Sauk County Hazard Mitigation Plan: 2011-2015

A Multi-Jurisdictional Plan Adopted by:

- Sauk County
- City of Baraboo
- City of Reedsburg
- City of Wisconsin Dells
- Village of Cazenovia
- Village of Ironton
- Village of LaValle
- Village of Lake Delton
- Village of Lime Ridge
- Village of Loganville
- Village of Merrimac
- Village of North Freedom
- Village of Plain
- Village of Prairie du Sac
- Village of Rock Springs
- Village of Sauk City
- Village of Spring Green
- Village of West Baraboo

Local Review Draft

civi◊tek CONSULTING LLC

FORWARD

The *Sauk County Hazard Mitigation Plan: 2011-2015* consists of seven chapters and a map series. The first chapter provides an overview of the project. The second chapter presents background information about Sauk County including its setting, demographic and economic characteristics, climate, natural resources, land use, and development trends. Chapter 3 presents background information related to special needs populations and groups in the county. Chapter 4 contains a complete inventory of critical facilities in the county. Natural hazards and manmade hazards are identified and reviewed in chapters 5 and 6, respectively. Estimated losses to buildings, infrastructure, and critical facilities are also discussed in these two chapters. In chapter 7, goals, objectives, and policies are identified that will help to craft appropriate solutions to the identified problems. A range of activities are also presented to help foster hazard mitigation efforts. Various funding sources are reviewed with an eye towards identifying options for funding identified projects. Most of the maps in the plan are included in the final section of the plan.

Sauk County adopted a multi-jurisdictional plan in 2005, which was approved by the Federal Emergency Management Agency on April 27, 2006. The City of Baraboo also adopted a plan on June 28, 2005, which was approved by the Federal Emergency Management Agency on April 27, 2006. As part of the required five-year update, this plan was prepared to cover all of the municipalities in the county, including the City of Baraboo. This plan was substantially updated and revised to meet new state and federal guidelines.

This version is intended to guide mitigation planning efforts in Sauk County during the five-year period from 2011 through 2015.

Acknowledgements

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Project Supervision
Jeff Jelinek, Sauk County Emergency Management Director, supervised the preparation of this plan.

Funding
Partial funding for the preparation of this plan was provided by Wisconsin Emergency Management through a grant from the federal Pre-Disaster Mitigation Program.

Consultant
- Civi Tek Consulting prepared this plan under the supervision of Tim Schwecke, AICP.
- Greg Rybarczyk with GeoEco Design prepared the maps.

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INTRODUCTION

Chapter Contents

1. CHAPTER OVERVIEW

This chapter introduces the need for this plan by making the case that natural and manmade disasters have historically caused damage to the people and property in Sauk County, and that while it is not possible to prevent disasters from occurring, it is possible to better position a community to mitigate the effects of such disasters. The purpose and scope of this plan are described so that it is clear what this document is intended to do and how it relates to other previous planning efforts and ongoing emergency management activities. The ways in which the general public and local units of government were involved in the preparation, review, and adoption of this plan are documented. A procedure for keeping this document current is described. In the final section, those governmental units adopting this plan are listed.

2. PURPOSE

Most people do not think about natural disasters until they are personally affected in some way. Yet when a significant event does occur it is important to have a response plan in place to coordinate activities. All communities in the County face different hazards, and every community has different resources with which to handle hazards. No one solution will fit every community so it is the purpose of this plan to recognize certain hazards facing the County and outline the appropriate steps needed to lessen damage to property and potential loss of life.

When a significant event does strike, the general public most often looks to government at all levels and non-governmental organizations, like the American Red Cross, for assistance. Likewise, local units of government look to state agencies and the federal government for financial help and assistance. Depending on the scale of the natural disaster, assistance can be short-term or on-going over an extended period of time.

Throughout the United States, government's response has grown significantly. At the federal level, the average annual loss from natural disasters was $3.3 billion between 1989 and 1993. Between 1994 and 1998 that amount rose to $13 billion. In an effort to curb rising costs, the federal government adopted the Disaster Mitigation Act of 2000 (DMA 2000). It amended the Robert T. Stafford Disaster Relief and Emergency Act, which is the primary law at the federal level dealing with disaster planning, mitigation, response, and recovery.

DMA 2000 reinforced the importance of hazard mitigation planning to proactively devised strategies intended to avoid and reduce the negative effects of natural disasters. If a community wants to apply for grant funding from the Pre-Disaster Mitigation (PDM) Program or the Hazard Mitigation Grant Program (HMGP), it must have an approved hazard mitigation plan. If a disaster strikes a community that does not have an approved plan, it can only receive funding through HMGP if it agrees to prepare a plan within one year.

Sauk County and participating municipalities have prepared this plan to meet this new requirement, and in so doing, help its citizens mitigate the effects of natural disasters.

3. Funding

Sauk County's Hazard Mitigation planning efforts are funded by the Pre-Disaster Mitigation Program through the Federal Emergency Management Agency. Maintenance of the plan will be part of the Sauk County Emergency Management Office's responsibility on an as-needed basis.

4. Scope

Like most hazard mitigation plans, this plan addresses natural hazards. It also includes manmade hazards that pose a threat to people and property in Sauk County.

5. Contents

This plan includes seven chapters and a map series. The first chapter provides an overview of the project. The second presents background information about the county including its setting, demographic and economic characteristics, climate, natural resources, land use, and development trends. Special needs populations and groups are identified in Chapter 3. The fourth chapter details the critical facilities. Natural and manmade hazards are identified and reviewed in chapters 5 and 6, respectively. In the seventh chapter, the recommended mitigation strategy for the County and its individual jurisdictions is presented. A series of maps is included in the last chapter.

6. Data Sources

Primary data sources for this plan included the following:

- Participating Towns, Villages and Cities in Sauk County
- Sauk County Department of Emergency Management
- Sauk County GIS and Mapping Department
- Sauk County Planning and Zoning Department
- Sauk County Sheriff's Department
- Sauk County Highway Department
- Sauk County Department of Public Health
- Wisconsin Department of Emergency Management
- Wisconsin Department of Natural Resources
- Wisconsin Department of Administration
- U.S. Census Bureau
- National Oceanic Atmospheric Agency

Critical facilities were identified from a wide range of sources. After initial compilation of the list, it was sent to each point of contact for review and approval. This list is believed to be the most comprehensive and updated list of such facilities in the county.

Key Terms in This Chapter

Disaster Mitigation Act of 2000 (DMA 2000) – A federal law (P.L. 106-390) amending the Robert T. Stafford Disaster Relief and Emergency Act. The act authorizes the president to establish (1) a program of technical and financial assistance to the states and local governments to assist in the implementation of pre-disaster hazard mitigation measures; (2) the National Predisaster Mitigation Fund; and (3) an interagency task force. It requires state, local, or tribal governments to develop predisaster hazard mitigation plans as a precondition of receiving certain federal funds and controls and streamlines the cost of disaster assistance.

Federal Emergency Management Agency (FEMA) – A federal agency created in 1979 with a mission to reduce loss of life and property and protect our nation's critical infrastructure from all types of hazards through a comprehensive, risk-based emergency management program of mitigation, preparedness, response, and recovery. In March 2003, it was placed under the Department of Homeland Security.

Hazard mitigation plan (HMP) – A plan prepared at the state or local level that systematically evaluates policies, actions, and tools, and sets goals for implementation over the long term that will result in a reduction in risk and minimize future losses in a community.

Hazard Mitigation Grant Program (HMGP) – A federal program administered by the Federal Emergency Management Agency intended to prevent future losses of lives and property due to disasters; to implement state or local hazard mitigation plans; to enable mitigation measures to be implemented during immediate recovery from a disaster; and to provide funding for previously identified mitigation measures to benefit the disaster area. It was authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act.

Wisconsin Emergency Management (WEM) – A state agency that specializes in hazard mitigation, warning and communications, emergency police services, disaster response and recovery, hazardous materials & EPCRA, radiological emergency preparedness, and exercise and training.

7. Relationship of Mitigation Planning to Other Emergency Management Activities

Mitigation planning is one prong of a multi-faceted approach to emergency management (Exhibit 1-1). Each of these is briefly described to help provide context for this plan.

Mitigation

Mitigation is any activity that is proactively done to reduce a community's vulnerability of damage from future disasters. Mitigation is the focus of this plan.

Preparedness

Emergency preparedness focuses exclusively on creating effective strategies and procedures to respond to an emergency. It includes creating the institutional framework for response and protocol for decision-making, conducting training of emergency response personnel, ensuring equipment is available and operational, and developing and maintaining an appropriate communications network.

Sauk County has a well-established and tested emergency operations plan. It identifies a decision making structure and areas of responsibility depending on the nature of the emergency.

Response

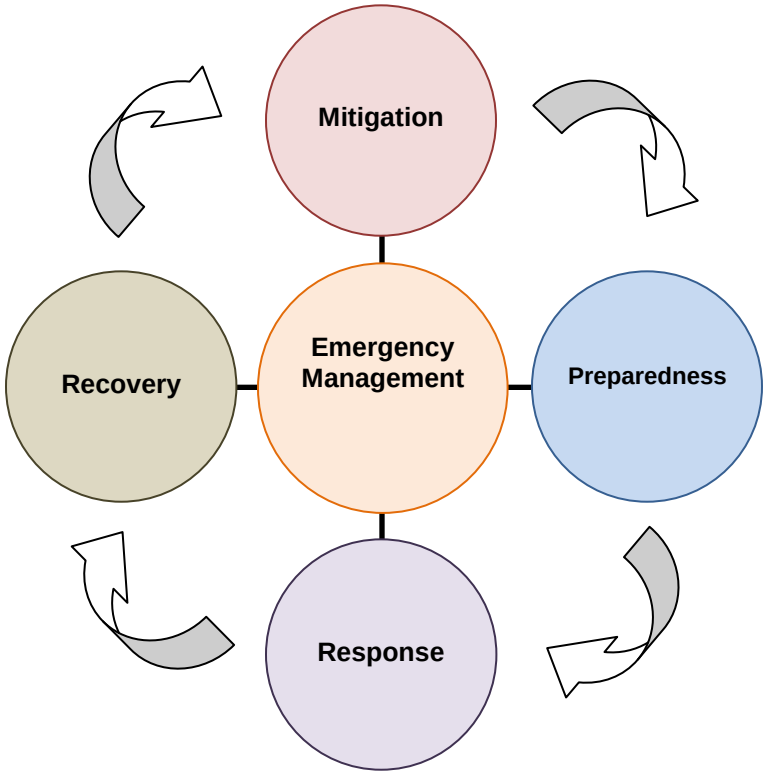
Response includes any action taken immediately before, during, and after an event to save lives and minimize property damage.

Recovery

Although the extent and type of recovery efforts will vary with the nature and extent of the event, recovery efforts focus on restoring support services and infrastructure and helping those affected to regain a sense of normalcy.

It is important to recognize that each of these areas focuses on different aspects of emergency management, but that the effectiveness of each depends on an integrated systems approach.

Exhibit 1-1. Emergency Management



8. Relationship to Other Plans

The following plans, studies, and reports were reviewed in preparing this plan:

- **Smart Growth Comprehensive Plans** Sauk County adopted a multi-jurisdictional comprehensive plan November 2010. Consistent with state requirements, the plan includes the following nine elements:
  - Issues and opportunities
  - Housing
  - Transportation
  - Utilities and Community Facilities
  - Agriculture, Natural and Cultural Resources
  - Economic Development
  - Intergovernmental Cooperation
  - Land Use
  - Implementation

- **Sauk County Hazards Analysis** The Sauk County Emergency Management Office has completed, and regularly updates, the Sauk County Hazard Analysis. The hazard analysis identifies all of the likely natural and technical hazards that might or have occurred within the county. The hazard analysis has not generally examined in detail mitigation strategies for the identified hazards.

- **Sauk County Land and Water Resource Management Plan** Most recently updated in 2007, this plan is designed to reduce soil erosion, protect water quality, and conserve the natural resources

- **Other Resources** There have been a number of other plans and ordinances completed by Sauk County departments or municipalities, some of which were used as reference materials for the 2005 plan, including:
  - Shoreland Zoning Ordinance
  - Subdivision Ordinance
  - Floodplain Ordinance
  - Erosion Control and Stormwater Management Ordinance

- **State Hazard Mitigation Plan** This plan was prepared by Wisconsin Emergency Management (WEM) and complies with the requirements of the Disaster Mitigation Act of 2000 at the state level.

- **Flood Insurance Study (FIS)** This study was conducted by the Federal Emergency Management Agency for Sauk County and incorporated areas. The plan investigates the existence and severity of flood hazards in the geographic area of Sauk County.

- **Flooding Conditions at Clark Creek and Possible Mitigation** This study was conducted by the Federal Emergency Management Agency and examined the Clark Creek area after the June 2008 flooding event. It describes what is at risk from Clark Creek floodwater, lists mitigation strategies suggested by local residents, and describes observations made by FEMA reconnaissance teams during various field visits.

- **Dam Failure Analysis, EAP and Operations and Maintenance Plan for Dutch Hollow Lake Dam, La Valle, Wisconsin.** This plan was prepared consistent with state requirements.

When any of these local plans are updated, they should incorporate provisions, as may be appropriate, that support this plan.

9. Plan Preparation, Review, and Adoption

2005 Plan

In 2003, the Sauk County Emergency Management office applied for a grant to prepare the county's first hazard mitigation plan. In anticipation of receiving the grant to do this plan, Sauk County Emergency Management Director met with the Town of Reedsburg Board on April 14, 2003 to review issues that would be addressed by the plan and request their cooperation. Emergency Management sent surveys to each of the towns, villages, and cities in the county on May 5, 2003 requesting their input as to concerns of hazards in their communities. On November 20, 2003, the Emergency Management Director spoke before the Towns Association about the plan at the VFW Hall in Hillpoint. Various phone calls, surveys, and memos were sent to local governments and departments throughout the course of preparing this plan. Copies of the draft plan will be forwarded to each participating community upon receiving preliminary approval of the plan document from the Wisconsin Department of Emergency

Management. Comments from these communities were incorporated into the final document as appropriate.

After receiving the grant, the County contracted with MSA to help prepare the plan. The 2005 plan was prepared by Sauk County Emergency Management Department with the assistance of MSA Professional Services under the guidance of an advisory task force that consisted of members from the following:

- Sauk County Mapping/GIS
- UW Extension/Agriculture
- Ho-Chunk Nation
- Sauk County Land Conservation Department
- Sauk County Planning & Zoning Department
- Sauk County Health Department
- Participating towns, villages, and cities

Sauk County utilized a two-phase process to involve the public in the development of the 2005 plan. Phase I consisted of an outreach program that utilized multiple surveys, attendance to local government meetings, phone interviews with local government officials, and a press release soliciting input from Sauk County residents.
Phase I was targeted at educating participating communities on the purpose of the plan, the anticipated process, and to initiate the identification of specific local issues that should be incorporated into the plan document.

Phase II consisted of the preliminary draft plan document being reviewed by local governments and their residents. Copies of the draft plan document were available on the Sauk County web site as well as at each public library in the County. A formal public hearing has held prior to final adoption at the County level, and many local communities conducted separate public hearings as well. No formal public comments were received during the designated period which ended on January 21, 2005.

The Federal Emergency Management Agency certified the plan on April 27, 2005.

2010 Plan Update

In 2009, the Sauk County Emergency Management office applied for and received a grant to prepare a five-year update to the plan. The county contracted with Civi Tek Consulting for this project.

In addition to the municipalities participating in the 2004 plan, this update also includes the city of Baraboo, which prepared and adopted its own plan on June 28, 2005.

The Sauk County Board of Supervisors adopted a public participation plan on November 11, 2009, that describes the ways in which the public and local units of government would be involved in the preparation, review, and approval of the plan update. A copy of the public participation plan is included as Appendix A. Key elements include: a project web site, publication of all meetings, submittal of press releases, and numerous opportunities for submitting written comments and suggestions.

Municipalities in the county were involved in a number of ways and were kept abreast of the plan's progress. Initially, letters were sent to each municipality

inviting them to approve a memorandum of understanding (MOU) and to designate an individual who would serve as a point of contact and a liaison. A sample of the MOU and of the appointment form is included in Appendix A. All of the municipalities approved the MOU. The local point of contact was given a listing of critical facilities in his/her jurisdiction for review and comment (Appendix A). Corrections were made to the list of critical facilities based on the input received.

A steering committee was established and given the responsibility of reviewing the draft of the plan update. Members are listed in the acknowledgements to this plan. The committee consisted of 21 members and met on May 14 and May 24, 2010 to review the proposed changes to the plan. An agenda from the meetings and a listing of those in attendance is included in Appendix A.

After the steering committee finished its work, another draft (2.0) was prepared, which was sent to Wisconsin Emergency Management (WEM) for tentative review. A third draft of the plan was prepared to address WEM's initial comments. A copy of this draft was then sent to each of the cities and villages in the county, the adjoining counties, and the local chapter of the American Red Cross for review and comment.[1] An executive summary was sent to each of the towns for review and comment. A copy of these cover letters are included in Appendix A.

A fourth draft of the plan was prepared based on the local government input that was received. It was then sent to the Federal Emergency Management Agency for preliminary approval. A letter dated _____, 2011, indicated such approval. The Judiciary Committee of the County Board reviewed this draft on _____, 2011, and recommended the draft plan to the full County Board for its review and action.

On _____, 2011 the County Board of Supervisors adopted this plan. A copy of the agenda is included in Appendix A. The county adoption resolution and those of the cities and villages is included in Appendix B.

In a letter dated _____, 2011, Wisconsin Emergency Management and the Federal Emergency Management Agency certified that this plan meets federal requirements (Appendix C).

Every effort has been made to use the best available data for the update. Because the plan uses data from the 2000 census of population and housing, some demographic information may appear to be dated. The next five-year update will be able to incorporate data from the 2010 census.

Exhibit 1-3 summarizes the changes made to each section of the plan as part of the update.

[1] Note: Sauk County is not located within the jurisdiction of a regional plan commission.

Exhibit 1-3. Summary of Changes Made in the 2010 Plan Update

Plan Section	Summary of Changes
Chapter 1	This chapter was reviewed and updated as needed. In addition, a number of new sections were added. A section describing interagency coordination was added along with a section describing how this plan relates to other plans that have been previously adopted. A new section was added to describe how mitigation planning is just one prong of a multi-faceted approach to emergency management. A narrative describing the process used in developing the update was included. The procedure for plan maintenance was reviewed and updated.
Chapter 2	This chapter was reviewed and updated using data that has been released since 2005. Population estimates and projections have been updated as well as the discussion relating to land use and development trends. Two new sections were added for housing and transportation.
Chapter 3	Chapter 3 is new in the 2010 update. It describes the special needs population and groups.
Chapter 4	Chapter 4 is new in the 2010 update. It consists of a complete inventory of critical facilities.
Chapter 5	Natural hazard profiles, occurrences, and probabilities were reviewed and updated as necessary. In addition, the risk assessments were updated. Earthquakes were not carried forward in the 2010 update because of the low probability of occurrence.
Chapter 6	The list of manmade hazards was updated to reflect the experience of the preceding five years.
Chapter 7	The chapter addressing mitigation strategies was expanded to cover the full range of mitigation strategies in use and potentially available. The steering committee focused in on the goals, objectives, policies, and activities. Revisions were made and new ones were added.
Map Series	This section includes all of the maps in the 2010 plan update. A number of new maps were added related to the critical facilities and some of the natural hazards.
Appendix A	Public participation documentation for the 2010 plan is included.
Appendix B	Resolutions adopting the 2010 plan update are included.
Appendix C	The 2010 certification letters from WEM and FEMA are included.
Appendix D	This appendix was updated to list all of the municipalities adopting the plan.
Appendix E	The listing represents an up-to-date inventory of critical facilities in the county sorted by type of facility.
Appendix F	The listing represents an up-to-date inventory of critical facilities in the county sorted by jurisdiction.
Appendix G	The history of storm events was updated using data provided by the National Weather Service.
Appendix H	This section describes the methodology used in calculating the flood loss estimate.
Appendix I	The update includes a flood loss estimate. Calculations for each of the structures within the floodplain are included in this table.

10. Interagency Coordination

A copy of the draft 2010 plan update was sent to the local chapter of the American Red Cross and each of the adjoining counties for review and comment. A copy of the letters that were sent is included in Appendix A.

11. Plan Maintenance and Amendment

DMA 2000 requires that an adopted plan be reviewed and updated at least once every five years. However, to ensure that the plan remains a viable planning tool, it should be reviewed each year and following a natural disaster. The Federal Emergency Management Agency and Wisconsin Emergency Management will be notified of amendments to this plan.

Without periodic review and assessment, this plan has the potential to lose its relevance as conditions change, specific projects are implemented, and new priorities emerge.

Annual Review

Each November, the Emergency Management Director should review and monitor this plan and suggest amendments to Law Enforcement and Judiciary Committee. As part of this review, the Emergency Management Director should contact each of the participating municipalities to give them the opportunity to suggest changes. During this annual review, most of the focus should be on Chapter 7, which lists the goals, objectives, polices, and activities.

To determine whether amendments are needed, the following considerations should be reviewed:

- Review of general development trends
- Review of hazard risk
- Review of hazard mitigation goals and objectives
- Review of completed mitigation activities and their effectiveness
- Review of recommended strategies
- Review of available resources for future projects
- Public input
- Input from WEM and FEMA

Following a Natural Disaster

In addition, to a yearly review cycle, this plan should be updated following a significant natural disaster. Ideally, the update should be completed within six months of the event.

The public will be formally notified of meetings scheduled for the purpose of plan review. Other mechanisms that will be used to maintain public involvement include making available a copy of the plan at local public libraries, issuance of periodic press releases to the media describing the status of plan implementation, and the use of the county's website as a medium to keep residents informed of the plan's status and implementation activities.

History of Adoption and Amendment

A history of adoption and amendment is included as Appendix D. It lists when this plan was first adopted and the various amendments which have taken place since then.

12. Incorporating this Plan into Other Planning Efforts

The state-mandated comprehensive plan and floodplain regulations will be the primary means of reducing the effects of hazards on people and property in Sauk County. Mitigation strategies can be incorporated into these plans when they are updated. Each jurisdiction should incorporate goals, objectives, and policies into their comprehensive plans that are consistent with this plan. The Sauk County Emergency Management Director should send a letter to the Plan Commission of each city and village in 2015 encouraging them to cross reference their plan revisions with this plan. Likewise, amendments to this plan should be made consistent with comprehensive plans so long as such action would reduce the impact of hazards on people and property.

In addition to long-range planning, this plan will also be utilized when reviewing land development projects. It will be useful to consult this plan to determine where hazards are located, primarily 100-year floodplains. The plan will also be consulted as necessary when capital improvement plans are being prepared. Again the intent of these cross-cutting planning efforts is to reduce the effects of hazards on people and property.

To underscore the importance of incorporating this plan into other planning efforts, Sauk County Emergency Management sent a letter to the County Planning Director encouraging the use of this plan (Appendix A).

13. Governmental Units Adopting This Plan

This plan has been prepared at the county level as a multi-jurisdictional document with the active input and direct involvement of the cities, villages, and towns, including the city of Baraboo which previously adopted its own plan in 2005. With the exception of Baraboo, all of the cities and villages adopted the initial plan in 2005.

All of the municipalities have adopted this plan update (Table 1-1) **[verify]**. Adoption resolutions are included in Appendix B. By virtue of the county adoption, this plan applies to each of the towns in the county.

Table 1-1. Involvement of Municipalities: 2005 and 2010

Municipality	Adoption in 2005	Adoption in 2010
City of Baraboo	No	Yes
City of Reedsburg	Yes	Yes
City of Wisconsin Dells [1]	Yes	Yes
Village of Cazenovia [1]	No	Yes ???
Village of Ironton	Yes	Yes
Village of La Valle	Yes	Yes
Village of Lake Delton	Yes	Yes
Village of Lime Ridge	Yes	Yes
Village of Loganville	Yes	Yes
Village of Merrimac	Yes	Yes
Village of North Freedom	Yes	Yes
Village of Plain	Yes	Yes
Village of Prairie du Sac	Yes	Yes
Village of Rock Springs	Yes	Yes
Village of Sauk City	Yes	Yes
Village of Spring Green	Yes	Yes
Village of West Baraboo	Yes	Yes

Notes:
1. Municipality located in Sauk County and another county

Planning Area Profile

Chapter Contents

1. Chapter Overview

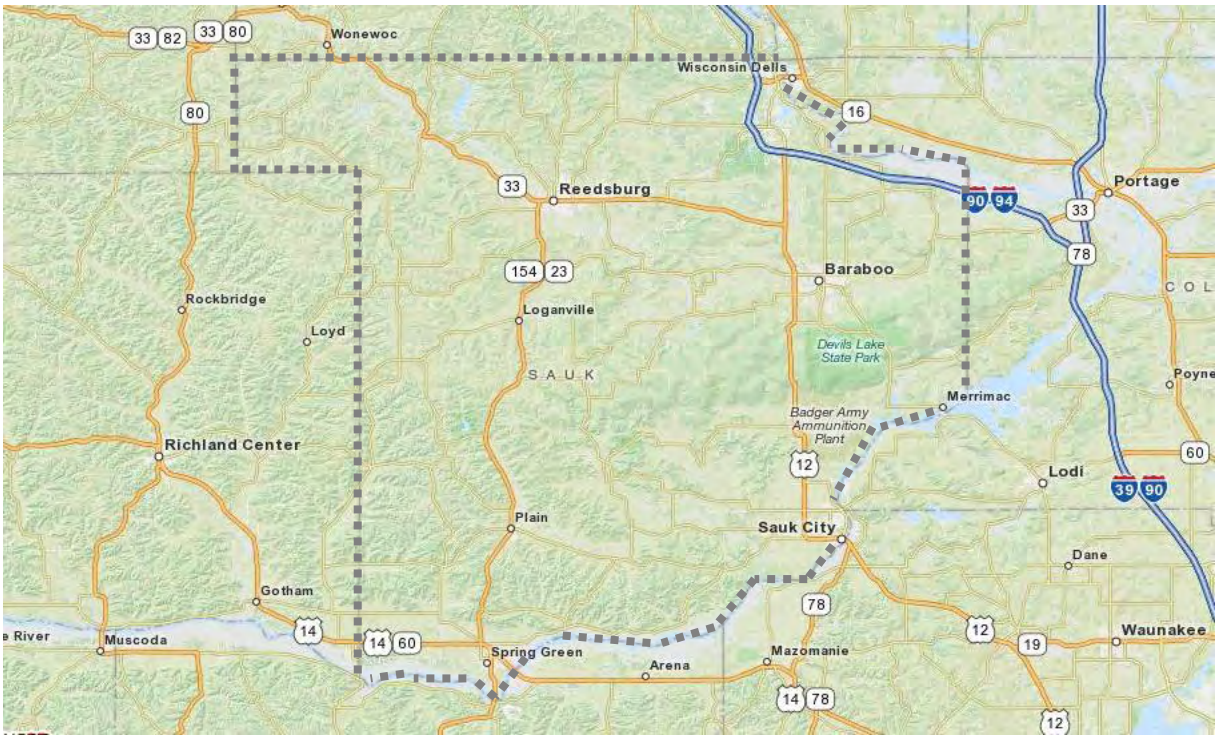
This chapter is intended to give an overview of Sauk County to help describe the setting and provide the general context for mitigation planning.

2. Regional Context

Sauk County is located in south central Wisconsin, approximately 25 miles northwest of Madison. Sauk County is bordered on the east by Columbia County, on the west by Richland County, Juneau and Adams counties on the north, and Dane and Iowa counties on the south (Exhibit 2-1).

The largest urban area in the county is the City of Baraboo, followed by Reedsburg, and a portion of Wisconsin Dells. Sauk County geographically consists of rivers, plains, and hilly terrain including the famous Baraboo Bluff Range, with elevations ranging from 700 feet to 2,200 feet. The county covers 544,640 acres, or approximately 840 square miles.

Exhibit 2-1. Regional Context



3. Units of Government

In Sauk County there are 3 cities, 14 villages, and 22 towns. A portion of both the City of Wisconsin Dells and the Village of Cazenovia are also in other counties. The civil divisions are listed in Table 2-1.

Table 2-1. Civil Divisions; Sauk County

Town	Village	City
Baraboo	Cazenovia [1]	Baraboo
Bear Creek	Ironton	Reedsburg
Dellona	La Valle	Wisconsin Dells [1]
Delton	Lake Delton	
Excelsior	Lime Ridge	
Fairfield	Loganville	
Franklin	Merrimac	
Freedom	North Freedom	
Greenfield	Plain	
Honey Creek	Prairie du Sac	
Ironton	Rock Springs	
La Valle	Sauk City	
Merrimac	Spring Green	
Prairie du Sac	West Baraboo	
Reedsburg		
Spring Green		
Sumpter		
Troy		
Washington		
Westfield		
Winfield		
Woodland		

Notes:
1. Municipality located in Sauk County and another county

4. Population

In 2000, the resident population in the county was 55,225 and eight years later it had grown to 57,985 persons, representing a 5 percent increase (Table 2-2). The city of Baraboo is the most populous municipality in the county, accounting for almost 20 percent of the countywide population. In 2008, approximately 40 percent of the population lived in towns, with 32 percent and 28 percent living in cities and villages, respectively.

Based on projections prepared by the Demographic Service Center, Wisconsin Department of Administration, the county's population is expected to increase to 68,208 residents by 2025 (Table 2-3). While most of the municipalities are expected to gain population over this period, the towns of Reedsburg and Troy along with the villages of La Valle, Rock Springs, and Sauk City, and the city of Wisconsin Dells are expected to lose residents. The city of Baraboo is expected to experience the largest numerical gain (2,041 residents) and the village of Lake Delton the largest percent change (115.2%).

Table 2-2. Population; Sauk County and Civil Divisions: 1990, 2000, and 2008

	1990 Count	2000 Count	2008 Estimate	Percent Change 1990-2008
Town				
Baraboo	1,503	1,828	1,654	10.05
Bear Creek	521	497	557	6.91
Dellona	768	1,199	1,232	60.42
Delton	1,599	2,024	2,179	36.27
Excelsior	1,194	1,410	1,419	18.84
Fairfield	826	1,023	1,098	32.93
Franklin	668	696	751	12.43
Freedom	422	416	446	5.69
Greenfield	758	911	913	20.45
Honey Creek	725	736	781	7.73
Ironton	585	650	693	18.47
La Valle	1,005	1,203	1,199	19.31
Merrimac	737	868	970	31.62
Prairie du Sac	1,105	1,138	1,122	1.54
Reedsburg	1,367	1,236	1,235	-9.7
Spring Green	1,329	1,585	1,593	19.87
Sumpter	747	1,021	1,035	36.68
Troy	867	773	823	-5.08
Washington	798	904	941	13.28
Westfield	578	611	630	9.00
Winfield	649	752	773	19.11
Woodland	584	783	818	40.07
Village				
Cazenovia [1]	0	0	22	0.00
Ironton	200	250	260	30.00
Lake Delton	1,466	1,982	3,155	115.21
La Valle	446	326	317	-28.92
Lime Ridge	152	169	153	.66
Loganville	228	276	280	22.81
Merrimac	392	416	464	18.37
North Freedom	591	649	608	2.88
Plain	691	792	765	10.71
Prairie du Sac	2,546	3,231	3,717	46.00
Rock Springs	432	425	400	-7.41
Sauk City	3,019	3,109	2,945	-2.45
Spring Green	1,283	1,444	1,497	16.68
West Baraboo	1,021	1,248	1,539	50.74
City				
Baraboo	9,203	10,711	11,244	22.19
Reedsburg	5,834	7,827	7,659	31.29
Wisconsin Dells [1]	136	106	98	-27.94
Sauk County	**46,975**	**55,225**	**57,985**	**23.44**

Source: US Census Bureau and Wisconsin Department of Administration
Notes:
1. Municipality located in Sauk County and another county; data is for Sauk County only

Table 2-3. Population Projections; Sauk County and Civil Divisions: 2010, 2020, and 2025

	2000 Census	2010 Projection	2020 Projection	2025 Projection	Percent Change 2000-2025
Town					
Baraboo	1,828	2,019	2,193	2,277	24.56
Bear Creek	497	493	486	483	-2.82
Dellona	1,199	1,603	1,970	2,146	78.98
Delton	2,024	2,395	2,728	2,889	42.74
Excelsior	1,410	1,528	1,627	1,676	18.87
Fairfield	1,023	1,115	1,193	1,231	20.33
Franklin	696	680	659	650	-6.61
Freedom	416	411	403	400	-3.85
Greenfield	911	1,017	1,112	1,158	27.11
Honey Creek	736	726	711	705	-4.21
Ironton	650	696	734	753	15.85
La Valle	1,203	1,372	1,521	1,594	32.502
Merrimac	868	953	1,025	1,060	22.12
Prairie du Sac	1,138	1,143	1,147	1,150	1.054
Reedsburg	1,236	1,178	1,117	1,089	-11.89
Spring Green	1,585	1,847	2,080	2,192	38.30
Sumpter	1,021	1,153	1,268	1,325	29.78
Troy	773	726	676	653	-15.53
Washington	904	968	1,021	1,047	15.82
Westfield	611	583	553	540	-11.62
Winfield	752	826	891	923	22.74
Woodland	783	978	1,153	1,238	58.11
Village					
Cazenovia [1]	0	21	21	20	0.00
Ironton	250	256	260	263	5.20
Lake Delton	1,982	2,639	3,232	3,517	77.45
La Valle	326	277	229	207	36.50
Lime Ridge	169	170	170	170	0.59
Loganville	276	291	304	310	12.32
Merrimac	416	433	445	451	8.41
North Freedom	649	651	649	648	-0.15
Plain	792	818	836	846	6.82
Prairie du Sac	3,231	3,677	4,062	4,248	31.48
Rock Springs	425	408	390	382	-10.12
Sauk City	3,109	3,192	3,246	3,275	5.34
Spring Green	1,444	1,478	1,500	1,511	4.64
West Baraboo	1,248	1,373	1,472	1,521	21.88
City					
Baraboo	10,711	11,536	12,224	12,562	17.28
Reedsburg	7,827	9,210	10,438	11,031	40.94
Wisconsin Dells [1]	106	90	75	67	-36.79
Sauk County	**55,225**	**60,930**	**65,821**	**68,208**	**23.51**

Notes:
1. Municipality located in Sauk County and another county; data is for Sauk County only

According to the 2008 U.S. Census estimates, the overwhelming majority of people in Sauk County reported that they were white. About 95 percent of the residents in Sauk County reported to be white, not of Hispanic origins. This compares to 85 percent statewide.

5. Housing

In 2000, there were 39,271 dwelling units in the county. Of this total, 36,931 were occupied (Table 2-4). Approximately three quarters of occupied residences were single family (both attached and detached units) and approximately 7 percent were mobile homes. In 2000, approximately 29 percent of the dwelling units were built at least 40 years ago (Table 2-5).

Table 2-4. Occupied Housing Types; Sauk County: 2000

Units in Structure	Number	Percent
1-unit, detached	17,058	70.2
1-unit, attached	584	2.4
2 units	1,632	6.7
3 or 4 units	809	3.3
5 to 9 units	986	4.1
10 to 19 units	619	2.5
20 or more units	482	2.0
Mobile home	2,084	8.6
Boat, RV, van, etc.	43	0.2
Total	24,297	100

Source: 2000 Census; US Census Bureau
Notes:
1. Total may not add up to 100 due to rounding

6. Transportation

Surface Transportation

Interstate 90/94 is the only interstate highway in Sauk County (Map 2). It follows the Wisconsin River in the northeast corner of the county and provides access to the east and west. US Highway 12 is a major north south connector through Sauk City, Baraboo, and Wisconsin Dells. US Highway 14 traverses the southernmost part of the county and connects Spring Green to Madison to the east and Richland Center to the west. The other key regional highways include STH 23, STH 33, STH 60, and STH 154. The remaining roads consist of county highways and local roads. Given the varied topography, roadways often follow rivers and streams. There was nearly 1,800 miles of roads in the county (Table 2-6).

Table 2-5. Age of Occupied Housing Stock; Sauk County: 2000

Year Structure Built	Number	Percent
1999 to March 2000	595	2.4
1995 to 1998	2,628	10.8
1990 to 1994	2,621	10.8
1980 to 1989	3,021	12.4
1970 to 1979	3,764	15.5
1960 to 1969	1,931	7.9
1940 to 1959	3,000	12.3
1939 or earlier	6,737	27.7
Total	24,297	100.0 [1]

Source: 2000 Census, US Census Bureau
Notes:
1. Total may not add up to 100 due to rounding

Air Transportation

Commercial passenger service is available at Dane County Regional Airport in Madison, General Mitchell International Airport in the Milwaukee metropolitan area, O'Hare International Airport and Midway International Airport in the Chicago metropolitan area, and Rockford International Airport in Rockford, Illinois.

Table 2-6. Road Network by Type

Type of Road	Distance in Miles
Interstate System	15
State Highway	206
County Highway	302
Local Roads and Streets	1,255
Other	20
Total	1,798

Rail Transportation

Amtrak maintains a station in the city of Wisconsin Dells, which provides access to Milwaukee and Minneapolis/St. Paul and points beyond. In 2010, Wisconsin and Southern Railroad operated a line as depicted in Map 1 which served the villages of La Valle, North Freedom, Merrimac, Prairie du Sac, Rock Springs, and Sauk City and the cities of Baraboo and Reedsburg.

7. Land Use

Farmland

Approximately 62 percent of the land area in Sauk County is used for agricultural purposes. In 2007 there were 1,923 farms in the County, a 15 percent increase since 2002 (Table 2-7). Over that same period, the number of acres in agricultural production rose about 2 percent from 353,104 acres in 2002 to 358,919 in 2007. The market value of products sold in 2007 almost reached $180 million, which represents a 55 percent increase over 2002.

Table 2-7. Agriculture at a Glance; Sauk County: 2002 and 2007

	2007	2002	Percent Change
Number of farms	1,923	1,673	+ 15
Land in farms (acres)	358,919 acres	353,104 acres	+ 2
Average size of farms	187 acres	211 acres	-11
Market value of products sold	$179,819,000	$116,064,000	+ 55
Average market value of products sold per farm	$93,510	$69,375	+ 35

Source: 2007 Census of Agriculture

Sales of livestock and livestock products accounted for 82 percent of market value, while crop sales accounted for only 18 percent. The number of dairy herds in Sauk County has been declining while the size of the remaining herds is increasing. Sauk County is the second largest pork-producing county in the state. There are also sizable acres of corn, alfalfa, soybeans, canning crops, potatoes, and small grains.

In addition, Sauk County has many agricultural business headquarters including Foremost Farms, Equity Livestock, Accelerated Genetics, and the Wisconsin Holstein Association. The county also has three cheese plants; Cedar Grove Cheese in Plain, Carr Valley Cheese in Ironton, and Saputo Cheese in Reedsburg. Lakeside Foods operates a large vegetable canning and freezing plant in Reedsburg.

Forestland

The U.S. Forest Service identifies approximately 211,000 acres of the 544,640 acres in Sauk County as wooded land. Approximately 95 percent of the Sauk County forest resource is privately owned. Baraboo Hills is the largest continuous stretch of woodland in Sauk County and is regarded as an excellent resource for ecologists seeking to protect habitat for rarer plants, birds, and animals in the area.

Residential, Commercial, and Industrial Land Uses

Cities and villages account for 38.2 square miles, or less than 5 percent of the total land area of the county (Table 2-8). There has been a steady growth in the residential and urban areas of the County. The City of Reedsburg and Village of Prairie du Sac have shown the greatest growth in that area. Numerous mobile home parks are present throughout the county. Small unincorporated communities are situated throughout the county, especially around some of the larger lakes such as Lake Redstone, Lake Virginia, and Dutch Hollow Lake.

Table 2-8. Municipalities Sorted by Land Area

Municipality	Square Miles
Village of Loganville	0.2
Village of Ironton	0.3
Village of La Valle	0.5
Village of Plain	0.7
Village of W. Baraboo	0.7
Village of North Freedom	0.9
Village of Lime Ridge	1.0
Village of Spring Green	1.3
Village of Rock Springs	1.4
Village of Merrimac	1.4
Village of Prairie du Sac	1.4
City of Wisconsin Dells	2.0
Village of Cazenovia	2.7
City of Reedsburg	5.2
City of Baraboo	5.6
Village of Sauk city	6.3
Village of Lake Delton	6.6
Town of Merrimac	26.3
Town of Greenfield	29.4
Town of Delton	30.3
Town of Prairie du Sac	30.3
Town of Reedsburg	30.8
Town of Baraboo	32.6
Town of Excelsior	34.0
Town of Freedom	34.7
Town of Dellona	35.1
Town of Ironton	35.2
Town of La Valle	35.3
Town of Winfield	35.4
Town of Washington	35.6
Town of Fairfield	35.6
Town of Westfield	35.7
Town of Woodland	36.2
Town of Sumpter	37.8
Town of Honey Creek	44.9
Town of Spring Green	46.2
Town of Franklin	49.3
Town of Bear Creek	49.7
Town of Troy	54.3
Sauk County	852.9

Sauk County has a large elderly population and numerous elderly housing developments and community based residential facilities, both urban and rural.

Sauk County, like so many counties in southern Wisconsin, is in a state of transition regarding land use. The major land use over time has been primarily agricultural in the rural areas with adjoining small communities that relied on the agricultural sector and a small manufacturing base. Unlike some of the other southern counties though, Sauk has always had a very strong tourism economy. The Dells of the Wisconsin River, near Wisconsin Dells, and Devil's Lake, near Baraboo, have been tourist destinations for over 150 years. During this period, tourism has expanded beyond the natural features of these two sites to include numerous manmade attractions. The tourism industry has evolved into a continuous 20-mile long tourist corridor extending from Wisconsin Dells to the city of Baraboo and beyond. The county has become the third highest ranked county in the state for tourism income behind Milwaukee and Dane counties. This strong tourism economy has led to a low unemployment rate and an increasing wage scale. Such factors make the County a desirable location for the relocation of working families and helps to keep young adults employed in their home communities. The number of rural land use permits issued per year has doubled between 1990 and 2006. All of these statistics reflect the growth and development within the County both in the incorporated areas and in the rural towns.

Sauk County has a very diverse employment base. Table 2-9 lists the top 20 employers in Sauk County. With 1,300 employees, Ho-Chunk Casino, Hotel and Convention Center is the largest employer in the county followed by Kalahari Resort and Convention Center with 1,200 employees.

