page v.

## PLAN MAINTENANCE

Planning is an ongoing process, and this plan should grow and adapt in order to keep pace with growth and change in the planning area and its local jurisdictions. The Disaster Mitigation Act of 2000 requires that local plans be evaluated and updated at least every five years in order to remain eligible for assistance.

### Plan Monitoring, Evaluation, and Updating

This Manitowoc County Hazard Mitigation Plan is an update to the initial 2009 plan, and will continue to be monitored, evaluated, and updated by Manitowoc County. Every five years, the plan will be comprehensively reviewed, and fully updated. The update shall involve the collection of the most current data to support the plan and the development of new mitigation strategies and an implementation plan. This planning effort will be comprehensive, and will incorporate opportunities for public involvement to meet all requirements of 44 CFR Part 201.6 and/or any applicable requirements or regulations developed over the next five years.

The five-year plan update will be coordinated by the either the Manitowoc County Planning Department or the Emergency Management Director for County Board approval. All meetings to update the plan shall be subject to the Wisconsin Open Meeting Law, and shall be properly noticed to allow for public involvement and comment.

### Additional Plan Review

Within three to six months following a significant natural hazard event (as determined by the Steering Committee), a special post-disaster review will occur. Information concerning the disaster shall be collected by the Manitowoc County Emergency Management Director from local law enforcement personnel, fire department personnel, disaster response personnel, Wisconsin Emergency Management staff, FEMA staff, affected citizens, and any other pertinent entities. This information shall be provided to the Steering Committee for its review.

At a public meeting, the Steering Committees will analyze the contributing factors to the impact(s) of the hazard event, the likelihood of the event recurring, and any strategies that should be implemented to mitigate the impact(s) in the future. The County Emergency Management Director will have primary responsibility for establishing post-disaster review meeting dates, distributing related materials, facilitating the meetings, and advertising these special meetings to

affected county department heads and citizens and community groups, so that additional input and comment can be received. Special post-disaster review meetings shall be subject to the Wisconsin Open Meeting Law and shall be properly noticed to allow for public involvement and comment.

The Steering Committee may choose to revise or amend the existing County plan based on what is learned in the review process. Any recommended changes to the plan shall be forwarded to the Manitowoc County Board for its action and consideration.

## PLAN COORDINATION

The mitigation action plan (provided in Chapter 4) ties the mitigation strategies to related plans or policies. As the county and jurisdictions in the planning area develop or update their comprehensive plans, incorporation of this Hazard Mitigation Plan is highly recommended. The Wisconsin comprehensive planning law includes a detailed description of elements that need to be addressed in all comprehensive plans. The following items must be considered when incorporating this Hazard Mitigation Plan into the required elements of local comprehensive plans for jurisdictions in the planning area:

- Issues and Opportunities Element – A summary of major hazards that local governments are vulnerable to, and what is proposed to be done to mitigate future losses from the hazards.
- Housing Element – An inventory of the properties that are in the floodplain boundaries, the location of mobile homes, recommendations concerning building codes, shelter opportunities, and a survey of homeowners that may be interested in a voluntary buyout and relocation program.
- Transportation Element – Identify any transportation routes or facilities that are more at risk during flooding or winter storms.
- Agricultural, and Natural and Cultural Resources Element – Identify the floodplains and agricultural areas that are at risk during hazardous events. Incorporate recommendations on how to mitigate future losses to these areas.
- Economic Development Element – Describe the impacts that past hazards have had on area businesses.
- Intergovernmental Cooperation Element – Identify intergovernmental police, fire and rescue service sharing agreements that are in effect or which may merit further investigation, and consider cost sharing and resource pooling of government services and facilities.
- Land Use Element – Describe how flooding has impacted land uses and what is being done to mitigate negative land use impacts from flooding; map and identify natural hazard areas, such as floodplains and soils with limitations.
- Implementation Element – Have recommended actions from this plan included in the implementation element of comprehensive plans of all jurisdictions in the planning area.

To maximize coordination with other related plans for Manitowoc County, mitigation strategies recommended in this plan have been and should continue to be considered when developing capital improvement plans, stormwater management plans, or flood mitigation plans.

A number of plans, reports, and technical data were referenced and incorporated into the Manitowoc County Hazard Mitigation Plan. The following is a comprehensive list of the data and reports that were utilized in plan development:

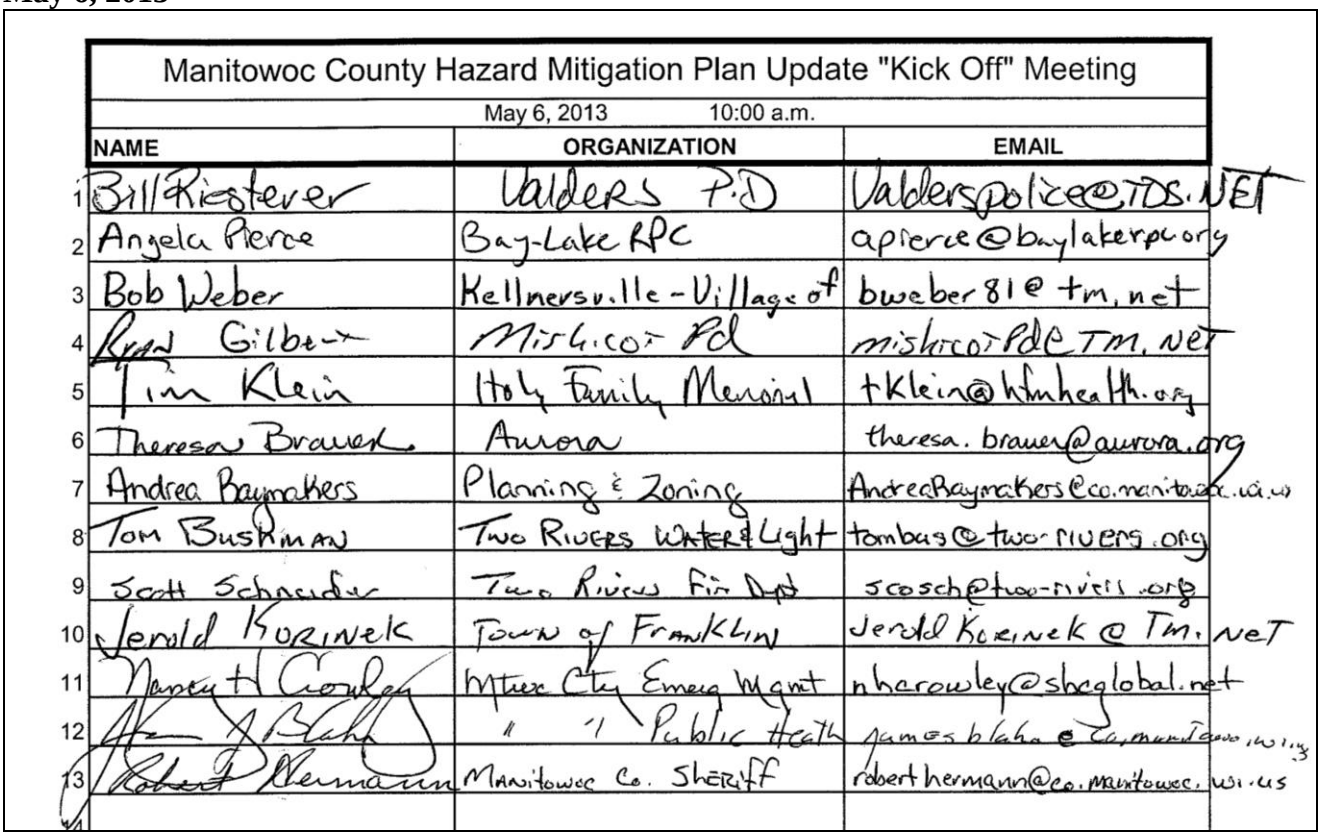
- Population, housing, and employment data from the Bureau of the Census (2000 and 2010);
- Bay-Lake Regional Planning Commission land use inventory data (2009);
- Risk Assessment Matrix Worksheet adapted from the *Resource Guide to All Hazards Mitigation Planning in Wisconsin* (AWRPC, 2003);
- Local Hazard Mitigation Plan Review Crosswalk, Completed for Manitowoc County in April 2009 was used to complete the updated Crosswalk;
- *State of Wisconsin Hazard Mitigation Enhanced Plan* (2009) was used to develop hazard descriptions for the risk assessment;
- FEMA *Local Mitigation Plan Review Guide* (2011) was used to ensure the plan contained all required information;
- Past hazard occurrences were obtained from National Oceanic and Atmospheric Administration (NOAA) – National Climatic Data Center – severe weather event data (January 2000 – February 2013);
- U.S. Geological Survey maps on landslides, land subsidence and earthquakes were used to describe those hazards;
- FEMA Flood Insurance Studies and FEMA Flood Insurance Rate Maps (FIRMs) were used to map floodplain areas;
- Parcel data from Manitowoc County was used to determine impacts of hazards with defined areas;
- Assessed valuation data from Manitowoc County was used to derive estimates of potential dollar losses;
- *Manitowoc County Emergency Operations Plan* contributed to the development of the mitigation action plan;
- *Manitowoc County Comprehensive Plan* was used to develop the community profile and contributed to the development of the mitigation action plan;
- Local municipal comprehensive plans contributed to the development of the mitigation action plan; and
- FEMA *Mitigation Ideas: Possible Mitigation Measures by Hazard Type* (2002) contributed to the development of the mitigation action plan.

It is recommended that similar materials be referenced when completing any updates to the hazard mitigation plan.

# APPENDIX A - STEERING COMMITTEE SIGN-IN SHEETS

In order to assist in plan development, Manitowoc County established a Hazard Mitigation Plan Steering Committee. A table listing all members of the Committee can be found in Chapter 1 - Introduction. The plan steering committee met on five occasions: May 6, 2013; June 20, 2013; August 13, 2013; October 22, 2013; and March 19, 2014. This Appendix contains the sign-in sheets from each of these meetings to verify attendance and participation by Committee members.

**May 6, 2013**



Manitowoc County Hazard Mitigation Plan Update "Kick Off" Meeting

May 6, 2013 10:00 a.m.

| | NAME | ORGANIZATION | EMAIL |
|---|---|---|---|
| 1 | Bill Riesterer | Valders P.D | Valderspolice@TDS.NET |
| 2 | Angela Pierce | Bay-Lake RPC | apierce@baylakerpc.org |
| 3 | Bob Weber | Kellnersville - Village of | bweber81@tm.net |
| 4 | Ryan Gilbert | Mishicot PD | mishicotPD@TM.NET |
| 5 | Tim Klein | Holy Family Memorial | tklein@hfmhealth.org |
| 6 | Theresa Brauer | Aurora | theresa.brauer@aurora.org |
| 7 | Andrea Baymakers | Planning & Zoning | AndreaBaymakers@co.manitowoc.wi.us |
| 8 | Tom Buskman | Two Rivers Water & Light | tombus@two-rivers.org |
| 9 | Scott Schroeder | Two Rivers Fire Dept | scosch@two-rivers.org |
| 10 | Jerold Kurinek | Town of Franklin | Jerold Kurinek@TM.NET |
| 11 | Nancy H Crowley | Mtwoc City Emerg Mgmt | nherowley@sbcglobal.net |
| 12 | James Blaha | " " Public Health | jamesblaha@co.manitowoc.wi.us |
| 13 | Robert Hermann | Manitowoc Co. Sheriff | roberthermann@co.manitowoc.wi.us |

**June 20, 2013**

Manitowoc County Hazard Mitigation Plan Update Meeting

June 20, 2013 10:00 a.m.

| | NAME | ORGANIZATION | EMAIL |
|---|---|---|---|
| 1 | KARL PUESTOW | FRANCIS CREEK | KPuestow@manitowoc.org |
| 2 | Tim Klein | HFM | tklein@hfmhealth.org |
| 3 | Steve Bacalzo | Manitowoc Utilities | SBACALZO@MPU.org |
| 4 | Randy Neils | City of Kiel | dpw@ci.kiel.wi.us |
| 5 | Steve Simons | Village of Cleveland | SSimons@clevelandwi.gov |
| 6 | Angela Pierce | Bay-Lake Regional Planning | apierce@baylakerpc.org |
| 7 | Bill Biesterer | Village of Valders | Valderspolice@TDS.NET |
| 8 | Tim Ryan | Planning + Zoning | tim.ryan@co.manitowoc.wi.us |
| 9 | Tom Bushman | Two Rivers Utilities | tombus@two-rivers.org |
| 10 | GARY KENNEDY | MANITOWOC COUNTY | |
| 11 | Pete Turnowski | Planning & Zoning | |
| 12 | Judy Rank | ADRC | judyrank@co.manitowoc.wi.us |
| 13 | Jerry Korinek | Town of Franklin | jerold korinek@TM.NET |
| 14 | Bob Weber | Village Kellnersville | bweber81@tm.net |
| 15 | Theresa Brauer | Aurora | theresa.brauer@aurora.org |
| 16 | Jeff Beyer | Manitowoc County | jeff.beyer@co.manitowoc.wi.us |
| 17 | James Blaha | " " H.D. | |
| 18 | | | |