Table 2-9. Top Employers in Sauk County: 2010

Company	Product or Service	Municipality
Land's End	Clothing/Distribution & Telemarketing	City of Reedsburg
Grede Foundries, Inc.	Ductile Iron Castings	City of Reedsburg
Flambeau Plastic Co.	Plastics	City of Baraboo
Sysco Food Services of Baraboo	Wholesale Food distribution	City of Baraboo
Perry Judd's Inc.	Commercial Printing	City of Baraboo
Cardinal IG	Insulated Glass	Village of Spring Green
Milwaukee Valve Co. - PDS Division	Brass Foundry	Village of Prairie du Sac
Cardinal CG	Coated Glass	Spring Green
Seats, Inc.	Seating	City of Reedsburg
Gerber Products Plastics	Baby Supplies	City of Reedsburg
Ho-chunk Casino, Hotel & Convention Center	Gaming, Hotel, Convention Center	Town of Delton
Wilderness Lodge	Hotel/Resort	Village of Lake Delton
Sauk County	Government	City of Baraboo
Kalahari Resort & Convention Center	Hotel/Resort/Convention Center	Village of Lake Delton
Noah's Ark	Water Park	Village of Lake Delton
Sauk Prairie Memorial Hospital & Clinics	Health Care	Village of Prairie du Sac/Sauk City
St. Clare Hospital	Health Care	City of Baraboo
Sauk Prairie School District	Education	Village of Prairie du Sac/Sauk City
Reedsburg Area Medical Center	Health Care	City of Reedsburg

8. Climate

The climate in Sauk County is characteristic of much of south central Wisconsin. Temperature and precipitation data from an observation station in Sauk County are presented in Table 2-10.

Table 2-10. Temperature and Precipitation; Sauk County: 1971-2000

Month	Average Daily High Temperature Fº [1]	Average Daily Low Temperature F º [1]	Average Total Precipitation (Inches)	Average Snow and Sleet (Inches)
January	25.1	3.1	0.94	9.8
February	30.2	6.6	0.92	7.2
March	42.1	20.1	2.01	7.3
April	56.7	33.4	2.99	1.8
May	69.2	44.2	3.12	0.0
June	78.2	53.7	3.73	0.0
July	82.6	58.4	3.52	0.0
August	80.0	55.4	4.16	0.0
September	71.4	46.5	3.91	0.0
October	59.9	36.0	2.36	0.2
November	44.3	24.4	2.16	3.5
December	30.0	10.3	1.34	10.6

Source: http://www.wisconline.com/counties/sauk/climate.html
Notes:
1. The monthly mean temperature is the mean of the average daily maximum temperature and the average daily minimum temperature for each month.

9. Physiographic Features[1]

The county is composed of varied and unique land features including the plains along the Wisconsin River, the oak forest covered quartzite bluffs, the unglaciated hills and valleys of the county's western two-thirds and the extensive wetlands in the northeast. Land elevations range from 700 feet to 2,200 feet. The county consists of three major distinctive geological regions.

- **The Driftless Area** The western four-fifths of Sauk County is part of an area commonly described as the Driftless Area. There is no evidence of this area having been glaciated for at least 750,000 years. Because the western portions of Sauk County are unglaciated, the topography has been sculpted by flowing water for thousands of years, resulting in a dissected bedrock plateau with relatively narrow ridges and steep-sided valleys.
- **The Glaciated Area** In contrast to the western portion, the landscape of the eastern one-fifth of Sauk County has been modified by the last glaciation, which in Sauk County lasted from about 18,000 to about 15,000 years ago. The glacier came into the County from the east, moving slowly westward covering the landscape with glacial deposits. This eastern one-fifth of Sauk County is described as being rolling with complex slopes.
- **The Baraboo Bluffs** One of the most significant topographic features in eastern Sauk County are the Baraboo Hills, which are eroded remnants of Precambrian quartzite. The Hills extend for approximately 25 miles east-west across east-central Sauk County into westernmost Columbia

[1] Source: *Sauk County Land and Water Management Plan*

County. The Baraboo Bluffs attain their greatest relief in the Devil's Lake area. Devil's Lake was formed when glacier ice plugged both ends of Devil's Lake gorge and left behind ridges (moraines) composed of till in a portion of the Baraboo Bluffs. These moraines are part of the terminal moraine that extends through eastern Sauk County from the north, a few miles east of the city of Wisconsin Dells and village of Lake Delton, continuing southward towards Sauk Prairie.

10. Surface Water

Sauk County is divided into nine watersheds: Seymour Creek, Crossman Creek-Little Baraboo River, Narrows Creek-Baraboo River, Dell Creek, Lower Baraboo, Lake Wisconsin, Plain-Honey Creek, Willow Creek, and Bear Creek.

Sauk County has 19 named lakes[2] covering 10,977 acres (Table 2-11). Lake Wisconsin is the largest lake in the county, with a surface area of 9,000 acres. The majority of lakes are 100 acres or smaller. There were 75 miles of trout streams in the county. There are one or more streams located within the boundary of each of the cities, villages, and towns, with the exception of the villages of Cazenovia and Lime Ridge (Table 2-12).

Table 2-11. Lakes in Sauk County (10 acres or larger)

Lake	Acres
Bakkens Pond	14
Blass Lake	33
Buckhorn Lake	18
Cynthia Slough	13
Deacon Thomas Lake	11
Devil's Lake	357
Dutch Hollow	210
Hemlock Slough	20
Lake of the Dells	11
Lake Delton	254
Lake Redstone	600
Lake Virginia	45
Lake Wisconsin	9,000
Leland Mill Pond	24
Long Lake	48
Mirror Lake	52
Seeley Lake	70
Upper Mirror Lake	93
White Mount Lake	104
Total	10,977

Source: Wisconsin Department of Natural Resources

11. Wetlands

According to the Wisconsin Department of Natural Resources, Sauk County has 32,145 acres of wetlands, or about 6 percent of the area of the county. Wetlands are defined by state statute as "an area where water is at, near, or above the land surface long enough to be capable of supporting aquatic or hydrophilic (water-loving) vegetation and which has soils indicative of wet conditions." Wetlands may be seasonal or permanent and are commonly referred to as swamps, marshes, or bogs. Wetland plants and soils have the capacity to store and filter pollutants, replenish groundwater supplies, store floodwaters and maintain stream flows.

[2] There are an additional 17 unnamed lakes in the DNR database in Sauk County

Table 2-12. Surface Water by Location

Municipality	Major Waterways in Boundaries
Town	
Baraboo	Baraboo River, Devils Lake
Bear Creek	Bear Creek, White Mound
Dellona	Dell Creek
Delton	Wisconsin River
Excelsior	Lake Virginia, Baraboo River, Narrows Creek, Copper Creek
Fairfield	Wisconsin River, Baraboo River
Franklin	Honey Creek
Freedom	Seeley Creek, Baraboo River, Pine Creek, Skillet Creek
Greenfield	Baraboo River, Creek from Devils Lake
Honey Creek	Honey Creek
Ironton	Little Baraboo River
La Valle	Lake Redstone, Baraboo River
Merrimac	Wisconsin River
Prairie du Sac	Otter Creek, Honey Creek, Wisconsin River
Reedsburg	Babb Creek, Hay Creek, Narrows Creek, Baraboo River
Spring Green	Wisconsin River
Sumpter	Oak Creek
Troy	Honey Creek
Washington	Narrows Creek, Bear Creek
Westfield	Narrows Creek, Honey Creek, Seeley Creek
Winfield	Twin Creek
Woodland	Little Baraboo River, Dutch Hollow Lake
Village	
Cazenovia	--
Ironton	Little Baraboo River
La Valle	Baraboo River
Lake Delton	Lake Delton
Lime Ridge	--
Loganville	Narrows Creek
Merrimac	Wisconsin River
North Freedom	Baraboo River
Plain	Honey Creek
Prairie du Sac	Wisconsin River
Rock Springs	Baraboo River, Narrows Creek
Sauk City	Wisconsin River
Spring Green	--
West Baraboo	Baraboo River
City	
Baraboo	Baraboo River
Reedsburg	Baraboo River, Hay Creek
Wisconsin Dells	Wisconsin River

Special Needs Populations and Groups

Chapter Contents

1. Chapter Overview

During a natural disaster the potential exists for certain groups of people to be disproportionately affected when compared to the general population. This chapter looks at those groups including the elderly, people with disabilities, homeless individuals, populations with language barriers, and people in mobile home parks, campgrounds, recreational/educational camps, and group quarters. Strategies and actions are included in Chapter 6 in order to address the particular needs of these groups.

2. The Elderly

As a group, the elderly are especially vulnerable to natural hazards. This is particularly true when an elderly person lives alone or with an elderly spouse and do not have family or friends to help them prepare for natural hazards or react to and recover from an event.

The aging of the population is occurring throughout the nation and is also evident in Sauk County. The number of people between the age of 5 and 19 decreased between 2000 and 2006, while the number of people 45 and older generally increased, especially in the 45 to 64 age group (Table 3-1). As the population continues to get proportionately older, it will become increasingly important to address the needs of the elderly with respect to natural hazards planning.

Table 3-1. Age of Population; Sauk County: 2000 and 2006

	Percent of Total		Percent Change
Age Group	2000	2006	2000-06
Under 5 years	6.5	5.9	-1.7
5 to 9	7.0	5.5	-19.1
10 to 14	8.0	7.6	1.3
15 to 19	7.1	6.6	-18.5
20 to 24	5.0	7.1	14.5
25 to 34	12.9	12.7	0.8
35 to 44	12.9	14.0	-13.0
45 to 54	13.8	15.4	10.8
55 to 64	8.9	11.0	29.4
65 to 74	7.0	6.7	-4.3
75 to 84	5.3	4.9	-5.8
85 and older	2.1	2.7	28.6

Source: 2000 Census of Population and Housing, US Census Bureau
2006 American Community Survey, US Census Bureau

3. People with Disabilities

Like the elderly, people with disabilities[1] have increased exposure to some types of natural hazards. As shown in Table 3-2, the likelihood that an individual has a disability increases with age. Only 8 percent of county residents between 5 to 20 years had a disability, while 38 percent that were 65 years and older had a disability.

4. Homeless Individuals

Homeless individuals are disproportionately affected by many types of natural disasters. Excessive heat and cold are especially hard on the homeless and particularly the elderly.

Homeless Haven of Sauk County is a not for profit organization that operates three housing facilities in the Baraboo area. The organization was

[1] The definition for a disability is from the US Census Bureau. A long-lasting physical, mental, or emotional condition. This condition can make it difficult for a person to do activities such as walking, climbing stairs, dressing, bathing, learning, or remembering. This condition can also impede a person from being able to go outside the home alone or to work at a job or business.

founded in 1991 and provides temporary housing facilities to homeless individuals. In addition, Homeless Haven provides job placement services.

It is not known how many homeless individuals live in Sauk County on a permanent or transient basis.

5. Populations with Language Barriers

Although, the vast majority of people in Sauk County are able to communicate effectively in English, there is a small group of residents, most likely recent immigrants, who have not learned to speak English or have not become moderately proficient. According to the 2000 census, English was the primary language spoken in 95 percent of households in Sauk County (Table 3-3).

Even though the number of residents who do not speak proficient English is comparatively small, it is anticipated that the number may continue to rise barring a significant shift in public policy in immigration. The needs of those who do not speak proficient English should be considered when devising strategies to help residents prepare themselves for an impending disaster and recover from the aftermath of the event.

Table 3-2. People with Disabilities: 2000

Age Group	Percent of Population
5 to 20 years	8.1
21 to 64 years	15.7
Percent Employed	67.3
65 years and over	38.0

Source: 2000 Census of Population and Housing, US Census Bureau, Summary File 3

6. People Living in Manufactured and Mobile Homes

Manufactured housing and mobile homes are especially susceptible to damage from high wind storm events. As a result, people living in this type of housing are more vulnerable to injury and death when compared to those living in dwellings built with conventional framed construction. In 2000, there were 2,084 mobile homes, accounting for 8.6 percent of all housing units in Sauk County). In 2010, there were 13 mobile home parks in Sauk County (Table 3-4. None of the mobile parks had a storm shelter where people could go during a wind-related storm event.

Table 3-3. Primary Language Spoken a Home : 2000

	Percent
English	**95.0**
Spanish	**1.9**
Speak English very well	60
Speak English well	16
Speak English not well	18
Don't speak English at all	6
Indo-European language	**2.7**
Speak English very well	61
Speak English well	28
Speak English not well	9
Don't speak English at all	2
Asian or Pacific Island language	**0.1**
Speak English very well	62
Speak English well	38
Other language	**0.3**
Speak English very well	61
Speak English well	28
Speak English not well	11

Source: 2000 Census of Population and Housing, US Census Bureau, Summary File 3

Table 3-4. Manufactured/Mobile Home Parks: 2010

Name	Municipality	Address
Bader's Villa Estates	City of Reedsburg	325 S Grove Street
Black Hawk Manor	City of Baraboo	902 Moore Street
Bluff View Mobile Home Park	Village of Sauk City	7559 US Highway 12
Deer Run Estates	Village of Lake Delton	731 Sunset Boulevard
Dellwood Mobile Home Court	City of Reedsburg	E9450 Dellwood Court
Honey Boy Mobile Home Park	City of Baraboo	1420 South Blvd W
Maple Aire Mobile Village	City of Reedsburg	1239 Maple Street
Maple Bluff Estates	Village of Merrimac	S7175 Bluff Road
Oak Ridge Estates	Village of Spring Green	513220 Shifflet Road
Pine Vista Mobile Home Park	Town of Prairie du Sac	N750 Golf Road
Schoepp Cottonwood Resort	Village of Sauk City	554 Schoepp Road
Steele's Trailer Park	City of Baraboo	51903 County Road A
The Courtyards	City of Reedsburg	2701 E Main Street

Source: Various sources

7. People in Campgrounds

People staying in campgrounds are even more vulnerable to wind storm events than those living in mobile home and manufactured homes. Although many campers stay in hard-sided campers or RVs, some stay in soft-sided tents. During a wind storm or tornado, they have little protection from wind-borne debris and falling branches and trees.

In 2010, there were 16 campgrounds in the county (Table 3-5 and Map 6). The Wisconsin Department of Natural Resources operated 3 campgrounds. The other campgrounds were privately operated.

Table 3-5. Campgrounds: 2010

Name	Ownership	Municipality	Address
American World RV Resort	Private	City of Wisconsin Dells	400 County Road A
Baraboo Hills Campground	Private	City of Baraboo	E10545 Terrytown Rd
Bonanza Campground & RV Park	Private	Village of Lake Delton	1770 Wisconsin Dells Parkway
Camp CHI	Private	Village of Lake Delton	443 Monroe St
Dell Boo Campground	Private	Town of Delton	E10562 Shady Lane Rd
Devil's Lake State Park	Public	City of Baraboo	S5975 Park Rd
Fox Hill RV Park & Campground	Private	Town of Fairfield	E11371 N Reedsburg Rd
Greens Corners	Private	Town of Fairfield	
Lighthouse Rock Campground Resort	Private	Town of Winfield	S2330 County Road V
Merry Mac's Campground	Private	Town of Merrimac	E12995 Halweg Rd
Mirror Lake State Park	Public	Town of Delton	E10320 Fern Dell Rd
Northern Lights Campground	Private	City of Baraboo	S5975 Park Rd
Sherwood Forest Camping & RV Park	Private	Town of Delton	S352 Highway 12/16
Wanna-Bee Campground & RV Resort	Private	Town of Delton	E10096 Trout Rd
Wisconsin Dells KOA	Private	Town of Delton	S235 Stand Rock Rd
Yogi Bear's Jellystone Park Camp	Private	Town of Delton	S1915 Ishnala Rd

Source: Sauk County Health Department

8. People in Recreational/Educational Camps

In addition to the campgrounds in the county, there were 3 group camps operated by a nonprofit entity for recreational or educational purposes (Table 3-6 and Map 6). Housing in a group camp usually consists of lodging in one or more buildings and/or camping in tents and the like.

Table 3-6. Recreational/Educational Camps: 2010

Name	Municipality	Address
American Ukrainian Youth Association Camp & Resort	Town of Greenfield	E14481 Luebke Rd
Camp Gray	Town of Delton	E10213 Shady Lane Rd
Church of God Campground	Town of Freedom	E7665 CTH D

Source: Various sources

9. People in Group Quarters

While the majority of people in Sauk County live in a single-family dwelling or a multifamily building, more than 880 people lived in what are referred to as group quarters in 2000 (Table 3-7). If residents live in a controlled environment (e.g., correctional institutions and nursing homes), the group quarters are referred to as institutional. Those living in a group setting are referred to as noninstitutional (e.g., college dormitories, military quarters). Nursing homes are the most populated type of group quarter, accounting for over 53 percent of this population.

Table 3-7. Population in Group Quarters; Sauk County: 2000

Type of Group Quarter	Number	Percent of Total [1]
Nursing homes	475	53.9
Local jails and other confinement facilities	132	15.0
Halfway homes or rehab centers	53	6.0
Group homes	19	2.1
Religious group quarters	13	1.5
Homes for the mentally ill	12	1.4
Homes for the mentally retarded	7	0.7
Noninstitutional group quarters	170	19.4
Total	881	100

Source: Various sources including field verification
Note.
1. Total may not add up to 100.0 due to rounding

Critical Facilities

Chapter Contents

1. Chapter Overview

This chapter focuses on those critical facilities in Sauk County that need to be evaluated in terms of natural hazards mitigation planning. For the purpose of this plan, critical facilities are categorized into the following classification scheme:

- Type I A facility that provides a public service, which if damaged would significantly impair a local governmental response
- Type II A facility that provides a public service, but which if damaged would not significantly impair a local governmental response
- Type III A facility that can cause greater damage to the surrounding area if damaged by a natural hazard
- Type IV A facility that primarily housing special populations such as the infirm, children, elderly, or people with development disabilities

In all, there were 562 critical facilities in the county (Table 4-1). There were 110 Type I facilities, 279 Type II, 29 Type III, and 144 Type IV facilities. Appendix E lists all of the critical facilities sorted by type and Appendix F provides a list sorted by jurisdiction.

As part of the 2010 plan update, the consultant created an Access™ database to manage basic information for critical facilities identified in this plan. Each facility was assigned to one or more parcels using the county PIN number to facilitate use in the county's geographic information system.

2. Bridges

The road network in the county consists of local, county, sate, and federal roads. In 2010, there were 207 locations where a federal, state, or county roadway crossed a waterbody such as a stream or lake. These locations have been identified because flooding may overtop the roadway or backup floodwaters. The locations are shown on Map 5. Bridges that cross another roadway or railroad tracks are not considered a critical facility from the perspective of natural hazards.

Table 4-1. Critical Facilities by Type: 2010

Facility Type	Type I	Type II	Type III	Type IV
Infrastructure				
Bridge	-	207	-	-
Dam (large & small)	-	-	29	-
Telecommunication Tower	-	13	-	-
Electric Facility – Power Plant	1	-	-	-
Electric Facility – Substation	3	-	-	-
Natural Gas Facility	-	-	-	-
Public-Use Airport	4	-	-	-
Telephone Facility	4	-	-	-
Utility Office/Yard	1	-	-	-
Water Facility [1]	14	-	-	-
Wastewater Treatment Facility	12	-	-	-
Government Facility				
Community / Senior Center	-	5	-	-
Library	-	8	-	-
Municipal Garage	25	-	-	-
Municipal Office and Other	-	31	-	-
Post Office	-	14	-	-
Recreation	-	1	-	-
Health Care Facility				
Health Care Clinic	11	-	-	-
Hospital	3	-	-	-
Public Safety Facility				
Correctional Facility	-	-	-	1
EMS Facility	11	-	-	-
Fire Station	13	-	-	-
Military Facility	2	-	-	-
Police Station	6	-	-	-
School				
K-12	-	-	-	37
Post-Secondary	-	-	-	2
Special Care Facility – Residential				
Adult Family Home	-	-	-	5
Community Based Residential Facility	-	-	-	20
Nursing Home	-	-	-	10
Residential Care Apartment Complex	-	-	-	4
Special Care Facility – Nonresidential				
Adult Day Care	-	-	-	0
Group Day Care	-	-	-	19
Vulnerable Housing				
Campground	-	-	-	14
Manufactured/Mobile Home Park	-	-	-	28
Recreational/Educational Camp	-	-	-	4
Total	110	279	29	144

Notes: 1. Types of facilities included in this category include wells, towers, and treatment plants.

Key Terms in This Chapter

Adult day care – A place where adults receive care for less than 24 hours a day.

Adult family home (AFH) – A place where three or four adults who are not related to the operator reside and receive care, treatment, or services that are above the level of room and board and that may include up to seven hours per week of nursing care per resident.

Community based residential facility (CBRF) – A place where five or more adults reside who are not related to the operator, who do not require care above intermediate level nursing care, and who receive care, treatment, or services that are above the level of room and board, but includes no more than three hours of nursing care per week per resident.

Group day care – A place where a person for less than 24 hours a day provides care and supervision for 9 or more children who are not related to the provider.

Nursing home – A place where unrelated individuals live, who because of their mental or physical condition, are given 24-hour personal care and nursing care, but who do not require hospitalization.

Large dam – A dam that either (1) has a structural height of over 6 feet and impounds 50 acre-feet or more, or (2) has a height of 25 feet or more and impounds more than 15 acre-feet.

Power plant – A facility containing prime movers, electric generators, and auxiliary equipment for converting mechanical, chemical, and/or fission energy into electric energy.

Public-use airport – An airport open for public use without prior permission, and without restrictions within the physical capacities of available facilities. A public-use airport may or may not be publicly owned.

Residential care apartment complex (RCAC) – A multi-family building where five or more adults reside in independent dwelling units and also receive not more than 28 hours per week of supportive services, personal assistance, and nursing assistance.

Small dam – A dam not classified as a large dam.

Substation – An auxiliary power station where electrical current is converted, as from DC to AC, or where voltage is stepped up or down.

3. Dams

According to an inventory maintained by the Wisconsin Department of Natural Resources, there were 175 dams in Sauk County; 46 of which have since been removed, are no longer active, or were not built (Map 8). Most of these are mill-type dams that were built more than 50 years ago and do not have a regular program for maintenance or repair. They are not subject to regulatory inspection. There are also small dams that pool water for livestock and various recreational ponds around the county.

For the purposes of this plan, the identified dams are classified as a Type III critical facility in that a dam failure would cause additional impacts primarily to downstream properties.

4. Public-Use Airports

There were four public-use airports in the county (Table 4-2 and Map 9). Baraboo Wisconsin Dells Airport and Baraboo Wisconsin Dells Airport are both classified as a transport/cargo airport[1]. Sauk-Prairie is classified as a basic utility airport[2] Tri-County Regional Airport near Lone Rock is classified as a general utility airport[3]. In addition to this public-use airport, there were a number of private-use airports / airstrips located throughout the county.

Table 4-3. Public-Use Airports: 2010

Name	Classification	Municipality
Baraboo Wisconsin Dells Airport	Transport/Cargo	Town of Delton
Reedsburg Municipal Airport	Transport/Cargo	City of Reedsburg
Sauk-Prairie Airport	Basic Utility	Town of Prairie du Sac
Tri-County Regional Airport	General Utility	Town of Spring Green

Source: *Wisconsin State Airport System Plan: 2020*

5. Communication Towers

Map 10 shows the location of the 13 communication towers located in the county.

[1] Transport/corporate airports are intended to serve corporate jets, small passenger and cargo jet aircraft used in regional service and small airplanes (piston or turboprop) used in commuter air service. These aircraft generally have a gross takeoff weight of less than 60,000 pounds, with approach speeds below 141 knots and wingspans of less than 118 feet. In Wisconsin, airports in this category normally have a primary runway length of 4,800 to 6,800 feet.

[2] Basic utility airports are intended to serve all small single-engine piston aircraft and many of the smaller twin-engine piston aircraft with a gross takeoff weight of 12,500 pounds or less. These aircraft typically seat from two to six people and are now commonly used for business and some charter flying as well as a wide variety of activities including recreational and sport flying, training, and crop dusting. In Wisconsin, airports in this category normally have a primary runway length of 2,800 to 3,900 feet.

[3] General utility airports serve virtually all small general aviation single and twin-engine aircraft, both piston and turboprop, with a maximum takeoff weight of 12,500 pounds or less. These aircraft generally have approach speeds below 121 knots and wingspans of less than 79 feet. Typically, these aircraft are used for business and charter flying and for personal reasons. In Wisconsin, airports in this category normally have a primary runway length of 3,900 to 4,800 feet.

6. Telephone Facilities

Telephone service providers maintained 4 telephone facilities (Map 11). They were located in the villages of La Valle, Lime Ridge, North Freedom, and Prairie du Sac.

7. Electric Facilities

There was one hydroelectric dam in 2010 – Alliant Energy - and 3 electric substations.

8. Public Water Facilities

Public water facilities inventoried for this plan include water wells, towers, reservoirs, and treatment plants. A total of 14 facilities were identified and are shown on Map 12. They are located in the cities of Baraboo, Reedsburg, and Wisconsin Dells and the villages of Prairie du Sac, Sauk City, Lake Delton, and Spring Green. In the rest of the county, individuals rely on private wells for their water supplies.

9. Wastewater Facilities

There were 12 wastewater treatment plants in the county and they are located in each of the urban areas and in the more developed areas of the towns (Map 12). The Reedsburg Wastewater Treatment Plant is located on Division Street on the south side near the Baraboo River. The Baraboo Wastewater Treatment Plant is on Manchester Street near the Baraboo River. The facilities in the villages of Lake Delton, Sauk City, and Prairie du Sac are near the Wisconsin River. The village of Spring Green's wastewater plant is not close to the Wisconsin River, but is located in an area with a very high water table. Excessive rain in that area has caused major flooding.

10. Public Safety Facilities

Within Sauk County, there were 6 police stations and 13 fire stations (Map 13). The Baraboo Fire Department provides a full time Chief and a full time Fire Inspector, and the Delton Fire Department also has a full time chief. The other departments rely on volunteers. The Wonewoc Fire Department (Juneau County) services a portion of the town of Woodland and Wisconsin Dells Fire Department (Columbia County) services that portion in Sauk County. Cazenovia Fire/EMS (Richland County) serves a portion of the western side of the County.

There were 11 emergency medical service facilities in the County plus the Cazenovia Ambulance Service in Richland County that services part of the west central part of the County. Wisconsin Dells Ambulance Service in Columbia County provides service the city in Wisconsin Dells, and Wonewoc (Juneau County) Ambulance provides service to the northwest corner of the county.

11. National Guard Facilities

There were two National Guard facilities in the County (Map 13). They are located in the city of Baraboo at 999 South Boulevard and in the city of Reedsburg at 549 S. Dewey Avenue.

12. Government Facilities

Government facilities included in the inventory of critical facilities include a wide array of facilities including community/senior centers, public libraries, municipal garages, municipal offices, post offices, and large recreation buildings (Table 4-4). Map 14 shows the location of the government facilities.

Table 4-4. Government Facilities: 2010

	Community/ Senior Center	Public Library	Municipal Garage	Municipal Office and Other	Post Office	Recreation Facility
Town						
Baraboo	-	-	-	-	-	-
Bear Creek	-	-	1	1	-	-
Dellona	-	-	-	1	-	-
Delton	-	-	2	-	-	-
Excelsior	-	-	-	-	-	-
Fairfield	-	-	-	1	-	-
Franklin	-	-	-	-	-	-
Freedom	-	-	1	-	-	-
Greenfield	-	-	-	1	-	-
Honey Creek	-	-	1	-	-	-
Ironton	-	-	-	1	-	-
La Valle	-	-	1	-	-	-
Merrimac	-	-	-	1	-	-
Prairie du Sac	-	-	1	1	-	-
Reedsburg	-	-	-	-	-	-
Spring Green	-	-	1	-	-	-
Sumpter	-	-	1	-	-	-
Troy	-	-	-	-	-	-
Washington	-	-	-	-	1	-
Westfield	-	-	-	-	-	-
Winfield	-	-	-	-	-	-
Woodland	-	-	-	-	-	-
Village						
Cazenovia [1]	-	-	-	-	-	-
Ironton	-	-	-	1	-	-
Lake Delton	-	-	1	2	1	-
La Valle	-	1	2	-	1	-
Lime Ridge	1	-	1	1	1	-
Loganville	-	-	1	1	1	-
Merrimac	-	-	1	1	1	-
North Freedom	-	1	-	1	1	-
Plain	1	-	1	2	1	-
Prairie du Sac	-	1	1	1	1	-
Rock Springs	1	1	1	1	1	-
Sauk City	1	1	-	1	1	-
Spring Green	1	1	2	-	1	-
West Baraboo	-	-	1	2	-	-
City						
Baraboo	-	1	2	7	1	-
Reedsburg	-	1	2	3	1	-
Wisconsin Dells [1]	-	-	-	-	-	-
Total	5	8	25	31	14	0

Notes:
1. Municipality located in Sauk County and another county; data is for Sauk County only

13. Schools

In 2010, there were 37 schools serving kindergarten through high school (Table 4-5). There were two post-secondary schools. The University of Wisconsin-Baraboo is located in the city of Baraboo and Madison Area Technical College is located in Reedsburg (Map 15).

14. Special Care Facilities–Residential

Special care facilities include various types of housing arrangements where residents receive care or supervision from trained personnel. Special care facilities include nursing homes, residential care apartment complexes (RCACs), community based residential facilities (CBRFs), and adult family homes (AFHs) (Map 16). There were 10 nursing homes in the county (Table 4-6).

In a RCAC, people live in independent dwelling units complete with a kitchen, a bathroom, and sleeping and living areas. The management team provides supportive services such as general housekeeping and transportation to access community services and recreational activities. Personal services are also provided and may include help with daily activities such as dressing, eating, bathing, and grooming. Finally nursing services are available to help with health monitoring, medication administration, and medication management. There were 4 RCACs in Sauk County.

CBRFs and AFHs are similar in terms of the level of care provided. One significant difference between them is the number of residents served in the facility. An AFH can serve up to four adults. A CBRF serves five or more adults. There were 5 AFHs in the county and 4 CBRFs (Table 4-6).

15. Special Care Facilities–Nonresidential

Nonresidential special care facilities include group day care centers and adult day care centers (Map 17). Group day care centers provide child care for nine or more children. Adult day care centers provide care to older adults who may live at home but need care during the day because the spouse or other primary care giver is not able to provide care.

There were 19 group day care centers located throughout the county primarily in more urban areas (Table 4-6). There were no adult day care facilities in the county.

Table 4-5. Schools: 2010

	K-12	Post-Secondary
Town		
Baraboo	-	-
Bear Creek	-	-
Dellona	-	-
Delton	-	-
Excelsior	-	-
Fairfield	1	-
Franklin	-	-
Freedom	-	-
Greenfield	-	-
Honey Creek	1	-
Ironton	-	-
La Valle	-	-
Merrimac	-	-
Prairie du Sac	-	-
Reedsburg	-	-
Spring Green	-	-
Sumpter	-	-
Troy	1	-
Washington	-	-
Westfield	-	-
Winfield	-	-
Woodland	-	-
Village		
Cazenovia [1]	-	-
Ironton	-	-
Lake Delton	1	-
La Valle	1	-
Lime Ridge	-	-
Loganville	1	-
Merrimac	1	-
North Freedom	1	-
Plain	2	-
Prairie du Sac	2	-
Rock Springs	1	-
Sauk City	3	-
Spring Green	4	-
West Baraboo	1	-
City		
Baraboo	7	1
Reedsburg	9	1
Wisconsin Dells [1]	-	-
Total	37	2

Notes:
1. Municipality located in Sauk County and another county; data is for Sauk County only

Table 4-6. Special Care Facilities: 2010

	Nursing Home	Residential Care Apartment Complex (RCAC)	Community Based Residential Facility (CBRF)	Adult Family Home (AFH)	Group Day Care	Adult Day Care
Town						
Baraboo	-	-	-	-	-	-
Bear Creek	-	-	-	1	-	-
Dellona	-	-	-	-	1	-
Delton	1	-	-	-	-	-
Excelsior	-	-	1	-	-	-
Fairfield	-	-	-	-	-	-
Franklin	-	-	-	-	-	-
Freedom	-	-	-	-	-	-
Greenfield	-	-	-	-	-	-
Honey Creek	-	-	-	-	-	-
Ironton	-	-	-	-	-	-
La Valle	-	-	-	-	-	-
Merrimac						
Prairie du Sac	-	-	-	-	-	-
Reedsburg	1	-	1	1	-	-
Spring Green	-	-	-	-	-	-
Sumpter	-	-	1	-	-	-
Troy	-	-	-	-	-	-
Washington	-	-	2	-	-	-
Westfield	-	-	-	-	-	-
Winfield	-	-	-	1	-	-
Woodland	-	-	-	-	-	-
Village						
Cazenovia [1]	-	-	-	-	-	-
Ironton	-	-	-	-	-	-
Lake Delton	-	-	-	-	-	-
La Valle	-	-	-	-	-	-
Lime Ridge	-	-	-	-	-	-
Loganville	-	-	-	-	-	-
Loganville	-	-	-	-	-	-
Merrimac	-	-	-	-	1	-
North Freedom	-	-	-	-	-	-
Plain	-	-	-	-	-	-
Prairie du Sac	-	-	2	-	2	-
Rock Springs	-	-	-	-	-	-
Sauk City	2	1	-	-	2	-
Spring Green	1	1	1	-	-	-
West Baraboo	-	-	-	-	-	-
City						
Baraboo	2	1	8	2	8	-
Reedsburg	3	1	4	-	4	-
Wisconsin Dells [1]	-	-	-	-	-	-
Total	10	4	20	5	19	0

Source: Wisconsin Department of Health and Family Services
Notes:
1. Municipality located in Sauk County and another county; data is for Sauk County only

16. Health Care Facilities

For the purpose of this plan, health care facilities are divided into two types: hospitals and health care centers. Hospitals provide acute health care and health care clinics provide sub-acute medical services, and include ambulatory surgery centers. In 2010, there were 11 health care centers and three hospitals (Map 18).

Reedsburg Area Medical Center, located at 2000 North Dewey Avenue in the city of Reedsburg, is an independent, nonprofit organization that has been in operation for over 100 years. It provides a full range of inpatient and outpatient healthcare services consisting of 25 acute care beds and 17 one day surgery beds. In 2007 the facilities were expanded to include the Reedsburg Area Specialty Center and Surgery Center, offering expanded operating room technologies and rehabilitation facilities.

St. Claire Hospital is located at 707 14th Street in the city of Baraboo. It houses over 100 beds and has more than 100 physicians on staff. St. Claire is a member of SSM Health Care, a St. Louis based health care group, and offers a wide range of services from acute care to chemical dependency treatment.

Sauk Prairie Memorial Hospital is a not for profit acute care facility with 36 beds. It was founded in 1956 and is located at 80 First Street in the village of Prairie du Sac. There are currently 34 full-time physicians ranging in specialties from orthopedics to spinal surgery.

17. Vulnerable Housing

Vulnerable housing, including campgrounds, recreational/educational camps, and mobile home parks, is described in Chapter 3.

Assessment of Natural Hazards

Chapter Contents

1. Chapter Overview

This chapter evaluates the natural hazards that have or could occur in the county. Initially, 14 natural hazards were identified. They were prioritized and earthquakes, wildland fire, and land subsidence were dropped from future consideration. The remaining natural hazards are described in this chapter. After describing the nature of the hazard, the frequency of occurrence is documented along with its effect on critical facilities, various population groups, and economic sectors. Estimates of economic loss are included when there is enough empirical data to do so.

2. Hazard Identification

As part of an initial screening process, the steering committee used the methodology developed by Wisconsin Emergency Management[1] to evaluate 14 natural hazards that were initially identified as a potential threat. The members of the steering committee used a group consensus process to assign a numeric value to the factors listed in Table 5-1 to help determine those hazards that warrant the most attention on a countywide basis.

Table 5-1. Hazard Assessment Criteria

Factor	Description
Historical Hazard Frequency	Frequency of past occurrences
Anticipated Hazard Probability	Probability of the hazard occurring again
Historical Health and Public Safety	Degree of past hazard events causing injuries, sickness, and/or deaths
Residential Damage	Degree of past hazard events causing damages to homes
Business Damage	Degree of past hazard events causing damages to businesses
Public Costs	Amount of local, state, and federal funds expended on past hazard recovery activities
Magnitude of Population at Risk	Amount of the area's population still vulnerable to injury, sickness, and/or death
Magnitude of Homes at Risk	Amount of homes still vulnerable to damage
Magnitude of Businesses at Risk	Amount of businesses still vulnerable to damage or interruption of business trade
Magnitude of Public Infrastructure at Risk	Amount of infrastructure that is susceptible to damages

Source: *Resource Guide to All Hazards Mitigation Planning In Wisconsin*, 2003. Wisconsin Emergency Management

Table 5-2 shows the results of that exercise. The three highest ranked natural hazards are thunderstorms, winter storms, and tornadoes. Given the distance to a known fault line, earthquakes were judged to be of little concern. In addition, given the topography and soils in the county, land failures, including subsidence and mass movement, were judged to be of little concern. Wildland fire was also

[1] *Resource Guide to All Hazards Mitigation Planning In Wisconsin*, 2003. Wisconsin Emergency Management

deemed to be comparatively of low priority. These were removed from further consideration in this plan.

Table 5-2. Countywide Comparative Analysis of Natural Hazards; Sauk County: 2010

Natural Hazard	1 Historical Hazard Frequency (1,2,3)	2 Anticipated Hazard Probability (1,2,3)	3 Historical Health and Public Safety (1,2,3)	4 Residential Damage (1,2,3)	5 Business Damage (1,2,3)	6 Public Costs (1,2,3)	7 Magnitude of Population At Risk (1,2,3)	8 Magnitude of Homes At Risk (1,2,3)	9 Magnitude of Businesses At Risk (1,2,3)	10 Magnitude of Public Infrastructure At Risk (1,2,3)	11 Overall Score
Thunderstorm	3	3	1	1	1	1	3	3	2	2	20
Flooding – riverine	2	2	2	1	2	3	1	1	2	2	20
Tornado	1	1	1	1	2	2	3	3	3	2	19
Winter storm	1	1	1	1	2	2	3	2	2	1	19
Flooding – stormwater	2	2	1	1	2	3	1	1	1	2	17
Dense fog	3	3	1	1	1	1	2	1	1	1	15
Hail	2	2	1	2	1	1	1	2	2	1	14
Extreme cold	2	2	2	1	1	1	2	1	1	1	14
Excessive heat	2	2	2	1	1	1	2	1	1	1	14
Drought	1	1	1	1	2	1	3	1	1	1	13
Dam Failure	1	1	1	1	1	1	1	1	1	2	11

Notes: This matrix is based on a qualitative assessment and is intended to identify those hazards posing the greatest concern.

A low, medium, or high numerical rating of 1, 2, or 3, respectively, is assigned to each criterion and then the ratings for each hazard are totaled.

Column 1 refers to the frequency of past occurrences.
Column 2 refers to the probability of the hazard occurring again.
Column 3 refers to the degree of past hazard events causing injuries, sickness, and/or deaths.
Column 4 refers to the degree of past hazard events causing damages to homes.
Column 5 refers to the degree of past hazard events causing damages to businesses.
Column 6 refers to the amount of local, state, and federal funds expended on past hazard recovery activities.
Column 7 refers to the amount of the area's population still vulnerable to injury, sickness, and/or death.
Column 8 refers to the amount of homes still vulnerable to damage.
Column 9 refers to the amount of businesses still vulnerable to damage or interruption of business trade.
Column 10 refers to the amount of infrastructure that is susceptible to damage.
Column 11 is the raw score for the hazard.

The nature of the identified hazards are quite different as shown in Table 5-3. Some of the hazards are characteristically localized occurrences, while others could potentially cover the entire county and the surrounding region. Further, some hazards occur with little advance warning and others, such as riverine flooding on larger rivers, can be forecasted with some degree of accuracy several days in advance of the actual event. Some hazards have the potential to occur often, while others occur rather infrequently.

In an effort to keep residents and local officials informed about potential events, the National Weather Service (NWS) issues, outlooks, watches, and warnings for most weather events. NWS mentions the possibility of a hazard in daily

message entitled “Hazardous Weather Outlook” (HWO) that is disseminated to the media, posted on its web site, broadcast on NOAA Weather Radio All Hazards, and made available on various computer circuits. An outlook covers possible events seven days out. Confidence factor is about 30 percent for issuance. A message entitled “watch” for most weather hazards is generally issued hours to a couple days in advance of a possible event. Confidence factor is about 60 percent for issuance. It is disseminated to the media, posted on the NWS web site, broadcast on NOAA Weather Radio All Hazards, and made available on various computer circuits. A “warning” message for most weather hazards has a confidence factor of 80 to 100 percent. It is disseminated to the media, posted on the NWS web site, broadcast on NOAA Weather Radio All Hazards, and made available on various computer circuits.

Table 5-3. Nature of Natural Hazards; Sauk County

Natural Hazard	Extent	Amount of Advance Notification	Recurrence Interval [1]
Dam Failure	Along affected stream corridor	None to weeks	N/A [2]
Flooding – Riverine	Along affected stream corridor and around lakes	Several days	0.01 [3]
Flooding – Stormwater	Poorly drained areas	Several days	0.01 [3]
Dense Fog	Small pockets in low-lying areas to countywide	Several days	0.7
Tornado	Generally a linear path up to several miles long	Several days	0.7
Hail Storm	1 square mile and larger	Several days	0.7
Thunderstorm	10 square miles and larger	Several days	0.33
Snow Storm	Countywide	Several days	1.3
Extreme Heat	Countywide	Several days	0.4
Extreme Cold	Countywide	Several days	0.3
Drought - short-lived	Countywide	Several months	10
Drought - long-lived	Countywide	Year	75

Notes:
1. Recurrence interval is number of events occurring over a period of time.
2. It is not possible to define a recurrence interval for this type of hazard
3. Based on a 100-year flood

Table 5-4 lists each of the hazards and identifies whether they will have an impact on the critical facilities identified in this plan, noncritical buildings and structures, special populations, the general population, and broadly defined economic sectors.