**August 13, 2013**

Manitowoc County Hazard Mitigation Plan Update Meeting

August 13, 2013 10:00 a.m.

| | NAME | ORGANIZATION | EMAIL |
|---|---|---|---|
| 1 | Paul Priestaw | Francis Creek | Francescreekpolice@yahoo.com |
| 2 | Andrea Raymakers | Planning & Zoning | AndreaRaymakers@co.manitowoc.wi.us |
| 3 | Tim Klein | Holy Family Memorial | tklein@hfmhealth.org |
| 4 | Angela Pierce | Bay-Lake RPC | apierce@baylakerpc.org |
| 5 | Nita Catalano-Plank | Aurora Medical Center Manit. County n. | |
| 6 | Tom Bushman | Two Rivers W & L | |
| 7 | Jerry Kokinak | WTA- Town of Franklin | |
| 8 | Judy Rank | ADRC | |
| 9 | Nancy H. Crowley | Emerg. Mgmt | |
| 10 | Randy Neils | City of Kiel DPW | |
| 11 | Brad Busse | Village of Reedsville | |
| 12 | Tim Ryan | mtwc city planning | |
| 13 | Steve Sinkus | Village of Cleveland | |

**October 22, 2013**

Manitowoc County Hazard Mitigation Plan Update Meeting

October 22, 2013 10:00 a.m.

| | NAME | ORGANIZATION | EMAIL |
|---|---|---|---|
| 1 | Scott Schneider | Two Rivers Fire Dept | sceach@two-rivers.org |
| 2 | Tom Bushman | Two Rivers Water & Light | tombus@two-rivers.org |
| 3 | Nancy H. Crowley | Emerg. Mgmt. | nhcrowley@sbcglobal.net |
| 4 | Randy Neils | city of Kiel | dpw@ci.kiel.wi.us |
| 5 | James Blaha | County Health | |
| 6 | Nita Catalano-Plank | Aurora Medical Center mc. | nita.catalano-plank@aurora.org |
| 7 | Tim Ryan | Manitowoc city | |
| 8 | Angela Pierce | Bay-Lake RPC | |
| 9 | Judy Rank | ADRC of the Lakeshore | judyrank@co.manitowoc.wi.us |
| 10 | Andrea Raymakers | Man. Co. Planning & Zoning | AndreaRaymakers@co.manitowoc.wi.us |
| 11 | | | |

**March 19, 2014**

Manitowoc County Hazard Mitigation Plan Update Meeting

March 19, 2014 10:00 a.m.

| | NAME | ORGANIZATION | EMAIL |
|---|---|---|---|
| 1 | Roger Siehr | Village of Kellnersville | |
| 2 | Tim Ryan | mtwc cty Planning | |
| 3 | Bill Riesterer | Village of Valders | |
| 4 | Angela Pierce | Bay-Lake RPC | |
| 5 | Nancy Crowley | EM Dir | |
| 6 | Randy Neis | city of Kiel | |
| 7 | Scott Karboon | Manitowoc Public Utilities | skarboon@mpu.org |
| 8 | Scott Schneider | Two Rivers Fin Dept | scosch@two-rivers.org |
| 9 | Verold Korinek | WTA- Town of Franklin | jverold korinek@TM.net |
| 10 | Tom Bushman | Two Rivers Water & Light | |
| 11 | Andrea Praymakos | Manitowoc County | |
| 12 | | | |

# APPENDIX B - MULTI-JURISDICTIONAL COOPERATION EXERCISE

As a way to ensure accurate data and multi-jurisdictional cooperation in the update of the county's hazard mitigation plan, the steering committee and Bay-Lake Regional Planning Commission engaged the local communities in a cooperation exercise to review and provide input on plan materials.

Communities were provided a listing of their critical facilities, goals identified in the plan, and hazards mitigation actions, and were asked to review and comment on the materials. Additionally, they were asked to identify mitigation actions specific to their community.

The following is the letter that was sent to the municipalities in Manitowoc County and Table B.5.1 displays the municipalities that returned the reviewed materials.

Table B.5.1: Documentation of Municipal Review of Plan Materials

| | Community Representative | | |
|---|---|---|---|
| **Municipality** | **Name** | **Title** | **Date Signed** |
| City of Manitowoc | Timothy R. Herzog | Battalion Chief | 2/1/2014 |
| City of Two Rivers | Lee Brochen | Council President | 2/17/2014 |
| City of Kiel | Randy Neils | DPW/ED | 3/12/2014 |
| Village of Cleveland | Stacy Grunwald | Clerk/Treasurer | 2/19/2014 |
| Village of Francis Creek | Ted Zigmunt | President | 2/19/2014 |
| Village of Kellnersville | Robert W. Weber | President | 2/25/2014 |
| Village of Maribel | Nancy L. Van Elzen | Clerk/Treasurer | 2/12/2014 |
| Village of Mishicot | Paul Granger | Police Chief | 3/21/2014 |
| Village of Reedsville | Andrew Bubolz | President | 2/6/2014 |
| Village of St. Nazianz | Kay M. Mueller | Clerk/Treasurer | 3/14/2014 |
| Village of Valders | Devan Schneider | President | 2/10/2014 |
| Village of Whitelaw | Judy Schuh | President | 3/3/2014 |

Source: Bay-Lake Regional Planning Commission, 2014.

January 7, 2014

Clerk
City/Village
Address
City, WI Zip

RE: Request for Review of Hazard Mitigation Materials

**(Please forward to your Plan Commission, Common Council, or Municipal Board)**

Manitowoc County Emergency Management, County Planning, and the Bay-Lake Regional Planning Commission have been working with the Manitowoc County Hazards Mitigation Plan Steering Committee to update the Hazard Mitigation Plan for Manitowoc County and the municipalities.

The Disaster Mitigation Act of 2000 established a **requirement for local governments** to prepare a Hazard Mitigation Plan to be eligible for funding from FEMA through the Pre-Disaster Mitigation Grant Program, the Flood Mitigation Assistance Program, the Hazard Mitigation Grant Program, and disaster assistance.

Hazard mitigation planning is being conducted at the county level, with local municipalities participating in the plan by providing valuable input. Once completed, the plan must be adopted locally and by the county before receiving plan approval from FEMA. **Your community's participation in the development of this plan is necessary in order for your community to adopt this final plan and to be fully eligible for future assistance from FEMA.**

The following materials have been enclosed to facilitate your participation in development of this plan update:

- A current inventory of the critical facilities found in your community, plus a list of the critical facility categories that are to be included. It is very likely that some critical facilities have been omitted or others need to be removed. **Please review this information for accuracy, write in any edits, and sign your approval on the last page**.
    - Ensure that there is an address or lat/long coordinates provided for each critical facility that you add.
    - Ensure there is a name and address for each critical facility.
    - Add missing dry hydrants and fire ponds and their locations (address or lat/long). *This may require review by your fire department.*
- Mitigation goals for the plan, and hazards to be addressed in the plan listed in prioritized order based on impact and frequency (from the steering committee). **Please review, comment, and sign indicating your approval**.

- The mitigation actions identified by the steering committee. **Please review, comment, and sign indicating your approval** and **ADD AT LEAST ONE MITIGATION ACTION SPECIFIC TO YOUR COMMUNITY** that you plan to implement or would like to implement if grant funding were available.

If you have any questions or need any additional information (including electronic copies), please contact Angela Pierce with the Bay-Lake Regional Planning Commission at (920) 448-2820 or apierce@baylakerpc.org. Please return your information (with or without edits) **no later than March 15, 2014** to Bay-Lake Regional Planning Commission, 425 S. Adams Street, Suite 201, Green Bay, WI 54301. Thank you for your participation in reviewing the enclosed materials.

**PLEASE NOTE THAT THIS IS THE ONLY REQUEST THAT WILL BE MADE FOR THIS INFORMATION. IF YOUR MATERIALS ARE NOT RECEIVED, YOU WILL NOT BE A PART OF THE PLAN.** Not participating in this plan will require your community to develop its own plan if you wish to be eligible for future FEMA funding – including disaster assistance.

Sincerely,

Enclosures (4):
1) Critical Facility Categories; 2) Listing of Municipal Critical Facilities; 3) Plan Goals; 4) Hazards Addressed; and 5) Mitigation Actions

# APPENDIX C - CRITICAL FACILITIES BY MUNICIPALITY

The Manitowoc County Hazard Mitigation Plan Steering Committee and community representatives identified critical infrastructure assets for all the communities in the county. Table C.5.2 below summarizes the critical facilities by municipality for Manitowoc County.

## Table C.5.2: Critical Facilities by Municipality, Manitowoc County

**City of Kiel Critical Facilities (2013)**

| TYPE | NAME | ADDRESS |
|---|---|---|
| Administrative Building | Kiel City Hall | 621 6th St |
| Bridge | Bridge | STH 67/Sheboygan River |
| Bridge | Bridge | 1st St/Sheboygan River |
| Bridge | Bridge | Rockville Rd/Sheboygan River |
| Communication Facility | Emergency Siren | 417 Paine St |
| Communication Facility | Emergency Siren | 96 Rockville Rd |
| Communication Facility | Tower | 621 6th St |
| Dam | Kiel | Sheboygan River |
| Fire and Safety | Kiel Fire Department | 99 E Fremont St |
| Fire and Safety | Kiel Police Department | 619 Paine St |
| Licensed Childcare Facility | Chatterbox Child Learning Center | 711 North St |
| Licensed Childcare Facility | Small Steps Family Child Care | 1025 1st St |
| Licensed Healthcare Facility | Affinity Medical | 632 Fremont St |
| Licensed Healthcare Facility | Aurora Health Center | 1001 Service Rd |
| Licensed Healthcare Facility | Care Partners | 65 Riverview Rd |
| Licensed Healthcare Facility | Field of Dreams | 505 Belitz Dr |
| Power Facility/Bulk Fuel Storage | Power Facility | 705 Washington Ave |
| School | Kiel High | 210 Raider Hts |
| School | Kiel Middle | 502 Paine St |
| School | SS Peter & Paul Elementary | 423 Fremont St |
| School | Trinity Lutheran | 387 Cemetery Rd |
| School | Zielanis Elementary | 1010 Adams St |
| Wastewater Treatment Facility | Sewage Lift Station | 301 River Ter |
| Wastewater Treatment Facility | Sewage Lift Station | 619 STH 67 |
| Wastewater Treatment Facility | Sewage Lift Station | 300 Rockville Rd |
| Wastewater Treatment Facility | Sewage Lift Station | 402 8th St |
| Wastewater Treatment Facility | Wastewater Treatment Facility | 100 Rockville Rd |
| Water Supply | Water Storage Tower | 220 3rd St |
| Water Supply | Well #1 | 705 Washington St |
| Water Supply | Well #3, Water Storage Tower | 149 1st St |
| Water Supply | Well #4 | 22501 CTH XX |
| Water Supply | Well #5 | 355 Clay St |
| Licensed Healthcare Facility | Oak Creek Assisted Living | 1237 Techla Pl |
| Mobile Home Park | Terrace Park | 620 12th St |
| Wastewater Treatment Facility | Sewage Lift Station | 1055 STH 57 |

**City of Kiel Critical Facilities**

| Type | Total |
|---|---|
| Wastewater Treatment Facility | 6 |
| Licensed Healthcare Facility | 5 |
| School | 5 |
| Water Supply | 5 |
| Bridge | 3 |
| Communication Facility | 3 |
| Fire and Safety | 2 |
| Licensed Childcare Facility | 2 |
| Administrative Building | 1 |
| Dam | 1 |
| Mobile Home Park | 1 |
| Power Facility/Bulk Fuel Storage | 1 |
| **Grand Total** | **35** |