Table 5-4. General Effects of Natural Hazards on Facilities, Population Groups, and Economic Sectors; Sauk County: 2010

Critical Facility		Dam Failure	Flooding - Riverine	Flooding - Stormwater	Dense Fog	Tornado/ High Wind	Hail	Thunderstorm	Winter Storm	Extreme Temperature	Drought
Facility with Hazardous Materials		-	D	-	-	D	-	-	-	-	-
Infrastructure	Bridge	D	D	-	-	-	-	-	-	-	-
	Dam	D	D	-	-	-	-	-	-	-	-
	Communication Tower	-	-	-	-	D	-	-	-	-	-
	Electric Facility – Power Plant	-	-	-	-	D	-	-	-	-	-
	Electric Facility – Substation	-	-	-	-	D	-	-	-	-	-
	Natural Gas Facility	-	-	-	-	D	-	-	-	-	-
	Petroleum Pipeline	-	-	-	-	-	-	-	-	-	-
	Public-Use Airport	-	-	-	I	D	I	I	I	-	-
	Telephone Facility	-	-	-	-	D	-	-	-	-	-
	Utility Offices/Yard	-	-	-	-	D	-	-	-	-	-
	Water Facility [1]	-	-	-	-	D	-	-	-	-	I
	Wastewater Facility	-	-	-	-	D	-	-	-	-	-
Government Facility	Community Center	-	-	-	-	D	D	-	-	-	-
	Library	-	-	-	-	D	D	-	-	-	-
	Municipal Garage	-	-	-	-	D	D	-	-	-	-
	Municipal Office and Other	-	-	-	-	D	D	-	-	-	-
	Post Office	-	-	-	-	D	D	-	-	-	-
	Senior Center	-	-	-	-	D	D	-	-	-	-
Health Care Facility	Health Care Clinic	-	-	-	-	D	D	-	-	-	-
	Hospital	-	-	-	-	D	D	-	-	-	-
Public Safety Facility	EMS Facility	-	-	-	-	D	D	-	-	-	-
	Fire Station	-	-	-	-	D	D	-	-	-	-
	National Guard Facility	-	-	-	-	D	D	-	-	-	-
	Police Station	-	-	-	-	D	D	-	-	-	-
School	K-12	-	-	-	-	D	D	-	-	-	-
	Secondary	-	-	-	-	D	D	-	-	-	-
Special Care Facility - Residential	Adult Family Home	-	-	-	-	D	D	-	-	-	-
	Community Based Residential Facility	-	-	-	-	D	D	-	-	-	-
	Nursing Home	-	-	-	-	D	D	-	-	-	-
	Residential Care Apartment Complex	-	-	-	-	D	D	-	-	-	-
Special Care Facility - Nonresidential	Adult Day Care	-	-	-	-	D	D	-	-	-	-
	Group Day Care	-	-	-	-	D	D	-	-	-	-
Vulnerable Housing	Mobile Home Park	-	-	-	-	D	D	-	-	-	-
	Campground	-	-	-	-	D	D	-	-	-	-
Noncritical Buildings/Structures		-	-	-	-	D	D	-	-	-	-
Population Groups											
General Public		-	-	-	-	D	-	-	-	I	I
Elderly and People with Disabilities		-	-	-	-	-	-	-	-	I	-
Homeless		-	-	-	-	-	-	D	D	D	-
Economic Sector											
Agriculture		-	D	D	-	-	D	I	-	I	D
Commercial		-	-	-	-	-	-	-	-	-	I
Industrial		-	-	-	-	-	-	-	-	-	-
Transportation		-	-	-	-	-	-	-	-	-	-

Notes: 1. Types of facilities included in this category include wells, towers, and treatment plants

Key: - No or minimal effect; I – Indirect Effect; D – Direct Effect

3. History of Weather-Related Events

Table 5-5 presents a summary of weather-related events occurring in Sauk County and surrounding region since 1950 as documented by the National Weather Service (NWS). A complete list of weather events is listed in Appendix G. It should be noted that for excessive cold and heat and winter storms, the data for direct deaths and injuries, property damage, and crop damage is for the county and the surrounding region. It also appears that crop damage as documented by the NWS is under reported.

Out of all of the weather-related events, temperature extremes have caused the highest number of deaths and injuries. Tornadoes caused the next highest number of injuries. In terms of monetary loss, flooding has caused the most damage to property and crops ($312.7 million). Widespread heavy rains across central and southeast Wisconsin for the period of June 9-12, 2004 resulted in flooding in all affected areas. Many streams and rivers were at or above flood stage for a good part, or most of the month of June and continuing into the early part of July. Damage from this flooding resulted in $251.6 million in loss to both property and crops.

Thunderstorms have occurred with the highest frequency— about 2.7 times a year. Hail and winter storms were the next most common weather-related event. Flooding, lightning, severe winter weather, and tornadoes have about the same recurrence interval.

Table 5-5. Summary of Weather-Related Events Affecting Sauk County and Surrounding Region: 1950 through 2009

Type of Event	Number	Direct Deaths	Direct Injuries	Property Damage	Crop Damage
Dense Fog	44	0	0	0	0
Drought	12	0	0	0	$4.45M
Excessive Heat	17	81	40	0	0
Extreme Cold	23	9	52	$23,000	0
Flood	38	0	0	$69.6M	$243.1M
Funnel Cloud	4	0	0	0	0
Hail	98	0	0	$984,000	$438,000
Heavy Rain	6	0	0	0	0
Lightning	10	0	1	$1.99M	0
Tornado	23	0	13	$6.544M	$530K
Wind – High	4	1	15	$10.4M	$1.6M
Wind – Strong	14	0	0	$664,000	0
Wind – Thunderstorm	163	0	6	$2.104M	$547K
Winter Storm	85	0	1	$315,000	0

Source: National Climatic Data Center database accessed on March 20, 2009 http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms

4. Presidential Declarations

Since 1965, there have been 38 declarations issued for Wisconsin. Sauk County was included in three disaster declarations and one emergency declaration.

Major Disaster Declaration A major disaster declaration was issued for Sauk County, along with other counties, in 2000, 2007, and 2008 (Table 5-6).

Emergency Declaration In 2005, an emergency declaration was issued for all 72 counties in the state as part of the nationwide response to Hurricane Katrina.

Fire Management Assistance Declaration No fire management assistance declarations have been issued for Sauk County.

Table 5-6. Presidential Disaster Declarations, Sauk County: 1965 through 2010

			Number of Counties By Type of Assistance	
Major Disaster	**Year**	**Description**	**Public**	**Individual**
FEMA-_____	1993	Flooding	__	__
FEMA-1332-DR	2000	Severe storms, tornadoes, flooding	12	3
FEMA-1719-DR	2007	Severe storms, tornadoes, flooding	5	0
FEMA-1768-DR	2008	Severe storms, tornadoes, flooding	28	29
Emergency				
FEMA-3249-EM	2005	Hurricane Katrina evacuation	72	0
Fire Management Assistance				
None	-	-	-	-

Source: Federal Emergency Management Agency (http://www.fema.gov/news/disasters.fema accessed April 2009) and Wisconsin Emergency Management

Notes:
1. Data not available

Denied Applications for Presidential Disaster Declaration The county's application for a presidential disaster declaration has been denied on two occasions (Table 5-7).

Table 5-7. Denied Applications for Presidential Disaster Declarations; Sauk County: 1965 through 2009

Year	Description
1996	Flooding, severe storm
1998	High winds, severe storms

Source: Wisconsin Emergency Management and Sauk County Emergency Management

5. Dam Failure

Profile

A dam failure involves the uncontrolled release of impounded water when the structure fails. A dam can fail because of excessive rainfall or melting snow, poor construction or maintenance, flood damage, earthquake activity, weakening caused by burrowing animals, vegetation, surface erosion, vandalism, or a combination of factors. When a dam does fail, the impounded

water flows unimpeded and, depending on what development is located downstream, can potentially cause significant property damage and loss of life.

According to the Department of Natural Resources, there were 175 dams in the county (Table 5-8). Of that number, 128 remain active in that they impound some water. The others were abandoned or were otherwise destroyed (20), no longer impound water (23), or have been permitted but have not been built yet (3).

Table 5-8. Dams; Sauk County: 2010

Status	Number
Abandoned or destroyed	20
Active	128
No longer impounding water	23
Planned or not built	3
Total	175

Source: Wisconsin Department of Natural Resources, data accessed April 2010

Most of dams in the county were "millpond" dams that were built more than 80 years ago. There were also small dams for watering livestock and various recreational ponds around the county. Sauk County owns two dams, White Mound, put in to control flooding on the Honey Creek Watershed, and Lake Redstone, a recreational lake near La Valle. Two electric power generating dams were also located in Sauk County.

If any of the mill type dams failed, the runoff would hardly be noticed downstream. The electric power generating dams within the county are of the greatest concern, but consistent maintenance keeps them in good repair. Failure of dams in Juneau and Adams counties could cause flooding in the northeast corner of Sauk County.

History of Past Occurrences

According to the Wisconsin Department of Natural Resources, there were about 3,800 dams in the state. Between 1990 and 1995, 75 dam failures were documented, many of which resulted from the flooding that occurred statewide in 1993. In Sauk County, there are no documented dam failures of significance. Although the Lake Delton Dam did not fail, County Highway A in the Village of Lake Delton washed out in 2008, causing Lake Delton to empty into the Wisconsin River.

Vulnerability Assessment

Over the years, 20 dams in the county were removed or have fallen into disrepair and do not currently impound water (Table 5-9). Of the 128 dams that remain intact, 24 are classified as large, 102 are small, and 2 are unclassified.

A failure of a small dam would likely not cause damage. Given the amount of water impounded behind a large dam, dam failure is a concern in varying degrees. Dams are also classified based on the threat to downstream property if a dam failed as specified in Section 333.06, Wisconsin Administrative Code. A dam rated as a high hazard indicates that a failure would most probably result in the loss of life. A significant hazard indicates that a dam failure could result in appreciable property damage. A low hazard rating is assigned to dams where a dam failure would result in only minimal property damage and where loss of life is unlikely. Of the 24 existing large dams, 4 are classified as high and 20 are low (Table 5-10).

Table 5-9. Abandoned Dams; Sauk County: 2010

DNR ID	Official Name	Municipality	Stream Name
189	Waterworks Dam	City of Baraboo	Not specified
296	Linen Milll	Town of Greenfield	Baraboo River
297	Oak Street Dam	City of Baraboo	Baraboo River
298	La Valle Dam	Village of La Vallle	Baraboo River
1455	Fort Dells		Not specified
2736	Kindschi, Dam		Not specified
4316	Tucker Dam		Baraboo River
4317	Coles Mill dam		Narrows Creek
4318	Rathburn Dam		Big Creek
4319	Falkenstern Dam		Rowley Creek
4320	Island Woolen Dam		Baraboo River
4321	Konkesl Dam		Rowley Creek
4322	Ironton Dam		Little Baraboo River
4323	Loganville Dam		Narrows Creek
4324	Witwen Dam		Honey Creek
4325	Reedsburg Dam		Baraboo River
4326	Lodde's Dam		Honey Creek
4327	Black Hawk Dam		Honey Creek
4328	Sarrington's Dam		Dell Creek
4329	Bear Creek Dam		Honey Creek

Source: Wisconsin Department of Natural Resources, data accessed April 2010

Section NR 333.07 (3) of the Wisconsin Administrative Code mandates that owners of a large dam or a dam that poses a threat to life or property must prepare an emergency action plan (EAP). An EAP is a document that identifies potential emergency conditions at a dam and procedures to be followed to eliminate the loss of life and minimize downstream property damage. When drafting an EAP, the dam operator must consult with the local units of government that lie downstream of the dam as well as the county emergency management department. An EAP has been prepared for four dams (Table 5-10). The status of the EAP for the Delton Dam is not known. This table also indicates in which municipality the dams are located.

Table 5-10. Large Dams; Sauk County: 2010

DNR ID	Official Name	Municipality	Ownership	Hazard Rating Code [1]	Impoundment Size (Acres)	Status of Emergency Action Plan
30	Prairie du Sac Dam	Town of Prairie du Sac	Utility	High	9,000	2010
56	Dell Creek Dam	Village of Lake Delton	Village	High	267	Not known
190	Delton Dam	Village of Lake Delton	County	High	137	Current
191	Leland Dam	Town of Honey creek	Private	Low	14	NA
193	Dutch Hollow Lake	Town of La Valle	Private	Low	125	2010
381	Plain Honey Creek 4	Town of Franklin	County	Low	15	NA
382	Plain Honey Creek 3	Town of Franklin	County	Low	104	NA
418	Magruder Dam	Town of Woodland	Private	Low	4	NA
456	Satterlee Dam	Town of Woodland	Private	Low	4	NA
480	Steinhorst and Coughlin Dam	Town of Freedom	Private	Low	6	NA
497	Plain Honey Creek 2	Town of Franklin	County	Low	0	NA
568	Huey Duck Lake	Town of Excelsior	Private	Low	15	NA
653	Lake Redstone	Town of La Valle	County	High	37	Current
654	Dells Manor Dam	Village of Lake Delton	Private	Low	34	NA
815	Long Lake Flowage Dam	Town of Spring Green	WI-DNR	Low	10	NA
816	Bakkens Pond Dam	Town of Spring Green	WI-DNR	Low	60	NA
829	Virginia Lake Dam	Town of Excelsior	Private	Low	35	NA
830	Polk Dam	Town of Woodland	Private	Low	3	NA
846	Marking Dam	Town of Dellona	Private	Low	15	NA
896	Sensnovis Dam	Town of Woodland	Private	Low	4	NA
899	Stolte Dam	Town of Reedsburg	Private	Low	7	NA
954	Lake Dellona	Town of Dellona	Private	Low	4	NA
956	Hemlock Dam	Town of La Valle	County	Low	12	NA
4837	Lake of the Dells	City of Wisconsin Dells	Private	Low	14	NA

Source: Wisconsin Department of Natural Resources, data accessed April 2010
Notes:
1. Key: High - loss of life likely should dam fail; Significant - significant property damage is likely; Low - neither loss of life or property will occur
2. The Village is in the process of working with the Wisconsin Department of Natural Resources on the removal of this dam. It is anticipated that it will be removed during the winter of 2009/2010.
3. Data unknown

Effects on Facilities – Because a dam break analysis has not been conducted on any of the dams in Sauk County, it is not possible to determine what effects would occur.

Effects on Population Groups – A dam failure would not disproportionately affect the elderly, people with disabilities, or the homeless.

Effects on Economic Sectors – Although a dam failure could damage individual structures, it likely would not affect the overall economy of the area or any particular economic sector.

Effects on New Development – Communities have the opportunity through the land division process to ensure that new development does not occur within defined dam inundation areas.

6. Flooding

Profile

Riverine flooding occurs when a stream, lake, or other body of water overflows its banks onto normally dry land. Stormwater flooding occurs when stormwater pools in normally dry depressions in the land. Flooding can develop slowly over a period of days, but can also occur within a few hours in some watersheds with narrow stream channels.

Flooding that occurs in the spring due to snow melt or during a period of heavy rain is characterized by a slow build-up of flow and velocity in rivers and streams over a period of days. This buildup continues until the river or stream overflows its banks for as long as a week or two then slowly recedes. Generally the timing and location of this type of flooding is fairly predictable and allows ample time for evacuation of people and property.

For prediction and warning purposes, floods are classified by the National Weather Service into two types: those that develop and crest over a period of approximately six hours or more and those that crest more quickly. The former are referred to as "floods" and the latter as "flash floods". Flash flooding occurs solely from surface run-off as a result of intense rainfalls. Flash flooding occurs less frequently in Wisconsin than flooding associated with spring snow melt. This type of flooding, however, is generally unpredictable. These are a particular concern in Sauk County because the topographical profile of the county is generally flat.

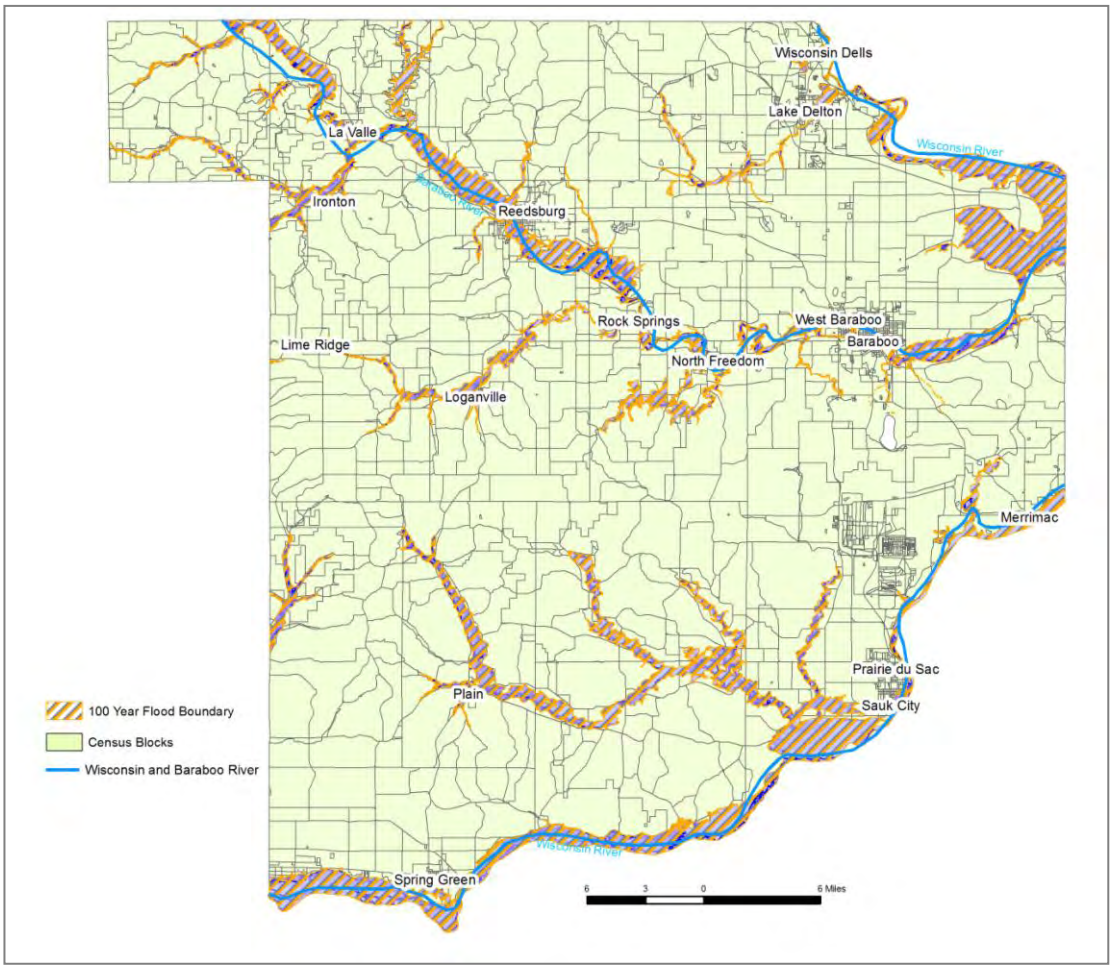
Terms commonly used when referring to flooding are "100-year flood" and "flood plain." A 100-year flood is defined as the flood water level that can be expected to occur or to be exceeded in a given location once every 100 years. There is a one percent chance of a flood of such magnitude or greater occurring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

Vulnerability Assessment

Staff with Wisconsin Emergency Management conducted a vulnerability assessment of flooding in the county using the HAZUS-MH MR3 program released in July 2007. As part of this analysis, the bundled aggregated general building stock was updated to Dun & Bradstreet 2006 and building valuations were updated to R.S. Means 2006. Building counts based on census housing unit counts (as opposed to calculated building counts) are available for RES1 (single-family dwellings) and RES2 (manufactured housing). The site specific inventory (specifically schools, hospitals, fire stations, emergency operation centers, and police stations) was updated using the best available statewide information.

HAZUS-MH was used to generate the flood depth grid for a 100-year return period calculated by clipping the USGS 30m digital elevation model to the DFIRM boundary. The most damage occurs near the Baraboo and Wisconsin rivers. Exhibit 5-1 depicts the flood boundary generated by HAZUS-MH.

Exhibit 5-1. HAZUS-MH Analysis 100-Year Flood; Sauk County



History of Past Occurrences

Documentation of historic flooding is available from the following sources:

- presidential disaster declarations
- insurance claim records from the Federal Flood Insurance Program
- National Weather Service
- flood accounts derived from various authoritative sources

Presidential Disaster Declarations – Since 1965, there have been three presidential declarations in Sauk County, all of which were flood related (Table 5-6). Presidential disaster declarations were issued in Sauk County for flooding in 2000, 2007, and 2008.

National Flood Insurance Program Claims In 1968, Congress adopted the National Flood Insurance Act, which among other things created the National Flood Insurance Program (NFIP). This federal program allows property owners to purchase flood insurance if their community participates in the program. Those homeowners with mortgages backed by a federal program must purchase flood insurance when their property is located in the regulatory floodplain. All county residents are eligible to purchase flood insurance because all of the jurisdictions participate in the program.

The number of paid claims for flood damage under the NFIP is a good indicator of the extent of flooding in a community and the number of affected properties. From 1978 through January 2009, 90 insurance claims were paid in Sauk County for a total of $3.4 million (Table 5-11). More than half of the payments have been made to policyholders in the city of Reedsburg. Policyholders in the village of Rock Springs received the second largest amount ($900,800.98).

Table 5-11. National Flood Insurance Program Claims by Jurisdiction; 1978 through January 2009

Municipality	Total Losses [3]	Closed Losses [4]	Open Losses [5]	Unpaid Losses [6]	Total Payments [7]
City					
Baraboo	5	4	0	1	$119,974.05
Reedsburg	35	31	2	2	$1,840,180.40
Village					
La Valle	2	2	0	0	$1,755.90
North Freedom	1	1	0	0	$140,742.08
Rock Springs	29	21	0	8	$900,800.98
Sauk City	1	1	0	0	$1,121.67
West Baraboo	1	1	0	0	$7,402.72
Unincorporated Sauk County	39	29	0	10	$363,299.01
Total	113	90	2	21	$3,375,276.81

Source: National Flood Insurance Program, Federal Emergency Management Agency (http://bsa.nfipstat.com/reports/1040.htm#55)
Notes:
1. Municipality located in Sauk County and another county; data is for the entire municipality
2. This municipality is not listed as participating or as not participating in the National Flood Insurance Program.
3. All losses submitted regardless of status
4. Losses that have been paid
5. Losses that have not been paid in full
6. Losses that have been closed without payment
7. Total amount paid on losses

Repetitive Loss Properties A property for which two or more National Flood Insurance Program losses of at least $1,000 each have been paid within any 10-year rolling period since 1978 is referred to as a repetitive loss property. According to the National Flood Insurance Program, there were five repetitive loss properties in Sauk County (Table 5-12). Requirements of the program stipulate that individual policy information may not be disclosed, including addresses of such properties.

Table 5-12. Repetitive Loss Properties; Sauk County: 2010

Municipality	General Location	Type
City of Reedsburg	North James Avenue	Residential
City of Reedsburg	West 2nd Street	Residential
Village of Rock Springs	Maple Street	Residential
Unincorporated Sauk County	East Diamond Hill Road	Residential
Unincorporated Sauk County	New Haven Road	Residential

Historical Events Wisconsin has experienced several major floods during the last two decades. Recent floods revealed that no floodplains or urban areas in Wisconsin can be considered safe from flood damages. Sauk County has experienced 11 major floods and two major flash floods since 1965. In addition, there is usually some localized flooding primarily caused by heavy rainfall, spring runoff, or both.

2008 Flooding[2] The flood of record for the Baraboo River occurred in 2008. The flood was measured at 872.5 feet in Rock Springs (1-percent-chance elevation of 870.0 feet), 848.8 feet in West Baraboo (848.2 feet), and 814.1 feet in Baraboo (812.5 feet). These elevations equate to approximately a 0.3- percent-chance-annual flood hazard. During this event, the dam on Lake Delton held, but County Highway A in the village of Lake Delton washed out, causing Lake Delton to drain. This washout eroded the shoreline and caused five houses to be washed away downstream into the Wisconsin River (Exhibit 5-2).

Exhibit 5-2. Lake Delton, June 2008

Extensive flooding occurred on July 17, 1993. Flooding caused by precipitation varied considerably by basin. The storm's center remained relatively stagnant, producing an extreme intensity and volume of precipitation. The worst flooding occurred just south of Baraboo on two small, steep tributaries to the Baraboo River. One death occurred and damages were extensive. According to reports from the Wisconsin State Climatologist Office, rainfall near the storm center was in excess of 12 inches in approximately three hours.

Devil's Lake Tributary built up behind two 72-inch corrugated metal pipes under Highway DL until the adjacent railway grade gave way. The washout reacted similar to a dambreak and the resulting rapid increase in elevation caused much damage to the north including the Devi-Bara Lodge and Hein-Werner building. There were also washouts to Highway 113 and many driveways along Clark Creek. Vehicles fell into these washouts and resulted in one fatality. The Baraboo River reached an elevation equivalent to a 0.2-percent-annual-chance flood elevation, while Devil's Lake Tributary and Clark Creek exceeded 0.1-percent-annual-chance flood elevations. Newspaper reports from several incorporated communities indicate substantial flooding of the Baraboo River in February 1966. During this flood, 2 feet of water was reported over Broadway Street in the village of Rock Springs, and the city of Baraboo reported water 9 feet above flood stage (Exhibit 5-3).

[2] Source: *Flood Insurance Study, Sauk County, Wisconsin and Incorporated Areas*, Federal Emergency Management Agency

Exhibit 5-3. Reedsburg, June 2008

Major damage to flooded basements was reported as well as an isolated collapse of basement walls. Most bridges on the Baraboo River have sufficient capacity to pass the regional 100-year flood with little backwater effect. The flood stages during February 1966 were increased by ice jams along the river. At the USGS gaging station at County Highway X, east of Baraboo, ice jams increased the flood elevation 1.3 feet higher than with the same discharge and no ice jams. Four major floods, each with a 10-year frequency interval, occurred on the Wisconsin River in April 1920, April 1951, May 1960, and March 1973, in addition to a 25- to a 30-year flood in September 1938. Numerous reservoirs in the headwaters of the Wisconsin River are managed by the Wisconsin Valley Improvement Company to stabilize flow in the Wisconsin River. These reservoirs reduce flood discharges from the areas upstream of the reservoirs. There is a large, uncontrolled drainage area between these reservoirs and Sauk County, so the flood-control effects are greatly reduced.

Three large hydroelectric dams upstream from Sauk County are managed to reduce spring flood peaks. The reservoirs controlled by these dams are partly drained in late winter each year and refilled by May 1. Until June 15, the water-level reservoirs may be permitted to rise one foot above their normal levels to reduce flood discharge. After June 15, the water level in the reservoirs must be maintained within narrow limits, so the reservoirs have no flood-control potential during the summer and fall. Near Portage, about six miles east of Sauk County on the Wisconsin River, large floods will overtop the levees and flow to the Fox River. This will reduce flood peaks downstream, affecting the southern edge of Sauk County. Devil's Lake does not have a natural outlet, however, the lake has gotten high enough on two occasions to overtop its banks and drain towards the Baraboo River via Devil's Lake Tributary. This occurred in July 1993 and June 2008. The 1993 lake elevation was estimated to have a frequency of 0.2 percent-chance-annual flood hazard and the 2008 lake elevation was estimated at less than a 0.1-percent-chance-annual flood hazard.

Table 5-13 lists some of the more recent flooding incidents in Sauk County.

Table 5-13. Recent Flood Events

Date	General Location	Description
1978 July	Countywide	$150,565 property damage
1979 March	Baraboo River	Log jams treatment plant flooded
1980 January	Baraboo River	Ice jams - damage to 6 bridges
1980 July	Baraboo and Wisconsin rivers	Minor home evacuation some crop damage
1989 January	Baraboo River	Ice jam - no damage
1990 June	Two thirds of county	$3,190,700 damage
1992 September	Northern half of county	$282,000 damage
1993 June	Wisconsin River	Levee Road, included below
1993 June	High water table	Spring Green, included below
1993 July	Flash flood	$33,243,300 damage and crop loss
1996 June	Flash flood	$2,418,500 damage & crop loss in the Narrows Creek, Baraboo River area
1999 June	Flash flood	Baraboo and also Leyland
2000 May	Flash flood	Baraboo
2000 June	Flash flood	Countywide
2000 July	Flash flood	Lime Ridge, significant property/crop damage
2001 August	Flash flood	Countywide, significant property damage
2008 June	Countywide	Significant damage to infrastructure, structures, and agricultural land

The July 1993 flood set the most rainfall record in Wisconsin with 7 inches per hour, the Spring Green area received approximately 46 inches that summer. There were 286 houses flooded and 41 with structural damage totaling $641,000; vehicles $30,000; industrial and commercial structures $5.5 million; public property $2.9 million; crops $23 million and farm buildings $169,000. The 2000 floods resulted in around $3 million damage to homes, businesses and roadway, plus farm fields and crop damage. Presidential declarations have been received for flooding in 1978, 1990, 1992, 1993, 2000, 2007, and 2008.

Clark Creek Flooding – Flooding along Clark Creek south of the city of Baraboo was especially pronounced. As a result of the damage, the Federal Emergency Management Agency initiated a study to evaluate the situation, the results of which are contained in a report titled *Flooding Conditions at Clark Creek and Possible Mitigatio*n.

Buildings and agricultural land along State Highway 113 experienced flooding from Clark Creek and the highway, which provides principal north-south access, sustained significant damage. In fact, State Highway 113 was closed for more than three months after the June 2008 flood event.

As part of the investigation, the Federal Emergency Management Agency conducted four technical visits to the Clark Creek area as well as several non-technical visits. The technical teams included hazard mitigation specialists, floodplain managers, geologists, and professional engineers.

Most at-risk assets were located in the lower reach. Approximately 60 buildings (residential / non-residential) along Clark Creek were determined to be at risk from flooding or bank collapse. Most of the structures at risk from flooding are located within two miles of the Clark Creek – Baraboo River confluence. At least one residential structure is at risk from bank collapse.

The analysis showed that a number of culverts are not properly aligned with the current stream channel causing water-borne debris to form dams at the culvert crossings. If not corrected, this will restrict and probably reroute the stream. A portion of Tower Road in the upper Clark Creek watershed is at considerable risk. It appears that the culvert is under sized and/or poorly maintained.

According to the report, resolving the Clark Creek flood problem must be accomplished at the local level and include an analysis of physical and geological settings. The study considered various options including the following:

- Stabilization of the banks to pre- 1993 conditions
- Realignment of the channel of Clark Creek
- Installation of flow diverters in channel of Clark Creek
- Construction of sediment-catchment basins along the stream
- Construction of a dam at the Clark Creek headwaters
- Construction of an emergency spillway at Maxwell farm
- Realignment of Highway 113
- Replacing culverts at the Maxwell far m with a bridge
- Replacing culverts at Maxwell farm with a low water crossing -
- Realignment of the culverts.
- Installation of debris barriers at entrances to culverts
- Installation of perforated standpipes in lieu of the standard culverts
- Acquisition
- Relocation
- Elevation / flood-proofing of structures

Flood and siltation problems in the lower reach of Clark Creek cannot be resolved without mitigating up-stream causes. Debris dams are particularly problematic. Removing woody debris from the upper reaches of Clark Creek may be one of the few cost-effective options. The study concluded that a detailed watershed study be conducted by the U.S. Department of Agriculture (USDA) through the Natural Resources Conservation Service (NRCS). Either the Emergency Watershed Protection Program or Flood Prevention Program would be adequate in evaluating the given situation. In undertaking these studies, scientific as well as engineering principles can be evaluated / incorporated into the final corrective action plan. This will ensure that all environmental considerations will be adequately addressed and supported.

Vulnerability Assessment

Areas within Sauk County that are susceptible to riverine flooding include those areas in close proximity to the Wisconsin River, the Baraboo River, and the multiple creeks and streams that actively flow year round and are within or near the floodplain of these waterways. Flash flooding can occur anywhere in Sauk County where a significant amount of rainfall happens in a short amount of time. Lower, flat areas and depressions as well as those areas with poor infiltration capacity or inadequate drainage have a higher susceptibility to flash flood events. Roadways are where many people encounter flash flooding.

Sauk County has a high probability for flash flooding in certain areas of the county. The percentage chance of at least one flash flood event per year is estimated at 80 percent. Riverine flooding has improved with the removal of the dam on the Baraboo River, there remains areas that are subject to flooding after

heavy rains or spring runoff. The chance of riverine flooding is estimated at 40 percent in a given year.

Flash flooding caused by snowmelt or heavy rain occurs regularly in some of the watersheds in Sauk County. Heavy rains or snow melt north of Sauk County can cause river or overbank flooding anytime during the year.

Effects on Facilities –Essential facilities encounter the same impacts as other buildings within the flood boundary: structural failure, extensive water damage to the facility, and loss of facility functionality (i.e., a damaged police station will no longer be able to serve the community).

The HAZUS-MH analysis identified two fire stations, two schools, and one police station that may be subject to flooding. A list of the essential facilities within Sauk County is included in Table 5-14. Maps of essential facilities potentially at risk of flooding are shown in Exhibits 5-4, 5-5, and 5-6.

Table 5-14. Sauk County Essential Facility Loss – 100-Year Flood

Class	Total	At Least Moderate Damage	At Least Substantial Damage	Loss of Use
Care Facility	9	0	0	0
Emergency Operations Center	1	0	0	0
Fire Station	13	2	0	0
Police Station	12	1	0	0
Schools	43	2	0	0
Total	78	5	0	0

Source: Wisconsin Emergency Management

Exhibit 5-4. 100-Year Flood Boundary Overlaid with Essential Facilities; Village of Sauk City

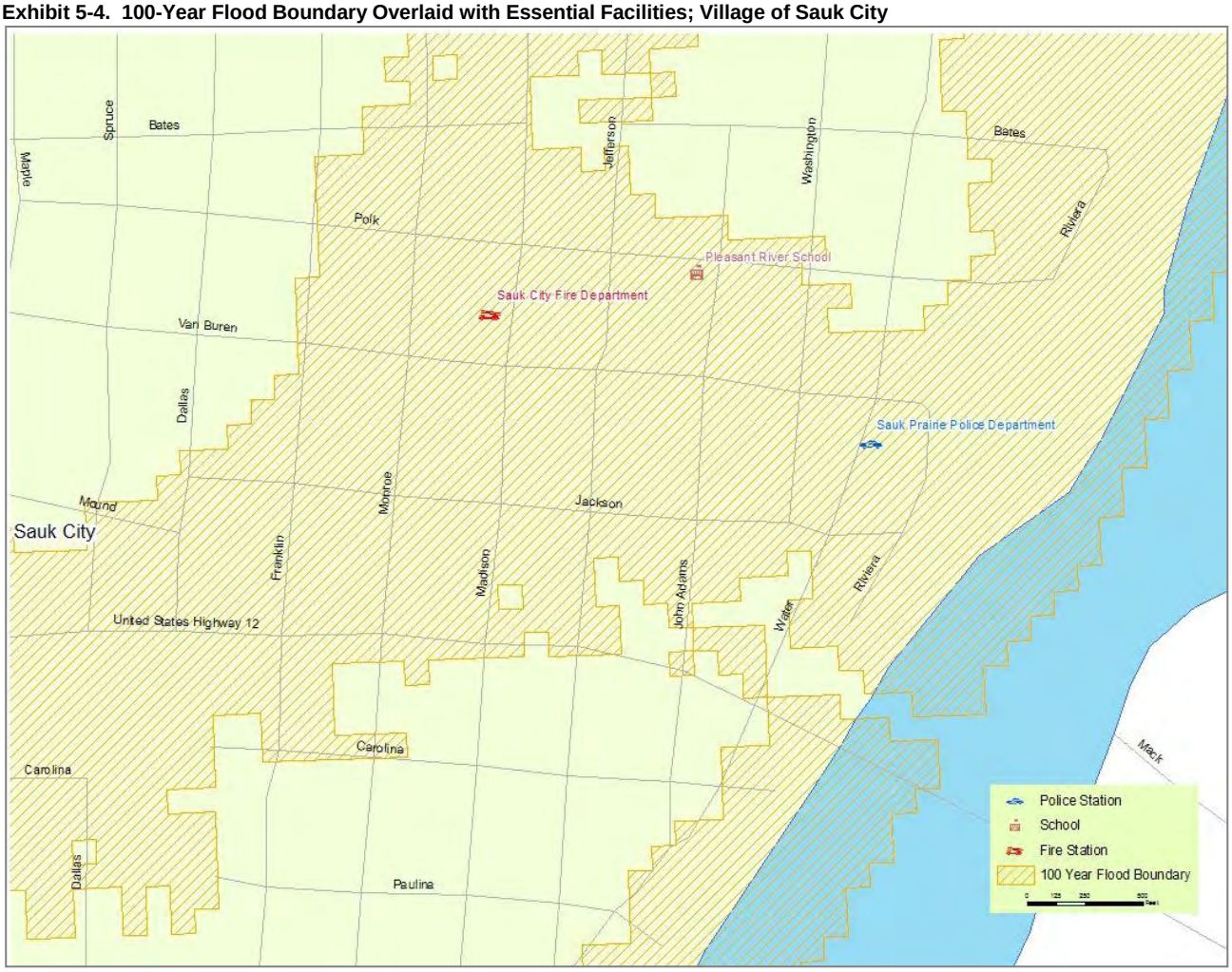


Exhibit 5-5. 100-Year Flood Boundary Overlaid with Essential Facilities: Village of La Valle

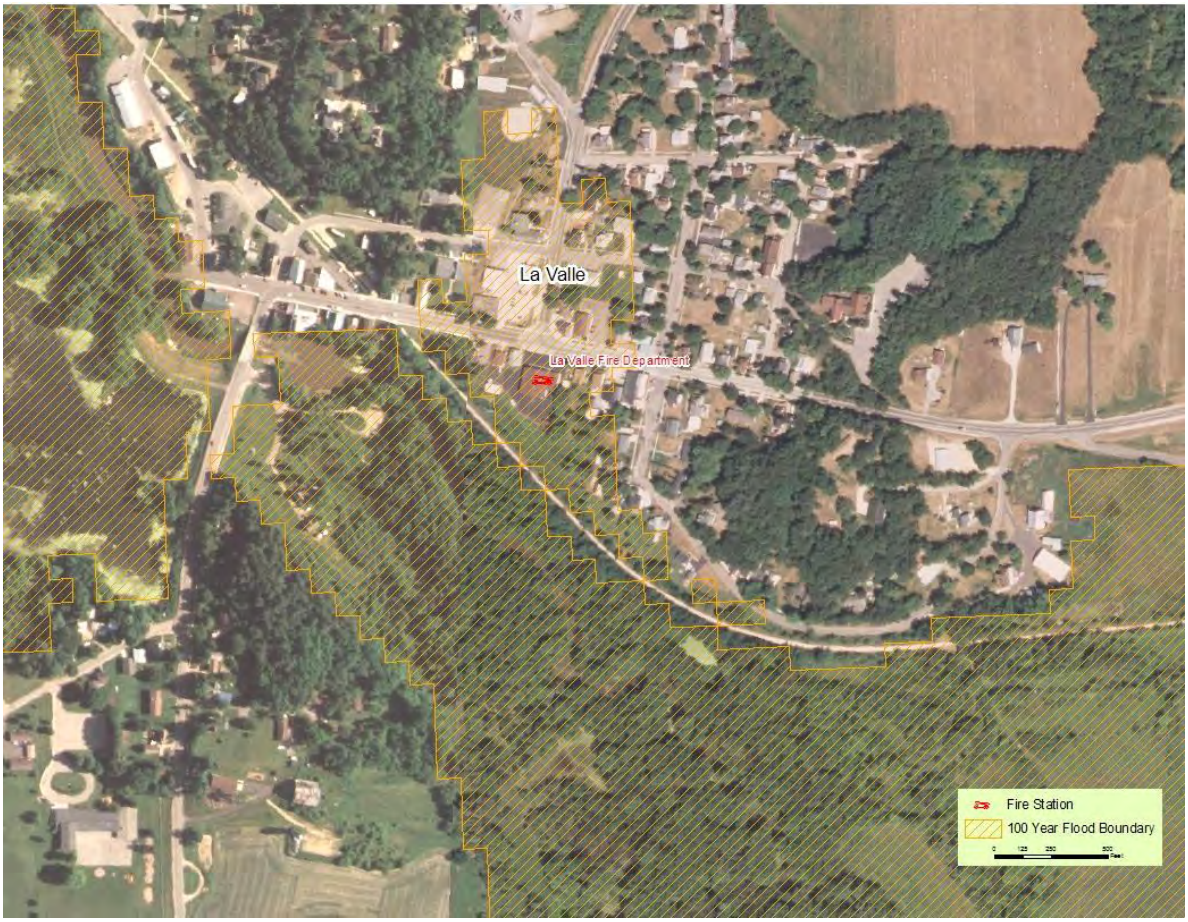


Exhibit 5-6. 100-Year Flood Boundary Overlaid with Essential Facilities: City of Reedsburg

Effects on Population Groups – There are no population groups that are especially vulnerable to flooding except to the extent older homes, which were built prior to floodplain regulations, are occupied by lower income residents.

HAZUS-MH estimates the number of households expected to be displaced from their homes due to flooding and the associated potential evacuation. HAZUS-MH also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 1,193 households will be displaced due to a 100-year flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 1,696 people (out of a total population of 55,225) will likely seek temporary shelter in public shelters.

Effects on Economic Sectors – While flooding can impact a number of economic sectors, the agricultural sector is the most vulnerable. Aside from damaging farm buildings, flooding can destroy crops and reduce crop yields for surviving crops. In addition, harvesting crops on wet soils causes soil compaction that reduces crop yields in subsequent years. Heavy rains, which are often associated with flooding, cause a considerable amount of soil erosion on unprotected soils.

Damages sustained by businesses in the county are primarily a direct reflection of the agricultural production losses. The effects of the agricultural base extend

throughout the county. Farming supports a variety of farm (e.g., implement dealers, feed stores, granaries) and non-farm related (e.g., grocery stores, hardware stores) businesses.

Other Effects – During periods of flooding, no-wake boating restrictions are imposed which limit recreational uses, but are needed to protect shorelines from erosion. Road closures do occur and in some cases cause a significant impediment to the flow of traffic within and through the county.

Effects on New Development – All new development in the unincorporated parts of the county and in the municipalities is subject to local floodplain regulations. Therefore, all new development in the regulated floodplain will meet or exceed adopted development standards, which are designed to afford a reasonable level of protection from floodwaters. In addition, communities have the opportunity through the subdivision review process to ensure that new projects are not susceptible to flooding that may result from the ponding of storm water.

Estimated Damage

Based on an analysis using HAZUS-MH, it is estimated that during a 100-year flood event in Sauk County 221 buildings would be impacted with damage totaling $53 million in building losses and $134 million in economic losses. The total estimated number of damaged buildings, total building losses, and estimated total economic losses are shown in Table 5-15.

Table 5-15. Effects of a 100-Year Flood Event; Sauk County: 2010

General Occupancy	Estimated Number of Buildings	Total Damaged Buildings	Total Building Exposure (1000)	Total Economic Loss (1000)	Total Building Loss (1000)
Agriculture	2	0	$69,573	$3,471	$935
Commercial	241	1	$863,224	$48,375	$11,341
Education	0	0	$67,359	$2,048	$317
Government	5	0	$26,031	$2,175	$269
Industrial	27	0	$300,852	$15,160	$3,756
Religious/Non-Profit	14	0	$76,361	$5,967	$786
Residential	20,539	220	$3,305,908	$57,343	$35,845
Total	20,828	221	$4,709,308	$134,539	$53,249

Source: Wisconsin Emergency Management

A countywide 100-year flood could potentially cause more than $53 million in damage to buildings.

HAZUS-MH estimated 25 census blocks with losses exceeding $1 million. The distribution of losses is shown in Exhibit 5-7.

HAZUS-MH aggregate loss analysis is evenly distributed across a census block. Census blocks of concern should be reviewed in more detail to determine the actual percentage of facilities that fall within the flood hazard areas. The aggregate losses reported in this study may be overstated. Examples are provided in Exhibit 5-8 and 5-9.