**City of Manitowoc Critical Facilities (2013)**

| TYPE | NAME | ADDRESS |
|---|---|---|
| Administrative Building | Manitowoc City Hall | 900 Quay St |
| Administrative Building | Manitowoc County Courthouse | 1010 S 8th St |
| Administrative Building | Manitowoc County Office Complex | 4319 Expo Dr |
| Administrative Building | Manitowoc Public School District | 2902 Lindbergh Dr |
| Administrative Building | Manitowoc Public Utilities | 1303 S 8th St |
| Administrative Building | Manotowoc Public Works | 2655 S 35th St |
| Administrative Building | Public Utilities | 1520/1540 Dewey St |
| Bridge | Bridge | Viebahn St/IH 43 |
| Bridge | Bridge | Calumet Ave/Silver Creek |
| Bridge | Bridge | N 8th St/Little Manitowoc River |
| Bridge | Bridge | Waldo Blvd/Little Manitowoc River |
| Bridge | Bridge | Maritime Dr/Little Manitowoc River |
| Bridge | Bridge | Waldo Blvd/Railroad |
| Bridge | Bridge | Revere Dr/Railroad |
| Bridge | Bridge | Railroad/Dewey St |
| Bridge | Bridge | Revere Dr/Manitowoc River |
| Bridge | Bridge | 10th St/Manitowoc River |
| Bridge | Bridge | 8th St/Manitowoc River |
| Bridge | Bridge | Braodway St/Manitowoc River |
| Bridge | Bridge | W Custer St/Unnamed Water |
| Bridge | Bridge | N 18th St/Little Manitowoc River |
| Bridge | Bridge | Reed Ave/Little Manitowoc River |
| Communication Facility | Building | 820 S 21st St |
| Communication Facility | Building | 1915 Mirro Dr |
| Communication Facility | Emergency Siren | 1002 E Cedar Ave |
| Communication Facility | Emergency Siren | 600 Block of N 8th St |
| Communication Facility | Emergency Siren | 26th St and Hamilton St |
| Communication Facility | Emergency Siren | 1115 Washington St |
| Communication Facility | Emergency Siren | 708 N Water St |
| Communication Facility | Emergency Siren | 4921 Expo Dr |
| Communication Facility | Emergency Siren | N Rapids Rd & Menasha Ave |
| Communication Facility | Emergency Siren | Fleetwood Dr |
| Communication Facility | Emergency Siren | Harvest Cir & Broadway St |
| Communication Facility | Radio Stations Tower | 1915 Mirro Dr |
| Communication Facility | Tower | 1915 Mirro Dr |
| Communication Facility | Tower | 1025 S 9th St |
| Communication Facility | Tower | 204 N 8th St |
| Communication Facility | Tower | 1615 Spring St |
| Communication Facility | Tower | 1815 Freedom Way |
| Communication Facility | Tower | 2035 S 30th ST |
| Communication Facility | Tower | 4410 Custer St |
| Communication Facility | Tower | 1400 N 8th St |
| Communication Facility | Tower | 736 Revere Dr |
| Communication Facility | Tower | 2515 Viebahn St |
| Communication Facility | Tower | 4400 Michigan Ave |
| Communication Facility | Tower | 3110 Viebahn St |
| Communication Facility | Tower | 1015 S Lakeview Dr |
| Communication Facility | Tower | 3730 Mangin St |
| Communication Facility | WCUB 980 Tower | 4009 Viebahn St |
| Communication Facility | WCUB 980 Tower | 4009 Viebahn St |
| Communication Facility | WCUB 980 Tower | 4009 Viebahn St |
| Communication Facility | WCUB 980 Tower | 4009 Viebahn St |
| Fire and Safety | EOC | 1024 S 9th St |
| Fire and Safety | Manitowoc Fire Station 1 | 911 Franklin St |
| Fire and Safety | Manitowoc Fire Station 2 | 1410 N 8th St |
| Fire and Safety | Manitowoc Fire Station 3 | 3820 Dewey St |
| Fire and Safety | Manitowoc Fire Station 4 | 1125 Fleetwood St |
| Fire and Safety | Manitowoc Police Department | 910 Jay St |
| Fire and Safety | Manitowoc Sheriff's Department | 1025 S 9th St |
| Fire and Safety | Silver Creek Fire Department | 6510 Calumet Ave |
| Licensed Childcare Facility | Bearhugs Daycare | 2006 S 9th St |
| Licensed Childcare Facility | Cathey's Day Care Center | 1314 Manila St |
| Licensed Childcare Facility | Cesa 7 Head Start | 702 State St |
| Licensed Childcare Facility | Clare's Precious Moments | 2205 Fairmont St |
| Licensed Childcare Facility | Grandma's House Childcare | 1037 N 18th St |

| City of Manitowoc Critical Facilities (2013) | | |
|---|---|---|
| **TYPE** | **NAME** | **ADDRESS** |
| Administrative Building | Manitowoc City Hall | 900 Quay St |
| Administrative Building | Manitowoc County Courthouse | 1010 S 8th St |
| Administrative Building | Manitowoc County Office Complex | 4319 Expo Dr |
| Administrative Building | Manitowoc Public School District | 2902 Lindbergh Dr |
| Administrative Building | Manitowoc Public Utilities | 1303 S 8th St |
| Administrative Building | Manotowoc Public Works | 2655 S 35th St |
| Administrative Building | Public Utilities | 1520/1540 Dewey St |
| Bridge | Bridge | Viebahn St/IH 43 |
| Bridge | Bridge | Calumet Ave/Silver Creek |
| Bridge | Bridge | N 8th St/Little Manitowoc River |
| Bridge | Bridge | Waldo Blvd/Little Manitowoc River |
| Bridge | Bridge | Maritime Dr/Little Manitowoc River |
| Bridge | Bridge | Waldo Blvd/Railroad |
| Bridge | Bridge | Revere Dr/Railroad |
| Bridge | Bridge | Railroad/Dewey St |
| Bridge | Bridge | Revere Dr/Manitowoc River |
| Bridge | Bridge | 10th St/Manitowoc River |
| Bridge | Bridge | 8th St/Manitowoc River |
| Bridge | Bridge | Braodway St/Manitowoc River |
| Bridge | Bridge | W Custer St/Unnamed Water |
| Bridge | Bridge | N 18th St/Little Manitowoc River |
| Bridge | Bridge | Reed Ave/Little Manitowoc River |
| Communication Facility | Building | 820 S 21st St |
| Communication Facility | Building | 1915 Mirro Dr |
| Communication Facility | Emergency Siren | 1002 E Cedar Ave |
| Communication Facility | Emergency Siren | 600 Block of N 8th St |
| Communication Facility | Emergency Siren | 26th St and Hamilton St |
| Communication Facility | Emergency Siren | 1115 Washington St |
| Communication Facility | Emergency Siren | 708 N Water St |
| Communication Facility | Emergency Siren | 4921 Expo Dr |
| Communication Facility | Emergency Siren | N Rapids Rd & Menasha Ave |
| Communication Facility | Emergency Siren | Fleetwood Dr |
| Communication Facility | Emergency Siren | Harvest Cir & Broadway St |
| Communication Facility | Radio Stations Tower | 1915 Mirro Dr |
| Communication Facility | Tower | 1915 Mirro Dr |
| Communication Facility | Tower | 1025 S 9th St |
| Communication Facility | Tower | 204 N 8th St |
| Communication Facility | Tower | 1615 Spring St |
| Communication Facility | Tower | 1815 Freedom Way |
| Communication Facility | Tower | 2035 S 30th ST |
| Communication Facility | Tower | 4410 Custer St |
| Communication Facility | Tower | 1400 N 8th St |
| Communication Facility | Tower | 736 Revere Dr |
| Communication Facility | Tower | 2515 Viebahn St |
| Communication Facility | Tower | 4400 Michigan Ave |
| Communication Facility | Tower | 3110 Viebahn St |
| Communication Facility | Tower | 1015 S Lakeview Dr |
| Communication Facility | Tower | 3730 Mangin St |
| Communication Facility | WCUB 980 Tower | 4009 Viebahn St |
| Communication Facility | WCUB 980 Tower | 4009 Viebahn St |
| Communication Facility | WCUB 980 Tower | 4009 Viebahn St |
| Communication Facility | WCUB 980 Tower | 4009 Viebahn St |
| Fire and Safety | EOC | 1024 S 9th St |
| Fire and Safety | Manitowoc Fire Station 1 | 911 Franklin St |
| Fire and Safety | Manitowoc Fire Station 2 | 1410 N 8th St |
| Fire and Safety | Manitowoc Fire Station 3 | 3820 Dewey St |
| Fire and Safety | Manitowoc Fire Station 4 | 1125 Fleetwood St |
| Fire and Safety | Manitowoc Police Department | 910 Jay St |
| Fire and Safety | Manitowoc Sheriff's Department | 1025 S 9th St |
| Fire and Safety | Silver Creek Fire Department | 6510 Calumet Ave |
| Licensed Childcare Facility | Bearhugs Daycare | 2006 S 9th St |
| Licensed Childcare Facility | Cathey's Day Care Center | 1314 Manila St |
| Licensed Childcare Facility | Cesa 7 Head Start | 702 State St |
| Licensed Childcare Facility | Clare's Precious Moments | 2205 Fairmont St |
| Licensed Childcare Facility | Grandma's House Childcare | 1037 N 18th St |

| City of Manitowoc Critical Facilities (2013) (cont'd) | | Page 3 |
|---|---|---|
| **TYPE** | **NAME** | **ADDRESS** |
| Power Facility/Bulk Fuel Storage | Power Facility | 712 N Rapids Rd |
| Power Facility/Bulk Fuel Storage | Power Facility | 2039 S 30th St |
| Power Facility/Bulk Fuel Storage | Power Facility | 701 Columbus St |
| Power Facility/Bulk Fuel Storage | Power Facility | 4200 Ellis St |
| School | Ashling Montessori School | 2005 Johnston Dr |
| School | Bethany Lutheran | 3209 Meadow Ln |
| School | First German Evangelical Lutheran | 1025 S 8th St |
| School | Franklin Elementary | 800 S 35th St |
| School | Immanual Evangelical Lutheran | 916 Pine St |
| School | Jackson Elementary | 1201 N 18th St |
| School | Jefferson Elementary | 1415 Division St |
| School | Lincoln High | 1433 S 8th St |
| School | Madison Elementary | 701 N 4th St |
| School | Manitowoc Lutheran High | 4045 Lancer Cir |
| School | McKinley Academy Charter | 1010 Huron St |
| School | Monroe Elementary | 2502 S 14th St |
| School | Redeemer Lutheran Christian Preschool | 1712 Menasha Ave |
| School | Riverview | 4400 Michigan Ave |
| School | Roncalli High | 2000 Mirro Dr |
| School | St. Francis De Sales Elementary | 1408 Waldo Blvd |
| School | Stangel Elementary | 1002 E Cedar Ave |
| School | Trinity Christian | 2201 S 42nd St |
| School | UW Manitowoc | 705 Viebahn St |
| School | Washington Junior High | 2101 Division St |
| School | Wilson Junior High | 1201 N 11th St |
| Transportation Facility | Car Ferry Dock | 900 S Lakeview Dr |
| Transportation Facility | Manitowoc City Transit System | 915 S 11th St |
| Transportation Facility | Manitowoc County Airport | 1805 Freedom Way |
| Wastewater Treatment Facility | Manitowoc Wastewater Treatment | 1015 S Lakeview Dr |
| Wastewater Treatment Facility | Sewage Lift Station | 2511 Lakeside Blvd |
| Wastewater Treatment Facility | Sewage Lift Station | 2901 S 10th St |
| Wastewater Treatment Facility | Sewage Lift Station | 600 S 19th St |
| Wastewater Treatment Facility | Sewage Lift Station | 4000 Archer St |
| Wastewater Treatment Facility | Sewage Lift Station | 1396 Irving Cr |
| Wastewater Treatment Facility | Sewage Lift Station | 1800 E Horseshoe Dr |
| Wastewater Treatment Facility | Sewage Lift Station | 2329 Silveridge Dr |
| Wastewater Treatment Facility | Sewage Lift Station | 500 S 16th St |
| Wastewater Treatment Facility | Sewage Lift Station | 2319 S 14th St |
| Wastewater Treatment Facility | Sewage Lift Station | 5023 River Heights Dr |
| Wastewater Treatment Facility | Sewage Lift Station | 2300 Paul Rd |
| Wastewater Treatment Facility | Sewage Lift Station | 911 Lawton Ter |
| Wastewater Treatment Facility | Sewage Lift Station | 920 Maritime Dr |
| Water Supply | Collector Well C | S 10th St |
| Water Supply | New York Ave Pump Station | 930 N 18th St |
| Water Supply | Water Storage Tower | West Dr |
| Water Supply | Water Storage Tower | Reed Ave & N 8th St |
| Water Supply | Water Supply Booster/Pumping Station | 1600 S 39th St |
| Water Supply | Water Supply Filter Treatment Plant | Lakeview Dr |
| Water Supply | Water Supply Filter Treatment Plant | 701 Columbus St |
| Water Supply | Water Tower | 3145 Basswood Rd |

**City of Manitowoc Critical Facilities**

| Type | Total |
|---|---|
| Licensed Healthcare Facility | 39 |
| Communication Facility | 30 |
| School | 21 |
| Licensed Childcare Facility | 18 |
| Bridge | 15 |
| Wastewater Treatment Facility | 14 |
| Power Facility/Bulk Fuel Storage | 10 |
| Fire and Safety | 8 |
| Water Supply | 8 |
| Administrative Building | 7 |
| Mobile Home Park | 5 |
| Transportation Facility | 3 |
| Post-Disaster Recovery Site | 1 |
| Military Installation | 1 |
| **Grand Total** | **180** |

| City of Two Rivers Critical Facilities (2013) | | |
|---|---|---|
| **TYPE** | **NAME** | **ADDRESS** |
| Administrative Building | Department Public Works | 1415 Lake Street |
| Administrative Building | Two Rivers City Hall | 1717 E Park St |
| Administrative Building | Utility Shop & Office | 1415 Lake Street |
| Bridge | Bridge | Madison St/West Twin River |
| Bridge | Bridge | Washington St/West Twin River |
| Bridge | Bridge | 17th St/East Twin River |
| Bridge | Bridge | 22nd St/East Twin River |
| Communication Facility | Cable TV Control Center | 807 34th St |
| Communication Facility | Cellular- Lakefield Telephone Tower | 12th St & Buchholz St |
| Communication Facility | Cellular on Water Tower | 2314 Picnic Hill Ln |
| Communication Facility | Communication Tower for Utility & Public Works | 1415 Lake Street |
| Communication Facility | Emergency Siren | Bellvue Pl |
| Communication Facility | Emergency Siren | 29th St &Adams St |
| Communication Facility | Emergency Siren | 2600 Block of 13th St |
| Communication Facility | Lakefield Switching Station | 2722 45th St |
| Communication Facility | Lakefield Telephone Switch Station | 4412 Browns Dr |
| Communication Facility | Lakefield Telephone Switch Station | 2205 Forest Ave |
| Communication Facility | Police & Fire Radio Tower | 2500 Garfield St |
| Communication Facility | Telephone Switching Center- Frontier | 1609 Adams St |
| Communication Facility | Tower | 800 Columbus St |
| Communication Facility | Tower | 1316 18th St |
| Communication Facility | Tower | 2701 18th St |
| Fire and Safety | Two Rivers Fire Department | 2122 Monroe St |
| Fire and Safety | Two Rivers Police Department | 1717 E Park St |
| Licensed Childcare Facility | A Child's Place Day Care | 2611 11th St |
| Licensed Childcare Facility | Kids-N-Us Family Child Care Center | 3805 Tannery Rd |
| Licensed Childcare Facility | Tiny Treasures Christian Child Care | 1029 33rd St |
| Licensed Healthcare Facility | Aurora Health Center | 5300 Memorial Dr |
| Licensed Healthcare Facility | Aurora Medical Center | 5000 Memorial Dr |
| Licensed Healthcare Facility | Aurora Two Rivers Clinic | 2219 Garfield St |
| Licensed Healthcare Facility | Hamilton Care Center | 1 Hamilton Dr |
| Licensed Healthcare Facility | Harmony Living Center | 4606 Mishicot Rd |
| Licensed Healthcare Facility | Holy Family Memorial Two Rivers Health Center | 3310 45th St |
| Licensed Healthcare Facility | Northland Lodge | 2500 Garfield St |
| Licensed Healthcare Facility | Parkway Group Home | 1110 Victory St |
| Licensed Healthcare Facility | TLC Homes | 2214 11th St |
| Licensed Healthcare Facility | Wisteria Haus | 2741 45th St |
| Military Installation | US Coast Guard | 13 East St |
| Military Installation | US National Guard | 2225 Sandy Bay Rd |
| Power Facility/Bulk Fuel Storage | 500 kva Generator | Memorial Dr |
| Power Facility/Bulk Fuel Storage | Columbus St. Sub Station | 1916 Columbus St |
| Power Facility/Bulk Fuel Storage | Lakeshore Substation | Memorial Dr & 12th St |
| Power Facility/Bulk Fuel Storage | Natural Gas Substation | Columbus St |
| Power Facility/Bulk Fuel Storage | West River Substation | 27th St & West River St |
| School | ChildrenÆs House Montessori | 4020 Memorial Dr |
| School | Clarke Middle | 4608 Bellevue Pl |
| School | Creative Learning Child Enrichment Center | 4404 Bellevue Pl |
| School | Good Shepherd Lutheran Preschool/4K | 3234 Mishicot Rd |
| School | Koenig Elementary | 1114 Lowell St |
| School | Magee Elementary | 3502 Glenwood St |
| School | St. Johns Evangelical Lutheran | 3607 45th St |
| School | St. Peter the Fisherman Elementary | 1322 33rd St |
| School | Two Rivers High | 4519 Lincoln Ave |
| Wastewater Treatment Facility | Sewage Lift Station | 44th St |
| Wastewater Treatment Facility | Sewage Lift Station | Lake View Ave/Jessie St |
| Wastewater Treatment Facility | Sewage Lift Station | Gardner St |
| Wastewater Treatment Facility | Sewage Lift Station | Columbus St |
| Wastewater Treatment Facility | Sewage Lift Station | Woodland Dr |
| Wastewater Treatment Facility | Sewage Lift Station | Pierce St |
| Wastewater Treatment Facility | Sewage Lift Station | 23rd St/Pine Tree Rd |
| Wastewater Treatment Facility | Sewage Lift Station | Pierce Ct |
| Wastewater Treatment Facility | Sewage Lift Station | Blue Heron Dr |
| Wastewater Treatment Facility | Sewage Lift Station | 31st St |
| Wastewater Treatment Facility | Sewage Lift Station | W River St |

| City of Two Rivers Critical Facilities (2013) (cont'd) | | Page 3 |
|---|---|---|
| **TYPE** | **NAME** | **ADDRESS** |
| Wastewater Treatment Facility | Sewage Lift Station | 37th St |
| Wastewater Treatment Facility | Sewage Lift Station | CTH VV |
| Wastewater Treatment Facility | Sewage Lift Station | Forest Hills Dr |
| Wastewater Treatment Facility | Sewage Lift Station | Riverhills Dr/Bellevue Pl |
| Wastewater Treatment Facility | Sewage Lift Station | 43rd St |
| Wastewater Treatment Facility | Two Rivers Wastewater Treatment | 1415 Lake St |
| Water Supply | Water Reservoir | 3900 Bellevue Pl |
| Water Supply | Water Supply Filter Treatment Plant | Memorial Dr |
| Water Supply | Water Tower | 12th St & Buchholz St |
| Water Supply | Water Tower | Picnic Hill Ln |

**City of Two Rivers Critical Facilities**

| Type | Total |
|---|---|
| Wastewater Treatment Facility | 18 |
| Communication Facility | 15 |
| Licensed Healthcare Facility | 10 |
| School | 9 |
| Power Facility/Bulk Fuel Storage | 5 |
| Bridge | 4 |
| Water Supply | 4 |
| Administrative Building | 3 |
| Licensed Childcare Facility | 3 |
| Fire and Safety | 2 |
| Military Installation | 2 |
| **Grand Total** | **75** |

| Village of Cleveland Critical Facilities (2013) | | |
|---|---|---|
| **TYPE** | **NAME** | **ADDRESS** |
| Administrative Building | Cleveland Village Hall | 1150 W Washington Ave |
| Administrative Building | Village of Cleveland | 1151 Lakeshore Dr |
| Bridge | Bridge | Center St/Unnamed Water |
| Bridge | Bridge | Dairlyland Dr/Centerville Creek |
| Bridge | Bridge | N Westview St/Centerville Creek |
| Bridge | Bridge | E Washington Ave/Unnamed Water |
| Bridge | Bridge | Lakeshore Dr/Centerville Creek |
| Bridge | Bridge | North Ave/Centerville Creek |
| Bridge | Bridge | Hickory St/Unnamed Water |
| Bridge | Bridge | Linden St/Unnamed Water |
| Communication Facility | Building | 1050 Linden St |
| Communication Facility | Emergency Siren | Dairyland Dr &W Washington Ave |
| Communication Facility | Emergency Siren | 411 E Washington Ave |
| Communication Facility | Tower | 1290 North Ave |
| Fire and Safety | Cleveland Fire Department | 1274 W Washington Ave |
| Fire and Safety | Cleveland Police Department | 1150 W Washington Ave |
| Licensed Childcare Facility | Lakeshore Technical College Child Care | 1290 North Ave |
| Licensed Healthcare Facility | V.A. Clinic | 1205 North Ave |
| Mobile Home Park | Cleveland Heights | 115 Edgewood St |
| Power Facility/Bulk Fuel Storage | Power Facility | W Washington Ave |
| Power Facility/Bulk Fuel Storage | Wind Turbine | 1290 North Ave |
| School | Cleveland Elementary | 411 E Washington Ave |
| School | Lakeshore Technical College | 1290 North Ave |
| Wastewater Treatment Facility | Cleveland Waterwater Treatment Facility | 245 Whitetail Ln |
| Wastewater Treatment Facility | Sewage Lift Station | 1151 Lake Shore Dr |
| Wastewater Treatment Facility | Sewage Lift Station | N Westview St |
| Wastewater Treatment Facility | Village of Cleveland | 1151 Lakeshore Dr |
| Water Supply | Water Tower | South End of Polk Ln |
| Water Supply | Well #1 | Park Ln & Maple St |
| Water Supply | Well #2 | 1299 Franklin Dr |

**Village of Cleveland Critical Facilities**

| Type | Total |
|---|---|
| Bridge | 8 |
| Communication Facility | 4 |
| Wastewater Treatment Facility | 4 |
| Water Supply | 3 |
| Administrative Building | 2 |
| Fire and Safety | 2 |
| Power Facility/Bulk Fuel Storage | 2 |
| School | 2 |
| Licensed Childcare Facility | 1 |
| Licensed Healthcare Facility | 1 |
| Mobile Home Park | 1 |
| **Grand Total** | **30** |

| Village of Francis Creek Critical Facilities (2013) | | |
|---|---|---|
| **TYPE** | **NAME** | **ADDRESS** |
| Administrative Building | Francis Creek Village Hall | 200 Norwood Dr |
| Administrative Building | Kossuth Town Hall | 129 S Packer Dr |
| Bridge | Bridge | CTH V/IH 43 |
| Bridge | Bridge | Packer Dr/Francis Creek |
| Fire and Safety | Francis Creek Fire Department | 310 Norwood Dr |
| Fire and Safety | Dry Hydrant | Semi Dr |

| Village of Kelnersville Critical Facilities (2013) | | |
|---|---|---|
| **TYPE** | **NAME** | **ADDRESS** |
| Communication Facility | Emergency Siren | 1214 Main St |
| Fire and Safety | Kellnersville Fire Department and First Responders | 807 Main St |
| Licensed Healthcare Facility | K-West Apartments | 1414 Main St |
| Licensed Healthcare Facility | Parkview Apartmemts | 628 Park St |
| Licensed Healthcare Facility | Senior Housing | 520 Tower Ave |
| Mobile Home Park | K-Ville Mobile Home Park | 444 Pleasant Ln |
| Wastewater Treatment Facility | Sewage Lift Station | Zeman Rd |

| Village of Maribel Critical Facilities (2013) | | |
|---|---|---|
| **TYPE** | **NAME** | **ADDRESS** |
| Administrative Building | Maribel Village Hall | 15127 N Maribel Rd |
| Communication Facility | Tower | 10408 E Bel-Mar Rd |
| Fire and Safety | Maribel Fire Department | 15127 N Maribel Rd |
| School | St. John's Evangelical Lutheran | 14211 S Maribel Rd |
| Wastewater Treatment Facility | Water Treatment Facility | 14701 Pleasant Rd |
| Water Supply | Water Storage Tower | E Belmar Ave |

| Village of Mishicot Critical Facilities (2013) | | |
|---|---|---|
| **Type** | **NAME** | **ADDRESS** |
| Administrative Building | Manitowoc County Highway Shop | 710 N State St |
| Administrative Building | Mishicot Town Hall | 710 N State St |
| Administrative Building | Mishicot VFW Hall | 314 W Main St |
| Administrative Building | Mishicot Village Hall | 511 E Main St |
| Administrative Building | Utility Support Building | 1418 S Main St |
| Bridge | Bridge | Main St/East Twin River |
| Bridge | Bridge | State Street/East Twin River |
| Communication Facility | Building | 250 S Main St |
| Communication Facility | Cell Tower | 425 E Samz Rd |
| Communication Facility | Emergency Siren | Salvage Rd & S Rockway St |
| Communication Facility | Village, Ambulance, Cell, TV Tower | 419 Buchanan St |
| Dam | Mishicot | East Twin River |
| Fire and Safety | Dry Hydrant | W Samz Rd/Ridge Rd |
| Fire and Safety | Mishicot Fire Department | 214 S Main St |
| Fire and Safety | Mishicot Police Department | 511 E Main St |
| Licensed Childcare Facility | Forever Friends Family Child Care | 824 Randolph St |
| Licensed Healthcare Facility | Aurora Health Center | 175 S State St |
| School | Mishicot High | 660 Washington St |
| School | Mishicot Middle | 660 Washington St |
| School | Schultz Elementary | 510 Woodlawn Dr |
| School | Tiny Treasures Pre-School | 325 Randolph St |
| Wastewater Treatment Facility | Sewage Lift Station 1 | Laduron Dr |
| Wastewater Treatment Facility | Sewage Lift Station 2 | East End of E Church St |
| Wastewater Treatment Facility | Sewage Lift Station 3 | 400 Washington St |
| Wastewater Treatment Facility | Sewage Lift Station 4 | E Samz Rd/S State St |
| Wastewater Treatment Facility | Sewage Lift Station 5 | 139 W Church St |
| Wastewater Treatment Facility | Sewage Lift Station 6 | Riverwood Dr/Riverwood Ct |
| Water Supply | Water Storage Tower | 425 E Samz Rd |
| Water Supply | Water Storage Tower | Randolph St & N Rockway St |
| Water Supply | Water Supply Well #1 | 309 Washington St |
| Water Supply | Water Supply Well #2 | 1310 Steiner Dr |