The reported building counts should be interpreted as degrees of loss rather than as exact numbers of buildings exposed to flooding. These numbers were

derived from aggregate building inventories which are assumed to be dispersed evenly across census blocks. HAZUS-MH requires that a predetermined amount of square footage of a typical building sustain damage in order to produce a damaged building count. If only a minimal amount of damage to buildings is predicted, it is possible to see zero damaged building counts while also seeing economic losses.

Exhibit 5-7. Sauk County Total Economic Loss – 100-Year Flood

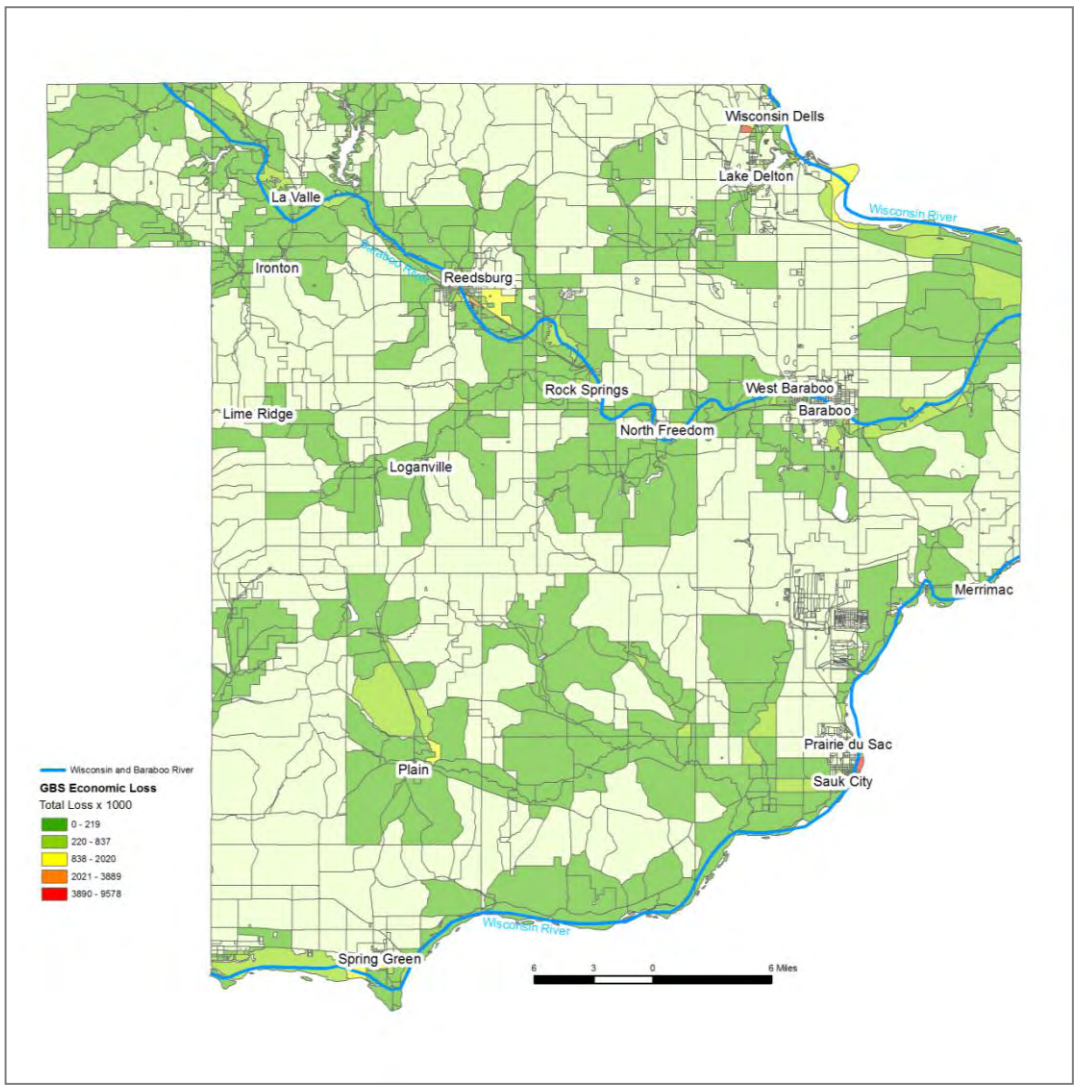


Exhibit 5-8 shows census blocks overlaid with the flood boundary and orthophoto near Spring Green along the Wisconsin River. Census block 551110008002041 has an estimated building loss of $265,000 with a combined replacement cost of $572,000. The overlay of the flood boundary with the aerial photo shows that no buildings are at risk.

Table 5-16 Flood-Damaged Essential Facilities

Sauk Prairie Police Department
Sauk City Fire Department
La Valle Fire Department
South Elementary
Pleasant River School

Source: Wisconsin Emergency Management

Exhibit 5-8. Flood Damage Exposure in Spring Green

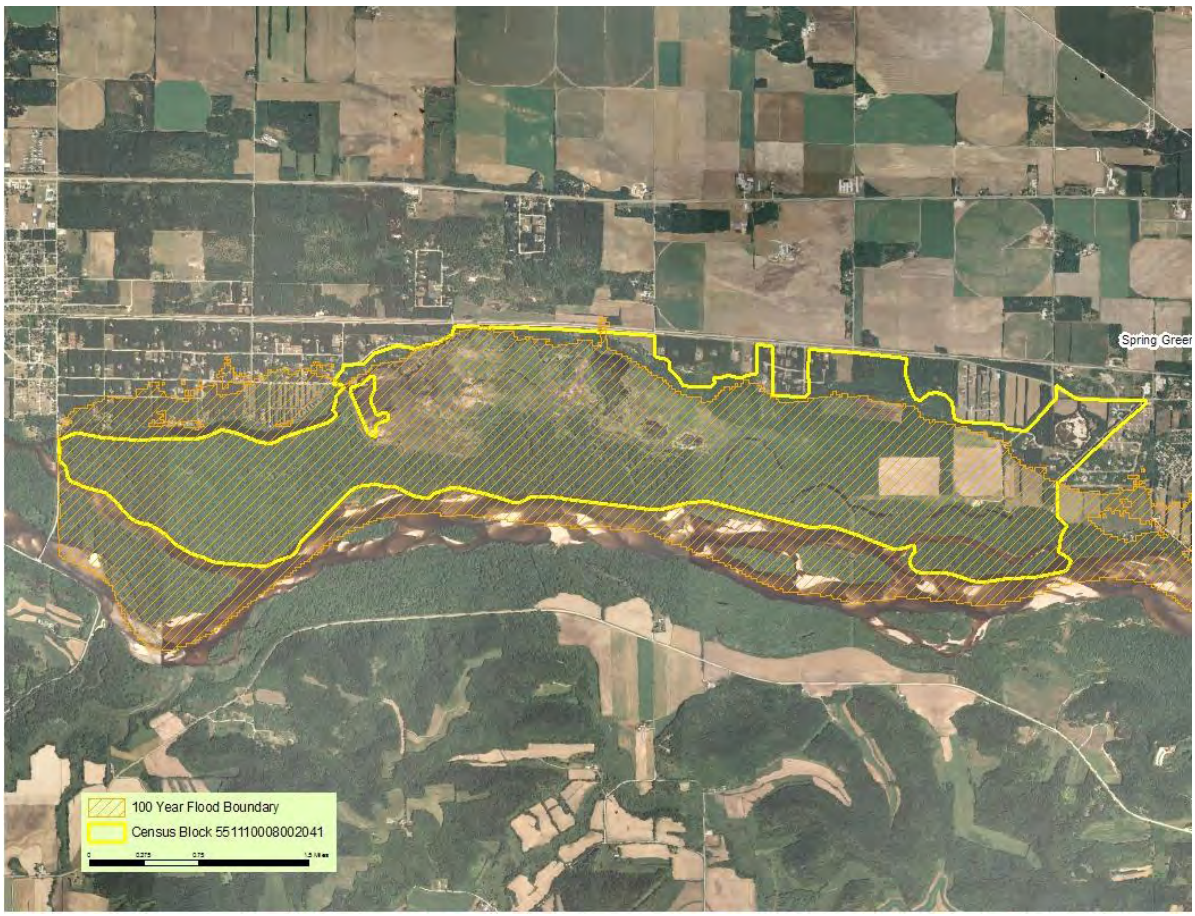
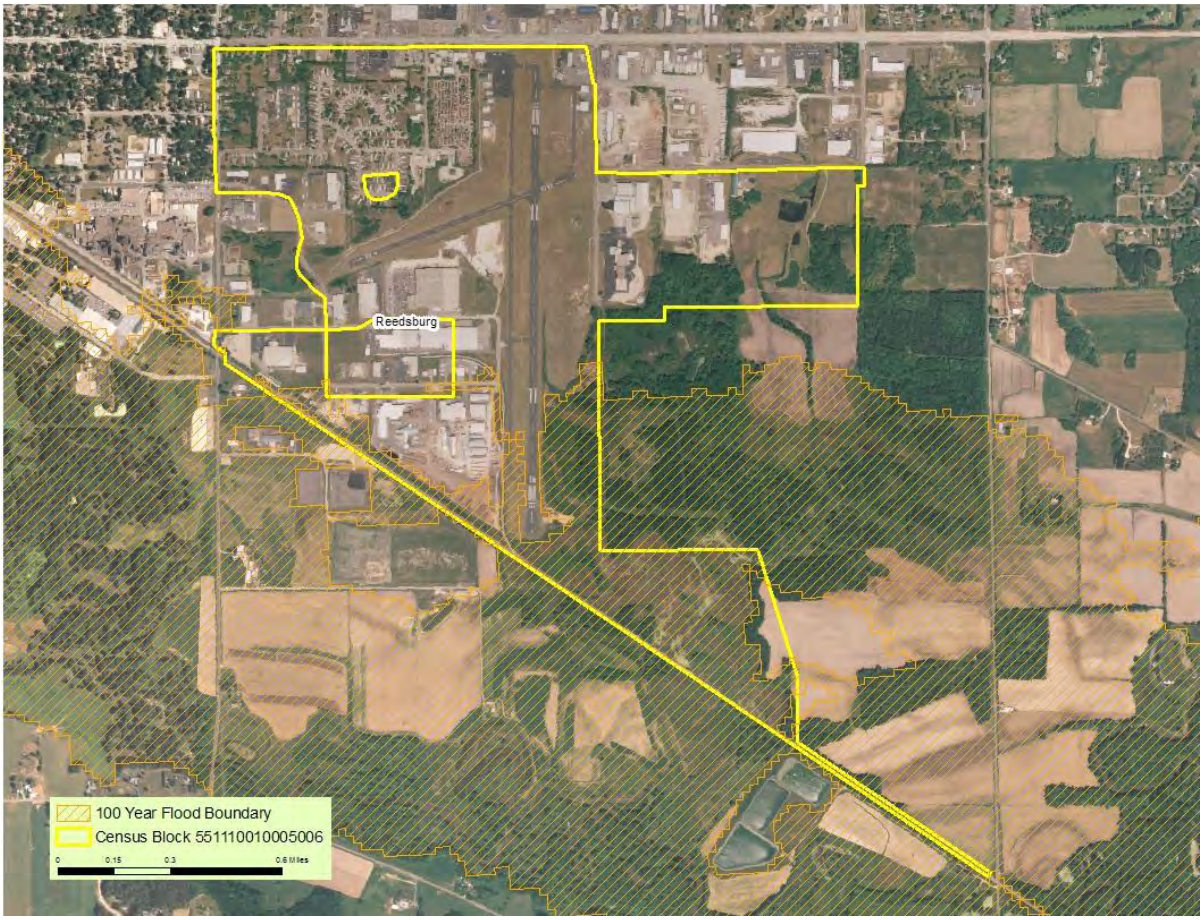


Exhibit 5-9 shows census blocks overlaid with the flood boundary and orthophoto of Reedsburg. Census block 551110010005006 has an estimated building loss of $500,000 and a combined replacement cost of $1.65 million.

Exhibit 5-9. Flood Damage Exposure in Reedsburg



7. Dense Fog

Profile

Fog is a visible concentration of small water droplets suspended in the air at the earth's surface that obscures visibility to less than one kilometer. It forms when air temperature falls to its dew point, which is the temperature at which air is holding as much moisture as it can. When air reaches its dew point, it condenses into very small water droplets.

History of Past Occurrences

Fog can form throughout the year, but is most common from September through April. As shown in Appendix G, there have been 44 reported occurrences of fog in Sauk County since 1950. In Sauk County, fog tends to cover large areas.

Vulnerability Assessment

Effects on Facilities – Fog does not damage or impair the operation of facilities.

Effects on Population Groups – Fog does not negatively affect any population group.

Effects on Economic Sectors – Fog impairs visibility and can hamper ground and air transportation. When visibility is decreased, the potential for motor vehicle crashes increase as does the possibility of an airplane accident on landing or take off.

Effects on New Development – Dense fog does not affect buildings, whether current or future.

Estimated Damage

Based on historical data, dense fog events do no cause or result in property damage.

8. Tornadoes

Profile

A tornado is a violently rotating column of air extending from the ground to the base of a convective cloud. The tornado may or may not have a visible condensation funnel (commonly referred to as a "funnel cloud"), which may or may not extend from the cloud base all the way to the ground. In the absence of a visible condensation funnel, a severe weather spotter can determine they are looking at a tornado if they observe cloud-base rotation superimposed over rotating dirt and debris at ground level. Wind speeds in a tornado typically range from 80 mph to 150 mph, but on occasions reach speeds in excess of 200 mph. There have been documented tornado winds exceeding 300 mph outside of Wisconsin. The majority of damage resulting from a tornado occurs within one-eight mile of the tornado's path, which characteristically does not exceed 16 miles. In fact, the average path length of tornadoes in Wisconsin for the period of 1950-2005 was 5.8 miles with a duration of about 10 minutes. Tornadoes with track lengths greater than 150 miles have been reported in Wisconsin, although they are quite rare.

Tornadoes are visible because low atmospheric pressure in the vortex leads to cooling of the air by expansion with condensation and formation of water droplets. They are also visible as a result of the airborne debris and dust associated with the vortex. The destructive power of the tornado lies primarily in its high horizontal winds, a built-in upward-lifting force, and airborne debris impacting structures (collectively resulting in about 95 percent of the damage). To a much lesser degree, air pressure differences associated with a tornado result in additional damage. Years ago, it was assumed that air pressure differences accounted for a large portion of the damage, however, it is now realized that most buildings have enough air leakage or infiltration so that most of the air pressure differences between the inside and outside of a structure are minimized as the tornado approaches. Since tornadoes are usually associated with organized storm systems that consist of several thunderstorm cells of varying intensity, large hail, torrential rain, and intense lightning usually accompany the storm that spins up a tornado.

Although a tornado can form at any time during the year, the peak tornado season is May through July. They can also occur at any time of the day. The peak hour for tornado initiation is between 6:00 and 7:00 p.m. and the peak hours of occurrence are between 3:00 and 9:00 p.m.

Prior to 2007, the Fujita Tornado Scale was used to estimate the wind speed of a tornado based on damage to structures (Table 5-16). Though the Fujita Scale has 13 ratings (F0-F12), tornadoes never exceed an F5 (261 to 318 MPH). Beginning in 2007, tornadoes are rated using the Enhanced Fujita Tornado Scale, which is essentially the same as the former scale except for the wind speed (Table 5-17).

Table 5-16. Fujita Tornado Scale

Fujita Rating	Wind Speed	Characteristic Damage
F0	40 to 72 mph	Some damage to chimneys, TV antennas, roof shingles, trees, and windows
F1	73 to 112 mph	Automobiles overturned, carports destroyed, and trees uprooted
F2	113 to 157 mph	Roofs blown of homes, sheds and outbuildings demolished, mobile homes overturned
F3	158 to 207 mph	Exterior walls and roofs blown off homes; metal buildings collapsed or are severely damaged; forests and farmland flattened
F4	208 to 260 mph	Few walls, if any, standing in well-built homes; large steel and concrete missiles thrown far distances
F5	261 to 318 mph	Homes leveled with all debris removed; schools, motels, and other larger structures have considerable damage with exterior walls and roofs gone; top stories demolished

Table 5-17. Enhanced Fujita Tornado Scale

Fujita Rating	Wind Speed	Characteristic Damage
EF0	65 to 86 mph	Some damage to chimneys, TV antennas, roof shingles, trees, and windows
EF1	86 to 110 mph	Automobiles overturned, carports destroyed, and trees uprooted
EF2	111 to 135 mph	Roofs blown of homes, sheds and outbuildings demolished, mobile homes overturned
EF3	136 to 165 mph	Exterior walls and roofs blown off homes; metal buildings collapsed or are severely damaged; forests and farmland flattened
EF4	166 to 200 mph	Few walls, if any, standing in well-built homes; large steel and concrete missiles thrown far distances
EF5	>200 mph	Homes leveled with all debris removed; schools, motels, and other larger structures have considerable damage with exterior walls and roofs gone; top stories demolished

History of Past Occurrences

Wisconsin lies along the northern edge of the nation's tornado belt that extends northeastward from Oklahoma into Iowa. Winter, spring, and fall tornadoes are more likely to occur in southern Wisconsin than in northern counties. Yet, tornadoes have occurred in Wisconsin during every month except February.

Wisconsin's tornado season runs from the beginning of April through September. The most severe tornadoes typically occur during April, May, and June. Many tornadoes strike in late afternoon or early evening. However, tornadoes have occurred at other times. Personal property damage, deaths, and injuries have and will continue to occur in Wisconsin. On average, one person dies from tornado-related injuries each year.

In 2005, Wisconsin had a record of 62 verified tornadoes, including 27 that occurred on August 18, 2005.

In Sauk County, there have been 23 verified tornadoes sine 1844 (Appendix G). More than three quarters of the tornadoes were F0 or F1 (Table 5-18). Prior to 1982 when the National Weather Service began classifying tornadoes, ratings are at best broad estimates, with an accuracy of plus/minus 1.

Table 5-18. Tornado Frequency: Sauk County: 1950 through 2009

Fujita Rating [1]	Number of Occurrences	Probability of Occurrence
F0	11	48%
F1	7	30%
F2	5	22%
F3	0	0%
F4	0	0%
F5	0	0%

Source: National Weather Service
Notes:
1. Refer to Table 5-# for a description of the Fujita ratings
2. Based on data collected by the National Weather Service

While there have been no fatalities in any of the Sauk County tornado disasters, there have been events that have caused significant property damage. On July 4, 1994 a tornado passed through the town of Prairie du Sac, town of Merrimac, and part of the village of Merrimac. This tornado caused approximately $1,030,000 in damages to homes and property. In 1989 and 1984 two tornadoes touched down in the Sauk City area causing $443,500 and $1,547,000 worth of damage respectively.

Vulnerability Assessment

Effects on Facilities – Because tornadoes apparently occur randomly across the landscape, all areas of the county are equally as likely to experience a tornado. Therefore, all of the critical facilities which have been identified are at risk.

Effects on Population Groups – Even though all areas of the county are equally likely to experience a tornado, those living in mobile homes or staying in a campground are more vulnerable than those people living in a residence with a basement. In 2009, there were 12 campgrounds, 3 recreational/educational camps, and 13 manufactured/mobile home parks.

Effects on Economic Sectors – While individual businesses may be damaged, the overall economy generally experiences short-term effects of a tornado, if at all.

Estimated Damage

Depending on where a tornado occurs in the county and its magnitude, damage can vary widely from minimal economic damage to tens of millions. Table 5-16 lists the damage caused by each of the tornado ratings. Based on historical occurrences in the county and documented damage estimates, an EF2 tornado would be expected to cause about $1.2 million in damage to buildings and infrastructure.

Table 5-19. Tornado Property Damage; Sauk County: 1950 through 2008

Fujita Rating [1]	Number	Range of Damage Low	Range of Damage High	Total Damage	Average Damage
F0	11	0	$25,000	$34,000	$3,091
F1	7	$2,000	$250,000	$385,000	$55,000
F2	5	$25,000	$5,000,000	$6,125,000	$1,225,000
F3	0	-	-	-	-
F4	0	-	-	-	-
F5	0	-	-	-	-

Source: National Weather Service
Notes:
1. Refer to Table 5-16 and 5-17 for a description of the Fujita ratings

9. Hailstorms

Profile

A hailstorm is a weather event where water particles in the upper atmosphere form into round or irregular masses of ice that fall to earth. Hail stones form when sub-freezing temperatures in the upper atmosphere cause water in thunderstorm clouds to accumulate in layers around an icy core. When strong underlying winds no longer can support their weight, the hailstones fall to Earth. The size of hail typically ranges from ¼" up to three inches in diameter. In a rather rare occurrence, a 2006-hail storm in Lake Mills created hail stones with a diameter of 4.25 inches.

Hail tends to fall in swaths that may be 20-115 miles long and 5-30 miles wide. The swath is not normally an even bombardment of hail, but generally consists of a series of hail strikes that are produced by individual thunderstorm clouds traversing the same general area. Hail strikes are typically one-half mile wide and up to five miles long. They may partially overlap, but often leave completely undamaged gaps between them. Hailstorms tend to occur in conjunction with severe thunderstorms.

History of Past Occurrences

Between 1950 and October 2006, there have been 80 documented hailstorm events in the county (Table 5-5).

Vulnerability Assessment

Effects on Facilities – The threat of hail damage increases as the size of the hailstones increase. Hail can break windows, damage roofs and siding, and dent motor vehicles.

Effects on Population Groups – All population segments are equally susceptible to hail storms. Hail storms while resulting in property and crop damage, rarely causes serious injury or loss of life.

Effects on Economic Sectors – Of all the economic sectors, agriculture is the most susceptible to hail damage. When hailstones approach golf ball size, crops are damaged and are not able to recover, resulting in a total loss.

Estimated Damage

Based on historical data, hailstorms, while quite numerous, do not cause widespread or significant property damage. For the purposes of this plan, it is estimated that a hailstorm would cause about $1,500 in property damage per event.

10. Thunderstorms

Profile

Thunderstorms are severe and violent forms of convection produced when warm moist air is overlaid by dry cool air. As the warm air rises, thunderheads (cumulonimbus clouds) form and cause the strong winds, lightening, hail, and rain characteristically associated with these storms. Thunderheads may be a towering mass 6 miles or more across and 40,000 to 50,000 feet high. As much as 1.5 million tons of water may be held in a thunderhead.

A storm event arising for a single thunderhead typically lasts less than 30 minutes in a given location. However, strong frontal systems may spawn more than one squall line composed of many individual thunderheads.

As defined by the National Weather Service, a severe thunderstorm is a thunderstorm event that produces one or more of the following: downbursts with winds of 58 mile per hour or greater, hail ¾ of an inch in diameter, or a tornado.

History of Past Occurrences

Out of all the weather-related events in Sauk County, powerful thunderstorms are the most common. They account roughly one-third (32%) of all weather-related events documented from 1950 to January 2010. On average county residents can expect slightly less than three significant thunderstorm events each year (2.7/year). Although thunderstorms can occur throughout the year, they are most common from May through September. Typically, they occur after noon until 10:00 pm.

Vulnerability Assessment

Effects on Facilities – Aside from hail, straight line winds from a thunderstorm can damage property and to a less extent crops. Overhead utility lines are quite susceptible to downed trees and tree branches. Entire neighborhoods and even larger areas can lose power because of a thunderstorm. All areas of the county are equally susceptible to thunderstorms, meaning that all critical facilities are at risk.

Effects on Population Groups – Wind associated with severe thunderstorms can cause injury or loss of life. With the exception of those living in mobile home parks or staying in campgrounds, no population group is uniquely susceptible to a thunderstorm event. Those in mobile homes and campgrounds are at risk from falling trees and branches, and damage to their residence or camper.

Effects on Economic Sectors – Thunderstorms do not affect any economic sector disproportionately more than others.

Effects on New Development – Because a thunderstorm can occur anywhere in the county, new development will not be any more or less affected than current development.

Estimated Damage

Based on historical data, a severe thunderstorm is expected to cause about $33,000 in property damage and about $5,000 in crop damage.

11. Winter Storms

Profile

Winter storms include a wide range of weather-related events including snowstorms, blizzards, freezing rain, sleet, and ice storms. Typical snow events produce totals of between one and three inches. On a statewide basis, heavy snowfalls happen on average only five times per winter. Total snow accumulations in central Wisconsin average about 50 inches. Both ice and sleet storms can occur at any time from October into April. They are more common in southern and central Wisconsin than in the northern part of the state.

Terms Related to Winter Storms

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.

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 forming an accumulation of at least 1/4" in 12 hours or less.

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.

History of Past Occurrences

From 1950 through 2010, there have been 82 winter storm events in Sauk County consisting of blizzard conditions, heavy snow, ice, or sleet – about 1.4 events each year.

Vulnerability Assessment

Effects on Facilities – Heavy snow can cause the structural collapse of buildings with flat roofs.

Effects on Population Groups – Winter storms affect all population groups equally. People who commute a comparatively long distance are disproportionately affected.

Effects on Economic Sectors – A prolonged winter storm event with a large accumulation of snow can have a short term effect on the local economy in terms of lost productivity. Transportation-related businesses are often negatively affected when winter weather hits.

Effects on New Development – Because winter storms generally affect the county as a whole, new development will not be any more or less affected than current development.

Estimated Damage

The cost of snow removal is incorporated into local government budgets so there is no direct financial impact arising from a winter storm unless the community experiences a prolonged winter season with a high number of snowfall events, such as the 2007-2008 winter when record amounts of snow fell across much of the state.

12. Extreme Heat

Profile

Periods of excessive heat, often referred to as heat waves, are quite common in Wisconsin during the summer months. When high temperatures do occur, they cover large areas of the country. Summertime heat and exposure to solar radiation can cause a number of heat disorders ranging from sunburn to heat stroke as described in Exhibit 5-10.

If left untreated, heat stroke can be deadly. About 237 people die from excessive heat every year in the United States. The elderly, small children, chronic invalids, people on certain medications or drugs, and people with weight and alcohol problems are particularly susceptible to heat disorders. The human body dissipates heat by varying the rate and depth of blood circulation, by perspiring, and as a last resort, by panting. Perspiration is an effective way of cooling the body's surface, but as the relative humidity increases, the positive effects of perspiration decline.

The National Weather Service (NWS) devised the Heat Index[3] as a way to measure the combined effects of temperature and relative humidity. The Heat Index chart (Exhibit 5-11) also shows when certain physiological responses are commonly seen with prolonged exposure and/or physical activity. As the relative humidity increases, even modest temperatures can cause heat stroke and other less serious heat disorders.

Exhibit 5-10. Heat Disorders and Symptoms

Heat Disorder	Symptoms
Sunburn	Redness and pain; in severe cases swelling of skin, blisters, fever, headaches
Heat Cramps	Painful spasms usually in muscles of legs and abdomen possible; heavy sweating
Heat Exhaustion	Heavy sweating, weakness, skin cold, pale and clammy; pulse thready; normal temperature possible; fainting and vomiting
Heat Stroke	High body temperature (106 or higher); hot dry skin; rapid and strong pulse; possible unconsciousness

Source: National Weather Service, National Oceanic and Atmospheric Administration

[3] The Heat Index is sometimes referred to as the apparent temperature.

Exhibit 5-11. Heat Index (Apparent Temperature)

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

Source: National Weather Service, National Oceanic and Atmospheric Administration

With Prolonged Exposure and/or Physical Activity

Extreme Danger – Heat stroke or sunstroke highly likely

Danger – Sunstroke, muscle cramps, and/or heat exhaustion likely

Extreme Caution – Sunstroke, muscle cramps, and/or heat exhaustion likely

Caution – Fatigue possible

History of Past Occurrences

Based on records maintained by the National Weather Service, there have been 17 reported events with excessive temperatures between 1950 and 2010 (Appendix G). The most recent event occurred on June 23rd 2009 when the county experienced heat index reaching 106 degrees. The southern tier of counties experience the highest number of heat wave days.

Vulnerability Assessment

From 1986 to 2009, there were 10 years in which at least one or more persons in Wisconsin died from the direct or indirect effects of excessive heat (Table 5-20). A total of 115 people died in the 20-year period from 1986 to 2006. None of the deaths occurred in Sauk County. However, some Sauk County residents most likely received medical treatment for heat-related symptoms.

During that 20-year period, 1995 was the deadliest year when a total of 82 deaths were reported. Two heat waves gripped much of the state. The first occurred in mid-June and the second in mid-July. In the second heat wave, the temperature rose to between 100ºF and 108ºF with heat indices of 120ºF to 130ºF.

According to the National Weather Service, the mortality rate from excessive heat in Wisconsin is the highest of all natural disasters – more than four times greater than the second highest cause of death, tornadoes.

Intensely urbanized areas feel the effects of heat waves more than rural areas in that the temperature in urban areas is often elevated because radiant energy is stored in pavement and the exterior building surfaces and is released slowly over a period of time. Even during a heat wave, nighttime temperatures typically drop, but less so in urban areas because these heat reservoirs dissipate the radiant heat collected during the day time. This phenomenon is often referred to as the heat island effect.

Out of all of the natural hazards in Wisconsin, excessive heat is the leading cause of fatalities.

Not only are urban areas heat islands, pollutants often build up in the lower atmosphere during periods of excessive heat, causing respiratory problems, especially for the young, the elderly, and those with respiratory ailments such as asthma.

Although the more urban areas of the county experience the heat island effect, the change in the ambient temperature is modest. This is because the urban areas of the county are relatively small and street trees help to deflect solar radiation back into the atmosphere.

Effects on Facilities – Excessive heat does not directly impact critical facilities.

Effects on Population Groups – The elderly are disproportionately affected by heat. For example, during the heat waves of 1995, three-quarters of the fatalities were 60 years of age or older (Table 5-21).

Effects on Economic Sectors – Excessive heat can accompany drought causing a loss of crops. Additionally, some businesses may close or reduce production to minimize heat effects on employees.

Effects on New Development – Most new homes that are being constructed in the area have central air conditioning. As such, those people living in new dwelling units will be less affected by extreme heat than those living in the existing housing stock, some of which do not have air conditioning.

Estimated Damage

Aside from health consequences for county residents, excessive heat does not cause a definable economic loss.

Table 5-20. Heat-Related Fatalities; Wisconsin: 1986 - 2009

Year	Direct Deaths	Indirect Deaths
1986	1	**0**
1988	1	**0**
1993	2	**0**
1995	82	72
1997	1	0
1999	12	8
2001	10	5
2002	3	5
2003	0	4
2006	3	1
Total	115	95

Source: National Weather Service, Milwaukee - Sullivan Office

Table 5-21. Heat-Related Fatalities; United States: 1995

Age	Number	Percent
0 – 19	14	1.4
20 – 29	5	0.5
30 – 39	34	3.3
40 – 49	79	7.7
50 – 59	95	9.3
60 – 69	179	17.5
70 – 79	253	24.8
80 – 89	241	23.6
90 and older	61	6.0
Unknown age	60	6.0
Total	1,021	100 [1]

Source: National Weather Service
Notes:
1. Numbers may not add up to 100 due to rounding

13. Extreme Cold

Profile

Periods of extreme cold temperature are common during the winter months in Wisconsin.

History of Past Occurrences

From 1950 through 2010, the National Weather Service documented 24 periods of extreme cold, all of which occurring from December through mid-February. The lowest recorded temperature in Sauk County (-45°F) was recorded on January 30, 1951 at the Baraboo weather station (#470516). Based on data collected at the Baraboo weather station, there are on average 25 days with temperatures at or below zero degrees Fahrenheit (Table 5-22).

Table 5-22. Temperature Extremes; Sauk Weather Station: 1971-2000

Month	Number of Days ≥90°F	Number of Days ≤0°F
January	0.0	13.1
February	0.0	8.2
March	0.0	2.4
April	0.0	0.0
May	0.2	0.0
June	2.3	0.0
July	4.4	0.0
August	1.9	0.0
September	0.5	0.0
October	0.0	0.0
November	0.0	0.7
December	0.0	6.9

Source: http://mrcc.sws.uiuc.edu/climate_midwest/historical/temp/wi/470516_tsum.html

Vulnerability Assessment

Effects on Facilities – Excessive cold does not directly impact most critical facilities. There may be instances where an extended period of cold causes water pipes in buildings to freeze, and if not corrected, to burst. Underground water laterals often leak because of extreme cold temperatures as the surrounding soil materials expand and contract.

Effects on Population Groups – The elderly are disproportionately affected by cold temperatures. They are often times confined to their home during extended cold periods.

Effects on Economic Sectors – Excessively cold temperatures can accompany winter storm events; which compounds a generally difficult time. Because cold temperatures do not last for an extended period, the effects of excessively cold temperatures are short lived.

Effects on New Development – Periods of extreme cold will not disproportionately affect new development.

Estimated Damage

Aside from health consequences for county residents, excessively cold temperatures do not cause a definable economic loss.

14. Drought

Profile

A drought is an extended period of time when rainfall is significantly below normal amounts. Unlike other natural disasters, it is not known until much later in time, when a drought begins. A drought could last for months, several years, and in extreme conditions, much longer. Droughts are typically accompanied by higher-than-normal temperatures and lower-than-normal relative humidity levels.

Some droughts cover entire regions of a continent or can affect a sub-region as small as several counties.

A number of methodologies have been developed to measure droughts from a purely meteorological standpoint. Droughts can also be defined based on the consequences which result. For the purposes of this plan, two types of drought are considered: agricultural and hydrologic. An agricultural drought causes a noticeable drop in crop yields and a hydrological drought causes a drop in lake and stream levels and lowers the height of the ground water table.

Although these two types of droughts can occur at the same time, the negative effects of a drought are first seen on crop production. Hydrologic droughts characteristically lag behind an agricultural drought because it takes time for the lack of precipitation to lower surface and ground water levels. As a result, it is possible for an area to experience a hydrologic drought long after the end of an agricultural drought.

History of Past Occurrences

Agricultural and hydrologic droughts occur in Wisconsin on a regular basis. Since the Dust Bowl, short-lived droughts have occurred on an interval of about once in every ten years. Long-term droughts are more infrequent. Since the Dust Bowl, there have been four significant droughts in the state: 1987-1988, 1976-1977, 1955-1959, and 1948-1950. The most recent occurrence to cause damages in Sauk County occurred during the months of June and July in 2007. During this episode $50,000 in losses were recorded. The most damaging drought in Sauk County and surrounding region occurred in 2002 when $4.4 million was reported in lost crops.

In 2005, 2006, and 2007 Governor Doyle declared a statewide drought emergency by executive order so that the Department of Natural Resources could expedite farmers' requests to use water from lakes and streams for irrigation. Also in 2007, the governor asked the U.S. Secretary of Agriculture to declare 52 counties, including Sauk County, as disaster areas.

Exhibit 5-12 shows the statewide average annual precipitation between 1895 and 2008 and the lowest annual precipitation recorded in the state for the same period. Over this period, the average annual precipitation was 31.4 inches per year on a statewide basis. There were 56 years when precipitation was below the average and 7 years when precipitation was less than 25 inches. The lowest average annual precipitation occurred in 1976 with 20.9 inches of precipitation.

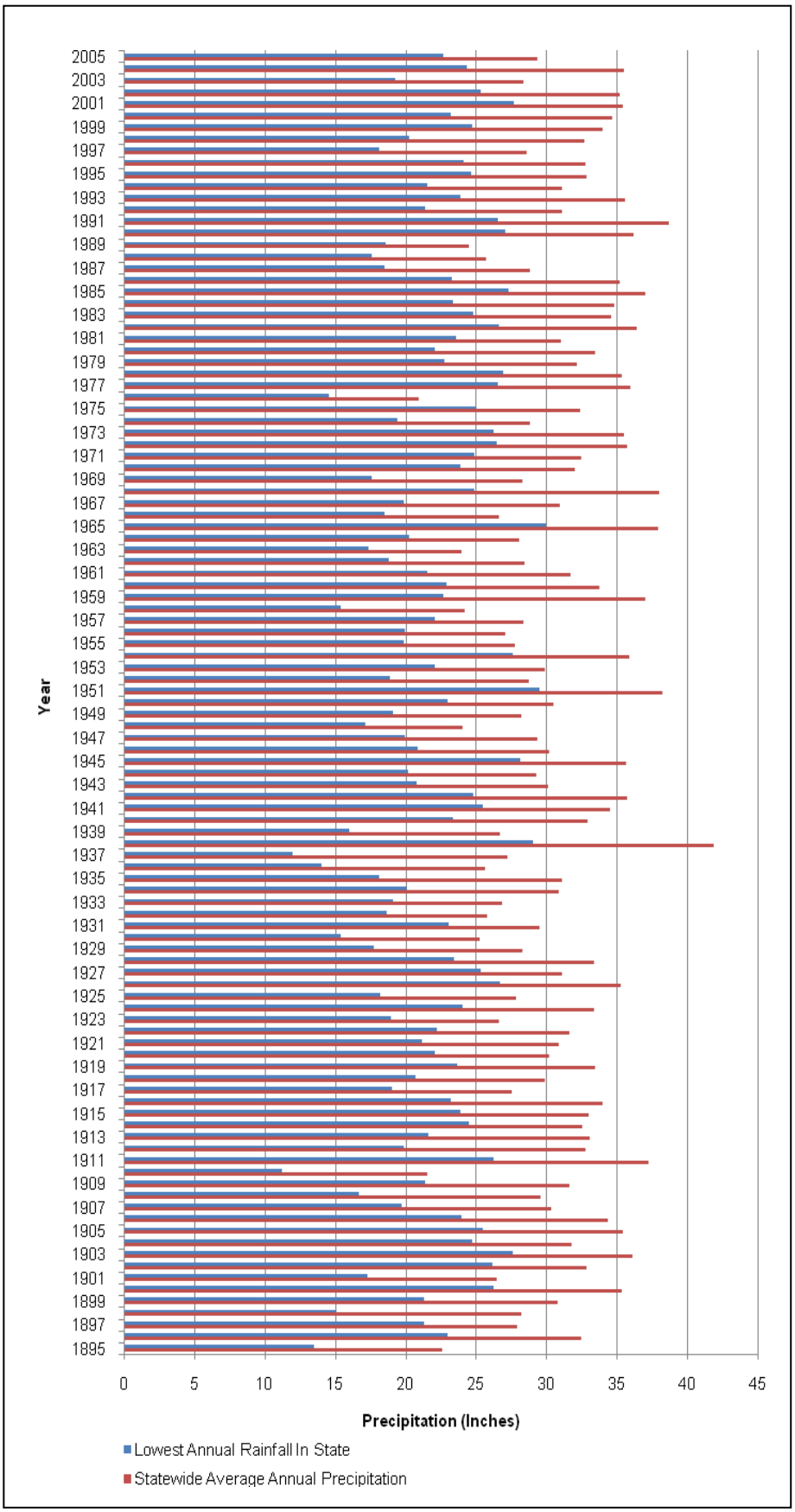
Table 5-23. Locations In and Near Sauk County with the Lowest Annual Statewide Precipitation Levels: 1895-2008

		Lowest Recorded Precipitation Levels			
Year	Statewide Average (Inches)	Precipitation (Inches)	Difference (Inches)	General Location	County
1888	28.24	23.07	5.17	Madison	Dane
1895	22.60	13.54	9.06	Madison	Dane
1905	35.44	25.49	9.95	Madison	Dane
1958	24.18	15.41	8.77	Hillsboro	Vernon
1962	28.47	18.79	9.68	Madison	Dane
1966	26.62	18.52	8.1	Hillsboro	Vernon
1975	32.40	25.04	7.36	Lone Rock	Sauk
1983	34.57	24.81	9.76	Stoughton	Dane
2002	35.22	25.36	9.86	Dodgeville	Iowa

Source: Wisconsin State Climatology Office www.aos.wisc.edu/~sco/clim-history/state/4700-RN-EX.html and www.aos.wisc.edu/~sco/clim-history/state/4700-R.html

On a more localized level, there have been 88 years when an area of the state with the lowest precipitation level received less than 25 inches of precipitation. As shown in Table 5-23, the lowest statewide precipitation levels occurred in Sauk County or an adjoining county on nine occasions.

Exhibit 5-12. Wisconsin Average Annual Precipitation: 1895-2006



Source: Wisconsin State Climatology Office

Vulnerability Assessment

By most accounts, the 1987-1988 drought in Wisconsin was the most severe and is estimated to have a recurrence interval of about 75 years. All Wisconsin counties were eligible for drought assistance. Agricultural losses throughout the state totaled $1.3 billion. More than half of the farms in the state suffered crop losses of 50 percent or more, with 14 percent experiencing a crop loss of 70 percent or more.

Potential for Future Losses

Effects on Facilities and Population Groups – Unlike many of the other natural disasters addressed in this plan, drought conditions do not cause direct physical harm to people or destroy buildings and other structures.

Effects on Economic Sectors -- The two main concerns with drought relate to economic losses to agricultural crops and livestock and effects on ground water supplies available to both private and public water wells.

Farmers in the county produce a variety of products, including dairy, grain, cattle and calves, hogs and pigs, vegetables, nursery and greenhouse stock, and Christmas trees. In 2009, farm operators owned and managed more than 358,919 acres of land. Droughts would therefore affect a significant portion of the county and a significant economic sector.

During extended droughts, municipalities often see an increased water usage due primarily to increased use for lawns and gardens. It is important that municipal wells are properly sized for the number of residents they are intended to serve. At times it may be necessary to impose water restrictions when there is concern that the available water supply may not be sufficient to meet basic needs.

Because municipal wells are generally concentrated in a relatively small area, extended droughts can affect the level of the water table. With decreased rainfall, the water table will naturally drop. Most public water wells draw from the deep aquifers and typically are not negatively affected. However, those wells serving an individual household are comparatively shallow and are more susceptible to a dropping water table, especially when located near a municipal well. It is estimated that about two-thirds of county residents receive their drinking water from a municipal system and the remaining one-third from a private well.

Effects on New Development – Aside from the potential of limiting the use of potable water for certain uses during drought periods, new development will be no more susceptible to drought than exists now.

Estimated Damage

It is estimated that a short-term drought over the course of a year would cause a loss in agricultural production in the range of $25,000 to $50,000. This estimate is based on an average loss of $300 per acre over 83 to 166 acres.

15. Summary of Risk by Jurisdiction

Table 5-21 presents a summary of risk for each jurisdiction in Sauk County.