**Village of Mishicot Critical Facilities**

| Type | Total |
|---|---|
| Wastewater Treatment Facility | 6 |
| Administrative Building | 5 |
| Communication Facility | 4 |
| School | 4 |
| Water Supply | 4 |
| Fire and Safety | 3 |
| Bridge | 2 |
| Dam | 1 |
| Licensed Childcare Facility | 1 |
| Licensed Healthcare Facility | 1 |
| **Grand Total** | **31** |

| Village of Reedsville Critical Facilities (2013) | | |
|---|---|---|
| **TYPE** | **NAME** | **ADDRESS** |
| Administrative Building | Manitowoc County Highway Shop | 212 Menasha St |
| Administrative Building | Reedsville Village Hall | 217 Menasha St |
| Bridge | Bridge | Main St/Mud Creek |
| Bridge | Bridge | Mill St/Mud Creek |
| Bridge | Bridge | Manitowoc St/Unnamed Water |
| Bridge | Bridge | Mill St/Unnamed Water |
| Bridge | Bridge | Manitowoc St/Mud Creek |
| Communication Facility | Cable Housing | Industrial Dr |
| Communication Facility | GTE Telephone | 502 Madison St |
| Communication Facility | Tower | 111 Industrial Park Dr |
| Communication Facility | Emergency Siren | 520 Manitowoc St |
| Fire and Safety | Reedsville Fire Department | 217 Menasha St |
| Fire and Safety | Reedsville Police Department | 217 Menasha St |
| Licensed Healthcare Facility | Aurora Health Center | 106 Mill St |
| Licensed Healthcare Facility | Reedsville Manor | 431 Madison St |
| Mobile Home Park | Mobile Home Park | Meadowbrook Ct |
| School | St. John-St. James Evangelical Lutheran | 223 Manitowoc St |
| School | Reedsville Elementary | 350 S Park St |
| School | Reedsville High | 340 Manitowoc St |
| School | Reedsville Middle | 350 S Park St |
| Wastewater Treatment Facility | Wastewater Treatment Facility | Mud Creek Rd |
| Water Supply | Water Supply Well | Manitowoc St |
| Water Supply | Water Storage Tower | Manitowoc St |
| Water Supply | Well #5 | Deerview Dr |

**Village of Reedsville Critical Facilities**

| Type | Total |
|---|---|
| Bridge | 5 |
| Communication Facility | 4 |
| School | 4 |
| Water Supply | 3 |
| Administrative Building | 2 |
| Fire and Safety | 2 |
| Licensed Healthcare Facility | 2 |
| Mobile Home Park | 1 |
| Wastewater Treatment Facility | 1 |
| **Grand Total** | **24** |

| Village of Nazianz Critical Facilities (2013) | | |
|---|---|---|
| **TYPE** | **NAME** | **ADDRESS** |
| Administrative Building | Eaton Town Hall | 316 W Main St |
| Administrative Building | Manitowoc County Highway Shop | 318 W Main St |
| Administrative Building | St Nazianz Village Hall | 228 W Main St |
| Administrative Building | St Nazianz Village Shop | 110 Colonial Dr |
| Communication Facility | Emergency Siren | 202 N 4th Ave |
| Communication Facility | Emergency Siren | 212 Church St |
| Fire and Safety | St Nazianz Fire Station | 202 N 4th Ave |
| School | St. Gregory Elementary | 212 Church St |
| Wastewater Treatment Facility | Village St Nazianz | 608 N 1st Ave |
| Water Supply | Water Utility Well | 106 Colonial Dr |
| Water Supply | Water Utility Well | 600 S 4th Ave |

| Village of Valders Critical Facilities (2013) | | |
|---|---|---|
| **TYPE** | **NAME** | **ADDRESS** |
| Administrative Building | Valders Village Hall | 207 S Liberty St |
| Communication Facility | Emergency Siren | 207 S Liberty St |
| Communication Facility | Tower | 250 N Calumet Dr |
| Fire and Safety | Valders Fire Department | 103 Eisenhower St |
| Fire and Safety | Valders Police Department | 207 S Liberty St |
| Licensed Childcare Facility | Little Lambs Day Care | 132 Mckinley St |
| Licensed Childcare Facility | Wee Care - Jodi's Day Care | 124 Jefferson St |
| Licensed Healthcare Facility | Aurora Valders Clinic | 721 S Calumet Dr |
| Mobile Home Park | Nordic Lands | 141 Jackson St |
| Post-Disaster Recovery Site | Gravel Pit | Quarry Ln |
| Power Facility/Bulk Fuel Storage | Country Visions Coop | 511 S Calumet Dr |
| Power Facility/Bulk Fuel Storage | Natural Gas Substation | 108 Brennan Rd |
| School | Faith Lutheran Pre School | 255 Roosevelt St |
| School | Valders Elementary | 331 W Wilson St |
| School | Valders High | 201 W Wilson St |
| School | Valders Middle | 138 Jefferson St |
| Wastewater Treatment Facility | Village of Valders | 340 N Adams St |
| Water Supply | Water Storage Tower | 205 N Calumet Dr |
| Water Supply | Water Well 1 | 207 S Liberty St |
| Water Supply | Water Well 2 | 314 S Adams St |

**Village of Valders Critical Facilities**

| Type | Total |
|---|---|
| School | 4 |
| Water Supply | 3 |
| Communication Facility | 2 |
| Fire and Safety | 2 |
| Licensed Childcare Facility | 2 |
| Power Facility/Bulk Fuel Storage | 2 |
| Administrative Building | 1 |
| Licensed Healthcare Facility | 1 |
| Wastewater Treatment Facility | 1 |
| Mobile Home Park | 1 |
| Post-Disaster Recovery Site | 1 |
| **Grand Total** | **20** |

| Village of Whitelaw Critical Facilities (2013) | | |
|---|---|---|
| **TYPE** | **NAME** | **ADDRESS** |
| Administrative Building | Whitelaw Village Hall | 147 W Menasha Ave |
| Fire and Safety | Whitelaw Fire Department | 330 E Menasha Ave |
| Licensed Childcare Facility | Precious Memories Day Care | 132 W Menasha Ave |
| Wastewater Treatment Facility | Wastewater Treatment Facility | 312 N Hickory St |
| Water Supply | Water Storage Tower | 337 E Menasha Ave |
| Water Supply | Water Supply Booster/Pumping Station | 337 E Menasha Ave |

| Town of Cato Critical Facilities (2013) | | |
|---|---|---|
| **TYPE** | **NAME** | **ADDRESS** |
| Administrative Building | Cato Town Hall | 14004 Upper Falls Rd |
| Bridge | Bridge | CTH J/Manitowoc River |
| Bridge | Bridge | CTH S/Manitowoc River |
| Bridge | Bridge | CTH J/Unnamed Water |
| Bridge | Bridge | Old Wooden Bridge Rd/Railroad |
| Communication Facility | Tower | 15709 Limestone Rd |
| Communication Facility | Tower | 4004 N CTH J |
| Communication Facility | Tower | 13003 USH 151 |
| Communication Facility | Tower | 13615 McGuire Rd |
| Communication Facility | Tower | 16919 USH 10 |
| Dam | Clarks Mill | Manitowoc River |
| Licensed Childcare Facility | Hwy 151 Day Care Center | 10706 STH 151 |
| Licensed Childcare Facility | Schmitt's Family Day Care | 903 CTH S |
| Post-Disaster Recovery Site | Gravel Pit | Highway H Rd |
| Post-Disaster Recovery Site | Gravel Pit | Lime Kiln Rd |
| Wastewater Treatment Facility | Wastewater Treatment Facility | Meier Ln |

**Town of Cato Critical Facilities**

| Type | Total |
|---|---|
| Communication Facility | 5 |
| Bridge | 4 |
| Licensed Childcare Facility | 2 |
| Post-Disaster Recovery Site | 2 |
| Administrative Building | 1 |
| Dam | 1 |
| Wastewater Treatment Facility | 1 |
| **Grand Total** | **16** |

| Town of Centerville Critical Facilities (2013) | | |
|---|---|---|
| **TYPE** | **NAME** | **ADDRESS** |
| Administrative Building | Manitowoc County Highway Shop | 10510 I-43 |
| Bridge | Bridge | IH 43/Point Creek |
| Bridge | Bridge | IH 43/Point Creek |
| Bridge | Bridge | Point Creek Rd/IH 43_Railroad |
| Bridge | Bridge | Point Creek Rd/Point Creek |
| Bridge | Bridge | CTH X/IH43_Railroad |
| Bridge | Bridge | IH 43/Center Rd |
| Bridge | Bridge | IH 43/Center Rd |
| Bridge | Bridge | Dairyland Dr/Fischer Creek |
| Bridge | Bridge | Center Rd/Fischer Creek |
| Bridge | Bridge | Fischer Creek Rd/IH 43 |
| Bridge | Bridge | Westview Rd/Fischer Creek |
| Bridge | Bridge | IH 43/Westview Rd |
| Bridge | Bridge | IH 43/Westview Rd |
| Bridge | Bridge | North Ave/IH 43 |
| Bridge | Bridge | Cleveland Rd/IH 43 |
| Bridge | Bridge | Dairyland Dr/Unnamed Water |
| Bridge | Bridge | CTH X/Unnamed Water |
| Bridge | Bridge | Centerville Rd/Fischer Creek |
| Bridge | Bridge | CTH LS/Fischer Creek |
| Bridge | Bridge | Center Rd/Centerville Creek |
| Bridge | Bridge | CTH LS/Point Creek |
| Bridge | Bridge | Centerville Rd/Point Creek |
| Bridge | Bridge | Center Rd/Point Creek |
| Bridge | Bridge | North Ave/Centerville Creek |
| Bridge | Bridge | Railroad/Fischer Creek |
| Bridge | Bridge | County Line Rd/IH 43 |
| Communication Facility | Tower | 16317 Dairyland Dr |
| Communication Facility | Tower | West View Rd |
| Power Facility/Bulk Fuel Storage | Natural Gas Substation | Point Creek Rd |