Table 5-21. Summary of Risk by Jurisdiction: 2010

	Dam Failure	Flooding [2]	Dense Fog	Tornado	Hail-storm	Thunder-storm	Temp. Extremes	Drought
Town								
Baraboo	Low	Medium	Low	Medium	Medium	Medium	Medium	Low
Bear Creek	Low	Medium	Low	Medium	Medium	Medium	Medium	Low
Dellona	Low	Medium	Low	Medium	Medium	Medium	Medium	Low
Delton	Low	Medium	Low	Medium	Medium	Medium	Medium	Low
Excelsior	Low	Medium	Low	Medium	Medium	Medium	Medium	Low
Fairfield	Low	Medium	Low	Medium	Medium	Medium	Medium	Low
Franklin	Medium	Medium	Low	Medium	Medium	Medium	Medium	Low
Freedom	Low	Medium	Low	Medium	Medium	Medium	Medium	Low
Greenfield	Low	Medium	Low	Medium	Medium	Medium	Medium	Low
Honey Creek	Medium	Medium	Low	Medium	Medium	Medium	Medium	Low
Ironton	Low	Medium	Low	Medium	Medium	Medium	Medium	Low
La Valle	Medium	Medium	Low	Medium	Medium	Medium	Medium	Low
Merrimac	Low	Medium	Low	Medium	Medium	Medium	Medium	Low
Prairie du Sac	Low	Medium	Low	Medium	Medium	Medium	Medium	Low
Reedsburg	Medium	Medium	Low	Medium	Medium	Medium	Medium	Low
Spring Green	Low	High	Low	Medium	Medium	Medium	Medium	Low
Sumpter	Low	Medium	Low	Medium	Medium	Medium	Medium	Low
Troy	Low	Medium	Low	Medium	Medium	Medium	Medium	Low
Washington	Low	Medium	Low	Medium	Medium	Medium	Medium	Low
Westfield	Low	Medium	Low	Medium	Medium	Medium	Medium	Low
Winfield	Low	Medium	Low	Medium	Medium	Medium	Medium	Low
Woodland	Medium	Medium	Low	Medium	Medium	Medium	Medium	Low
Village								
Cazenovia [1]	Low	Low	Low	Medium	Medium	Medium	Medium	Low
Ironton	Low	Low	Low	Medium	Medium	Medium	Medium	Low
Lake Delton	Low	Medium	Low	Medium	Medium	Medium	Medium	Low
La Valle	Low	High	Low	Medium	Medium	Medium	Medium	Low
Lime Ridge	Low	Low	Low	Medium	Medium	Medium	Medium	Low
Loganville	Low	Low	Low	Medium	Medium	Medium	Medium	Low
Merrimac	Low	Low	Low	Medium	Medium	Medium	Medium	Low
North Freedom	Low	Medium	Low	Medium	Medium	Medium	Medium	Low
Plain	Low	Medium	Low	Medium	Medium	Medium	Medium	Low
Prairie du Sac	Low	Low	Low	Medium	Medium	Medium	Medium	Low
Rock Springs	Low	High	Low	Medium	Medium	Medium	Medium	Low
Sauk City	Low	Low	Low	Medium	Medium	Medium	Medium	Low
Spring Green	Low	High	Low	Medium	Medium	Medium	Medium	Low
West Baraboo	Low	Medium	Low	Medium	Medium	Medium	Medium	Low
City								
Baraboo	Low	High	Low	Medium	Medium	Medium	Medium	Low
Reedsburg	Low	High	Low	Medium	Medium	Medium	Medium	Low
Wisconsin Dells [1]	Low	Low	Low	Medium	Medium	Medium	Medium	Low

Notes:
1. Municipality located in Sauk County and another county
2. See Section 6 of this chapter for a detailed loss estimates.

16. Summary of Damage Estimates

Table 5-22 lists damage estimates for the various natural hazards reviewed in this chapter.

Table 5-22. Damage Estimates for Natural Hazards; Sauk County

Natural Hazard	Damage Estimate
Dam failure	Unknown
Flooding [1]	$53.2 million (building loss)
Dense fog [2]	Minimal
Tornado – EF1	$55,000
Tornado – EF2	$1,225,000
Hail storm [2]	$1,500
Thunderstorm [2]	$33,000 property; $5,000 crop
Winter storm [2,3]	Minimal
Extreme temperature – heat	Minimal
Extreme temperature – cold	Minimal
Drought - short-lived	0 property; $25,000 to $50,000 crop
Drought - long-lived	0 property; $100,000-$200,000 crop

Notes:
1. Based on a 100-year flood
2. Estimates do not include damage to motor vehicle or other accident-related costs
3. Estimate does not include snow plowing/removal costs. While potentially significant, these costs are included in local government budgets.

Assessment of Manmade Hazards

Chapter Contents

1. Chapter Overview

This chapter evaluates the manmade hazards that have or could occur in the county. Initially, 20 manmade hazards were identified. They were prioritized and 14 of the hazards were dropped from future consideration given their low ranking compared to the other hazards. The remaining 6 hazards are described in detail. After describing the nature of the hazard, the frequency of occurrence is documented along with its effect on critical facilities, various population groups, and economic sectors. Estimates of economic loss are included when there is enough empirical data to do so.

2. Hazard Identification

As part of an initial screening process, the steering committee used the methodology developed by Wisconsin Emergency Management[1] to evaluate manmade hazards in Sauk County to determine, on a countywide basis, which warrant the most attention. For each hazard, the members of the steering committee used a group consensus process to assign a numeric value to the 10 factors listed in Table 6-1.

Table 6-1. Hazard Assessment Criteria

Factor	Description
Historical Hazard Frequency	Frequency of past occurrences
Anticipated Hazard Probability	Probability of the hazard occurring again
Historical Health and Public Safety	Degree of past hazard events causing injuries, sickness, and/or deaths
Residential Damage	Degree of past hazard events causing damages to homes
Business Damage	Degree of past hazard events causing damages to businesses
Public Costs	Amount of local, state, and federal funds expended on past hazard recovery activities
Magnitude of Population at Risk	Amount of the area's population still vulnerable to injury, sickness, and/or death
Magnitude of Homes at Risk	Amount of homes still vulnerable to damage
Magnitude of Businesses at Risk	Amount of businesses still vulnerable to damage or interruption of business trade
Magnitude of Public Infrastructure at Risk	Amount of infrastructure that is susceptible to damages

Source: *Resource Guide to All Hazards Mitigation Planning In Wisconsin*, 2003. Wisconsin Emergency Management

Table 6-2 shows the results of that exercise. The three highest ranked manmade hazards are loss of sewer system, structural fire, and traffic accidents.

[1] *Resource Guide to All Hazards Mitigation Planning In Wisconsin*, 2003. Wisconsin Emergency Management

The following manmade hazards were excluded from further consideration:

- Communicable diseases
- Terrorism
- Workplace violence
- Contaminants
- Civil disturbances
- School violence
- Correctional center incident
- HAZMAT Railway
- HAZMAT Pipeline
- HAZMAT Aircraft
- HAZMAT Waterway
- HAZMAT Roadway
- Transportation airway
- Transportation railway
- Water contamination

Table 6-2. Countywide Comparative Analysis of Manmade Hazards; Sauk County: 2010

Natural Hazard	1 Historical Hazard Frequency (1,2,3)	2 Anticipated Hazard Probability (1,2,3)	3 Historical Health and Public Safety (1,2,3)	4 Residential Damage (1,2,3)	5 Business Damage (1,2,3)	6 Public Costs (1,2,3)	7 Magnitude of Population At Risk (1,2,3)	8 Magnitude of Homes At Risk (1,2,3)	9 Magnitude of Businesses At Risk (1,2,3)	10 Magnitude of Public Infrastructure At Risk (1,2,3)	11 Overall Score
Loss of Sewer System	2	2	1	2	2	3	2	2	2	2	20
Traffic Accident	3	3	2	1	1	3	3	1	1	1	19
Structural Fire	3	3	2	3	2	1	1	1	1	1	18
Loss of Electrical System	1	1	1	1	1	2	2	2	1	1	13
HAZMAT Spill at a Fixed Facility	1	1	1	1	2	1	2	1	1	1	12

Notes: This matrix is based on a qualitative assessment and is intended to identify those hazards posing the greatest concern.

A low, medium, or high numerical rating of 1, 2, or 3, respectively, is assigned to each criterion and then the ratings for each hazard are totaled.

Column 1 refers to the frequency of past occurrences.
Column 2 refers to the probability of the hazard occurring again.
Column 3 refers to the degree of past hazard events causing injuries, sickness, and/or deaths.
Column 4 refers to the degree of past hazard events causing damages to homes.
Column 5 refers to the degree of past hazard events causing damages to businesses.
Column 6 refers to the amount of local, state, and federal funds expended on past hazard recovery activities.
Column 7 refers to the amount of the area's population still vulnerable to injury, sickness, and/or death.
Column 8 refers to the amount of homes still vulnerable to damage.
Column 9 refers to the amount of businesses still vulnerable to damage or interruption of business trade.
Column 10 refers to the amount of infrastructure that is susceptible to damage.
Column 11 is the raw score for the hazard.

The nature of the identified manmade hazards are quite different as shown in Table 6-3. Most of the manmade hazards typically occur with little or no advance warning and also tend to be rather localized.

Table 6-3. Nature of Manmade Hazards; Sauk County

Natural Hazard	Geographic Extent	Amount of Advance Notification	Recurrence Interval [1]
Loss of Sewer System	System wide	None or very little	Infrequent
Traffic Accident	Very localized	None	3-4 per day
Structural Fire	Very localized	None	0.33
Loss of Electrical System	System wide	None or very little	Infrequent
HAZMAT Spill at a Fixed Facility	Generally localized unless materials enter surface water or the groundwater	None	0.33

Notes:
1. Recurrence interval is number of events occurring over a period of time.

Table 6-4 lists each of the manmade hazards and identifies whether they will have an impact on the critical facilities identified in this plan, noncritical buildings and structures, special populations, the general population, and broadly defined economic sectors.

Table 6-4. General Effects of Manmade Hazards on Facilities, Population Groups, and Economic Sectors; Sauk County: 2010

Critical Facility	Loss of Sewer System	Traffic Accident	Structural Fire	Loss of Electrical System	HAZMAT Spill at a Fixed Facility
Facility with Hazardous Materials	-	-	-	D	D
Infrastructure					
Bridge	-	-	-	-	-
Dam	-	-	-	-	-
Communication Tower	-	-	-	D	-
Electric Facility – Power Plant	-	-	-	D	-
Electric Facility – Substation	-	-	D	D	-
Natural Gas Facility	-	-	-	-	-
Petroleum Pipeline	-	-	-	-	I
Public-Use Airport	-	-	D	D	-
Telephone Facility	-	-	D	D	-
Utility Offices/Yard	-	-	D	-	-
Water Facility [1]	-	-	D	D	-
Wastewater Facility	D	-	D	D	-
Government Facility					
Community Center	-	-	D	D	-
Library	-	-	D	D	-
Municipal Garage	-	-	D	D	-
Municipal Office and Other	-	-	D	D	-
Post Office	-	-	D	D	-
Senior Center	-	-	D	D	-
Health Care Facility					
Health Care Clinic	-	-	D	D	-
Hospital	-	-	D	D	-
Public Safety Facility					
EMS Facility	-	-	D	D	-
Fire Station	-	-	D	D	-
National Guard Facility	-	-	D	D	-
Police Station	-	-	D	D	-

continued

Table 6-4. General Effects of Manmade Hazards on Facilities, Population Groups, and Economic Sectors; Sauk County: 2010

Population Groups	Loss of Sewer System	Traffic Accident	Structural Fire	Loss of Electrical System	HAZMAT Spill at a Fixed Facility
School					
K-12	D	-	D	D	I
Secondary	D	-	D	D	I
Special Care Facility - Residential					
Adult Family Home	D	-	D	D	I
Community Based Residential Facility	D	-	D	D	I
Nursing Home	D	-	D	D	I
Residential Care Apartment Complex	D	-	D	D	I
Special Care Facility - Nonresidential					
Adult Day Care	D	-	D	D	I
Group Day Care	D	-	D	D	I
Vulnerable Housing					
Mobile Home Park	-	-	D	D	I
Campground	-	-	-	-	I
Noncritical Buildings/Structures	D	-	D	D	D
General Public	D	D	D	D	-
Elderly and People with Disabilities	I	I	D	D	-
Homeless	I	-	-	-	-
Economic Sector					
Agriculture	-	-	D	D	D
Commercial	C	-	D	D	D
Industrial	C	-	D	D	D
Transportation	-	D	-	-	D

Notes: 1. Types of facilities included in this category include wells, towers, and treatment plants

Key: - No or minimal effect; I – Indirect Effect; D – Direct Effect

3. Loss of Sewer System

Profile

The loss of a sewer system occurs when a wastewater treatment plant for whatever reason is not able to operate or operate at design levels. Typically, this would occur in extreme circumstances, including significant flooding and excessive rainfall, and less frequently, mechanical failure or electrical outage.

If a public sewer system is not operational, sewage is not flowing properly and may be discharged to receiving waters with no or insufficient treatment. If the event there is an electrical outage, onsite backup generators are generally available and provide necessary power. The greatest risk arises when the wastewater treatment plant is located in a floodplain and is not properly protected from flooding or when excessive rainfall overloads the system.

Most of the sewer collection systems have one or more lift stations. During an electrical outage, pumper trucks can be used to remove the wastewater from smaller stations and backup generators can be used for those that typically receive large volumes of wastewater.

History of Past Occurrences

Based on recent history, there have been few instances in the County when a public water system was not able to operate.

Vulnerability Assessment

Although impacts from a loss of a sewer system can be significant, the anticipated impacts are judged to be comparatively low, but nevertheless a consideration in mitigation planning.

Effects on Facilities – During an event when the sewer system is not operating, occupants of critical and non-critical facilities are able to dispose of wastewater. With the exception of flooding events, the loss of a sewer system typically lasts for a short period of time. During a flood event, an outage can last for one or more days.

Effects on Population Groups – None of the population groups identified in this plan are any more or less vulnerable to a sewer outage.

Effects on Economic Sectors – The loss of sewer service can be a significant problem for all economic sectors but especially those business that use water for processing or that serve the public.

Effects on New Development – The impacts of a sewer service outage will not impact new development any differently than existing development.

4. Traffic Accidents

Profile

Traffic accidents occur when one or more motor vehicles are involved in a crash resulting from human error, mechanical failure of the vehicle, severe weather, a hazardous material spill, and other various reasons. These accidents may involve a single vehicle, multiple vehicles, a vehicle and pedestrians, or some combination thereof.

Traffic accidents are generally instantaneous. Conditions that contribute to accidents can last from several minutes to several days (e.g., bad weather), or in some instances may be semi-permanent (e.g., poor visibility). Depending on the nature of the accident, damage can occur or passengers can be hurt or die.

Given the number of drivers and pedestrians on the roadways, there is always a risk for accidents. There are a number of significant roadway routes in the county. Interstate 39/90/94 is located in the northeast corner of the county. In addition to state highways, there are county roadways and local roads.

Table 6-5. Traffic Crashes; Sauk County: 2004-2009

		Change from Prior Year	
Year	Number	Numerical	Percent
2004	2,099	n/a	n/a
2005	1,985	-114	-5.4
2006	1,800	-185	-9.3
2007	1,911	111	6.2
2008	1,849	-62	-3.2
2009	1.635	-214	-11.6

Source: WisDOT-DMV Traffic Accident database accessed at http://www.dot.wisconsin.gov/drivers/drivers/traffic/crash/final-county.htm

History of Past Occurrences

According to data collected by the Wisconsin Department of Transportation, the overall number of crashes has declined each year between 2004 and 2009, with

the exception of 2007 when there was an increase of 6.2 percent over the preceding year (Table 6-5). Table 6-6 presents traffic crash statistics in Sauk County by the type of road where the accident occurred.

Table 6-6. Traffic Crashes by Municipality Type and Severity; Sauk County: 2008

Road Type	Fatality	Injury	Property Damage	Total
Local Road	1	144	455	600
County Highway	3	55	161	219
State Highway	8	249	593	850
Interstate	1	40	139	180
Total	13	488	1,348	1,849

Source: WisDOT-DMV Traffic Accident database accessed at http://www.dot.wisconsin.gov/drivers/drivers/traffic/crash/final-county.htm on August 12, 2010

Vulnerability Assessment

Effects on Facilities – Traffic accidents do not impact critical or non-critical facilities.

Effects on Population Groups – Although traffic accidents generally impact people of ages, those between the age of 16 and 19 are most susceptible to traffic accidents followed by the elderly.

The economic cost of a traffic crash can vary widely. Table 6-7 shows the costs of motor vehicle injuries at a national level. The calculable costs of crashes are wage and productivity losses, medical expenses, administrative expenses, motor vehicle damage, and employers' uninsured cost.

Table 6-7. Average Economic Cost per Death, Injury, or Crash; United States: 2008

Type	Cost
Death	$1,300,000
Nonfatal Disabling Injury	$63,500
Property Damage Crash	$8,300

Source: National Safety Council, 2008

Effects on Economic Sectors – The transportation sector is dependent on roadways for moving goods and products to market. Although significant to those involved, a traffic crash does not significantly impeded the continuation of this sector.

Effects on New Development – As new development occurs, more motorists will be using the roads which will increase the potential for traffic accidents. Development in and of itself will not be impacted by traffic crashes.

5. Structural Fire

Profile

A structural fire can strike virtually any building, including mobile homes, single- and multi-family residences, commercial buildings, and industrial buildings. The highest percentage of structure fires occur in the late afternoon between 5 p.m. and 7 p.m.

The extent of damage can range from minor to total destruction. can be s typically involve buildings that have more than three floors and are designed for multiple businesses or resident occupancy. Usually these fires occur in large

metropolitan and urban areas. The consequences can be severe with loss of property, income, and in some cases, lives. These fires impact large numbers of people and require special planning and response efforts.

Quick Stats – United States: 2008

- 3,320 civilians lost their lives as the result of fire
- 16,705 civilian injuries that occurred as the result of fire
- 118 firefighters were killed while on duty
- Fire killed more Americans than all natural disasters combined
- 84 percent of all civilian fire deaths occurred in residences
- There were an estimated 1.5 million fires in 2008
- Direct property loss due to fires was estimated at $15.5 billion
- An estimated 32,500 intentionally set structure fires resulted in 315 civilian deaths
- Intentionally set structure fires resulted in an estimated $866 million in property damage

Source: *National Fire Protection Association Fire Loss in the U.S. 2008* and *USFA's Firefighter Fatalities in the United States in 2008.*

History of Past Occurrences

At the national level, fire calls are most common in the winter season and in particular during January (Table 6-8). Table 6-9 shows the number of structural fires from 2007 to 2009 for those fire departments listed.

Table 6-8. Fire Department Runs; United States: 2004

Season	Percent of Total
Winter	26.9
Spring	26.2
Summer	23.9
Fall	22.9
Month	
January	11.1
February	8.9
March	8.9
April	8.4
May	7.6
June	7.3
July	7.7
August	6.8
September	6.9
October	7.9
November	8.2
December	10.4

Source: U.S. Fire Administration, National Fire Data Center

Table 6-9. Structural Fires by Fire Department; Sauk County: ____-____

Department	2007	2008	2009
Baraboo Fire Department			
Delton Fire Department			
La Valle Fire Department			
Loganville Area Fire Department			
Merrimac Fire & Rescue			
North Freedom Volunteer Fire Department	***data***	***is***	***forthcoming***
Plain Fire Department			
Prairie du Sac Volunteer Fire Department			
Reedsburg Fire Department			
Rock Springs Volunteer Fire Department			
Sauk City Fire Department			
Spring Green Fire Department			
Town of Washington Fire Department			
Total			

Source: Local Fire Departments

Sauk County has approximately 10 metropolitan areas where large numbers of people would be affected if a major structural fire occurred. Three fires have involved multiple families in the past. However, all 13 volunteer fire departments in Sauk County have had fires that have affected a single-family dwelling. The fires in Sauk County involving numbers of people were August 13, 1985 at the Bluffview Elderly Apartments near the former Badger Army Ammunitions Plant on State Highway 12, the DOT apartments (eight units) in Merrimac on July 18th, 1993, and a seven-unit apartment fire in Baraboo in 1994.

Vulnerability Assessment

Sauk County has established mutual aid agreements between municipalities and fire departments ensuring compatibility between responding agencies. A Countywide fire network frequency and communication system with other fire departments has also been established. The fire chief reviews and checks pre-fire response plans on a regular basis. Responders are given training involving unusual fire scenarios for local hazards on a regular basis. Public safety and emergency personnel will be called upon to deal with any instances of structural fires. Local and County medical centers will need to be able to treat any injuries or casualties resulting from such events. The actual impact will be subject to the extent and location of the event.

Effects on Facilities – Critical facilities are no more susceptible to structural fires than non-critical facilities.

Effects on Population Groups – According to the U.S. Fire Administration, there were 12.7 fire-related deaths in Wisconsin per million population in 2008, which was just under the national rate of 13.2. Twenty-six states had a death rate lower than Wisconsin's. At 3.9, Hawaii had the lowest death rate, while Mississippi had the highest rate (39.2). As a general rule, the elderly and the young are vulnerable to structural fires.

Effects on Economic Sectors – Given the localized nature of structural fires, no single economic sector is vulnerable to fires. However, if there would be a fire at any of the large employers in the county, there could be an overall drop in that particular sector and in the local economy.

Effects on New Development – When compared to the existing building inventory in a community, newer buildings are less susceptible to structural fires which result in fewer fire-related injuries and deaths. Smoke detectors and new electrical wiring are significant reasons for this difference.

6. Loss of Electrical System

Profile

Modern society is very dependent on electrical power for normal living. Most power outages last about fifteen minutes to one hour. If longer, the utilities will let the local news media know the duration of the outage. Most commonly, a loss of electrical service results from a weather-related event such as a lightning storm or high winds.

History of Past Occurrences

Sauk County's only extended power outage was that with the ice storm of 1976. However, the possibility always exists that an artificial or natural disaster could affect the power system.

Vulnerability Assessment

Sauk County has worked directly with the utility companies and emergency management responders to formulate emergency management plans. During a fuel and/or power shortage residents, schools, industry, and businesses will be

asked to take measures to conserve fuel. If the fuel shortage reaches the critical stage, all nonessential facilities will be closed down and contingency plans put into effect. In the event of a prolonged power outage Sauk County Emergency Management has listings of available generators within the County. Evacuation and shelter arrangements have been prepared in case of a severe power outage.

Effects on Facilities – A number of critical facilities without backup sources of power will be most affected. Local medical facilities, as well as public safety facilities and emergency facilities have backup power sources, and would be considered to be the highest priority. Not all public safety facilities have back-up generators.

Effects on Population Groups – All of the population groups identified in this plan are equally affected by a power outage.

Effects on Economic Sectors – The local economy may be impacted by any inability to conduct business due to a lack of electricity.

Effects on New Development – New residential subdivisions generally are serviced by underground electric distribution lines, and are therefore less vulnerable than those areas exclusively serviced by overhead lines.

7. Hazardous Material Spill at a Fixed Facility

Profile

A hazardous substance or material (HAZMAT) is defined as any substance or combination of substances that may cause or significantly contribute to an increase in mortality or an increase in serious illness to human health. These include wastes of a solid, liquid, gaseous, or semisolid form that, because of their quantity, concentration, or infectious characteristics pose a present or potential hazard. Such substances may include those that are toxic, corrosive, flammable, irritants, strong sensitizers, or explosives.

HAZMAT spills can occur on site where they are produced, handled, or otherwise used and also while being transported from one place to another. Spills at fixed facility operations exceed incidents from transportation accidents.

About 80 percent of all HAZMAT spills involve petroleum products. For emergency response purposes, hazardous material spill incidents are categorized as Level A or Level B releases. Level A releases are the most hazardous materials requiring the most protection. Response to a Level A incident will be done from Madison. Level B releases require respiratory protection with a minimum skin protection. Sauk County has mutual aid with the Portage Level B team for some areas on the east side and a contract with a Level B clean up company for the rest of the County. This occurs with the uncontrolled release or threatened release of hazardous materials from a fixed site that may impact public health and safety and/or the environment. The Emergency Planning and Community Right to Know Act (EPCRA) defines a

hazardous material as any chemical that is a physical hazard or health hazard [defined at 29 CFR 1910.1200(c)] for which the Occupational Safety and Health Administration (OSHA) requires a facility to maintain a Material Safety Data Sheet (MSDS). Under EPCRA, there is no specific list of hazardous materials, however, an extremely hazardous substance (EHS) list of 356 substances, identified at 40 CFR Part 355, is kept by the United States Environmental Protection Agency. There are two thresholds related to chemicals.

- Planning Threshold – The facility has an extremely hazardous substance present at any one time in an amount equal to or exceeding the chemical-specific threshold planning quantity and is required to have an off-site plan.
- Reporting Threshold – This facility has 10,000 pounds of a hazardous substance or either 500 pounds or the threshold planning quantity of an extremely hazardous substance present at any one time and is not exempt from the reporting requirements.

Sauk County had 62 planning facilities and 28 reporting facilities in 2010.

Table 6-10. Hazardous Material Spills; Sauk County: 1993-2009

Year	Number of Spills	Type of HAZMAT
1993	3	Fixed
1994	7	Unknown
1995	9	Unknown
1996	2	Unknown
1997	9	Unknown
1998	10	Unknown
1999	7	Unknown
2000	9	Unknown
2001	3	Unknown
2002	4	Unknown
2003	8	Unknown
2004		
2005	***data is forthcoming***	
2006		
2007		
2008		
2009		

History of Past Occurrences

On average, there are about four fixed facility HAZMAT incidents each year. To date, no fatalities occurred, however; one person was treated for inhalation in September 1996 from chlorine/muratic acid and 11 young people were transported to the hospital after a chlorine/muratic acid inhalation incident in August 2003. An explosion at a planning facility released ammonia and required evacuation in December 2003.

Vulnerability Assessment

Because the use of chemicals has increased considerably over the past several decades, hazardous materials are present in quantities of concern in business, industry, agriculture, hospitals, schools, water parks and other facilities in the County. There are no areas exempt from the possibility of a hazardous materials incident. Despite all the precautions, accidents can happen.

Short and/or long term hazards from an incident could cause adverse health hazards if exposed to chemicals through work, explosions, fires, or environmental contamination. An incident may also necessitate short or long-term evacuation, which disrupts the social and economic aspects of the affected area.

A hazardous materials incident at a fixed facility can result in loss of income if the facility is unable to operate waiting for cleanup. Other businesses and residents in the area may have to be evacuated until cleanup is finished. Medical treatment may also be required to persons affected by exposure to the hazardous materials. Public safety personnel and equipment may also need to be deployed to mitigate the spill at a cost to the taxpayer.

The Sauk County Local Emergency Planning Committee, in conjunction with the County Emergency Management Office has off-site facility plans for the various planning facilities. These are updated annually after the Tier IIs are received.

Effects on Facilities – Most of the critical facilities do not store or use hazardous materials in significant quantities. Water and wastewater treatment

facilities are the two exceptions. None of the critical facilities and non-critical facilities are especially vulnerable to a facility with hazardous materials.

Effects on Population Groups – None of the population groups identified in this plan are more or less vulnerable than the other groups.

Effects on Economic Sectors – As a whole, the agricultural and industrial sectors are the most vulnerable to HAZMAT spills of a significant size.

Effects on New Development – New development is no more or less vulnerable to a HAZMAT spill at a fixed site than is existing development in the county.

8. Summary of Risk by Jurisdiction

Table 6-11 presents a summary of risk for each jurisdiction in Sauk County.

Table 6-11. Summary of Risk by Jurisdiction: 2010

Municipality	Loss of Sewer System	Traffic Accident	Structural Fire	HAZMAT Spill at Fixed Facility	Loss of Electrical System
Town					
Baraboo	Low	Medium	Low	Low	Medium
Bear Creek	Low	Medium	Low	Low	Medium
Dellona	Low	Medium	Low	Low	Medium
Delton	Low	Medium	Low	Low	Medium
Excelsior	Low	Medium	Low	Low	Medium
Fairfield	Low	Medium	Low	Low	Medium
Franklin	Low	Medium	Low	Low	Medium
Freedom	Low	Medium	Low	Low	Medium
Greenfield	Low	Medium	Low	Low	Medium
Honey Creek	Low	Medium	Low	Low	Medium
Ironton	Low	Medium	Low	Low	Medium
La Valle	Low	Medium	Low	Low	Medium
Merrimac	Low	Medium	Low	Low	Medium
Prairie du Sac	Low	Medium	Low	Low	Medium
Reedsburg	Low	Medium	Low	Low	Medium
Spring Green	Low	Medium	Low	Low	Medium
Sumpter	Low	Medium	Low	Low	Medium
Troy	Low	Medium	Low	Low	Medium
Washington	Low	Medium	Low	Low	Medium
Westfield	Low	Medium	Low	Low	Medium
Winfield	Low	Medium	Low	Low	Medium
Woodland	Low	Medium	Low	Low	Medium

continued

Table 6-11. Summary of Risk by Jurisdiction: 2010

Municipality	Loss of Sewer System	Traffic Accident	Structural Fire	HAZMAT Spill at Fixed Facility	Loss of Electrical System
Village					
Cazenovia	Medium	Medium	Medium	Medium	Medium
Ironton	Medium	Medium	Medium	Medium	Medium
Lake Delton	Medium	Medium	Medium	Medium	Medium
La Valle	Medium	Medium	Medium	Medium	Medium
Lime Ridge	Medium	Medium	Medium	Medium	Medium
Loganville	Medium	Medium	Medium	Medium	Medium
Merrimac	Medium	Medium	Medium	Medium	Medium
North Freedom	Medium	Medium	Medium	Medium	Medium
Plain	Medium	Medium	Medium	Medium	Medium
Prairie du Sac	Medium	Medium	Medium	Medium	Medium
Rock Springs	Medium	Medium	Medium	Medium	Medium
Sauk City	Medium	Medium	Medium	Medium	Medium
Spring Green	Medium	Medium	Medium	Medium	Medium
West Baraboo	Medium	Medium	Medium	Medium	Medium
City					
Baraboo	Medium	Medium	Medium	Medium	Medium
Reedsburg	Medium	Medium	Medium	Medium	Medium
Wisconsin Dells [1]	Medium	Medium	Medium	Medium	Medium

Notes:

1. Municipality located in Sauk County and another county

Mitigation Strategy

Chapter Contents

1. Chapter Overview

This chapter is intended to identify common mitigation strategies for each of the hazards reviewed in this plan and potential funding sources for carrying out mitigation activities. The bulk of the chapter is devoted to listing goals, objectives, and policies along with projects or activities that apply broadly to the county and special projects or activities that apply to one or more of the municipalities.

2. Types of Potential Mitigation Strategies

Mitigation strategies can be grouped into six broad categories:

- Prevention
- Property protection
- Public education and awareness
- Natural resource protection
- Emergency services
- Structural projects

Examples are listed below for each of the natural hazards addressed in this plan.

Dam Failure

- Remove dams that don't serve a useful purpose
- Require the preparation of emergency action plans
- Ensure that emergency action plans are current
- Ensure that dam inspections are conducted as required by state law
- Include a dam failure in emergency planning exercises
- Minimize the level of development in a dam's hydraulic shadow in an effort to minimize damage resulting from a dam failure

Flooding

- Continue to enforce floodplain regulation and strengthen requirements when appropriate
- Limit development in the floodplain through local floodplain regulations or zoning
- Provide dryland access through flood-prone areas
- Retrofit legal nonconforming buildings that do not meet floodplain regulations (e.g., elevating, floodproofing)
- Purchase repetitive loss properties and remove structures (i.e., demolition or relocation)
- Raise the surface of local roads above 50-year flood elevations and arterials above 100-year flood elevations
- Enlarge the cross-section of culverts and bridges when they do not adequately carry anticipated flood flows
- Prohibit basements in new subdivisions where flooding from stormwater could be problematic
- Clean drainageways to allow a free flow of water
- Minimize the amount of impervious surfaces in a watershed so that

- stormwater can soak into the ground rather than contributing to flood water
- Maintain appropriate water rescue equipment
- Develop and implement appropriate evacuation procedures in flood-prone area
- Install gaging stations to better understand surface water flow regimes
- Construct stormwater facilities (e.g., detention and retention basins) to help manage stormwater
- Take steps to upgrade the National Flood Insurance Program requirements

Fog

- Identify those roadways where fog is localized and install appropriate signage
- Install automated visibility warning systems to detect reduced visibility conditions

Tornado / High Winds

- Construct storm shelters in campgrounds and mobile home parks
- Bury electrical and telephone lines and other utility cables
- Continue to enforce building codes and strengthen requirements when appropriate
- Include safety strategies for severe weather events in driver education classes
- Promote the construction of safe rooms when residential buildings are placed slab on grade

Severe Storms/Hail

- Encourage property owners to use building products (e.g., roofing, siding) resistant to hail damage

Snow Storms

- Bury electrical and telephone lines and other utility cables
- Install temporary snow fences along road ways that have experienced blowing and drifting snow
- Continue to enforce building codes and strengthen requirements when appropriate
- State and local governments can produce and distribute information to motorists relating to severe winter weather hazards
- Include safety strategies for severe weather events in driver education classes

Temperature Extremes

- Establish heating and cooling centers for vulnerable populations including the elderly and homeless
- Encourage local residents to contact friends, neighbors, and other family members during periods of extreme heat or cold.

Drought

- Adopt local ordinances for prioritizing water usage during drought emergencies
- Develop public wells in deep aquifers
- Maintain enough water storage capacity in public water systems
- Protect wetlands from development
- Encourage the use of water-saving devices in homes and other places where water is used

Key Terms in This Chapter

Community Rating System (CRS) – A voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum National Flood Insurance Programs requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from qualified community actions.

Goal – A statement that describes a desired condition to be achieved sometime in the future. A goal is often broad in scope, not easily measurable, and long-term in nature.

Objective – A specific and usually measurable intermediate end that is achievable and make progress toward a goal.

National Flood Insurance Program – A Federal program created in 1968 under which flood-prone areas are identified and flood insurance is made available to the owners of the property in participating communities.

Policy *– A predetermined course of action or specific rule that an organization adopts and uses in decision-making and which when applied will help to achieve one or more of its goals or objectives.*

Repetitive loss community *– A community with one or more repetitive loss properties.*

Repetitive loss property (RLP) *– For purposes of the Community Rating System, a property for which two or more National Flood Insurance Program losses of at least $1,000 each have been paid within any 10-year rolling period since 1978.*

Severe residential loss (SRL) property *– A residential property (1) that has at least four NFIP claim payments over $5,000 each, when at least two such claims have occurred within any ten-year period, and the cumulative amount of such claims payments exceeds $20,000; or (2) or which at least two separate claims payments have been made with the cumulative amount of the building portion of such claims exceeding the value of the property, when two such claims have occurred within any 10-year period.*

Safe room – An above ground room within a building (most often homes) that is specifically designed to withstand high winds and provides occupants a safe refuge from tornadoes, hurricanes, or other high-wind events.

Strategy *– An action or a group of actions intended to achieve a goal or objective.*

- Encourage farmers to take out crop insurance
- Protect important aquifer recharge areas from inappropriate development

Wildland Fire

- Maintain appropriate fire fighting equipment to effectively respond to wildland fires
- Ensure that new homes are well protected from wildland fires and have multiple routes of ingress and egress
- Provide homeowners with information on how to create a defensible space around structures
- Bury electrical and telephone lines and other utility cables
- Institute measures to reduce soil erosion following a wildland fire event
- Local governments in rural areas can require the issuance of burn permits
- Encourage property owners to conduct controlled burns as a means of controlling fuel buildup

3. Existing Mitigation Strategies

Flood Protection Measures

Under authority granted by Public Law 566, the U.S. Department of Agriculture, Soil Conservation Services constructed three flood-control dams and a multipurpose reservoir in the headwaters of Honey Creek, northwest of Plain, to control flooding. A reach of Honey Creek near Plain was channelized as part of the same project.

Other dams in Sauk County have minimal flood control potential. Seeley Lake decreases downstream discharges somewhat, due to the increase in evaluation needed to pass large flood discharges over the dam. No additional flood-protection structures are planned.

National Flood Insurance Program

In 1968, the United States Congress created the National Flood Insurance Program (NFIP)[1] to identify and map flood-prone communities and provide flood insurance to those property owners within a community that has adopted floodplain management regulations that meet minimum requirements. The Federal Insurance and Mitigation Administration, a division of the Federal Emergency Management Agency (FEMA), administers this federal program. Over 21,000 communities across the United States and its territories now participate in the NFIP.

Sauk County participates in the NFIP along with the cities and villages listed in Table 7-1. The villages of Cazenovia and Loganville do not participate. In 2002, the Federal Emergency Management Agency, in collaboration with the Wisconsin Department of Natural Resources, initiated a multi-year effort to create and adopt digital flood insurance rate maps (FIRMs) for the entire county. The new floodplain maps for Sauk County went into effect December 18, 2009.

[1] The National Flood Insurance Program was created with the passage of the National Flood Insurance Act of 1968.

Table 7-1. Participating Jurisdictions in the National Flood Insurance Program: May 2010

Municipality	Initial FIRM Adopted	Current FIRM Adopted
City		
Baraboo	08/01/79	12/18/09
Reedsburg	03/04/85	12/18/09
Wisconsin Dells [1]	12/18/84	12/18/09
Village		
Cazenovia	Not participating	Not participating
Ironton	03/07/01	12/18/09
Lake Delton [2]	09/04/85	12/18/09
La Valle	09/19/84	12/18/09
Lime Ridge	09/01/87	12/18/09
Loganville	Not participating	Not participating
Merrimac [3]	03/07/01	12/18/09
North Freedom	09/19/84	12/18/09
Plain	09/30/88	12/18/09
Prairie du Sac	03/07/01	12/18/09
Rock Springs	09/18/85	12/18/09
Sauk City	03/07/01	12/18/09
Spring Green	02/01/86	12/18/09
West Baraboo	09/19/84	12/18/09
Sauk County	09/17/80	12/18/09

Source: Federal Emergency Management Agency (http://www.fema.gov/fema/csb.shtm) Accessed on September 29, 2009

Notes:
1. Municipality located in Sauk County and another county
2. On probation effective September 2008
3. On probation effective October 2009

Participation in the NFIP is based on an agreement between local communities and the federal government. If a community adopts and enforces a floodplain management ordinance to reduce future flood risks to new construction in Special Flood Hazard Areas, the federal government will make flood insurance available within the community as a financial protection against flood losses.

The Sauk County floodplain ordinance is based on a model established by the Wisconsin Department of Natural Resources (DNR). In 2008, the DNR drafted a new model ordinance. All existing floodplain ordinances need to meet the requirements of the new model.

Because Sauk County and each of the cities and villages participate in the NFIP, property owners are able to purchase flood insurance, including those not located within a mapped floodplain area. Flood insurance pays even when no state or federal disaster is declared. Historically, federal disaster declarations have been issued in less than 50 percent of the flooding incidents.

There are two types of flood insurance. The first is a policy that insures the physical structure and the second is a policy that covers the content of the building. The standard flood insurance policy provides coverage for one building per policy. The only exception is 10 percent coverage for a detached garage. However, the total payment for flood damage to the detached garage and the house together cannot exceed the building policy limit. For coverage to apply, the garage can only be used for parking and storage. All other buildings on the

premises need separate coverage. The maximum allowable limits are $250,000 for residential properties and $500,000 for commercial properties.

Contents are not automatically included. If contents coverage is desired, a specific amount must be named and a separate premium charged. Contents coverage limits are $100,000 for residential policies and $500,000 for commercial policies.

Federal disaster declarations are issued in less than 50 percent of the flood events.

Building property coverage includes:

- The insured building and its foundation
- The electrical and plumbing systems
- Central air conditioning equipment, furnaces, and water heaters
- Refrigerators, cooking stoves, and built-in appliances such as dishwashers
- Permanently installed carpeting over an unfinished floor
- Permanently installed paneling, wallboard, bookcases, and cabinets.
- Window blinds
- Detached garages (up to 10 percent of building property coverage)
- Debris removal

Personal property coverage includes:

- Personal belongings such as clothing, furniture, and electronic equipment
- Curtains
- Portable and window air conditioners
- Portable microwave ovens and portable dishwashers
- Carpets not included in building coverage (see above)
- Clothes washers and dryers
- Food freezers and the food in them
- Certain valuable items such as original artwork and furs (up to $2,500)

The cost of an annual regular flood insurance policy varies depending on the site location, age of the building, design of the building, and elevation of the building if located in a flood hazard area.

Sanitary sewer backups are not covered. However, many homeowners policies do have riders to cover sewer back-ups. Sewer back-up riders can cost as little as $30 per year.

While flood insurance coverage can significantly reduce the potential economic loss to a landowner in case of a flood disaster, flood insurance also helps reduce the cost of disaster aid to the general public. It has been shown that every $3 paid in flood insurance claims saves $1 in disaster assistance payments.

At the beginning of 2009, there were more than 200 insurance policies in effect in Sauk County (Table 7-2). Roughly one quarter of all of the policies were for property in the city of Reedsburg. Countywide, coverage totaled more than $44.8 million and premiums totaled $135,626 for those policies.

Table 7-2. Flood Insurance Policies: January 2009

Municipality	Policies	Total Coverage	Total Premiums
City			
Baraboo	10	$2,452,000	$4,568
Reedsburg	49	$8,151,200	$25,868
Wisconsin Dells [1]	3	$770,000	$1,006
Village			
Lake Delton	2	$779,000	$4,456
La Valle	7	$1,895,000	$6,703
Merrimac	1	$280,000	$411
North Freedom	5	$1,282,800	$5,351
Plain	1	$28,800	$600
Prairie du Sac	1	$210,000	$290
Rock Springs	11	$1,604,400	$9,071
Sauk City	3	$455,000	$1,016
Spring Green	4	$3,280,000	$7,951
Unincorporated Sauk County	140	$23,664,600	$68,617
Total	237	$44,852,800	$135,626

Source: Federal Emergency Management Agency (http://bsa.nfipstat.com/reports/1011.htm#WIT) Accessed on March 31, 2009

Notes:
1. Municipality located in Sauk County and another county; data is for the entire municipality
2. This municipality is not listed as participating or as not participating in the National Flood Insurance program

Community Rating System

The Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum requirements of the National Flood Insurance Program (NFIP). Because flood risk has been reduced, policy holders in participating communities enjoy lower flood insurance premiums than those located in a community that is not part of CRS. Flood insurance premium rates are discounted as shown in Table 7-3 based on a community's rating. A Class 1 community receives a 45 percent premium discount, while a Class 9 community receives a 5 percent discount. A Class 10 community is not participating in CRS and receives no discount. The CRS classes for local communities are based on 18 activities, organized under four categories: (1) public information, (2) mapping and regulations, (3) flood damage reduction, and (4) flood preparedness. Nationwide, 1,049 communities are part of CRS, or roughly 5 percent of those who are eligible.

Sauk County and all of the cities and villages have a CRS rating of 10 (Table 7-4). Given the potential cost savings, the county and municipalities should investigate the feasibility of and support for lowering their CRS class rating.

Table 7-3. Insurance Premium Reductions for Communities in the Community Rating System

CRS Rating	Special Flood Hazard Area	Non-Special Flood Hazard Area
1	45%	10%
2	40%	10%
3	35%	10%
4	30%	10%
5	25%	10%
6	20%	10%
7	15%	5%
8	10%	5%
9	5%	5%
10	0	0

Table 7-4. Community Rating System Rating of Jurisdictions; Sauk County: 2010

Municipality	CRS Rating
City	
Baraboo	10
Reedsburg	10
Wisconsin Dells [1]	10
Village	
Cazenovia [1]	10
Ironton	10
Lake Delton	10
La Valle	10
Lime Ridge	10
Loganville	10
Merrimac	10
North Freedom	10
Plain	10
Prairie du Sac	10
Rock Springs	10
Sauk City	10
Spring Green	10
West Baraboo	10
Sauk County	10

Source: National Flood Insurance Program
Notes:
1. Municipality located in Sauk County and another county; rating is for the entire municipality
2. This municipality is not listed as participating or as not participating in the National Flood Insurance program

Property Acquisition and Structure Removal

In some situations, certain properties are eligible for voluntary acquisition. Once acquired the structures are demolished or otherwise removed. Following the flooding in 2008, four municipalities received funding for property acquisition involving both residential and commercial properties. Table 7-5 lists the properties acquired to date and what funding was used in the purchase.

Table 7-5. Acquired Flood-Prone Properties: 1996 through 2010

Year	Municipality		Funding Source
2010	Town of Spring Green	28 residential properties	HMGP, FEMA-DR-1768
2010	City of Reedsburg	2 commercial and 18 residential properties	FEMA-DR-1768
2010	Village of Rock Springs	1 commercial and 19 residential properties	FEMA-DR-1768
2010	Town of Excelsior	1 residential property	FEMA-DR-1768

Source: Sauk County Emergency Management
Key: PDM – Pre-Disaster Mitigation Program
HMGP – Hazard Mitigation Grant Program
FMA- Flood Mitigation Assistance Program
WDNR – Wisconsin Department of Natural Resources
CDBG – Community Development Block Grant

StormReady

StormReady is a national voluntary program, administered through local National Weather Service offices, that encourages communities to take a proactive approach in developing plans to improve local hazardous weather operations and public awareness for all types of local severe weather threats[2]. It is intended to give communities the skills and education needed to cope with and manage potential weather-related disasters, before and during the event. By participating in StormReady, local agencies can earn recognition for their jurisdiction by meeting criteria established by the National Weather Service in partnership with federal, state, and local emergency management professionals.

The program does not replace any of the various federally or state-funded hazard mitigation programs, rather, it compliments them. The entire community - from the mayor, emergency managers, to business leaders and civic groups - can take the lead on becoming StormReady. Education and communication are a key part of the StormReady program. The Wisconsin StormReady Advisory Board, comprised of National Weather Service personnel and state, regional, and county emergency managers, reviews applications and visits the jurisdictions to verify the steps made in the process to become StormReady. The designation is only valid for two years.

The county or none of the municipalities in the county are certified StormReady (Table 7-6).

Table 7-6. StormReady Jurisdictions; Wisconsin: 2009 (February)

Jurisdiction
Counties
Lincoln
Oneida
Racine
Communities
Belleville
Cedarburg
Dousman
Hillsboro
Lake Mills
Viroqua
Waupaca
Whitewater

Source: www.stormready.noaa.gov/communities.htm

NOAA Weather Radio

NOAA Weather Radio (NWR) is a nationwide network of radio stations broadcasting continuous weather information direct from a nearby National Weather Service office. NWR broadcasts National Weather Service warnings, watches, forecasts, and other hazard information 24 hours a day. It is also used to broadcast warning and post-event information for all types of hazards - both natural events (e.g., severe weather, flooding) and man-made events (e.g., Amber Alerts, toxic, chemical, and biological releases, terrorist attacks).The radios can be programmed to receive information specific to a certain geographic area and sound an alarm to alert users of approaching dangerous weather. NWR is the primary actuator of the Federal Communications Commission's Emergency Alert System (EAS).

The NOAA Weather Radio network provides authoritative weather and emergency information to the public.

As of October, 2006, the NWR network included 961 stations covering an estimated 97 percent of the U.S. population. The Milwaukee/Sullivan Weather Service Forecast office is located in the Town of Sullivan and serves 20 counties in south-central and southeast Wisconsin. NOAA Weather Radios are available through retail stores that sell electronic appliances, marine supply stores, truck stops, cable shopping networks, mail order catalogs, and the Internet.

The Sauk County Emergency Management Office has promoting use of National Atmospheric and Oceanic Administration (NOAA) weather radios as a cost-effective solution. These radios are a primary means of alerting the public to the imminent danger of hazardous weather. The office would like to see use

[2] More information about StormReady is available from the Milwaukee/Sullivan Weather Service Forecast office. www.crh.noaa.gov/mkx/?n=stormready-mkx

of this reasonably-priced product increase, especially among facilities in which large numbers of people congregate and/or which have populations with special needs (e.g., schools, hospitals, industry).

During the goal-setting exercise, the ad hoc working group indicated a preference of promoting the use of weather radios rather than deploying additional sirens.

Emergency Management Office Website

The Sauk County Emergency Management Office has been working to create a comprehensive website where citizens can access personal preparedness information, threat bulletins, and other emergency management information keyed to their community. This ongoing project is led by the County Emergency Management Office and is funded through the regular departmental budget. The Office would like to expand the current website to include bulletins from the American Red Cross, Wisconsin Emergency Management and the Federal Emergency Management Agency. County Emergency Management also plans to utilize various media outlets monitored by the public to publicize this resource to the community.

Stormwater Management Ordinance

New urban development brings with it increases in impervious surfaces such as rooftops, driveways, and streets. As areas develop into urban land uses, there is an increase in both volume and rate of runoff. To control the rate of runoff and potential downstream increases in peak flood elevations, some communities require detention of stormwater.

Sauk County has adopted a stormwater management ordinance and each of the cities and villages have an ordinance as well.

Erosion and Sediment Control Ordinances

Sediment from construction sites can deposit in local streams causing blockages that can result in potentially higher flood elevations during storm events. To control construction site erosion from construction sites, the Wisconsin Department of Commerce has adopted construction site erosion control regulations through the state Uniform Building Code. State erosion control regulations are enforced through the local building inspectors.

Shoreland Zoning

Under Wisconsin Administrative Code NR 115, counties are required to adopt a shoreland zoning ordinance that controls development within the shoreland[3] of lakes and streams. The shoreland-zoning ordinance establishes minimum lot sizes–10,000 square feet on public sanitary sewer and 20,000 square feet on private sanitary systems. Buildings must be setback 75 feet from the ordinary high-water mark and comply with local floodplain zoning ordinances. The ordinance regulates the cutting of trees and shrubbery within 35 feet of the ordinary high-water mark and prohibits more than 30 feet of every 100 feet to be removed. Primary uses in the shoreland-zoning district are limited to open space, agricultural, and maintenance of piers, roadways, and public utilities.

[3] A shoreland is defined as land within the following distances from the ordinary high-water mark of navigable waters: 1000 feet from a lake, pond, or flowage; and 300 feet from a river or stream or the landward side of the floodplain, whichever is greater. (NR 115.03 (8))

These development standards follow land when it is annexed into a city or village, unless the municipality has adopted an ordinance as strict as the county ordinance. Sauk County has adopted an ordinance consistent with state requirements.

Shoreland Wetland Zoning

Under Wisconsin Administrative Code NR 115, counties are required to adopt a shoreland wetland zoning ordinance that creates a shoreland wetland zoning district to control the development of wetlands that are two acres or more in size within the shoreland area. Permitted uses in the shoreland wetland district are limited to:

- recreation (hiking, fishing, hunting, swimming, and boating)
- agriculture
- public roadways and railroad lines
- public utilities
- non-residential building used for aquaculture

These development standards follow land when it is annexed into a city or village, unless the municipality has adopted an ordinance as strict as the county ordinance. Sauk County has adopted an ordinance consistent with state requirements.

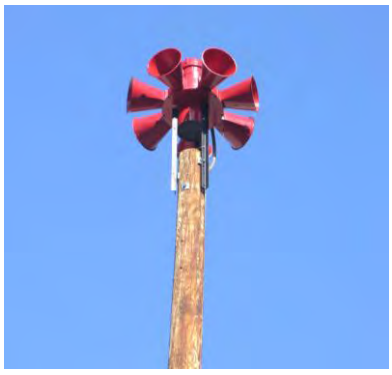
Comprehensive Plans

In 1999, the Governor signed legislation that created a new framework for comprehensive planning in Wisconsin. By January 1, 2010, any community wanting to regulate land use must have an adopted comprehensive plan that meets minimum state requirements. Although state requirements do not require that natural hazard planning be a part of a comprehensive plan, communities do have an opportunity to consider natural hazards when devising land use plans and goals, objectives, and policies relating to land use and environmental management.

Tornado Sirens

Warning sirens are located throughout Sauk County but are primarily located in more urban areas. For example, there are five sirens in the city of Baraboo. Given the cost related to the installation and on-going maintenance costs, the County is promoting the use of NOAA weather radios as a more cost-effective solution.

Tornado Siren



Roadway Closures During Flood Events

In some of the larger flood events, roadways in the county are blocked with water. This can create a potentially dangerous scenario for drivers, limit access to areas within the county, or cause travel delays. To deal with roadway closings, there are two categories of alternatives. The first are alternatives to modify the roadway (e.g. bridge replacement and elevate roadway) to prevent flooding. The second category includes maintenance of a system to actively close roadways when flooding occurs and identify alternate routes for emergency traffic.

Bridge Replacement. In some cases, an alternative to road inundation may be to increase the hydraulic opening of the bridges to minimize the backwater on the upstream side of the bridge. When bridges are scheduled for replacement due to age or roadway expansion, the bridge designers should look at the effect of the bridge design on the roadway overtopping. If feasible, the new bridge

should be replaced with a structure that would meet the criteria outlined in Table 7-7.

The Wisconsin Department of Transportation (WDOT) provides design criteria for structure crossings a stream in the Facilities Development Manual, Procedure 13-10-1. Major structures, such as bridges and box culverts, are designed using a process of selecting a design frequency which best produces a balance between structure costs and the cost of potential flood-related damages or risks. Structures in new locations are generally designed to accommodate the 100-year event without increasing the upstream flood stages over existing conditions. Replacement structures are generally designed not to increase the headwater elevation from existing conditions.

Table 7-7. Recommended Roadway Flood Protection Level

Roadway Classification	Recommended Protection Level
Interstate and railroads	100-year flood
State & county highway	50-year flood
Local arterial	50-year flood
Minor and collector street	10-year flood

In some situations, structure sizes may be increased to reduce the upstream flood elevations. In those cases, if the existing structure is causing upstream flood storage, the flows will need to be re-evaluated to determine if the new structure will increase downstream flows and stages. Under Wisconsin Administrative Code NR 116, if a new bridge results in upstream or downstream increases in the flood elevation greater than 0.01 feet, easements from the affected landowners are required. Where feasible, roadway surfaces should be designed to provide emergency access during flood events. The recommended criterion for flood protection, based on roadway classification, is outlined in Table 7-7.

Elevation of Roadways An alternative to roadway inundation is to raise the pavement surface to above the regional flood elevation. Placing additional fill along the roadway corridor would raise the road surface. While this alternative would help maintain public access, the raising of the road surface may increase flood elevations upstream of the fill. The fill would need to be structurally designed to withstand the hydraulic pressures of the floodwaters. As with bridge replacement, wide-scale elevation of roadway surfaces is not recommended at this time. As roadway maintenance is scheduled, the designers should consider the alternative of roadway elevation. Roadways should only be raised where the project is cost effective.

Road Closures During Flooding Drowning is the number one cause of flood deaths. More people drown in their cars than anywhere else. During flood events, the depth of the water over road surfaces is difficult to predict. Many drivers enter water they think is a few inches deep, only to find themselves in the center of a flowing stream. For years, Sauk County and the local municipalities have closed and barricaded roadways that are flooded. A coordinated system between Sauk County Emergency Management, the Sauk County Sheriff's Department, and local municipalities is in place to close flooded roads and reroute traffic.

Public Information

Information is one of the most important tools in helping people mitigate the potential impacts of hazards, particularly natural disasters. To be effective, information needs to be available from several sources and be offered on an on-going basis.

By way of example, Exhibit 7-1 outlines the roles of the various organizations involved in public education with regards to floodplain issues.

In an effort to keep state residents informed about natural hazards, Wisconsin Emergency Management sponsors a number of public awareness campaigns, including:

- Tornado & Severe Weather Week
- Rip Current Awareness Week
- Heat Awareness Day
- Lightning Safety Week proclamations

Exhibit 7-1. Organizations and Their Roles in Distributing Public Information Regarding Floodplain Management

Organization / Activities
Federal Emergency Management Agency (FEMA) ♦ Provides information on National Flood Insurance Program (NFIP) ♦ Provides training to insurance industry on implementation of NFIP ♦ Provides technical information on flood mitigation activities ♦ Maintains a national library of floodplain maps
Wisconsin Emergency Management ♦ Provides information and training in emergency management including preparedness, response, recovery, and mitigation activities.
Wisconsin Department of Natural Resources ♦ Provides information on National Flood Insurance Program (NFIP) ♦ Provides technical information on flood mitigation activities ♦ Maintains a state library of floodplain maps and flood profile models ♦ Provides training to local zoning administrators on implementation of floodplain zoning ordinances
Sauk County Zoning Department ♦ Maintains local library of floodplain maps ♦ Provides information on National Flood Insurance Program (NFIP) ♦ Provides information on county floodplain regulations
Local Insurance Agents ♦ Provides information on National Flood Insurance Program (NFIP)
Local Lending Agencies ♦ Provides information on National Flood Insurance Program (NFIP). Flood insurance is required on federally-backed mortgages for properties located in a floodplain.
Real Estate Agents ♦ Provides information on National Flood Insurance Program (NFIP) ♦ Required by state law to notify buyers whether or not a structure is located in a regulatory floodplain

4. Funding Sources

Available Federal Funding Sources

The Federal Emergency Management Agency administers a number of programs that fund mitigation activities at the local and state level.

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. The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act.

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.

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.

Repetitive Flood Claims Program The Repetitive Flood Claims (RFC) grant program was authorized by the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004, which amended the National Flood Insurance Act of 1968. Up to $10 million is available annually for FEMA to provide RFC funds to assist States and communities reduce flood damages to insured properties that have had one or more claims to the National Flood Insurance Program. Eligible activities include acquisition of properties, and either demolition or relocation of flood-prone structures, where the property is deed restricted for open space uses in perpetuity.

Severe Repetitive Loss Program The Severe Repetitive Loss (SRL) grant program was authorized by the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004, which amended the National Flood Insurance Act of 1968 to provide funding to reduce or eliminate the long-term risk of flood damage to severe repetitive loss (SRL) structures insured under the National Flood Insurance Program (NFIP). The act authorized up to $40 million for each fiscal year 2005 through 2009.

Eligible flood mitigation project activities include floodproofing (historical properties only), relocation, elevation, acquisition, mitigation reconstruction (demolition rebuild), and minor physical localized flood control projects.

Funding Received

Since 1965, Sauk County and municipalities have received more than $10 million in federal funding for mitigation activities (Table 7-8). The village of Rock Springs, city of Baraboo, and Sauk County recently received funding for land acquisition related to the Presidential disaster in 2008.

Table 7-8. Federal and State Funding for Mitigation Activities: 1965 through 2010

Year	Jurisdiction	Amount	Funding Source	Funded Activities
2004	Sauk County	$_____	Pre-Disaster Mitigation (PDM) Program	Prepare countywide hazard mitigation plan
2004	City of Baraboo	12,000	Pre-Disaster Mitigation (PDM) Program	Prepare countywide hazard mitigation plan
2009	Sauk County	$19,245.71	Hazard Mitigation Grant Program through Presidentially declared disaster (FEMA-DR-1768-WI)	Update countywide hazard mitigation plan
2009	Sauk County	$5,499,424	Hazard Mitigation Grant Program through Presidentially declared disaster (FEMA-DR-1768-WI)	Property acquisition in towns of Excelsior and Spring Green
2009	City of Baraboo	$2,602,770	Hazard Mitigation Grant Program through Presidentially declared disaster (FEMA-DR-1768-WI)	Property acquisition
2009	Village of Rock Springs	$2,512,786	Hazard Mitigation Grant Program through Presidentially declared disaster (FEMA-DR-1768-WI)	Property acquisition

Source: Sauk County Emergency Management and Wisconsin Emergency Management

5. Goals, Objectives, Policies, and Activities

This section builds off of the previous parts of the plan and presents a unified plan of action to mitigate the effects of natural hazards on property, people, and assets. It lists goals, objectives, and policies that will guide decision-makers and other officials. Goals are intended to describe an end state, usually in general terms. In contrast, objectives describe an end state in measurable and specific terms. Policies give clear direction on what will be done to help achieve a goal and the objectives.

Following the listing of goals, objectives, and policies, a chart lists specific action items along with an estimated implementation cost and potential funding sources. Responsible entities are listed for each so that implementation is well defined.

The activity charts are a work in progress. As items are completed, they will be deleted and as new opportunities or issues arise, items will be added. Further, depending on available resources, including funding and staff time, priorities may change.

Activities are prioritized as low, medium, or high based on the STAPLE+E approach. Exhibit 7-2 lists each of the criteria used to identify the priority. The mitigation actions with the highest priority were deemed to be the most cost effective and most compatible with the community's social and cultural values.

Cost estimates are provided to help formulate funding priorities. When a project is to be undertaken, a more detailed budget should be prepared to assess a project's cost. At that time a benefit cost analysis should be completed to show how the benefits of the project compare to anticipated costs. Federal funding for mitigation activities can only be obtained when benefits clearly outweigh the costs.

Exhibit 7-2. STAPLE+E

Criteria	Description
S – Social	Mitigation actions are acceptable to the community if they do not adversely affect a particular segment of the population, do not cause relocation of lower income people, and if they are compatible with the community's social and cultural values.
T – Technical	Mitigation actions are technically most effective if they provide long- term reduction of losses and have minimal secondary adverse impacts.
A – Administrative	Mitigation actions are easier to implement if the jurisdiction has the necessary staffing and funding.
P – Political	Mitigation actions can truly be successful if all stakeholders have been offered an opportunity to participate in the planning process and if there is public support for the action.
L – Legal	It is critical that the jurisdiction or implementing agency have the legal authority to implement and enforce a mitigation action.
E – Economic	Budget constraints can significantly deter the implementation of mitigation actions. Hence, it is important to evaluate whether an action is cost-effective, as determined by a cost benefit review, and possible to fund.
E – Environmental	Sustainable mitigation actions that do not have an adverse effect on the environment, that comply with Federal, State, and local environmental regulations, and that are consistent with the community's environmental goals, have mitigation benefits while being environmentally sound.

As part of the 2010 update, significant changes were made to this section of the plan. Those goals, objectives, policies, and activities that were added as part of the 2010 plan update are so noted, along with those that have been revised. Those that ensure continued compliance with the National Flood Insurance are also so designated.

The following exhibit presents a summary of significant changes in objectives, policies, and implementation activities between the 2004 plan and the 2010 plan. Cost estimates were updated as appropriate.

Relationship to Other Local Planning Efforts

It is strongly recommended that these goals and actions be adopted as part of local comprehensive planning efforts where appropriate, especially in areas where existing problems can be corrected and to prevent problems from occurring in newly developed areas.

Prioritization of Goals and Actions

Goals and actions have been prioritized based on 1) the potential risk associated with each particular hazard, 2) the ability of the proposed action to have a positive impact upon minimizing or eliminating the risk from the hazard, 3) overall cost of associated with the proposed action, and 4) the availability of resources to fund and implement the action in a timely manner.

Cost Benefit Analysis for Goals and Actions

Specific cost benefit reviews will occur for each action in each participating jurisdiction during annual budget scenarios. Most identified actions are programmatic and not capital expenditures. The impact and cost of each program will be determined on an as needed basis prior to implementation. The information provided with each action is intended to assist in the cost benefit evaluation of each action. Costs estimates, funding sources, schedules, and responsible parties are preliminary and subject to change based on fiscal conditions.

Exhibit 7-3. Summary of Changes to Objectives, Policies, and Activities in 2010 Plan

Goal	Objectives	Policies	Activities
Goal 1. Public Education and Communication	4 new objectives	3 new policies	4 new activities 1 revision
Goal 2. Information and Technology Systems	1 new objective	2 new policies	5 new activities No revisions
Goal 3. Early Warning System	3 new objective	3 new policies	5 new activities
Goal 4. Flooding and Dam Failure	4 new objectives	14 new policies	12 new activities 2 revisions
Goal 5. Storm Events	4 new objectives	8 new policies 1 revision	8 new activities
Goal 6. Temperature Extremes	2 new objectives	3 new policies	5 new activities
Goal 7. Drought	2 new objectives	6 new policies	2 new activities
Goal 8. Wildland Fire	3 new objectives	4 new policies 2 revisions	6 new activities
Goal 9. Hazardous Materials Incidents	no new objectives	5 new policies	5 new activities

Goal 1. Public Education and Communication
Provide the public with the information they need to adequately prepare for and respond to natural hazards including dam failure, flooding, ice shoves, dense fog, tornadoes, hailstorms, thunderstorms, winter storms, temperature extremes, drought, and wildland fire. **(New 2010)**

Objectives

1. Strengthen emergency service preparedness and response by enhancing public education throughout the county. **(New 2010)**
2. Increase the number of households that have prepared a family emergency plan. **(New 2010)**
3. Increase the number of multi-language public outreach materials. **(New 2010)**
4. Increase the number of municipalities and critical facilities with emergency plans. **(New 2010)**

Policies

1. Work with non-governmental organizations, such as youth, service, professional, and religious organizations, to promote mitigation education and awareness. **(New 2010)**
2. Look for multiple and varied opportunities to disseminate educational information to county residents and business owners. **(New 2010)**
3. Improve communication between the county and local units of government when disasters occur or are likely to occur. **(New 2010)**

Implementation Actions / Strategies	Cost Estimate (2010)	Potential Funding Source	Priority	Schedule 2011 - 2015	Schedule 2016 - 2020	Responsible Entity
1. Develop and implement education programs aimed at mitigating natural hazards and reducing the risk to citizens, public agencies, private property owners, businesses, and schools. **(2005 plan as revised; 2010 status – ongoing effort)**	$10,000	Departmental budget	Medium	X	X	Sauk County Emergency Management; cities of Baraboo, Reedsburg, and Wisconsin Dells; and villages of Cazenovia, Ironton, Lake Delton, La Valle, Lime Ridge, Loganville, Merrimac, North Freedom, Plain, Prairie du Sac, Rock Springs, Sauk City, Spring Green, and West Baraboo
2. Create displays for use at public events such as the county fair and wellness fairs. **(New 2010)**	Staff time and cost of supplies	Departmental budget	Medium	X		Sauk County Emergency Management; cities of Baraboo, Reedsburg, and Wisconsin Dells; and villages of Cazenovia, Ironton, Lake Delton, La Valle, Lime Ridge, Loganville, Merrimac, North Freedom, Plain, Prairie du Sac, Rock Springs, Sauk City, Spring Green, and West Baraboo
3. Work with the public and private schools within the county to promote hazard mitigation awareness and to create plans. **(New 2010)**	Staff time	Departmental budget	Medium	X	X	Sauk County Emergency Management; cities of Baraboo, Reedsburg, and Wisconsin Dells; and villages of Cazenovia, Ironton, Lake Delton, La Valle, Lime Ridge, Loganville, Merrimac, North Freedom, Plain, Prairie du Sac, Rock Springs, Sauk City, Spring Green, and West Baraboo

4.	Continue to promote informational campaigns about severe weather, such as Winter Awareness Week in November, Tornado and Severe Weather Awareness Week in April, Heat Awareness Day in June, Flood Awareness in March, and Preparedness Week in September. **(New 2010)**	Staff time	Departmental budget	Medium	X	X	Sauk County Emergency Management; cities of Baraboo, Reedsburg, and Wisconsin Dells; and villages of Cazenovia, Ironton, Lake Delton, La Valle, Lime Ridge, Loganville, Merrimac, North Freedom, Plain, Prairie du Sac, Rock Springs, Sauk City, Spring Green, and West Baraboo
5.	Continue offering information regarding insurance to farm operators for potential crop losses due to weather-related damage. **(New 2010)**	Staff time	Departmental budget	Medium	X	X	Sauk UW-Extension
6.	Provide more hazard-related information in multiple languages **(New 2010)**	Staff time	Departmental budget	Medium	X		Sauk County Emergency Management; Sauk County Health Department

Goal 2. Information and Technology Systems
Utilize the full range of information systems and digital technology in mitigation planning. **(New 2010)**

Objectives
1. Increase the amount of information that is available on the county's website relating to natural and manmade hazards. **(New 2010)**

Policies
1. Post information on the county's website that may be of interest to county residents and local officials. **(New 2010)**
2. Develop on-line tools as may be needed to provide cost-effective services. **(New 2010)**

Implementation Actions / Strategies	Cost Estimate (2010)	Potential Funding Source	Priority	Schedule 2011 - 2015	Schedule 2016 - 2020	Responsible Entity
1. Continue to add/update links on the existing department web sites (e.g., ARC, FEMA, WEM), especially focusing on preparedness bulletins, including a link to the stream gauge web site maintained by the National Weather Service. **(New 2010)**	Staff time	Departmental budget	Medium	X		Sauk County Emergency Management
2. Develop and maintain a geographic database of natural hazard events that have occurred in the county, including location, event conditions, and resulting damage. **(New 2010)**	Staff time	Departmental budget	High	X		Sauk County Emergency Management; Sauk County Land Information Department
3. Develop and maintain a webpage relating to mitigation planning and activities, to include the posting of the countywide natural hazards mitigation plan. **(New 2010)**	Staff time	Departmental budget	High	X		Sauk County Emergency Management
4. Add links on websites maintained by local jurisdictions to the Sauk County Emergency Management website. **(New 2010)**	Staff time	Departmental budget	High	X		Cities of Baraboo, Reedsburg, and Wisconsin Dells; and the villages of Cazenovia, Ironton, Lake Delton, La Valle, Lime Ridge, Loganville, Merrimac, North Freedom, Plain, Prairie du Sac, Rock Springs, Sauk City, Spring Green, and West Baraboo
5. Update and maintain the database of critical facilities that was provided to the county as part of the 2010 plan update project. **(New 2010)**	Staff time	Departmental budget	Medium	X	X	Sauk County Emergency Management

Goal 3. Early Warning System
Develop and utilize an early warning system to provide the affected public with as much advance warning as possible. **(New 2010)**

Objectives
1. Maintain the geographic coverage of emergency sirens in the county. **(New 2010)**
2. Increase the number of homes, large businesses, schools, health care facilities, and other facilities that utilize National Oceanic and Atmospheric Administration (NOAA) weather radios. **(New 2010)**
3. Identify options for mass notification/warning notification utilizing current technologies (e.g., cellular, text messaging, e-mail). **(New 2010)**

Policies
1. Evaluate the need for establishing additional sirens in those areas of the county that do not have coverage. **(New 2010)**
2. Promote the increased use of National Oceanic and Atmospheric Administration (NOAA) weather radios, especially among facilities of special concern especially in those areas of the county not currently covered by warning sirens. **(New 2010)**
3. Continue to support the efforts of severe weather spotters. **(New 2010)**

Implementation Actions / Strategies	Cost Estimate (2010)	Potential Funding Source	Priority	Schedule 2011 - 2015	Schedule 2016 - 2020	Responsible Entity
1. Explore alternatives to increase public warning options (e.g., sirens, mass notification system). **(New 2010)**	Staff time	Departmental budget	Medium	X		Sauk County Emergency Management
2. Analyze the current coverage of outdoor sirens and prepare a schedule for placing additional sirens in the county. **(New 2010)**	Staff time	Departmental budget	High	X		Sauk County Emergency Management; cities of Baraboo, Reedsburg, and Wisconsin Dells; and the villages of Cazenovia, Ironton, Lake Delton, La Valle, Lime Ridge, Loganville, Merrimac, North Freedom, Plain, Prairie du Sac, Rock Springs, Sauk City, Spring Green, and West Baraboo
3. Continue to update and/or monitor the countywide public early warning system and network. **(New 2010)**	Staff time	Departmental budget	Medium	X	X	Sauk County Emergency Management
4. Continue to apply for federal funding to purchase NOAA weather radios for county residents. **(New 2010)**	Staff time	Departmental budget	Medium	X	X	Sauk County Emergency Management; cities of Baraboo, Reedsburg, and Wisconsin Dells; and the villages of Cazenovia, Ironton, Lake Delton, La Valle, Lime Ridge, Loganville, Merrimac, North Freedom, Plain, Prairie du Sac, Rock Springs, Sauk City, Spring Green, and West Baraboo
5. Continue to host classes for severe weather spotters and maintain a network of spotters in the county. **(New 2010)**	Staff time	Departmental budget	Medium	X	X	Sauk County Emergency Management

Goal 4. Flooding and Dam Failure

Lessen the impact that floods have on people, property, and the environment. **(2005 plan as revised)**

Objectives

1. Minimize the impact of flooding on potentially affected structures. **(New 2010)**
2. Decrease the number of structures currently located in the 100-year floodplain that are not properly flood-proofed. **(New 2010)**
3. Minimize the amount of impervious surface in new development projects to allow more infiltration of stormwater into the ground. **(New 2010)**
4. Increase public awareness of flooding. **(New 2010)**
5. Maintain compliance with the National Flood Insurance Program. **(New 2010; NFIP compliance)**

Policies

1. Continue to enforce floodplain regulations to ensure that future development in the 100-year floodplain meets established standards. **(New 2010, NFIP compliance)**
2. Support the identification and conservation of land with high flood mitigation value (e.g., wetlands, upland storage, and infiltration areas). **(New 2010, NFIP compliance)**
3. Support land acquisition and other management strategies to preserve open space for flood mitigation purposes. **(New 2010)**
4. Ensure that governmental officials and employees, county residents, and real estate agents are aware of floodplain regulations. **(New 2010)**
5. Ensure that people owning property in the 100-year floodplain and other flood-prone areas, and their agents, notify buyers when selling their property. **(New 2010)**
6. Adopt standards to control the proportion of a site that can be covered with impervious surfaces. **(New 2010)**
7. Locate public infrastructure outside of the 100-year floodplain. When infrastructure needs to be located in the 100-year floodplain, it should be flood proofed or otherwise protected from flood water. **(New 2010)**
8. Design and properly size new stream crossings so that floodwaters do not overtop the road and a significant back-water effect is not created. **(New 2010)**
9. Continue to enforce stormwater management regulations. **(New 2010)**
10. Update flood insurance rate maps (FIRMs) when it can be shown that they are substantially inaccurate. **(New 2010, NFIP compliance)**
11. Ensure that all large dams in the county have emergency action plans and that they are up to date. **(New 2010)**
12. Undertake such activities as may be required to remain compliant with the requirements of the National Flood Insurance Program. **(New 2010, NFIP compliance)**
13. Discourage and/or limit development within the 100-year floodplain and other flood-prone areas through comprehensive plans that may be prepared or amended. **(New 2010)**
14. The County Board supports the preparation of grant applications for the preparation of emergency action plans. (**New 2010**)

Implementation Actions / Strategies	Cost Estimate (2010)	Potential Funding Source	Priority	Schedule 2011 - 2015	Schedule 2016 - 2020	Responsible Entity
1. Develop dam break analysis and Emergency Action Plans for County dams. **(2005 plan; status 2010, no action due to low priority)**	$3,000-$5,000/dam	Departmental budget	Low	X		Sauk County Emergency Management and Land Conservation Departments
2. Complete annual certifications for emergency action plans for major power dams impacting Sauk County **(2005 plan as revised; status 2010, ongoing effort)**	Staff time	Departmental budget	Medium	X	X	Sauk County Emergency Management and Land Conservation Departments
3. The County and local units should incorporate floodplain management in comprehensive planning. **(2005 plan; status 2010, completed)**	High	Departmental budget	High	X	X	Sauk County Emergency Management and Land Conservation Departments
4. Prepare a map depicting those areas of the county that have experienced problems resulting from flash flooding. **(2005 plan, as revised; status 2010, no action due to lower priority)**	Staff time	FEMA and departmental budgets	High	X		Sauk County Planning and Zoning; Mapping Department; and Emergency Management

Implementation Actions / Strategies	Cost Estimate (2010)	Potential Funding Source	Priority	Schedule 2011 - 2015	Schedule 2016 - 2020	Responsible Entity
5. Initiate a program to work with owners of property in the 100-year floodplain and other flood-prone areas relating to mapped flood storage areas and identification of pumping stations. **(2005 plan as revised; status 2010, ongoing effort)**	Staff time	Departmental budget	High	X	X	Sauk County Planning & Zoning Department, Sauk County Land Conservation Department, Mapping Department
6. Continue to survey floodplain property owners for a voluntary buyout or relocation project. **(2005 plan as revised; status 2010, ongoing effort)**	Varies	Departmental budget	High	X	X	Sauk County Planning & Zoning Department, Sauk County Emergency Management, individual local jurisdictions
7. Municipalities facing significant growth should develop, update or maintain a stormwater management plan to address stormwater control issues within their borders and meet new EPA/DNR regulations. **(2005 plan; status 2010, ongoing effort)**	Staff time	Departmental budget; state and federal grants	High	X	X	Sauk County Planning & Zoning and Emergency Management; cities of Baraboo, Reedsburg, and Wisconsin Dells; and the villages of Cazenovia, Ironton, Lake Delton, La Valle, Lime Ridge, Loganville, Merrimac, North Freedom, Plain, Prairie du Sac, Rock Springs, Sauk City, Spring Green, and West Baraboo
8. Identify and analyze feasible mitigation options for those properties which are designated as a repetitive loss property. **(New 2010)**	Staff time	Departmental budget	Medium	X	X	Sauk County Emergency Management
9. Apply for funding through the federal Hazard Mitigation Grant program, Flood Mitigation Assistance Program, and the Pre-Disaster Mitigation Program as well as any other resources that may be available to help flood proof repetitive loss sites or remove them through voluntary acquisition with demolition or relocation. **(New 2010)**	Staff time	Departmental budget	Medium	X	X	Sauk County Emergency Management
10. Design and construct stormwater management facilities consistent with adopted stormwater management plans than have been or will be prepared / amended. **(New 2010)**	Staff time	Departmental budget	Medium	X		Cities of Baraboo, Reedsburg, and Wisconsin Dells; and the villages of Cazenovia, Ironton, Lake Delton, La Valle, Lime Ridge, Loganville, Merrimac, North Freedom, Plain, Prairie du Sac, Rock Springs, Sauk City, Spring Green, and West Baraboo
11. Maintain the database of bridges/culverts on a county or state road. (As part of the 2010 plan update, these facilities were identified and included in the critical facilities inventory.) **(New 2010)**	Staff time	Departmental budget	Medium	X		Sauk County Highway and Public Works Department

Implementation Actions / Strategies	Cost Estimate (2010)	Potential Funding Source	Priority	Schedule 2011 - 2015	Schedule 2016 - 2020	Responsible Entity
12. Identify those culverts and bridges that are undersized or are otherwise unable to handle expected flood flows. **(New 2010)**	Staff time	Departmental budget	Medium	X		Sauk County Highway and Public Works Department; cities of Baraboo, Reedsburg, and Wisconsin Dells; and the villages of Cazenovia, Ironton, Lake Delton, La Valle, Lime Ridge, Loganville, Merrimac, North Freedom, Plain, Prairie du Sac, Rock Springs, Sauk City, Spring Green, and West Baraboo
13. Prepare a strategy to prioritize road improvements for public roadways that are susceptible to flooding. **(New 2010)**	Staff time	Departmental budget	Medium	X		Sauk County Highway and Public Works Department; cities of Baraboo, Reedsburg, and Wisconsin Dells; and the villages of Cazenovia, Ironton, Lake Delton, La Valle, Lime Ridge, Loganville, Merrimac, North Freedom, Plain, Prairie du Sac, Rock Springs, Sauk City, Spring Green, and West Baraboo
14. Re-evaluate and update the stormwater and erosion control ordinances as may be required. **(2005 plan; 2009 status – to be completed by 2011)**	Staff time	Departmental budget	Medium	X		Sauk County Planning and Development Department
15. Distribute National Flood Insurance Program information to the public. **(New 2010, NFIP compliance)**	Staff time	Departmental budget	Medium	X	X	Sauk County Emergency Management; Sauk County Planning and Development Department; cities of Baraboo, Reedsburg, and Wisconsin Dells; and the villages of Cazenovia, Ironton, Lake Delton, La Valle, Lime Ridge, Loganville, Merrimac, North Freedom, Plain, Prairie du Sac, Rock Springs, Sauk City, Spring Green, and West Baraboo.
16. Evaluate the support for and the feasibility of becoming part of the Community Rating System (CRS) to lower flood insurance premiums for property owners. **(New 2010)**	Staff time	Departmental budget	High	X		Sauk County Emergency Management; Sauk County Planning and Development Department; Cities of Baraboo, Reedsburg, and Wisconsin Dells; and the villages of Cazenovia, Ironton, Lake Delton, La Valle, Lime Ridge, Loganville, Merrimac, North Freedom, Plain, Prairie du Sac, Rock Springs, Sauk City, Spring Green, and West Baraboo.