**Town of Centerville Critical Facilities**

| Type | Total |
|---|---|
| Bridge | 26 |
| Communication Facility | 2 |
| Power Facility/Bulk Fuel Storage | 1 |
| Administrative Building | 1 |
| **Grand Total** | **30** |

| Town of Cooperstown Critical Facilities (2013) | | |
|---|---|---|
| **TYPE** | **NAME** | **ADDRESS** |
| Administrative Building | Cooperstown Maintenance Shop | 11626 CTH Z |
| Administrative Building | Cooperstown Town Hall | 11626 CTH Z |
| Bridge | Bridge | CTH NN/Devils River |
| Bridge | Bridge | Cooperstown Rd/Unnamed Water |
| Bridge | Bridge | Cooperstown Rd/IH 43 |
| Bridge | Bridge | IH 43/Rosecrans Rd |
| Bridge | Bridge | IH 43/Rosecrans Rd |
| Bridge | Bridge | IH 43/Trail |
| Bridge | Bridge | IH 43/Trail |
| Bridge | Bridge | Zander Rd/Trail |
| Bridge | Bridge | Rosecrans Rd/Devils River |
| Bridge | Bridge | IH 43/CTH T |
| Bridge | Bridge | IH 43/CTH T |
| Bridge | Bridge | Zander Rd/IH 43 |
| Bridge | Bridge | CTH R/Devils River |
| Bridge | Bridge | IH 43/Unnamed Water |
| Bridge | Bridge | IH 43/Unnamed Water |
| Bridge | Bridge | IH 43/Schley Rd |
| Bridge | Bridge | IH 43/Schley Rd |
| Bridge | Bridge | Hidden Valley Rd/IH 43 |
| Bridge | Bridge | IH 43/Trail |
| Bridge | Bridge | IH 43/Trail |
| Bridge | Bridge | Greenstreet Rd/IH 43 |
| Bridge | Bridge | Cooperstown Rd/Unnamed Water |
| Bridge | Bridge | Cooperstown Rd/Unnamed Water |
| Bridge | Bridge | Herold Rd/Devils River |
| Bridge | Bridge | Zander Rd/Devils River |
| Bridge | Bridge | Zander Rd/Unnamed Water |
| Bridge | Bridge | Kvitek Rd/Devils River |
| Bridge | Bridge | CTH T/Devils River |
| Bridge | Bridge | Kocian Rd/Unnamed Water |
| Bridge | Bridge | Pleasant Rd/Devils River |
| Bridge | Bridge | Rosecrans Rd/Unnamed Water |
| Bridge | Bridge | Greenstreet Rd/Unnamed Water |
| Bridge | Bridge | IH 43/STH 147 |
| Bridge | Bridge | IH 43/STH 147 |
| Communication Facility | CF Tower | 10167 Schley Rd |
| Communication Facility | Tower | 8304 Pautz Rd |
| Fire and Safety | Dry Hydrant | CTH Z |
| Post-Disaster Recovery Site | Gravel Pit | CTH NN |
| Post-Disaster Recovery Site | Gravel Pit | 14511 CTH Z |
| Post-Disaster Recovery Site | Gravel Pit | CTH NN |
| Post-Disaster Recovery Site | Gravel Pit | Hidden Vally Rd |
| Post-Disaster Recovery Site | Gravel Pit | Cooperstown Rd |

**Town of Cooperstown Critical Facilities**

| Type | Total |
|---|---|
| Bridge | 34 |
| Post-Disaster Recovery Site | 5 |
| Administrative Building | 2 |
| Communication Facility | 2 |
| Fire and Safety | 1 |
| **Grand Total** | **44** |

| Town of Eaton Critical Facilities (2013) | | |
|---|---|---|
| **TYPE** | **NAME** | **ADDRESS** |
| Bridge | Bridge | USH 151/Mud Creek |
| Bridge | Bridge | Quarry Rd/Manitowoc River |
| Bridge | Bridge | STH 37/Cedar Creek |
| Bridge | Bridge | USH 151/Cedar Creek |
| Communication Facility | Tower | 22520 Groh Rd |
| Post-Disaster Recovery Site | Gravel Pit (Binversie) | Glen Floral Rd |
| Post-Disaster Recovery Site | Gravel Pit (Brocker) | STH 67 |
| Post-Disaster Recovery Site | Gravel Pit (Litz) | Glen Floral Rd |
| Post-Disaster Recovery Site | Gravel Pit (Olm) | Hickory Hills Rd |
| Post-Disaster Recovery Site | Gravel Pit (Sukowaty) | USH 151 |

**Town of Eaton Critical Facilities**

| Type | Total |
|---|---|
| Post-Disaster Recovery Site | 5 |
| Bridge | 4 |
| Communication Facility | 1 |
| **Grand Total** | **10** |

| Town of Franklin Critical Facilities (2013) | | |
|---|---|---|
| **TYPE** | **NAME** | **ADDRESS** |
| Administrative Building | Franklin Town Hall | 7524 CTH J |
| Bridge | Bridge | Mancal Rd/Branch River |
| Bridge | Bridge | W Hillcrest Rd/Branch River |
| Bridge | Bridge | Reifs Mills Rd/Branch River |
| Bridge | Bridge | CTH J/Branch River |
| Bridge | Bridge | Mancal Rd/Unnamed Water |
| Bridge | Bridge | CTH K/Branch River |
| Bridge | Bridge | Grimms Rd/Branch River |
| Bridge | Bridge | Hillcrest Rd/Branch River |
| Bridge | Bridge | Hillcrest Rd/Branch River |
| Bridge | Bridge | Taus Rd/Branch River |
| Bridge | Bridge | Taus Rd/Branch River |
| Bridge | Bridge | CTH T/Branch River |
| Communication Facility | Tower | 16818 Long Rd |
| Fire and Safety | Menchalville Fire Department | 15331 County Rd K |
| Post-Disaster Recovery Site | Gravel Pit | |
| Power Facility/Bulk Fuel Storage | Power Facility | 11103 CTH K |

**Town of Franklin Critical Facilities**

| Type | Total |
|---|---|
| Bridge | 12 |
| Administrative Building | 1 |
| Communication Facility | 1 |
| Fire and Safety | 1 |
| Post-Disaster Recovery Site | 1 |
| Power Facility/Bulk Fuel Storage | 1 |
| **Grand Total** | **17** |

| Town of Gibson Critical Facilities (2013) | | |
|---|---|---|
| **TYPE** | **NAME** | **ADDRESS** |
| Administrative Building | Gibson Town Hall | 14920 CTH Q |
| Bridge | Bridge | CTH R/Trail |
| Bridge | Bridge | CTH BB/Black Creek |
| Bridge | Bridge | Old Y Rd/West Twin River |
| Bridge | Bridge | Nachtwey Rd/Neshota River |
| Bridge | Bridge | STH 147/West Twin River |
| Bridge | Bridge | W Tapawingo Rd/East Twin River |
| Bridge | Bridge | Holmes Rd/East Twin River |
| Bridge | Bridge | CTH B/East Twin River |
| Bridge | Bridge | CTH Y/West Twin River |
| Bridge | Bridge | Zander Rd/Unnamed Water |
| Bridge | Bridge | Twin Bridge Rd/Jambo Creek |
| Bridge | Bridge | Hillview Rd/East Twin River |
| Bridge | Bridge | Jambo Creek Rd/Jambo Creek |
| Bridge | Bridge | Rockledge Rd/East Twin River |
| Bridge | Bridge | Melnik Rd/West Twin River |
| Bridge | Bridge | CTH Q/Unnamed Water |
| Communication Facility | Emergency Siren | CTH Q |
| Communication Facility | Tower | 7318 Old Y Rd |
| Fire and Safety | Dry Hydrant | Holmes Rd/East Twin River |
| Fire and Safety | Dry Hydrant | Harpt's lake |
| Post-Disaster Recovery Site | Gravel Pit | 12415 CTH Q |
| Post-Disaster Recovery Site | Gravel Pit | STH 147 |
| Post-Disaster Recovery Site | Gravel Pit | STH 147 |
| Post-Disaster Recovery Site | Gravel Pit | CTH Q |
| Power Facility/Bulk Fuel Storage | Cenex | Avery Rd |
| Power Facility/Bulk Fuel Storage | Schaus | STH 147 |

**Town of Gibson Critical Facilities**

| Type | Total |
|---|---|
| Bridge | 16 |
| Post-Disaster Recovery Site | 4 |
| Communication Facility | 2 |
| Fire and Safety | 2 |
| Power Facility/Bulk Fuel Storage | 2 |
| Administrative Building | 1 |
| **Grand Total** | **27** |

| Town of Kossuth Critical Facilities (2013) | | |
|---|---|---|
| **TYPE** | **NAME** | **ADDRESS** |
| Administrative Building | Manitowoc County Highway Shop | 3500 STH 310 |
| Bridge | Bridge | Fisherville Rd/IH 43 |
| Bridge | Bridge | Reifs Mills Rd/IH 43 |
| Bridge | Bridge | Danmar Rd/Branch River |
| Bridge | Bridge | Reifs Mills Rd/Unnamed Water |
| Bridge | Bridge | Polifka Rd/IH 43 |
| Bridge | Bridge | IH 43/CTH K |
| Bridge | Bridge | IH 43/CTH K |
| Bridge | Bridge | Rockwood Rd/IH 43 |
| Bridge | Bridge | IH 43/Francis Creek |
| Bridge | Bridge | CTH V/West Twin River |
| Bridge | Bridge | IH 43/USH 10 |
| Bridge | Bridge | IH 43/USH 10 |
| Bridge | Bridge | Francis Creek Rd/Francis Creek |
| Bridge | Bridge | Parkway Rd/Francis Creek |
| Bridge | Bridge | Old Q Rd/Unnamed Water |
| Bridge | Bridge | Shoto Rd/Unnamed Water |
| Bridge | Bridge | CTH Q/Unnamed Water |
| Bridge | Bridge | Meadow Ln/Francis Creek |
| Bridge | Bridge | Trail/Meadow Ln |
| Bridge | Bridge | Francis Creek Rd/Unnamed Water |
| Communication Facility | Tower | 9635 Hillside Ln |
| Communication Facility | Tower | 11315 CTH T |
| Communication Facility | Tower | 7500 Village Dr |
| Communication Facility | Tower | 7500 Village Dr |
| Communication Facility | Building | 7117 CTH R |
| Communication Facility | Cable TV &DSL Internet Tower | CTH T |
| Dam | EIS | Unnamed Water |
| Fire and Safety | Dry Hydrant | CTH T |
| Fire and Safety | Dry Hydrant | CTH Y |
| Fire and Safety | Rockwood Fire Department | 5401 CTH R |
| Fire and Safety | Dry Hydrant | 3500 STH 310 |
| Fire and Safety | Dry Hydrant | Berringer Rd |
| Fire and Safety | Dry Hydrant | Forest Home Dr |
| Licensed Childcare Facility | Kids Crayon Club | 7219 CTH T |
| Post-Disaster Recovery Site | Gravel Pit | |
| Post-Disaster Recovery Site | Gravel Pit | |
| Post-Disaster Recovery Site | Gravel Pit | |
| Post-Disaster Recovery Site | Gravel Pit | |
| Post-Disaster Recovery Site | Gravel Pit | |
| Post-Disaster Recovery Site | Gravel Pit | |
| Post-Disaster Recovery Site | Gravel Pit | |
| Wastewater Treatment Facility | Wastewater Treatment Facility | CTH V |
| Wastewater Treatment Facility | Wastewater Treatment Facility | Tower Ave |
| Water Supply | Water Storage Tower | CTH T |

**Town of Kossuth Critical Facilities**

| Type | Total |
|---|---|
| Bridge | 20 |
| Post-Disaster Recovery Site | 7 |
| Communication Facility | 6 |
| Fire and Safety | 6 |
| Wastewater Treatment Facility | 2 |
| Administrative Building | 1 |
| Dam | 1 |
| Licensed Childcare Facility | 1 |
| Water Supply | 1 |
| **Grand Total** | **45** |

| Town of Liberty Critical Facilities (2013) | | |
|---|---|---|
| **TYPE** | **NAME** | **ADDRESS** |
| Administrative Building | Liberty Town Hall | 13812 English Lake Rd |
| Administrative Building | Town of Liberty | 13812 English Lake Rd |
| Bridge | Bridge | Pine River Rd/Unnamed Water |
| Communication Facility | Tower | 5102 Marken Rd |
| Post-Disaster Recovery Site | Gravel Pit | |
| Post-Disaster Recovery Site | Gravel Pit | |
| Post-Disaster Recovery Site | Gravel Pit | |
| Post-Disaster Recovery Site | Gravel Pit | |
| Post-Disaster Recovery Site | Gravel Pit | |
| Post-Disaster Recovery Site | Gravel Pit | |
| Post-Disaster Recovery Site | Gravel Pit | |
| Post-Disaster Recovery Site | Gravel Pit | |
| Post-Disaster Recovery Site | Gravel Pit | |
| Post-Disaster Recovery Site | Gravel Pit | |
| Post-Disaster Recovery Site | Gravel Pit | |
| Power Facility/Bulk Fuel Storage | Power Facility | 5109 CTH A |