Implementation Actions / Strategies	Cost Estimate (2010)	Potential Funding Source	Priority	Schedule 2011 - 2015	Schedule 2016 - 2020	Responsible Entity
17. Work with property owners with land that has been delineated as flood storage areas on the flood insurance rate maps to protect them from inappropriate development. **(New 2010)**	Staff time	Departmental budget	Low	X		Sauk County Emergency Management; Sauk County Planning and Development Department; Cities of Baraboo, Reedsburg, and Wisconsin Dells; and the villages of Cazenovia, Ironton, Lake Delton, La Valle, Lime Ridge, Loganville, Merrimac, North Freedom, Plain, Prairie du Sac, Rock Springs, Sauk City, Spring Green, and West Baraboo
18. Work with the Wisconsin Department of Natural Resources to ensure that an emergency action plan is prepared for large dams and that they are periodically updated. **(New 2010)**	Staff time	Departmental budget	Medium	X		Sauk County Emergency Management
19. Ensure that privately-owned large dams are inspected consistent with state law. **(New 2010)**	Staff time	Departmental budget	Medium	X		Sauk County Emergency Management; towns of Marshfield and Oakfield
20. Ensure that publicly-owned large dams are inspected consistent with state law. **(New 2010)**	Staff time	Departmental budget	Medium	X		Cities of Baraboo, Reedsburg, and Wisconsin Dells; and the villages of Cazenovia, Ironton, Lake Delton, La Valle, Lime Ridge, Loganville, Merrimac, North Freedom, Plain, Prairie du Sac, Rock Springs, Sauk City, Spring Green, and West Baraboo; Wisconsin Department of Natural Resources
21. Conduct a study to determine feasible and cost-effective solutions to minimize flooding along streams and rivers experiencing flooding in the last five years. **(New 2010)**	Unknown	Departmental budget	High	X		Sauk County Emergency Management; Sauk County Planning and Development Department; Cities of Baraboo, Reedsburg, and Wisconsin Dells; and the villages of Cazenovia, Ironton, Lake Delton, La Valle, Lime Ridge, Loganville, Merrimac, North Freedom, Plain, Prairie du Sac, Rock Springs, Sauk City, Spring Green, and West Baraboo

Goal 5. Storm Events (Tornadoes, Wind Events, Storms, Hail, and Dense Fog)
Lessen the effects of a storm event to the extent feasible and speed recovery following an event. **(New 2010)**

Objectives
1. Increase public education and awareness of the potential severity of storm events. **(New 2010)**
2. Minimize the amount of time that businesses and government facilities, such as schools, damaged by a storm event are not operational. **(New 2010)**
3. Minimize the amount of time it takes to rebuild or restore dwellings damaged by a storm event. **(New 2010)**
4. Prevent injuries and death from storm events. **(New 2010)**
5. Minimize response time needed to respond to storm events. (**New 2010**)

Policies
1. Bury overhead power and utility lines where feasible as a way to reduce power outages during all types of storm events. **(New 2010)**
2. Ensure that adequate tornado shelters are available to county residents especially those living in mobile/manufactured home parks. **(New 2010)**
3. Include redevelopment objectives in smart growth comprehensive plans to support post-disaster development activities. **(New 2010)**
4. Encourage home builders and others to incorporate wind-resistant features into new home construction. **(New 2010)**
5. Work with utility companies to assess and to improve, when necessary, electric service reliability. **(New 2010)**
6. Work with public and private utility companies to ensure that trees are properly trimmed near utility lines. **(New 2010)**
7. Promote home safety measures such as the construction of safe rooms. **(New 2010)**
8. Continue to ensure that new development meets applicable development standards, such as zoning, stormwater management, shoreland zoning, and shoreland/wetland zoning. **(New 2010)**
9. Encourage the use of tie-downs on mobile homes and manufactured homes. (**Revised implementation activity from 2005 plan**)
10. Encourage the use of snow fences where needed. (**Revised implementation activity from 2005 Plan**)
11. Promote winter hazards awareness, including home and travel safety measures, such as avoiding travel during winter storms. (**Revised implementation activity from 2005 plan**)

Implementation Actions / Strategies	Cost Estimate (2010)	Potential Funding Source	Priority	Schedule 2011 - 2015	Schedule 2016-2020	Responsible Entity
1. Promote lightning awareness **(2005 plan; 2010 status, ongoing effort**)	Low	Departmental budget	Low	X	X	Sauk County Emergency Management
2. The County and local units of government should identify buildings that will provide protection to the public in the event of a tornado. **(2005 plan; 2010 status, ongoing effort)**	Low	Departmental budget	High	X		Sauk County Emergency Management
3. Upon identifying existing building that could provide protection, the County and local units of government should identify areas that are deficit in tornado shelters. **(2005 plan; 2010 status, ongoing effort)**	Low	Departmental budget	High	X	X	Sauk County Emergency Management
4. Identify and pursue funding opportunities to develop and implement local and county mitigation activities. **(New 2010)**	Staff time	Departmental budget	Medium	X	X	Sauk County Emergency Management; cities of Baraboo, Reedsburg, and Wisconsin Dells; and the villages of Cazenovia, Ironton, Lake Delton, La Valle, Lime Ridge, Loganville, Merrimac, North Freedom, Plain, Prairie du Sac, Rock Springs, Sauk City, Spring Green, and West Baraboo
5. Periodically assess whether there are enough storm shelters to house displaced persons. **(New 2010)**	Staff time	Departmental budget	Medium	X	X	Sauk County Emergency Management; American Red Cross

Implementation Actions / Strategies	Cost Estimate (2010)	Potential Funding Source	Priority	Schedule 2011 - 2015	Schedule 2016-2020	Responsible Entity
6. Study the feasibility of and support for adopting a local regulation which would require new mobile home/manufacture home parks and future expansions of existing parks to provide for a tornado shelter for residents. **(New 2010)**	Staff time	Departmental budget	Medium	X		Sauk County Emergency Management; Cities of Baraboo, Reedsburg, and Wisconsin Dells; and the villages of Cazenovia, Ironton, Lake Delton, La Valle, Lime Ridge, Loganville, Merrimac, North Freedom, Plain, Prairie du Sac, Rock Springs, Sauk City, Spring Green, and West Baraboo
7. Assess strategies for debris management, including short- and long-term disposal. **(New 2010)**	Staff time	Departmental budget	Medium	X		Sauk County Emergency Management; Sauk County Highway and Public Works Department; cities of Baraboo, Reedsburg, and Wisconsin Dells; and the villages of Cazenovia, Ironton, Lake Delton, La Valle, Lime Ridge, Loganville, Merrimac, North Freedom, Plain, Prairie du Sac, Rock Springs, Sauk City, Spring Green, and West Baraboo
8. Install storm shelters near or in existing mobile home parks and high occupancy campgrounds. **(New 2010)**	Project dependant	Private funds and grants	Medium	X		Mobile home park operators and campground operations; Sauk County Emergency Management
9. Work with the local chapter of the American Red Cross to update its shelter evaluation assessment. **(New 2010)**	Staff time	Departmental budget	Medium	X		Sauk County Emergency Management; American Red Cross
10. Investigate the need for standby generators at government buildings, especially public safety facilities. **(New 2010)**	Staff time	Departmental budget	Medium	X		Sauk County Emergency Management; cities of Baraboo, Reedsburg, and Wisconsin Dells; and the villages of Cazenovia, Ironton, Lake Delton, La Valle, Lime Ridge, Loganville, Merrimac, North Freedom, Plain, Prairie du Sac, Rock Springs, Sauk City, Spring Green, and West Baraboo

Goal 6. Temperature Extremes
Protect county residents from the effects of temperature extremes. **(New 2010)**

Objectives
1. Prevent deaths and injuries due to temperature extremes. **(New 2010)**
2. Increase public education and awareness. **(New 2010)**

Policies
1. Encourage volunteers to look after vulnerable individuals, especially the elderly, during times of extreme heat and cold. **(New 2010)**
2. Open county and other public facilities with air conditioning, as appropriate, for public access during periods of extreme heat. **(New 2010)**
3. Ensure that county residents are aware that there are different forms of assistance to help qualified individuals to help pay their winter heating costs. **(New 2010)**

Implementation Actions / Strategies	Cost Estimate (2010)	Potential Funding Source	Priority	Schedule 2011 - 2015	Schedule 2016-2020	Responsible Entity
1. Develop a directory of public buildings that would be open to the public during extended heat waves. **(New 2010)**	Staff time	Departmental budget	Medium	X	X	Sauk County Emergency Management; Sauk County Health Department
2. Call a meeting of public and non-profit organizations that may be able to mobilize a volunteer corps of individuals willing to assist vulnerable people during periods of extreme heat or cold. **(New 2010)**	Staff time	Departmental budget	High	X		Sauk County Emergency Management; Sauk County Health Department
3. Investigate the possibility of establishing a database of individuals who are vulnerable to temperature extremes and who have voluntarily placed their name on a call list. **(New 2010)**	Staff time	Departmental budget	High	X		Sauk County Emergency Management; Sauk County Health Department; American Red Cross
4. Publicise available programs that help low-income residents pay for their utility expenses. **(New 2010)**	Staff time	Departmental budget	Medium	X		Sauk County Emergency Management; Sauk County Health Department; cities of Baraboo, Reedsburg, and Wisconsin Dells; and the villages of Cazenovia, Ironton, Lake Delton, La Valle, Lime Ridge, Loganville, Merrimac, North Freedom, Plain, Prairie du Sac, Rock Springs, Sauk City, Spring Green, and West Baraboo
5. Amend Sauk County's emergency operations plan to address temperature extremes. **(New 2010)**	Staff time	Departmental budget	Medium	X		Sauk County Emergency Management

Goal 7. Drought

Protect the public health, safety, and welfare of county residents during periods of drought. **(New 2010)**

Objectives

1. Decrease water use during periods of drought. **(New 2010)**
2. Minimize the economic impacts of drought on the local economy. **(New 2010)**

Policies

1. Encourage water conservation during periods of drought. **(New 2010)**
2. Impose water use restrictions during periods of extreme drought. **(New 2010)**
3. Work with appropriate agencies to conserve water, provide drought prediction, and provide stream and groundwater monitoring. **(New 2010)**
4. Work with local, state, and federal agencies that can assist with and promote soil health, preserve soil moisture and help to minimize the loss of the crops and topsoil in the event of a drought. **(New 2010)**
5. Monitor groundwater levels to identify the status of groundwater resources and trends. **(New 2010)**
6. Work with state and federal agencies to develop appropriate regional strategies to address drought conditions. **(New 2010)**
7. Provide information to farmers in times of drought. **(New 2010)**
8. Inform farmers about purchasing crop insurance. **(New 2010)**

Implementation Actions / Strategies	Cost Estimate (2010)	Potential Funding Source	Priority	Schedule 2011 - 2015	Schedule 2016 - 2020	Responsible Entity
1. The County should encourage farmers that irrigate to use the Wisconsin Irrigation Scheduling Program (WISP). **(2005 plan; 2010 status, ongoing strategy)**	Low	Departmental budget	Low	X	X	Sauk County Land Conservation Department
2. Develop a program to communicate with farmers during times of drought. **(2005 plan as revised; 2010 status, ongoing effort)**	Low	Departmental budgets	Low	X		Sauk County Land Conservation Department and Sauk County UW Extension
3. Provide a crop insurance educational program. **(2005 plan; 2010 status, ongoing effort)**	Low	Departmental budgets	Low	X	X	Sauk County Land Conservation Department and Sauk County UW Extension
4. Adopt local regulations to control the use of water during drought conditions. **(New 2010)**	Staff time	Departmental budget	Medium	X	X	Municipalities with public water systems
5. Develop procedures for water distribution during drought to those in need. **(New 2010)**	Staff time	Departmental budget	Medium	X		Sauk County Emergency Management

Goal 8. Wildland Fire
Protect structures and people in Sauk County from uncontrolled wildfires. **(New 2010)**

Objectives
1. Decrease the number of wildland fires occurring in the county. **(New 2010)**
2. Decrease the number of acres burned from wildland fires. **(New 2010)**
3. Increase public education. **(New 2010)**

Policies
1. Support the use of controlled burns as a way of reducing the threat of dangerous wildland fires. **(New 2010)**
2. Enhance emergency services to increase the efficiency of wildfire response and recovery activities. **(New 2010)**
3. Encourage local fire departments to work with the Wisconsin Department of Natural Resource to provide training to their personnel on fighting large wildland fires. **(New 2010)**
4. Continue to provide outreach efforts to homeowners on protecting homes and structures from wildfires including information about fire-resistant construction. **(New 2010)**
5. Continue cooperation through mutual aid agreements. **(New 2010)**

Implementation Actions / Strategies	Cost Estimate (2010)	Potential Funding Source	Priority	Schedule 2011 - 2015	Schedule 2016 - 2020	Responsible Entity
1. The County and DNR should continue to make outreach efforts to homeowners on protecting their homes and structures from wildfires. **(2005 plan; status 2010, no action due to low priority)**	Low	Departmental budget	Low	X	X	Sauk County Planning & Zoning Department and Sauk County Emergency Management
2. Local fire departments should work together and participate in more joint training for larger fires and other hazard-related emergencies. **(2005 plan; status 2010, no action due to priority)**	Low	Departmental budget	Medium	X	X	Sauk County Emergency Management, Department of Homeland Security (where appropriate)
3. Work with local jurisdictions to encourage adequate access for emergency vehicles, including 30 ft. minimum distance between structures and safe design/locations for driveways. **(2005 plan; status 2010, ongoing strategy)**	Low	Departmental budget	Low	X	X	Sauk County Planning & Zoning Department and the Sauk County Emergency Management
4. Apply for federal and state grants to enhance the capability of local fire departments. **(New 2010)**	Staff time	Departmental budget	Medium	X	X	Local fire departments
5. Provide education to county and municipal personnel about federal cost-share and grant programs, fire protection agreements, and other related federal programs so the full array of assistance available to local agencies is understood. **(New 2010)**	Staff time	Departmental budget	Low	X		Sauk County Emergency Management; cities of Baraboo, Reedsburg, and Wisconsin Dells; and the villages of Cazenovia, Ironton, Lake Delton, La Valle, Lime Ridge, Loganville, Merrimac, North Freedom, Plain, Prairie du Sac, Rock Springs, Sauk City, Spring Green, and West Baraboo
6. Develop a digital database to keep track of wildfire events in the county. **(New 2010)**	Staff time	Departmental budget	Medium	X		Sauk County Emergency Management; local fire departments

Goal 9. Hazardous Materials Incidents
Protect people and natural resources from the adverse affects of hazardous materials incidents. (**2005 plan**)

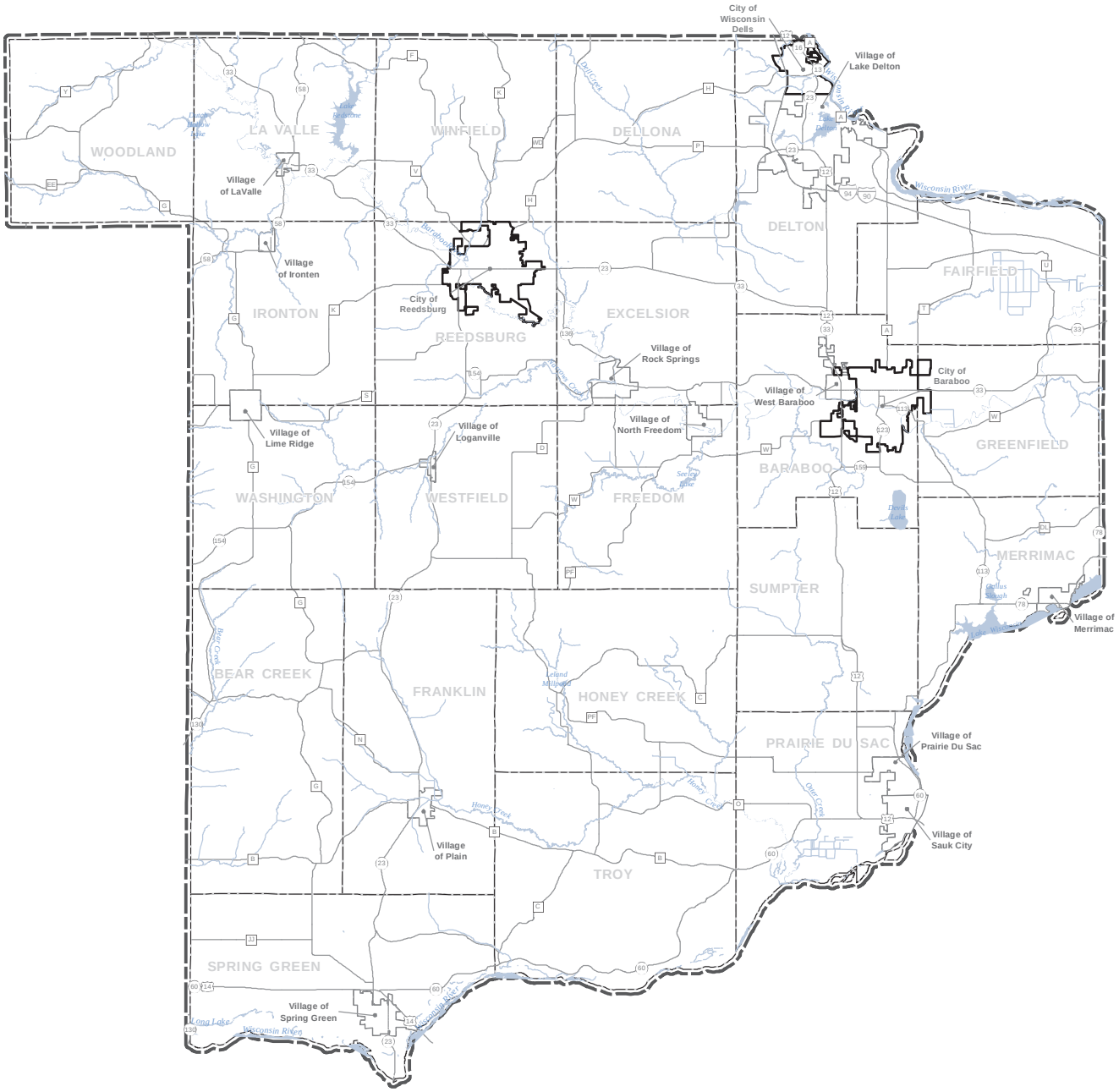
Objectives
1. Decrease the number of incidents involving hazardous materials. (**2005 plan**)
2. Increase the effectiveness of local emergency response crews. (**2005 plan**)
3. Increase awareness and information related to safe handling procedures. (**2005 plan**)
4. Increase awareness and education efforts concerning proper certification and identification for transporting hazardous materials. (**2005 plan**)
5. Minimize the negative effects of hazardous material spills. (**2005 plan**)

Policies
1. Encourage local enforcement of state compliance standards for safe handling and storage of hazardous materials. (**New 2010**)
2. Include local emergency response entities when appropriate in the development and maintenance of local emergency plans, off-site facility plans, SARA plans, and Tier 3 plans. (**New 2010**)
3. Continue coordination relating to the implementation of the Brown Route alternative route. (**New 2010**)
4. Ensure that facilities storing or using hazardous materials are not located near residential areas and/or residential care facilities such as nursing homes and the like. (**New 2010**)
5. Ensure that emergency response crews have proper training (e.g., recognize USDOT labels for hazardous materials). (**New 2010**)

Implementation Actions / Strategies	Cost Estimate (2010)	Potential Funding Source	Priority	Schedule 2011 - 2015	Schedule 2016 - 2020	Responsible Entity
1. The County should develop a Level B Emergency Response team to respond to hazardous spill situations **(2005 plan; status 2010, ongoing effort)**	Moderate	Departmental budget	Medium	X	X	Sauk County Emergency Management
2. The County should prevent or reduce hazardous material exposure by separation and buffering between industrial areas and other land uses **(2005 plan; status 2010, ongoing effort)**	Moderate	Departmental budget	High	X	X	Sauk County Planning and Zoning Department
3. Continue to identify and record locations of all properties where hazardous materials are used or stored. (**New 2010**)	Staff time	Departmental budget	Medium	X	X	Sauk County Emergency Management
4. Establish a formal procedure to promptly notify those people affected by an uncontrolled release of hazardous materials. (**New 2010**)	Staff time	Departmental budget	Medium	X	X	Sauk County Emergency Management
5. Develop a coordinated training procedure involving police departments and fire departments to respond to uncontrolled releases of hazardous materials. (**New 2010**)	Staff time	Departmental budget	Medium	X	X	Sauk County Emergency Management
6. Identify truck routes where transporting of hazardous materials is permitted and incorporate that information into comprehensive plans and other planning projects. (**New 2010**)	Staff time	Departmental budget	Medium	X	X	Sauk County Emergency Management
7. Conduct periodic emergency response training exercises. (**New 2010**)	$5,000 per training exercise	Departmental budget	Medium	X	X	Sauk County Emergency Management

Map Series

1. Civil Divisions: 2010
2. Road Network: 2010
3. Railroads: 2010
4. Zoning: 2010
5. Surface Water Resources: 2010
6. Vulnerable Housing: 2010
7. Bridges: 2010
8. Dams: 2010
9. Public-Use Airports: 2010
10. Telecommunication Facilities: 2010
11. Energy Facilities: 2010
12. Public Water and Wastewater Facilities: 2010
13. Public Safety Facilities: 2010
14. Government Facilities: 2010
15. Schools: 2010
16. Special Care Residential Facilities: 2010
17. Special Care Nonresidential Facilities: 2010
18. Health Care Facilities: 2010



Legend

- City Boundary
- Village Bounday
- Township Boundary
- County Boundary
- Waterbody
- River

Source: Base map from Sauk County Information Systems Department

0 1.25 2.5 5 Miles

N

Map 1
Civil Divisions: 2010

Sauk County Multijurisdictional Hazards Mitigation Plan: 2011-2015

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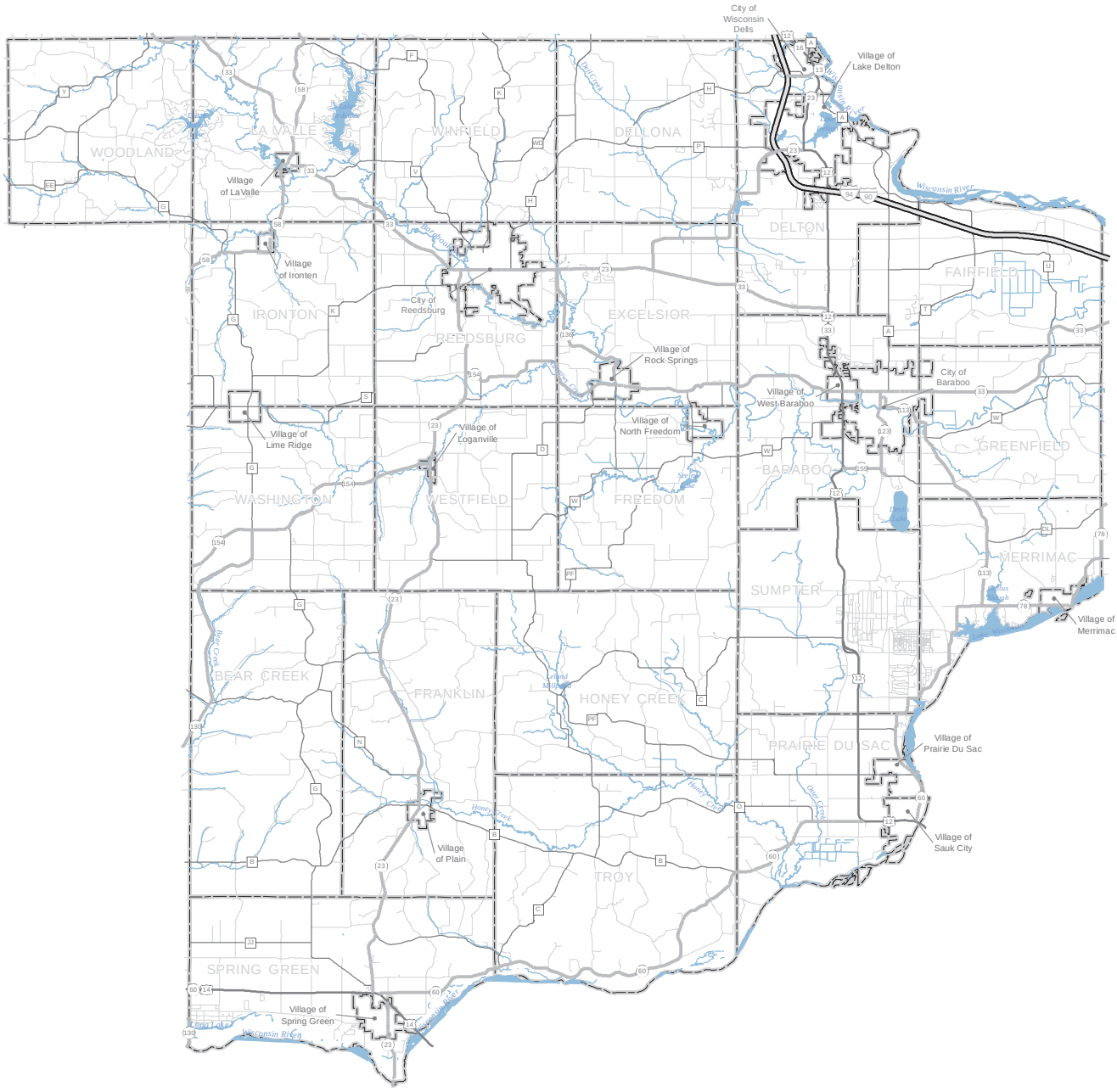

Legend

- Local Road
- County Road
- State Highway
- Federal Highway
- Interstate Highway
- Railroad
- Waterbody
- River
- Municipal Boundary

Source: Base map from Sauk County Information Systems Department

0 1.25 2.5 5 Miles

N

Map 2
Road Network: 2010

Sauk County Multijurisdictional Hazards Mitigation Plan: 2011-2015

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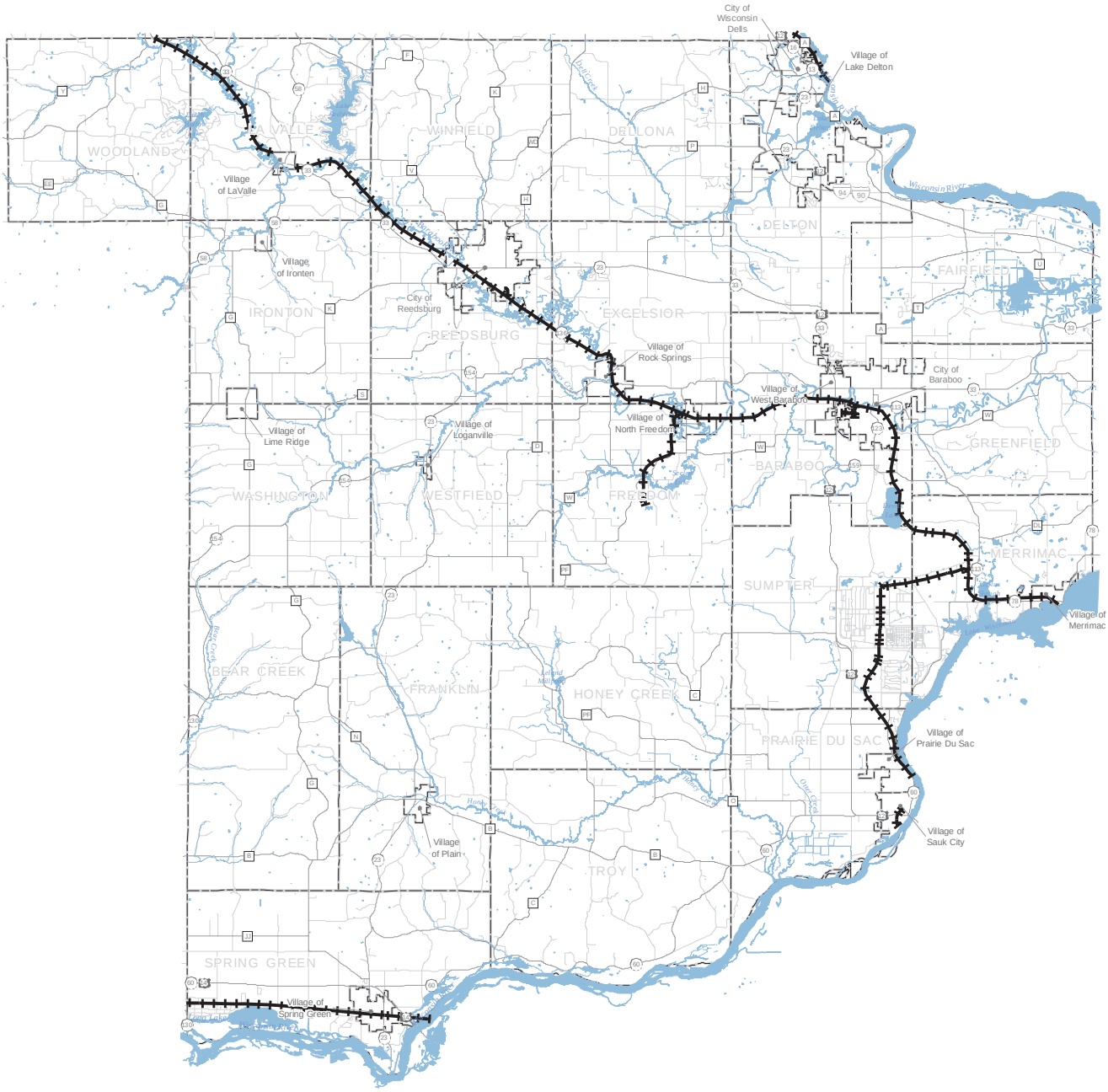

Legend

- Railroad
- Municipal Boundary
- Waterbody
- River
- Major Road

Source: Base map from Sauk County Information Systems Department

0 1.25 2.5 5 Miles

N

Map 3
Railroads: 2010

Sauk County Multijurisdictional Hazards Mitigation Plan: 2011-2015

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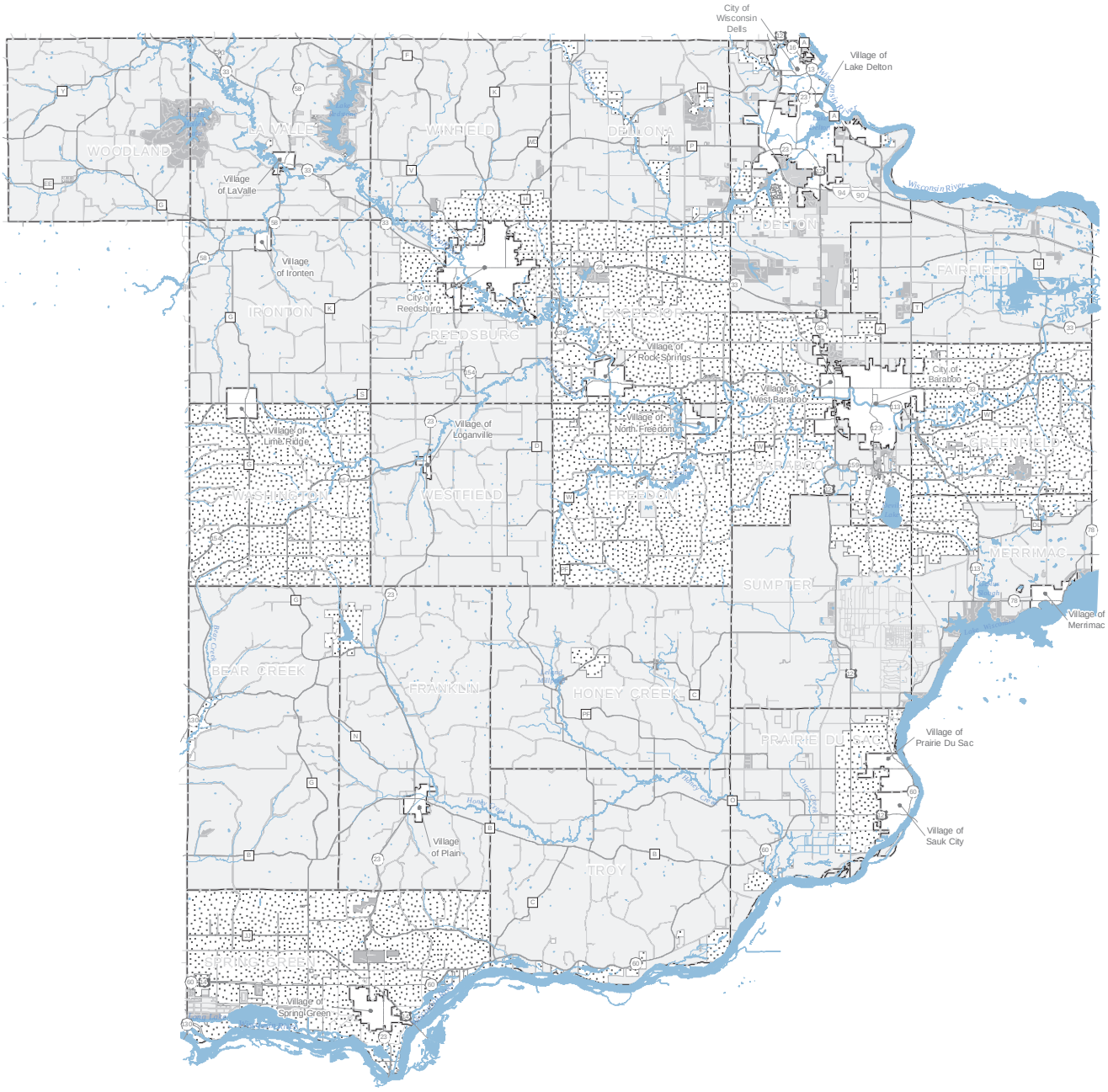

Legend

- Municipal Zoned
- Agriculture
- Industrial
- Commercial
- Residential
- Rural Community District
- Park/Conservancy/Open Space
- Municipal Boundary
- Major Road
- Waterbody
- River

Source: Base map from Sauk County Information Systems Department

0 1.25 2.5 5 Miles

N

Map 4
Zoning and Land Use: 2010

Sauk County Multijurisdictional Hazards Mitigation Plan: 2011-2015

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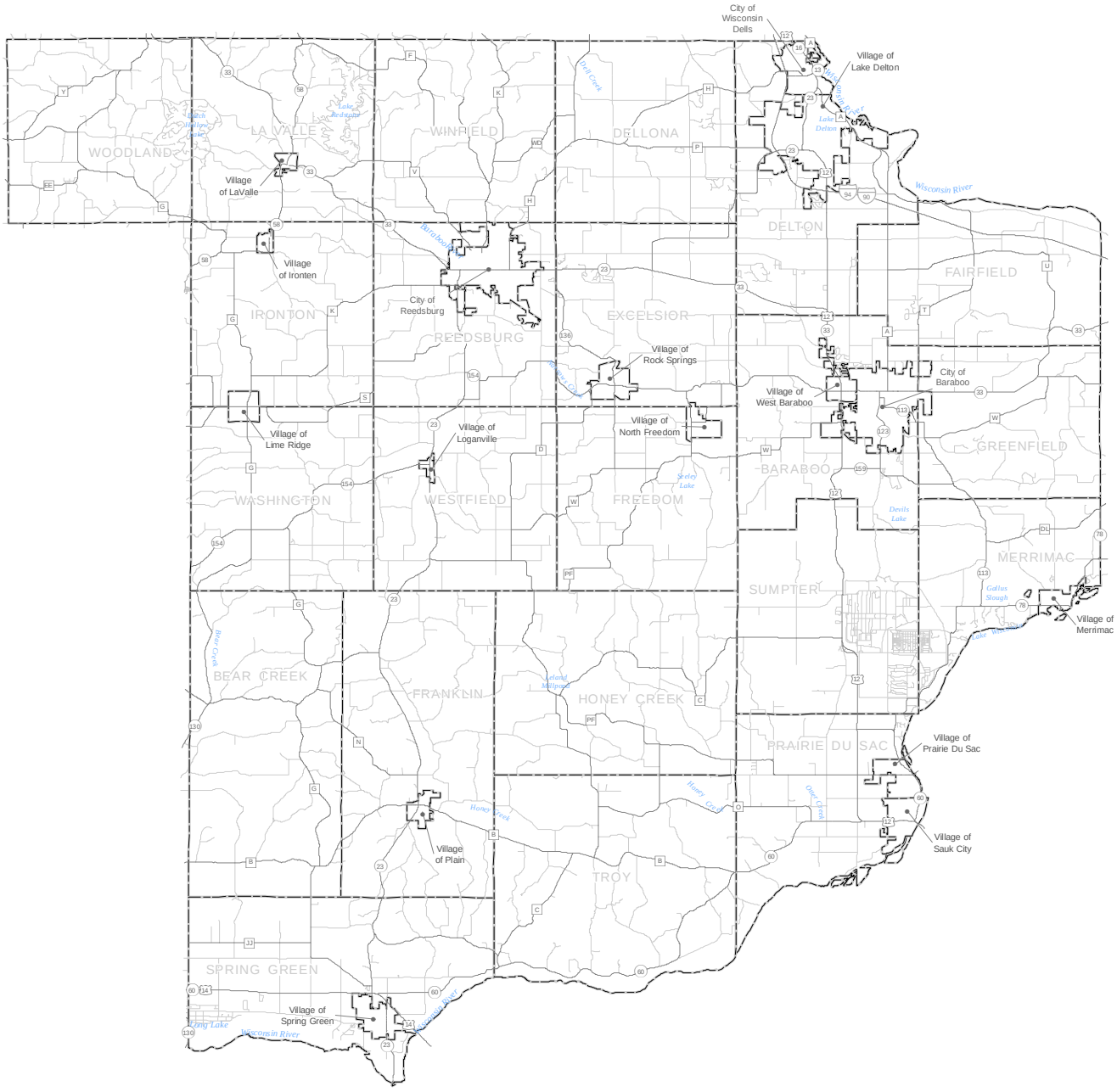

Legend

- Waterbody
- Wetland
- 100 year Floodplain
- River
- Municipal Boundary
- Major Road

Source: Base map from Sauk County Information Systems Department

0 1.25 2.5 5 Miles

N

Map 5
Surface Water Resources: 2010

Sauk County Multijurisdictional Hazards Mitigation Plan: 2011-2015

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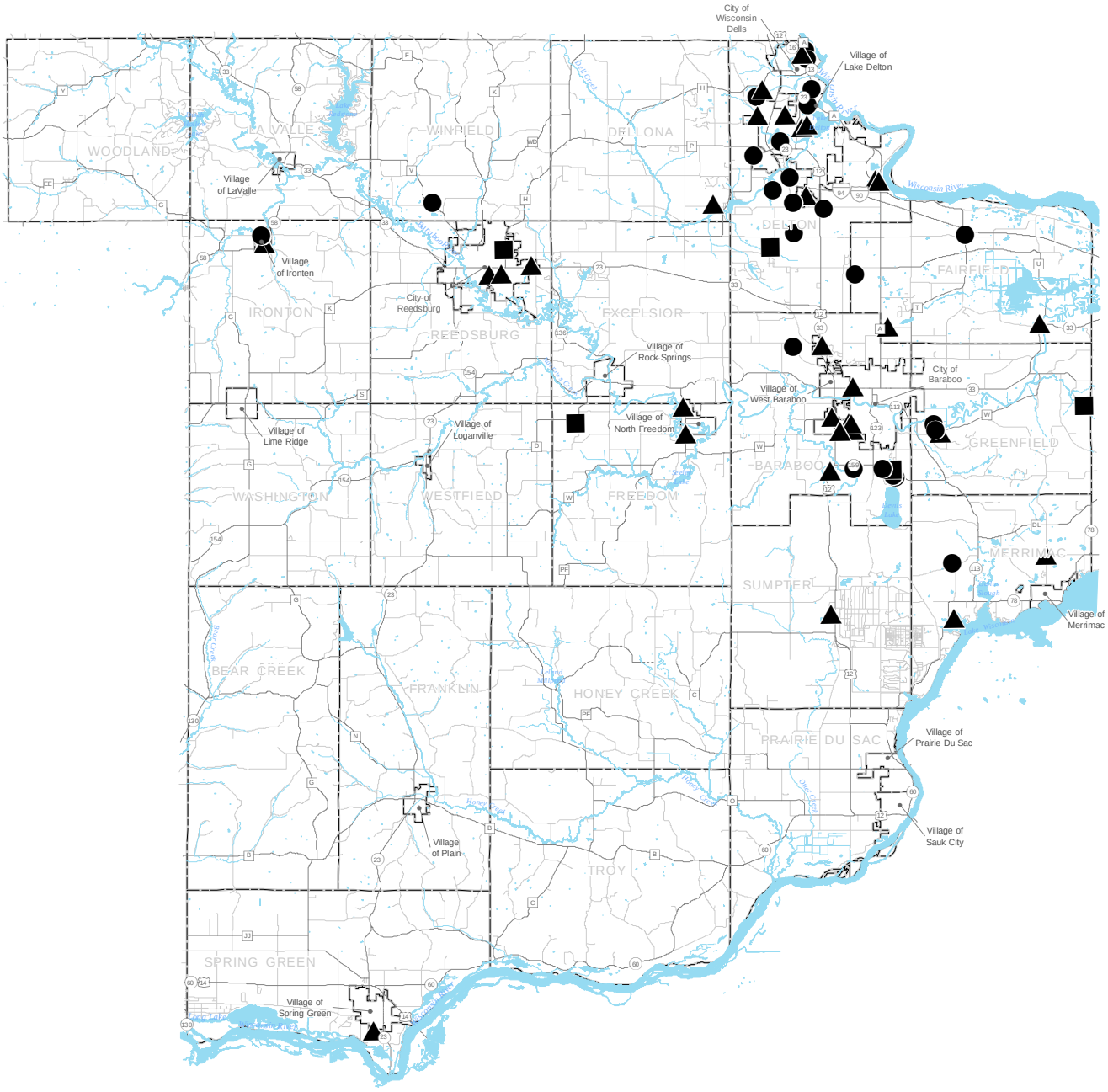

Legend

- Campground
- Manufactured/Mobile Home Park
- Recreational/Educational Campground
- Municipal Boundary
- Waterbody
- River
- Major Road

Source: Base map from Sauk County Information Systems Department

0 1.25 2.5 5 Miles

N

Map 6
Vulnerable Housing: 2010

Sauk County Multijurisdictional Hazards Mitigation Plan: 2011-2015

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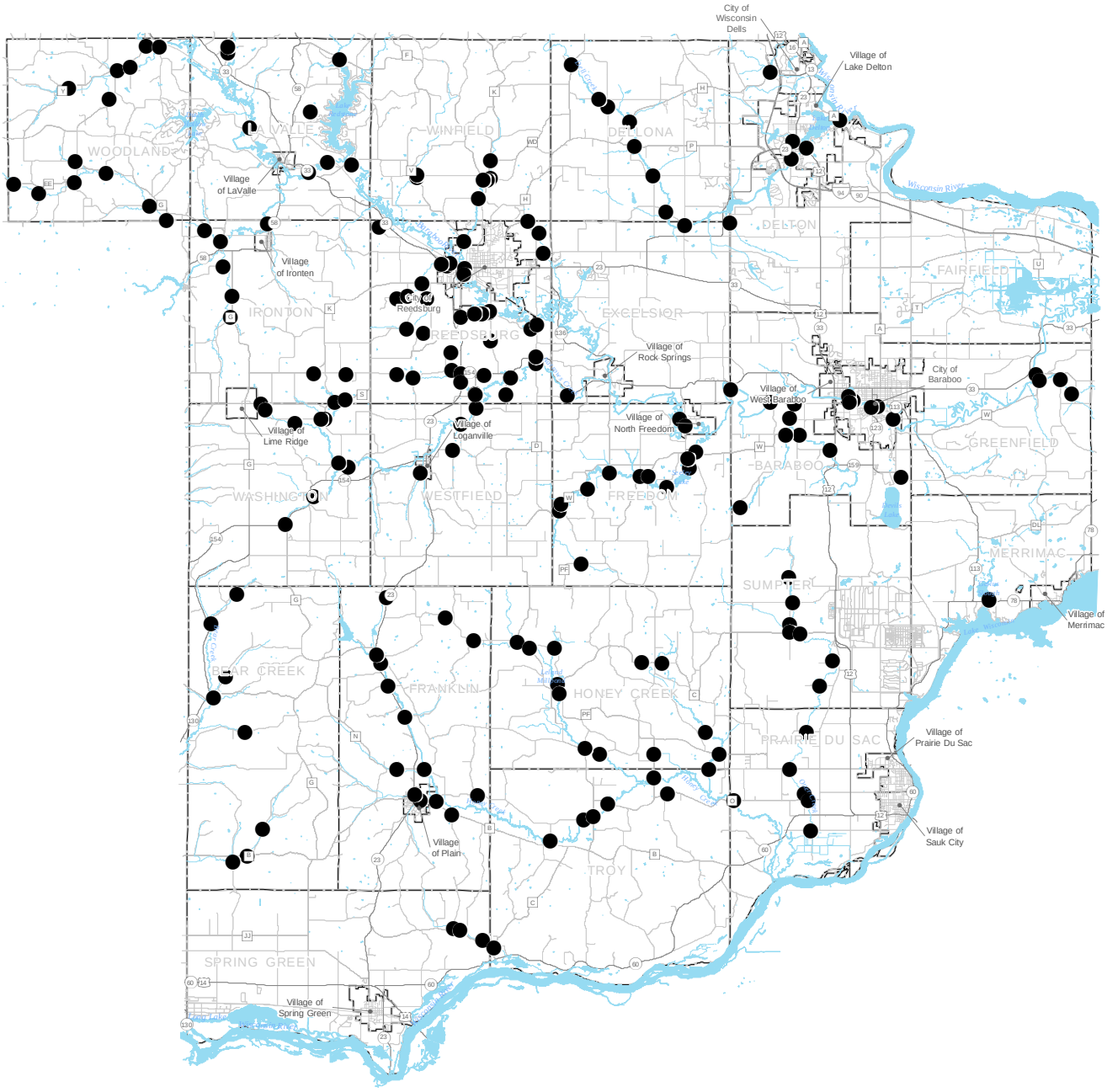

Legend

- Bridge
- Municipal Boundary
- Waterbody
- River
- Major Road

0 1.25 2.5 5 Miles

N

Source: Base map from Sauk County Information Systems Department

Map 7
Bridges: 2010

Sauk County Multijurisdictional Hazards Mitigation Plan: 2011-2015

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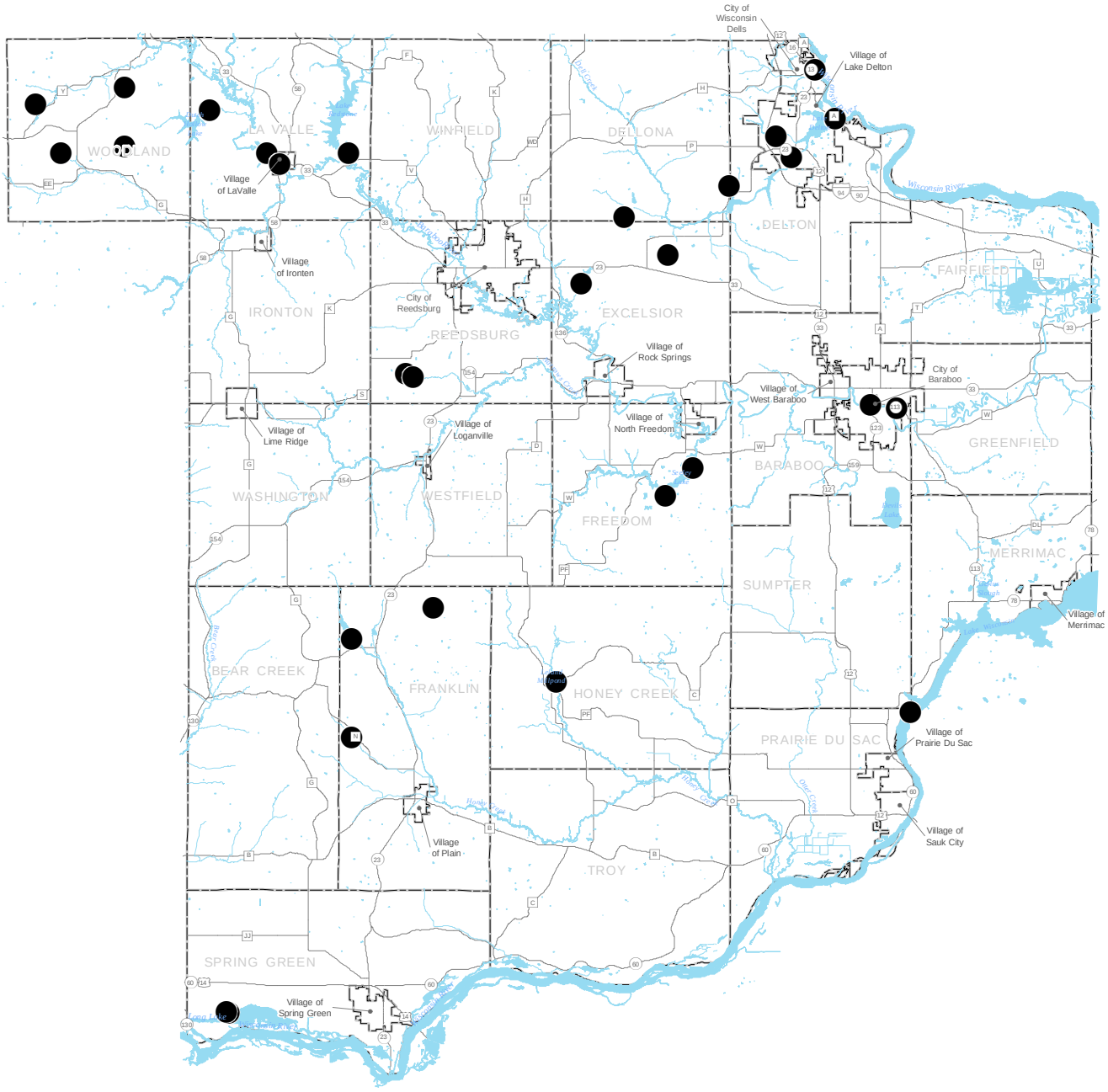

Legend

- Dam
- Municipal Boundary
- Waterbody
- River
- Major Road

Source: Base map from Sauk County Information Systems Department

0 1.25 2.5 5 Miles

N

Map 8
Dams: 2010

Sauk County Multijurisdictional Hazards Mitigation Plan: 2011-2015

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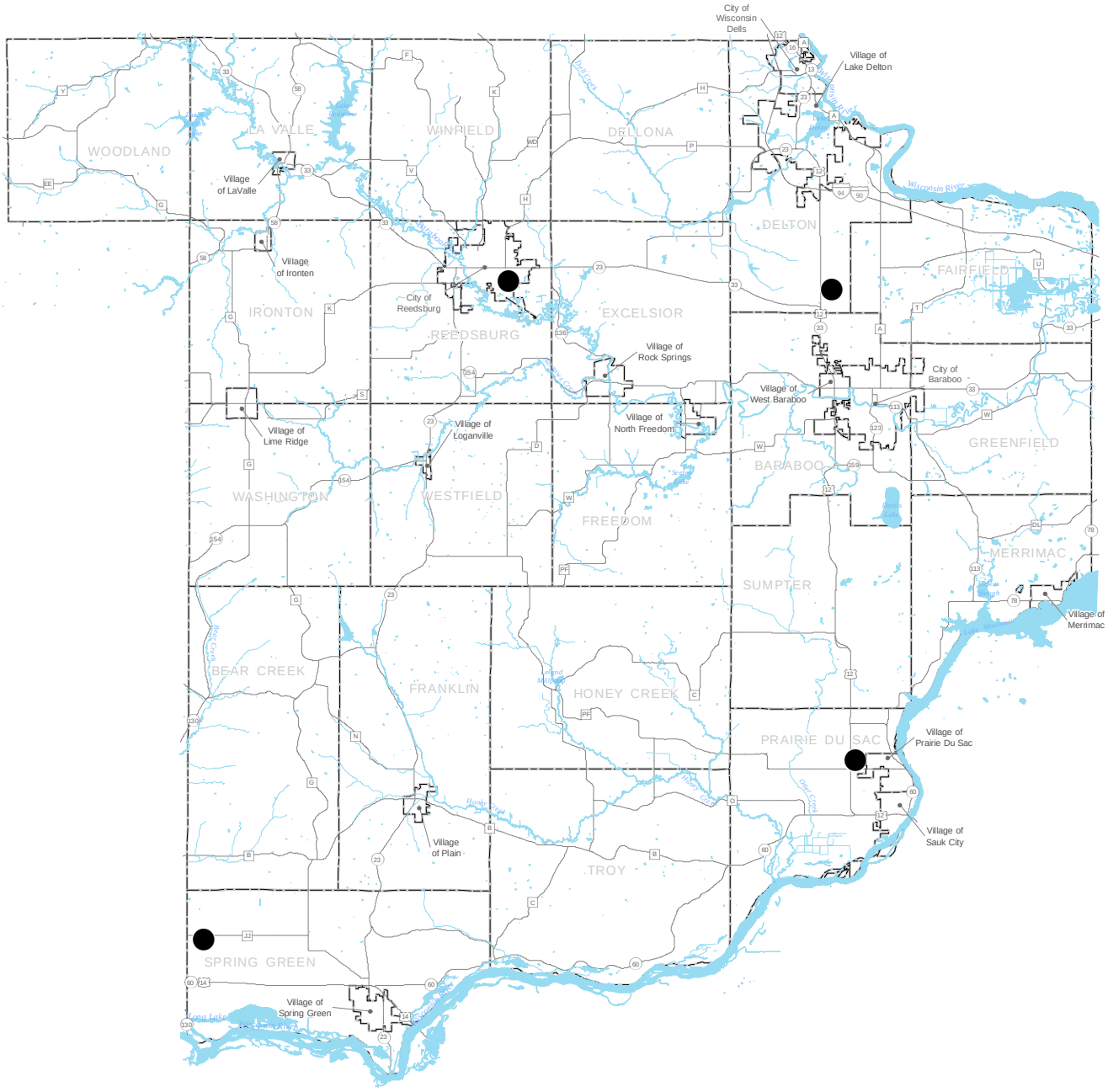

Legend

- Public Use Airport
- Municipal Boundary
- Waterbody
- River
- Major Road

0 1.25 2.5 5 Miles

N

Source: Base map from Sauk County Information Systems Department

Map 9
Public Use Aiports: 2010

Sauk County Multijurisdictional Hazards Mitigation Plan: 2011-2015

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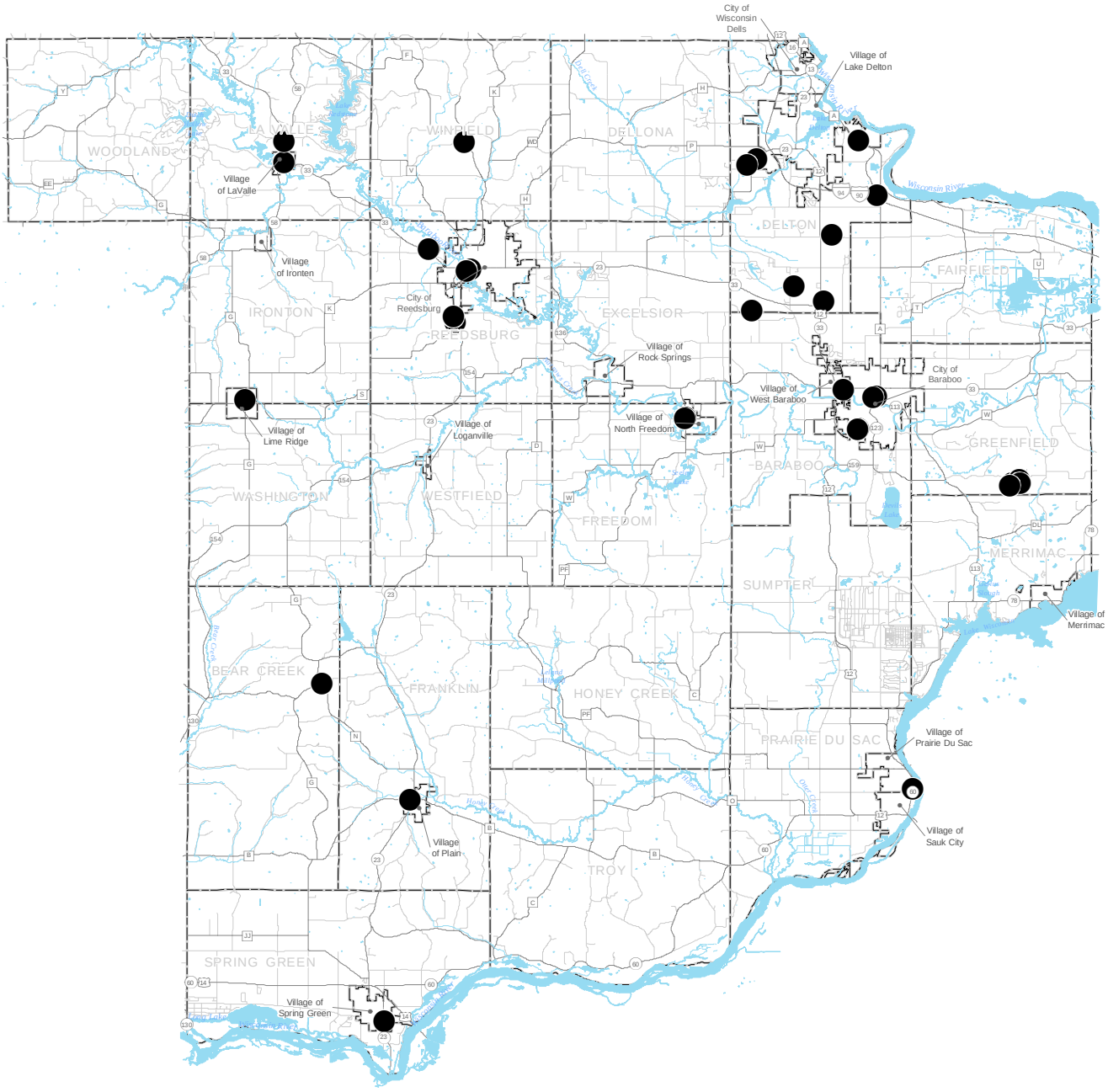

Legend

- Tower/Telecommunication Facility
- Municipal Boundary
- Waterbody
- River
- Major Road

Source: Base map from Sauk County Information Systems Department

0 1.25 2.5 5 Miles

N

Map 10
Telecommunication Facilities: 2010

Sauk County Multijurisdictional Hazards Mitigation Plan: 2011-2015

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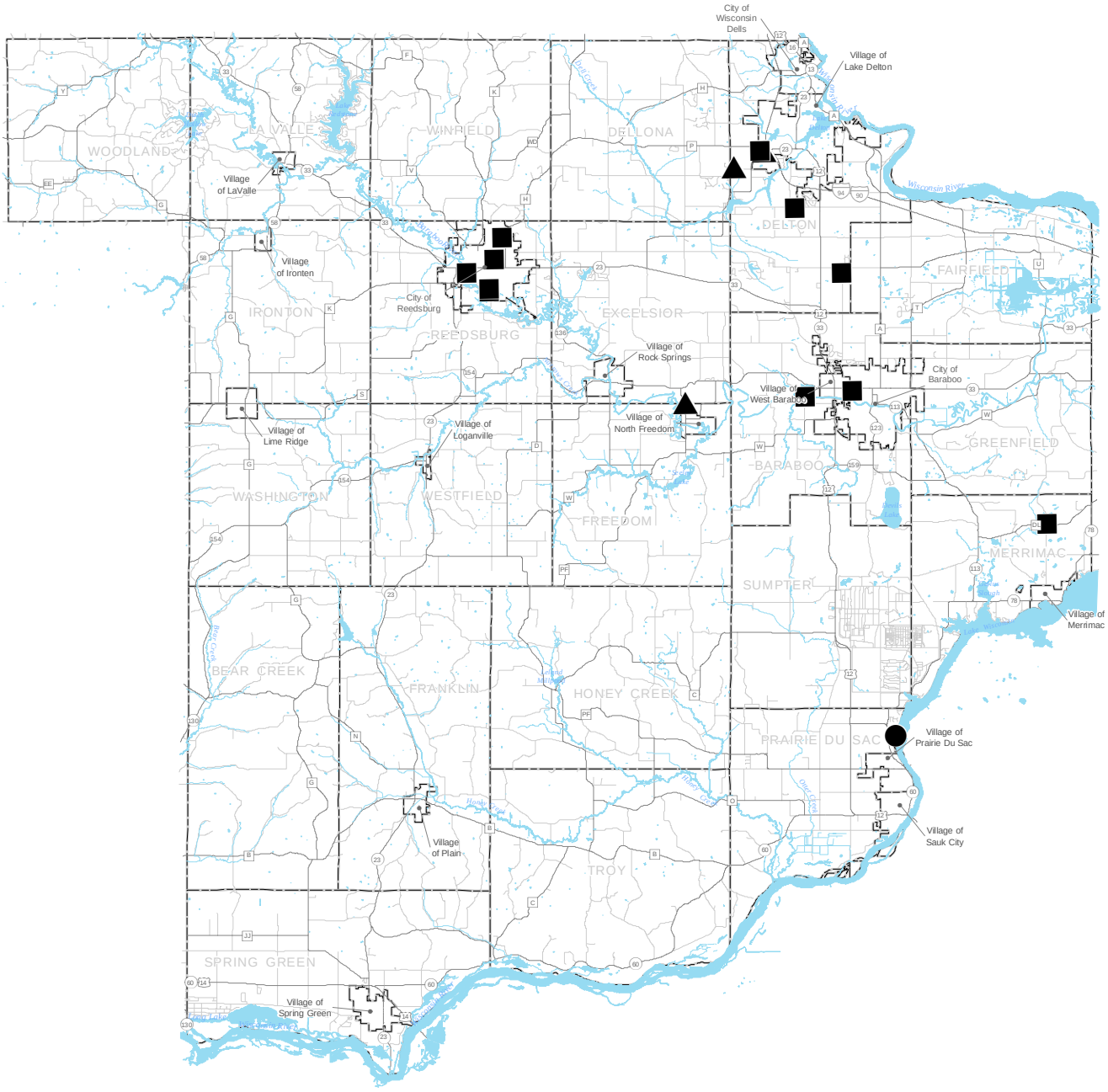

Legend

- Electric Facility - Power Plant
- Electric Facility - Substation
- Natural Gas Facility
- Municipal Boundary
- Waterbody
- River
- Major Road

0 1.25 2.5 5 Miles

N

Source: Base map from Sauk County Information Systems Department

Map 11
Energy Facilities: 2010

Sauk County Multijurisdictional Hazards Mitigation Plan: 2011-2015

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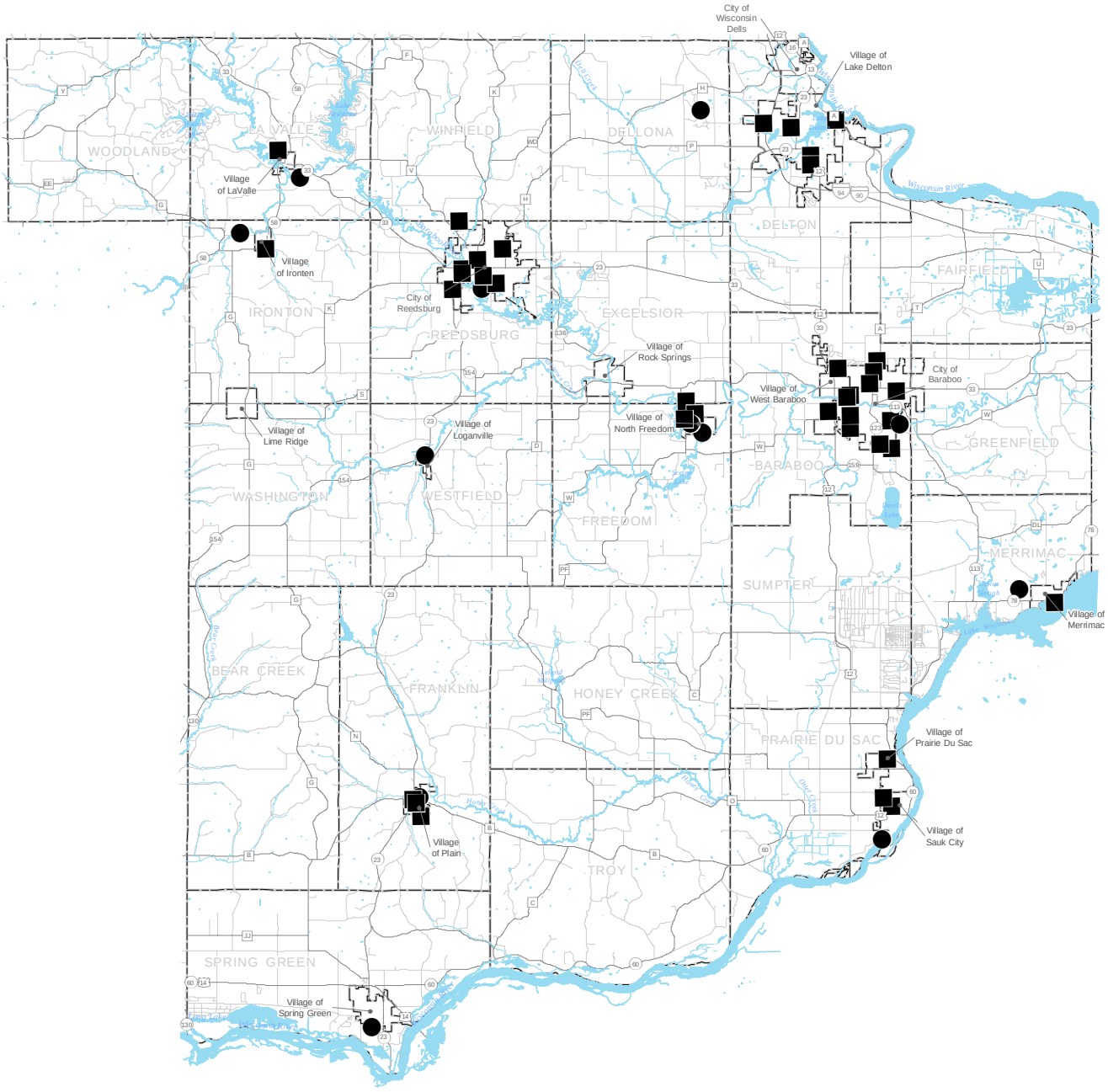

Legend

- Wastewater Facility
- Water Facility
- Municipal Boundary
- Waterbody
- River
- Major Road

0 1.25 2.5 5 Miles

N

Source: Base map from Sauk County Information Systems Department

Map 12
Public Water and Wastewater Facilities: 2010

Sauk County Multijurisdictional Hazards Mitigation Plan: 2011-2015

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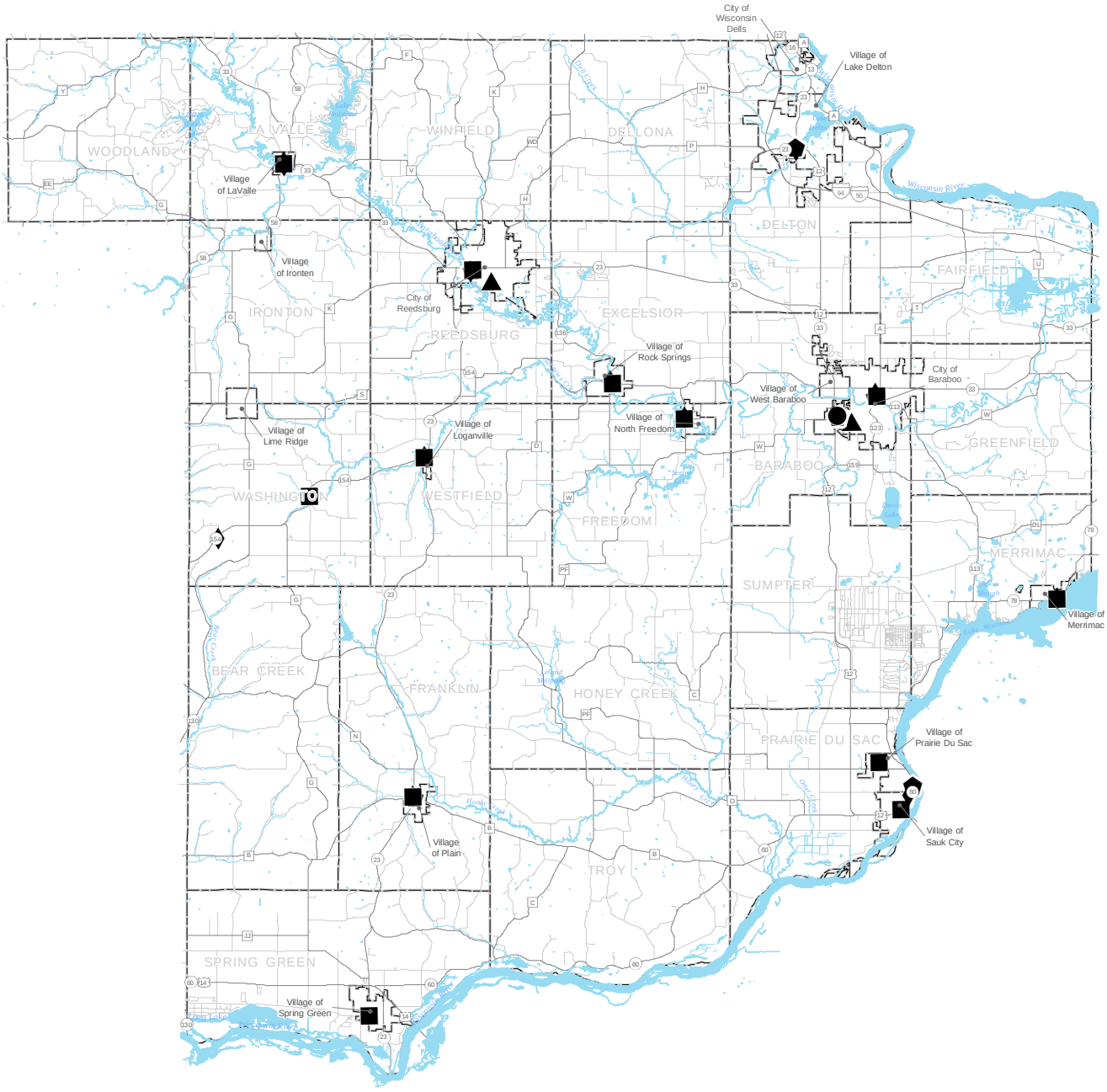
GeoEco Design, LLC



Legend

- Correctional Facility
- Fire Station
- National Guard Facility
- Police Station
- EMS Facility
- Municipal Boundary
- Waterbody
- River
- Major Road

Source: Base map from Sauk County Information Systems Department

0 1.25 2.5 5 Miles

N

Map 13
Public Safety Facilities: 2010

Sauk County Multijurisdictional Hazards Mitigation Plan: 2011-2015

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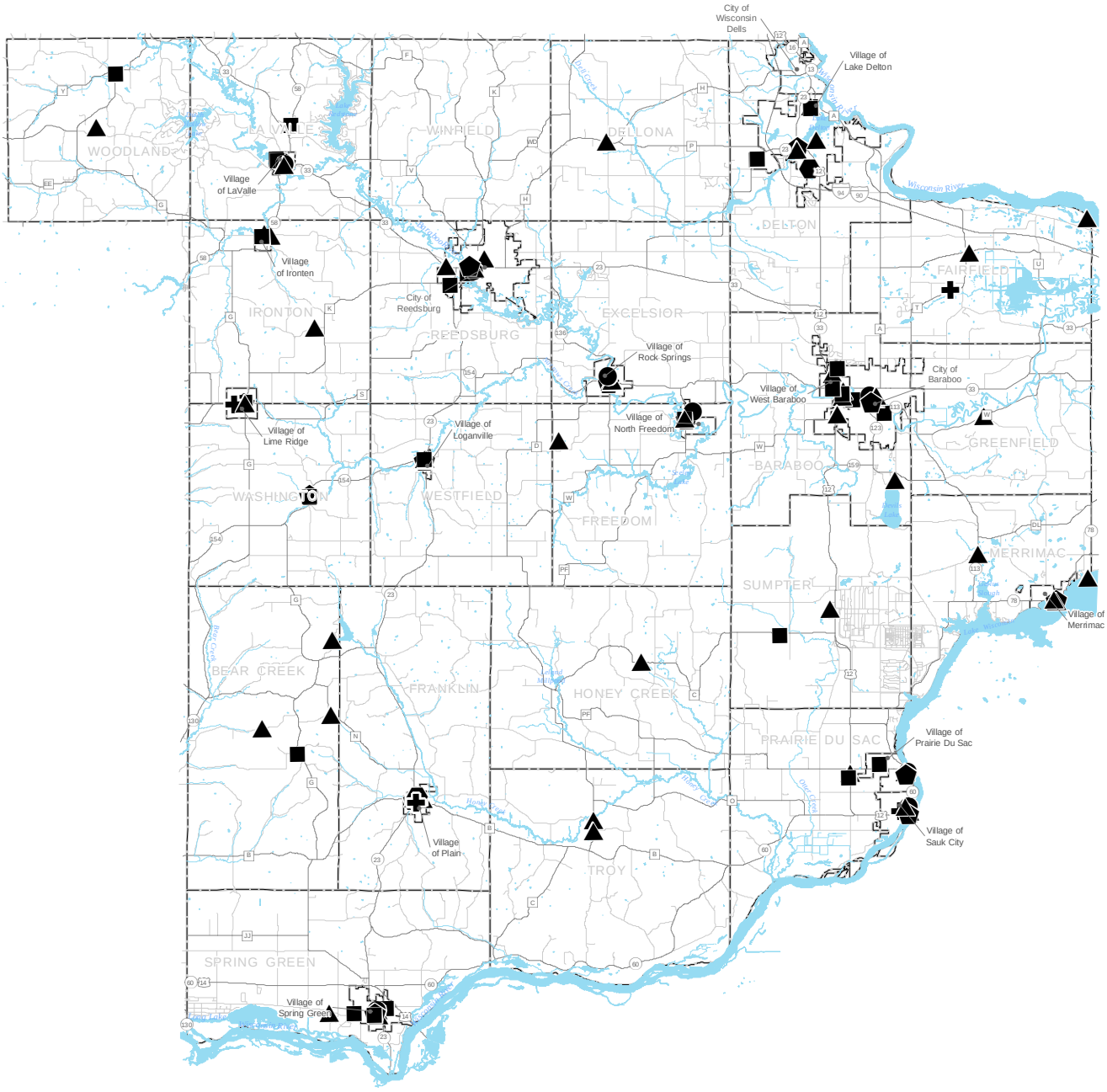

Legend

- Community/Senior Center
- Library
- Municipal Garage
- Municipal Office and Other
- Post Office
- Recreation
- Municipal Boundary
- Waterbody
- River
- Major Road

Source: Base map from Sauk County Information Systems Department

0 1.25 2.5 5 Miles

N

Map 14 Government Facilities: 2010

Sauk County Multijurisdictional Hazards Mitigation Plan: 2011-2015

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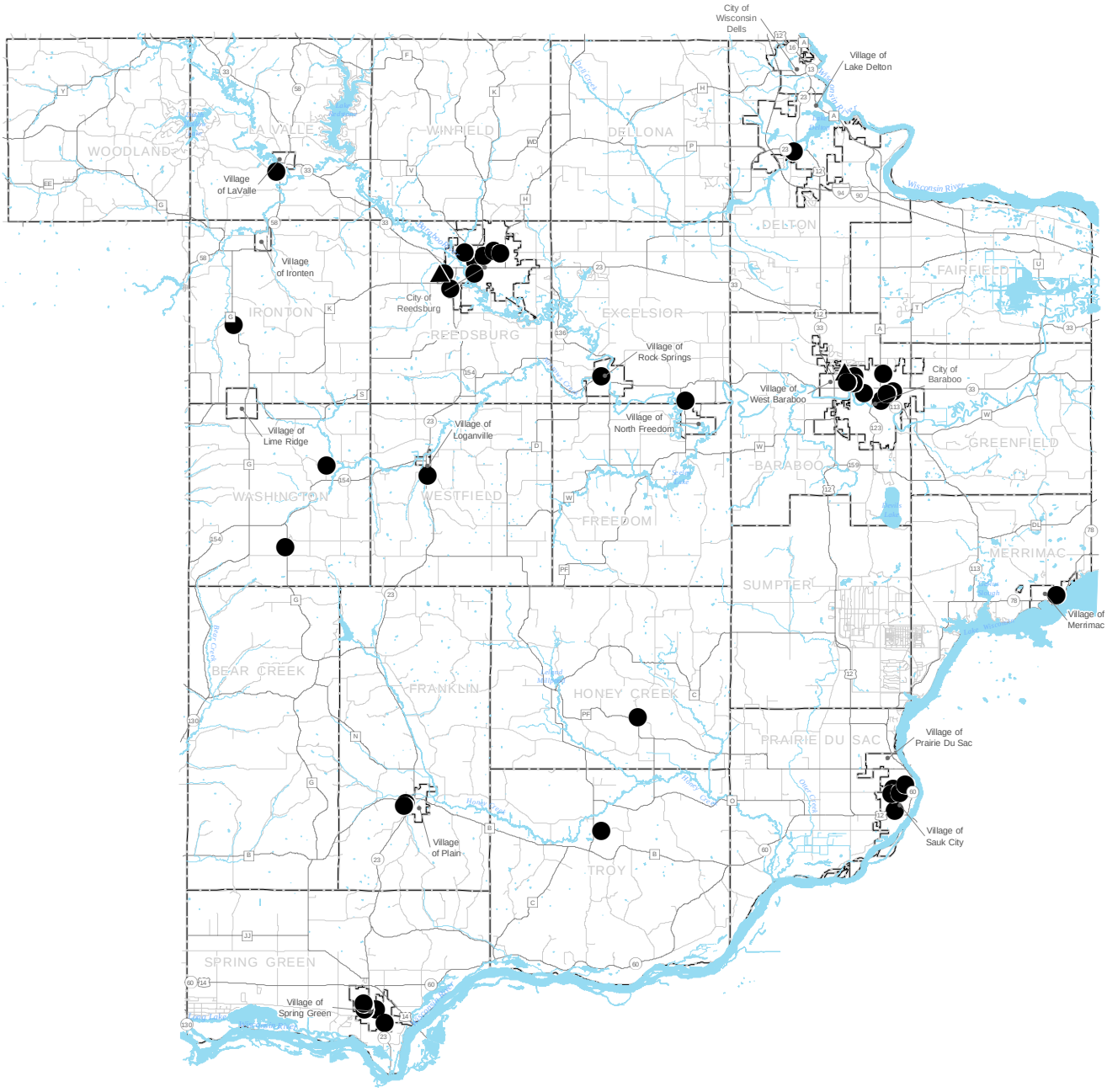
GeoEco Design, LLC



Legend

- K-12
- Post - Secondary
- Municipal Boundary
- Waterbody
- River
- Major Road

0 1.25 2.5 5 Miles

N

Source: Base map from Sauk County Information Systems Department

Map 15
Schools: 2010

Sauk County Multijurisdictional Hazards Mitigation Plan: 2011-2015

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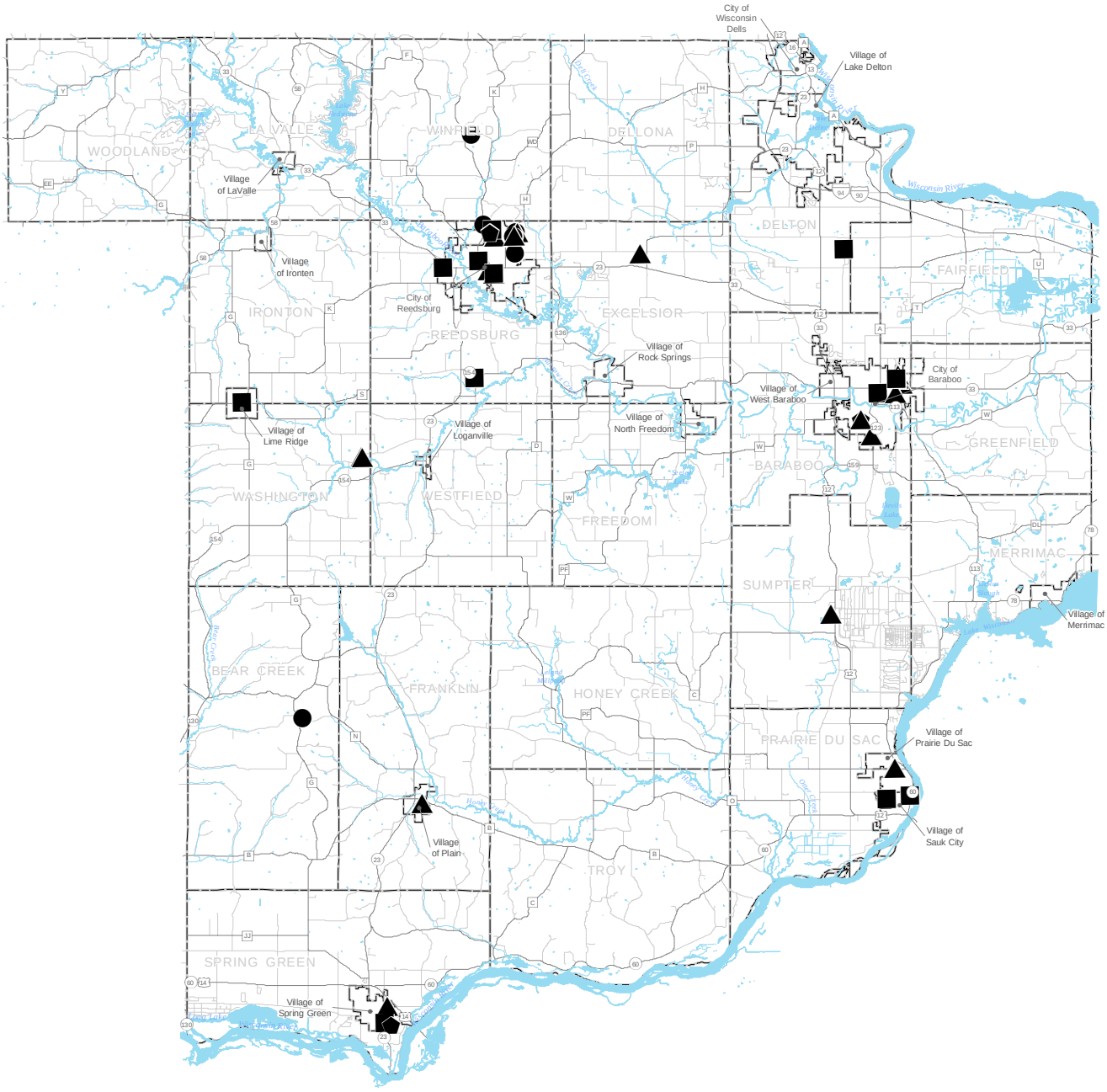

Legend

- Adult Family Home
- Community Based Residential Facility (CBRF)
- Nursing Home
- Residential Care Apartment Complex (RCAC)
- Municipal Boundary
- Waterbody
- River
- Major Road

Source: Base map from Sauk County Information Systems Department

0 1.25 2.5 5 Miles

N

Map 16
Special Care Residential Facilities: 2010

Sauk County Multijurisdictional Hazards Mitigation Plan: 2011-2015

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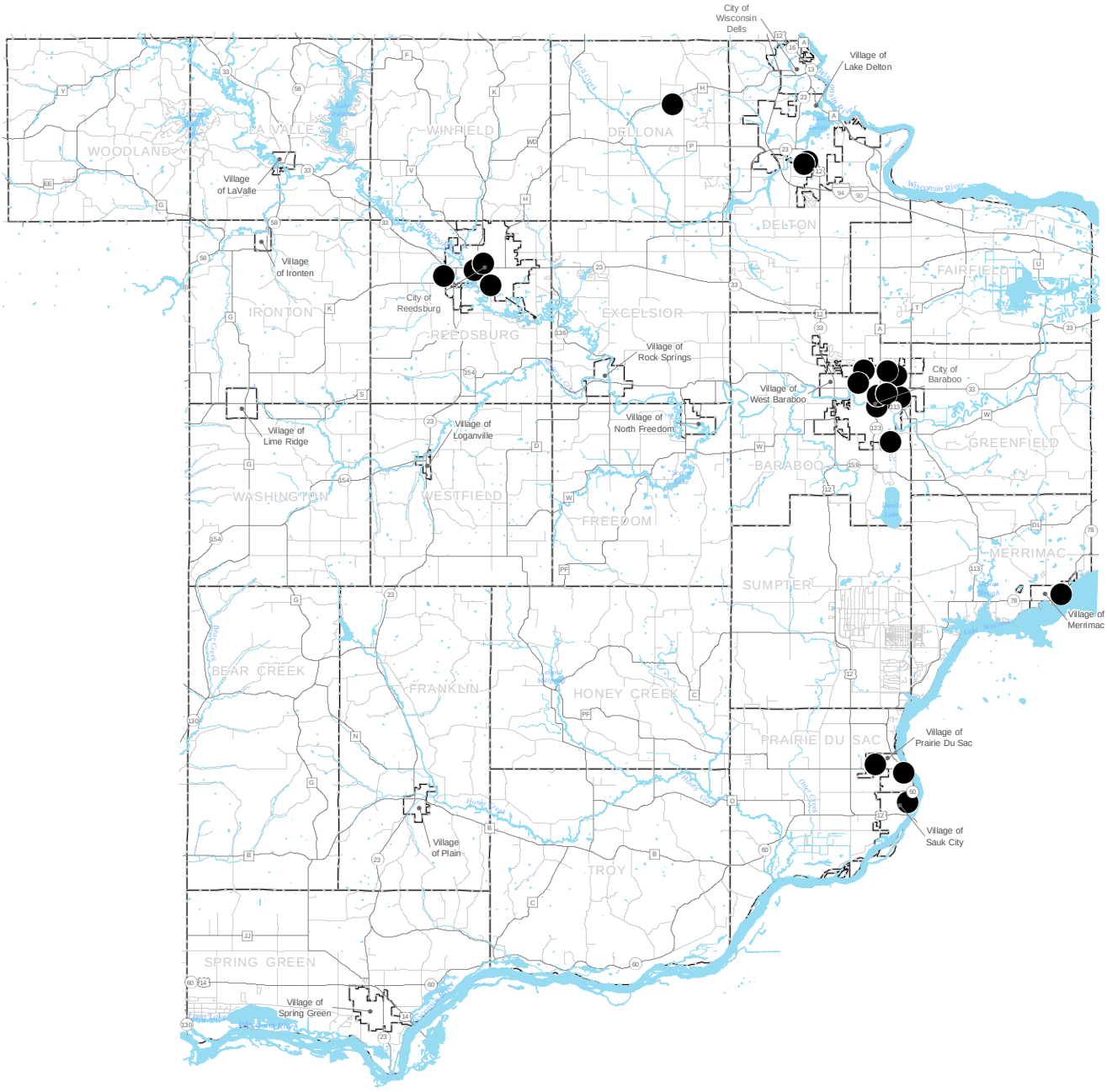
GeoEco Design, LLC



Legend

- Group Child Care Center
- Municipal Boundary
- Waterbody
- River
- Major Road

Source: Base map from Sauk County Information Systems Department

0 1.25 2.5 5 Miles

N

Map 17
Special Care Non-residential Facilities: 2010

Sauk County Multijurisdictional Hazards Mitigation Plan: 2011-2015

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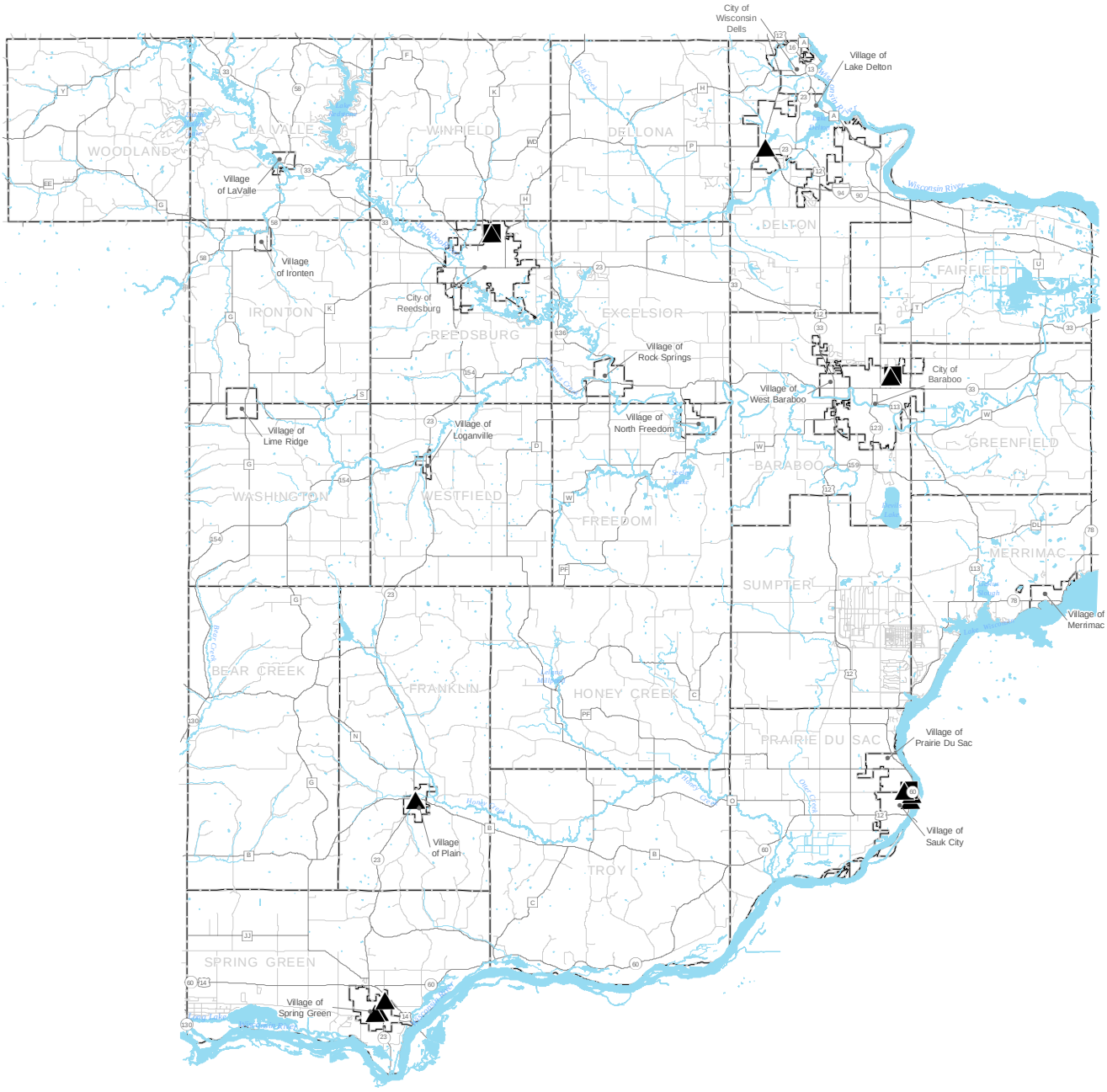
GeoEco Design, LLC



Legend

- Health Care Clinic
- Hospital
- Municipal Boundary
- Waterbody
- River
- Major Road

Source: Base map from Sauk County Information Systems Department

0 1.25 2.5 5 Miles

N

Map 18
Health Care Facilities: 2010

Sauk County Multijurisdictional Hazards Mitigation Plan: 2011-2015

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GeoEco Design, LLC