**Town of Liberty Critical Facilities**

| Type | Total |
|---|---|
| Post-Disaster Recovery Site | 11 |
| Administrative Building | 2 |
| Bridge | 1 |
| Communication Facility | 1 |
| Power Facility/Bulk Fuel Storage | 1 |
| **Grand Total** | **16** |

| Town of Manitowoc Critical Facilities (2013) | | |
|---|---|---|
| **TYPE** | **NAME** | **ADDRESS** |
| Administrative Building | Manitowoc Town Hall | 1822 Silver Creek Rd |
| Bridge | Bridge | CTH Q/Little Manitowoc River |
| Communication Facility | Emergency Siren | 21st St & Viebahn St |
| Fire and Safety | Silver Creek Fire Department | 1716 Silver Creek Rd |
| Post-Disaster Recovery Site | Gravel Pit | |
| Power Facility/Bulk Fuel Storage | Natural Gas Substation | Nagle Ave |
| Water Supply | Water Supply Booster/Pumping Station | Viebahn St |

| Town of Manitowoc Rapids Critical Facilities (2013) | | |
|---|---|---|
| **TYPE** | **NAME** | **ADDRESS** |
| Administrative Building | Manitowoc Rapids Town Hall | 8624 CTH JJ |
| Bridge | Bridge | Michigan Ave/Manitowoc River |
| Bridge | Bridge | CTH JJ/Whitewater Dr |
| Bridge | Bridge | CTH JJ/Whitewater Dr |
| Bridge | Bridge | IH 43/CTH JJ |
| Bridge | Bridge | IH 43/CTH JJ |
| Bridge | Bridge | Middle Rd/IH 43 |
| Bridge | Bridge | Homestead Rd/IH 43 |
| Bridge | Bridge | IH 43/Manitowoc River |
| Bridge | Bridge | IH 43/W Custer St |
| Bridge | Bridge | IH 43/W Custer St |
| Bridge | Bridge | IH 43/Railroad |
| Bridge | Bridge | IH 43/Railroad |
| Bridge | Bridge | IH 43/Manitowoc River |
| Bridge | Bridge | Rapids Rd/Manitowoc |
| Bridge | Bridge | W Custer St/Silver Creek |
| Bridge | Bridge | Village Dr/Branch River |
| Bridge | Bridge | USH 10/Branch River |
| Bridge | Bridge | Branch River Rd/Branch River |
| Bridge | Bridge | N Union Rd/Branch River |
| Bridge | Bridge | N Union Rd/Manitowoc River |
| Bridge | Bridge | Highway H Rd/Manitowoc River |
| Bridge | Bridge | STH 42/ Silver Creek |
| Bridge | Bridge | Valley Dr/Silver Creek |
| Bridge | Bridge | S Alverno Rd/Silver Creek |
| Communication Facility | Tower | 9526 Hilltop Rd |
| Communication Facility | Tower | 6492 Homestead Rd |
| Communication Facility | Tower | 9630 Old 151 Rd |
| Communication Facility | Tower | 2033 Highway H RD |
| Power Facility/Bulk Fuel Storage | Natural Gas Substation | Middle Ct |
| School | Silver Lake College | 2406 S Alverno Rd |

**Town of Manitowoc Rapids Critical Facilities**

| Type | Total |
|---|---|
| Bridge | 24 |
| Communication Facility | 4 |
| Administrative Building | 1 |
| Power Facility/Bulk Fuel Storage | 1 |
| School | 1 |
| **Grand Total** | **31** |

| Town of Maple Grove Critical Facilities (2013) | | |
|---|---|---|
| **TYPE** | **NAME** | **ADDRESS** |
| Administrative Building | Maple Grove Town Hall | 8432 CTH W |
| Bridge | Bridge | CTH K/Mud Creek |
| Bridge | Bridge | Taus Rd/Mud Creek |
| Bridge | Bridge | Reifs Mills Rd/Mud Creek |
| Bridge | Bridge | Sunny Slope Rd/Mud Creek |
| Bridge | Bridge | Maple Rock Rd/Unnamed Water |
| Bridge | Bridge | Marquette Rd/Mud Creek |
| Bridge | Bridge | CTH W/Mud Creek |
| Bridge | Bridge | Hickory Hills Rd/Mud Creek |
| Bridge | Bridge | Gill Rd/Mud Creek |
| Bridge | Bridge | Mancal Rd/Unnamed Water |
| Bridge | Bridge | USH 10/Unnamed Water |
| Bridge | Bridge | Manitowoc Rd/Unnamed Water |
| Communication Facility | Tower | 20400 Manitowoc Rd |
| Licensed Childcare Facility | Countryside Family Care Center | 24322 Manitowoc Rd |
| Post-Disaster Recovery Site | Gravel Pit | |
| Post-Disaster Recovery Site | Gravel Pit | |
| Post-Disaster Recovery Site | Gravel Pit | |
| Post-Disaster Recovery Site | Gravel Pit | |

**Town of Maple Grove Critical Facilities**

| Type | Total |
|---|---|
| Bridge | 12 |
| Post-Disaster Recovery Site | 4 |
| Administrative Building | 1 |
| Communication Facility | 1 |
| Licensed Childcare Facility | 1 |
| **Grand Total** | **19** |

| Town of Meeme Critical Facilities (2013) | | |
|---|---|---|
| **TYPE** | **NAME** | **ADDRESS** |
| Administrative Building | Meeme Town Hall | 15318 CTH X |
| Bridge | Bridge | CTH XX/Meeme River |
| Bridge | Bridge | E Spring Vally Rd/Meeme River |
| Bridge | Bridge | STH42/Meeme River |
| Bridge | Bridge | County Line Rd/Pigeon River |
| Bridge | Bridge | Schwartzwald Rd/Pigeon River |
| Bridge | Bridge | Pioneer Rd/Meeme River |
| Bridge | Bridge | W Washington Rd/Meeme River |
| Bridge | Bridge | Cleveland Rd/Meeme River |
| Bridge | Bridge | Cleveland Rd/Pigeon River |
| Bridge | Bridge | Cleveland Rd/Pigeon River |
| Bridge | Bridge | Mineral Springs Rd/Pigeon River |
| Bridge | Bridge | CTH M/Pigeon River |
| Bridge | Bridge | County Line Rd/Pigeon River |
| Communication Facility | Tower | 13103 Moraine Rd |
| Post-Disaster Recovery Site | Gravel Pit | |
| Post-Disaster Recovery Site | Gravel Pit | |
| School | Meeme Elementary | 12121 CTH XX |

**Town of Meeme Critical Facilities**

| Type | Total |
|---|---|
| Bridge | 13 |
| Post-Disaster Recovery Site | 2 |
| Administrative Building | 1 |
| Communication Facility | 1 |
| School | 1 |
| **Grand Total** | **18** |

| Town of Mishicot Critical Facilities (2013) | | |
|---|---|---|
| **TYPE** | **NAME** | **ADDRESS** |
| Bridge | Bridge | CTH BB/East Twin River |
| Bridge | Bridge | STH 147/East Twin River |
| Bridge | Bridge | E Zander Rd/East Twin River |
| Bridge | Bridge | CTH BB/Tisch Mills Creek |
| Bridge | Bridge | Tisch Mills Rd/East Twin River |
| Bridge | Bridge | CTH BB/Unnamed Water |
| Bridge | Bridge | Strum Rd/East Twin River |
| Bridge | Bridge | CTH Q/West Twin River |
| Bridge | Bridge | CTH V/Johnson Creek |
| Bridge | Bridge | Church St/Unnamed Water |
| Bridge | Bridge | Steiner Dr/East Twin River |
| Bridge | Bridge | E Hillcrest Rd/East Twin River |
| Communication Facility | County Radio Tower | 11903 Saxonburg Rd |
| Communication Facility | Emergency Siren | E Zander Rd & Stangel Rd |
| Communication Facility | Emergency Siren | Saxonburg Rd |
| Communication Facility | Emergency Siren | Cherney Rd |
| Communication Facility | Emergency Siren | Division Dr and Rawley Rd |
| Post-Disaster Recovery Site | Gravel Pit | |

**Town of Mishicot Critical Facilities**

| Type | Total |
|---|---|
| Bridge | 12 |
| Communication Facility | 5 |
| Post-Disaster Recovery Site | 1 |
| **Grand Total** | **18** |

| Town of Newton Critical Facilities (2013) | | |
|---|---|---|
| **TYPE** | **NAME** | **ADDRESS** |
| Administrative Building | Newton Town Hall | 6524 Carstens Lake Rd |
| Bridge | Bridge | IH 43/Silver Creek Rd |
| Bridge | Bridge | CTH CR/Silver Creek |
| Bridge | Bridge | IH 43/Silver Creek |
| Bridge | Bridge | IH 43/CTH F |
| Bridge | Bridge | IH 43/Clover Rd |
| Bridge | Bridge | IH 43/Clover Rd |
| Bridge | Bridge | CTH CR/Unnamed Water |
| Bridge | Bridge | IH 43/Unnamed Water |
| Bridge | Bridge | IH 43/Carstens Lake Rd |
| Bridge | Bridge | IH 43/Carstens Lake Rd |
| Bridge | Bridge | Gass Lake Rd/Pine Creek |
| Bridge | Bridge | CTH C/Pine Creek |
| Bridge | Bridge | IH 43/CTH C |
| Bridge | Bridge | IH 43/CTH C |
| Bridge | Bridge | IH 43/Newton Rd |
| Bridge | Bridge | IH 43/Newton Rd |
| Bridge | Bridge | Lakeshore Rd/Pine Creek |
| Bridge | Bridge | IH 43/CTH F |
| Bridge | Bridge | CTH F/Point Creek |
| Bridge | Bridge | STH 42/Unnamed Water |
| Bridge | Bridge | CTH U/Unnamed Water |
| Bridge | Bridge | Pine River Rd/Point Creek |
| Bridge | Bridge | IH 43 Ramp/Pine Creek |
| Communication Facility | Building | 7520 English Lake Rd |
| Communication Facility | Building | Newton Rd |
| Communication Facility | Tower | 9407 Newton Rd |
| Communication Facility | Tower | 3636 CTH CR |
| Communication Facility | WKTT CH 251 Tower | 7914 CTH F |
| Communication Facility | Tower | 9431 Center Rd |
| Communication Facility | Tower | 5622 CTH F |
| Fire and Safety | Newton Fire Department | 6524 Carstens Lake Rd |
| Post-Disaster Recovery Site | Gravel Pit | |
| Post-Disaster Recovery Site | Gravel Pit | |
| Post-Disaster Recovery Site | Gravel Pit | |
| School | St. John's Lutheran | 7531A English Lake Rd |

**Town of Newton Critical Facilities**

| Type | Total |
|---|---|
| Bridge | 23 |
| Communication Facility | 7 |
| Post-Disaster Recovery Site | 3 |
| Administrative Building | 1 |
| Fire and Safety | 1 |
| School | 1 |
| **Grand Total** | **36** |

| Town of Rockland Critical Facilities (2013) | | |
|---|---|---|
| **TYPE** | **NAME** | **ADDRESS** |
| Administrative Building | Rockland Town Hall | 615 Milwaukee St |
| Bridge | Bridge | CTH W/Unnamed Water |
| Bridge | Bridge | CTH W/Manitowoc River |
| Bridge | Bridge | CTH JJ/Manitowoc River |
| Bridge | Bridge | Boot Lake Rd/Unnamed Water |
| Bridge | Bridge | Boot Lake Rd/Unnamed Water |
| Bridge | Bridge | W Goodwin Rd/Mud Creek |
| Bridge | Bridge | Hilltop Rd/Mud Creek |
| Bridge | Bridge | CTH JJ/Unnamed Water |
| Dam | Collins Marsh | Mud Creek |
| Fire and Safety | Collins Fire Department | 607 Milwaukee St |
| Post-Disaster Recovery Site | Gravel Pit | Quarry Rd |
| Power Facility/Bulk Fuel Storage | Natural Gas Substation | 3932 CTH W |
| Wastewater Treatment Facility | Water Pumping Station | 20708 Main St |
| Water Supply | Water Supply Filter Treatment Plant | 20023 CTH JJ |

**Town of Rockland Critical Facilities**

| Type | Total |
|---|---|
| Bridge | 8 |
| Administrative Building | 1 |
| Dam | 1 |
| Fire and Safety | 1 |
| Post-Disaster Recovery Site | 1 |
| Power Facility/Bulk Fuel Storage | 1 |
| Wastewater Treatment Facility | 1 |
| Water Supply | 1 |
| **Grand Total** | **15** |

| Town of Schleswig Critical Facilities (2013) | | |
|---|---|---|
| **TYPE** | **NAME** | **ADDRESS** |
| Administrative Building | Schleswig Town Hall | 21935 Rockville Rd |
| Bridge | Bridge | Lax Chapel Rd/Unnamed Water |
| Bridge | Bridge | Rockville Rd/Sheboygan River |
| Bridge | Bridge | STH 57/Sheboygan River |
| Bridge | Bridge | STH 57/Sheboygan River |
| Bridge | Bridge | Pont Creek Rd/Unnamed Water |
| Bridge | Bridge | Steinthal Rd/Sheboygan River |
| Bridge | Bridge | CTH X/Unnamed Water |
| Bridge | Bridge | CTH XX/Unnamed Water |
| Communication Facility | Tower | 14000 Louis Corners Rd |
| Communication Facility | Tower | 13426 Meggers Rd |
| Communication Facility | Tower | 23233 Mueller Rd |
| Dam | Millhome | Sheboygan River |
| Dam | Rockville | Sheboygan River |
| Mobile Home Park | Nennig | 14108 Cedar Lake Rd |
| Post-Disaster Recovery Site | Gravel Pit | 16800 Little Elkhart Lake Rd |
| Post-Disaster Recovery Site | Gravel Pit | 14601 Lax Shapel Rd |
| Post-Disaster Recovery Site | Gravel Pit | 16318 Little Elkhart Lake Rd |
| Post-Disaster Recovery Site | Gravel Pit | Lax Shapel Rd |
| Wastewater Treatment Facility | Sewage Lift Station | 100 River Rd |

**Town of Schleswig Critical Facilities**

| Type | Total |
|---|---|
| Bridge | 8 |
| Post-Disaster Recovery Site | 4 |
| Communication Facility | 3 |
| Dam | 2 |
| Mobile Home Park | 1 |
| Administrative Building | 1 |
| Wastewater Treatment Facility | 1 |
| **Grand Total** | **20** |

| Town of Two Creeks Critical Facilities (2013) | | |
|---|---|---|
| **TYPE** | **NAME** | **ADDRESS** |
| Administrative Building | Two Creeks Town Hall | 5128 E Tapawingo Rd |
| Bridge | Bridge | STH 42/Unnamed Water |
| Bridge | Bridge | STH 42/Unnamed Water |
| Bridge | Bridge | Lakeshore Rd/Unnamed Water |
| Communication Facility | Emergency Siren | STH 42 |
| Communication Facility | Emergency Siren | Nuclear Rd & Twin Elder Rd |
| Communication Facility | Tower | 5036 Lehrmann Rd |
| Communication Facility | Tower | E Tapawingo Rd |
| Communication Facility | Tower | 6010 Nuclear Rd |
| Fire and Safety | Dry Hydrant | 18804 STH 42 |
| Fire and Safety | Dry Hydrant | 16704 Lakeshore Dr |
| Fire and Safety | Two Creeks Fire Department | 5128 E Tapawingo Rd |
| Power Facility/Bulk Fuel Storage | Power Facility | 6610 Nuclear Rd |
| Power Facility/Bulk Fuel Storage | Power Facility | CTH V |
| Power Facility/Bulk Fuel Storage | Waste Storage | E. Tapawingo Rd |
| Power Facility/Bulk Fuel Storage | Wisconsin Electric Power Point Beach Station | 6610 Nuclear Rd |

**Town of Two Creeks Critical Facilities**

| Type | Total |
|---|---|
| Communication Facility | 5 |
| Power Facility/Bulk Fuel Storage | 4 |
| Bridge | 3 |
| Fire and Safety | 3 |
| Administrative Building | 1 |
| **Grand Total** | **16** |

| Town of Two Rivers Critical Facilities (2013) | | |
|---|---|---|
| **TYPE** | **NAME** | **ADDRESS** |
| Administrative Building | Two Rivers Town Hall | 6525 CTH B |
| Bridge | Bridge | CTH O/Molash Creek |
| Bridge | Bridge | CTH B/West Twin River |
| Bridge | Bridge | CTH B/West Twin River |
| Bridge | Bridge | Lakeshore Rd/Unnamed Water |
| Bridge | Bridge | Maplewood Rd/East Twin River |
| Bridge | Bridge | CTH VV/East Twin River |
| Communication Facility | Emergency Siren | CTH V |
| Communication Facility | Emergency Siren | CTH V |
| Communication Facility | Emergency Siren | E Hillcrest Rd |
| Communication Facility | Emergency Siren | Crystal Springs Rd |
| Communication Facility | Tower | 5103 CTH B |
| Communication Facility | Tower | 3607 Maplewood Rd |
| Communication Facility | Tower | 6220 STH 42 |
| Communication Facility | WTRW 1590 Tower | 6200 STH 42 |
| Dam | Neshoto | West Twin River |
| Mobile Home Park | Quiet County | 7136 Tannery Dr |
| Post-Disaster Recovery Site | Gravel Pit | CTH VV |
| Post-Disaster Recovery Site | Gravel Pit | 6800 Manitou Dr |
| Power Facility/Bulk Fuel Storage | Power Facility | STH 310 |

**Town of Two Rivers Critical Facilities**

| Type | Total |
|---|---|
| Communication Facility | 8 |
| Bridge | 6 |
| Post-Disaster Recovery Site | 2 |
| Administrative Building | 1 |
| Dam | 1 |
| Mobile Home Park | 1 |
| Power Facility/Bulk Fuel Storage | 1 |
| **Grand Total** | **20** |

# APPENDIX D - PUBLIC MEETING NOTICE AND SIGN-IN SHEET

## NOTICE OF PUBLIC MEETING

*Media Contact:* Angela Pierce, Tel: (920) 448-2820

***For Immediate Release***

March 18, 2014

**Manitowoc County Undertaking Hazard Mitigation Planning – Open House Scheduled and Draft Plan Available for Public Review**

Emergency management, response, and planning personnel from the private and public sectors in Manitowoc County have been working together to update the County's Hazard Mitigation Plan. The original plan was developed in 2009 under funding from the Federal Emergency Management Agency (FEMA). The Bay-Lake Regional Planning Commission is facilitating the process and drafting the plan.

With this plan, the County has identified mitigation actions aimed at minimizing or eliminating long-term risk to people and property from natural hazards. With the rising costs associated with hazard recovery activities, it is much more cost effective to address hazards before they occur. Additionally, a current plan qualifies the County to apply for FEMA funding to undertake the identified mitigation actions.

Public input is requested on the draft plan. A public informational meeting to present the draft plan, maps, and materials will be held April 9, 2014 from 6:00-7:00 PM at the Manitowoc County Office Complex in Room 300 at 4319 Expo Drive in Manitowoc.

Alternatively, the draft plan can be viewed, and comments submitted online at http://tinyurl.com/ManHazPlan. Online comments are being accepted now through May 8, 2014.

# # #

**Manitowoc County Hazard Mitigation Plan**

**Open House/Public Informational Meeting Sign-In**

**April 9, 2014**

| Name | Affiliation or Address |
|---|---|
| Tim Ryan | Mtwc Planning & Zoning Dept. |
| Andrea Raymakers | Manitowoc County Planning & Zoning |
| Angela Pierce | Bay-Lake Regional Planning Commission |
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# APPENDIX E - RESOLUTIONS OF ADOPTION FROM MUNICIPALITIES

# RESOLUTION

## Adopting 2014 Update to Manitowoc County All Hazard Mitigaton Plan

**WHEREAS,** officials of Manitowoc County Emergency Services and the Manitowoc County Planning and Zoning Department have worked for the past 18 months to complete an update of the County's All Hazard Mitigation Plan; and

**WHEREAS,** representatives of area police, fire and EMS agencies, municipal utilities and other organizations involved in emergency planning and response have been actively engaged in the development of this update, which is required at least every five years; and

**WHEREAS,** said plan was adopted by action of the Manitowoc County Board on October 14, 2014; and

**WHEREAS,** adoption of the plan by the County Board extends its coverage to the 18 towns located in Manitowoc County, but separate adopting actions by the county's cities and villages are required to extend its coverage to those units; and

**WHEREAS,** in order for the City of Two Rivers to be covered under this county-wide plan, it must be formally adopted by the City Council; and

**WHEREAS,** having such an adopted plan in place is in the best interests of the community and maintains the City of Two Rivers' eligibility for Federal disaster assistance programs;

**NOW, THEREFORE, BE IT RESOLVED** that the City of Two Rivers does hereby adopt the 2014 Manitowoc County All Hazard Mitigation Plan Update, and declares that plan to be the governing document for emergency planning and response activities of the City of Two Rivers; and

**BE IT FURTHER RESOLVED,** that a copy of this resolution be forwarded to the Manitowoc County Planning and Zoning Department, in evidence of the City's adoption of said plan.

Adopted this 20th day of October, 2014.

Council Member

Gregory E. Buckley
City Manager

2014-12

RESOLUTION ADOPTING
MANITOWOC COUNTY, WISCONSIN
2014 ALL HAZARDS MITIGATION PLAN

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

WHEREAS, undertaking hazard mitigation action before a disaster occurs reduces the potential for harm to people and property and saves taxpayer dollars, and

WHEREAS, adoption of an All Hazards Mitigation Plan is required as a condition of future grant funding for mitigation projects, as well as federal grants and relief, and

WHEREAS, Manitowoc County has developed an All Hazards Mitigation Plan that the Village of Mishicot would like to support and adopt in cooperation with Manitowoc County, and

WHEREAS, the Bay-Lake Regional Planning Commission has submitted the adopted plan to Wisconsin Emergency Management and Federal Emergency Management Agency officials on behalf of Manitowoc County, as required under the Hazard Mitigation Grant Program, and

WHEREAS, the Wisconsin Emergency Management and Federal Emergency Management Agency officials have approved the plan as required under the Hazard Mitigation Grant Program; now therefore, be it

RESOLVED, by the Board of Trustees of the Village of Mishicot that the Manitowoc County, Wisconsin All Hazards Mitigation Plan (2014) be adopted.

Dated: October 21, 2014

Bernard J. Samz, Village President

Attest:

Connie Tesarik, Village Clerk-Treasurer

I, Connie Tesarik, Clerk-Treasurer of the Village of Mishicot do hereby certify that the above Resolution was duly adopted by a vote of 7 in favor and 0 opposed of the Village Board on the 21st day of October, 2014.

Connie Tesarik, Village Clerk-Treasurer

**RESOLUTION #2014-**

**RESOLUTION ADOPTING MANITOWOC COUNTY, WISCONSIN ALL HAZARDS MITIGATION PLAN (2014)**

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

**WHEREAS,** undertaking hazard mitigation action before a disaster occurs reduces the potential harm to people and property and saves taxpayer dollars, and;

**WHEREAS**, adoption of the updated All Hazards Mitigation Plan is required as a condition of future grant funding for mitigation projects, and;

**WHEREAS**, Manitowoc County has developed an All Hazard Mitigation Updated Plan that the Village of St Nazianz would like to support and adopt in cooperation with Manitowoc County, and;

**WHEREAS**, the adoption of this updated Manitowoc County All Hazards Mitigation Plan, the Village of St Nazianz will be eligible to participate in the Hazard Mitigation Grant Program (HMGP) and the FEMA's Pre-Disaster Mitigation (PDM) Grant Program and the Flood Mitigation Assistance (FMA) Program;

**THEREFORE, BE IT RESOLVED,** by the Village Board of the Village of St Nazianz to hereby adopt the Manitowoc County, Wisconsin All Hazards Mitigation Updated Plan (2014). (The original plan was adopted by the Village of St Nazianz Board of Trustees on 8-10-2010.)

**I HEREBY CERTIFY that the foregoing Resolution was duly passed by the St Nazianz Village Board, on the 21st day of October, 2014.**

Approved on: 10-21-14

By: _____
**Dale J Koeppen,** Village President

Dated on: 10-21-2014

Attest: _____
**Kay M Mueller,** Village Clerk-Treasurer

# BAY-LAKE REGIONAL PLANNING COMMISSION

***www.baylakerpc.org***

## COMMISSION MEMBERS

***Brown County***
Tom Sieber

***Door County***
Ken Fisher

***Florence County***
Ed Kelley
Larry Neuens
*Nomination Pending*

***Kewaunee County***
Chuck Wagner
Eric Corroy
*Nomination Pending*

***Manitowoc County***
Don Markwardt, Chairperson
Dan Koski
Chuck Hoffman

***Marinette County***
Alice Baumgarten, Secretary/Treasurer
Mary Meyer
*Nomination Pending*

***Oconto County***
Tom Kussow
Terry Brazeau
Dennis Kroll

***Sheboygan County***
Mike Hotz, Vice-Chairperson
Ed Procek
Brian Yerges

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BAY-LAKE
REGIONAL PLANNING COMMISSION
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