

MULTI-HAZARD MITIGATION PLAN AITKIN COUNTY, MINNESOTA, 2014



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2014

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SECTION 1 – INTRODUCTION

1.1 Introduction

Hazard mitigation is defined as any sustained action to reduce or eliminate long-term risk to human life and property from hazards. The Federal Emergency Management Agency (FEMA) has made reducing hazards one of its primary goals; hazard mitigation planning and the subsequent implementation of resulting projects, measures, and policies is a primary mechanism in achieving FEMA's goal.

Hazard mitigation planning and preparedness will be the most effective instrument to diminish losses by reducing the impact of disasters upon people and property. Although mitigation efforts will not eliminate all disasters, each county shall endeavor to be prepared as much as possible for a disaster.

The Multi-Hazard Mitigation Plan (MHMP) is a requirement of the Federal Disaster Mitigation Act of 2000 (DMA 2000). The development of a local government plan is required in order to maintain eligibility for certain federal disaster assistance and hazard mitigation funding programs. In order for communities to be eligible for future mitigation funds, they must adopt an MHMP.

Aitkin County is vulnerable to a variety of potential disasters. These hazards, both natural and human caused, threaten loss of life and property in the county. Such hazards as tornadoes, flooding, wildfires, blizzards, straight line winds, ice storms, and hazardous material spills have the potential for inflicting vast economic loss and personal hardship.

This Hazard Mitigation Plan represents the efforts of local agencies in Aitkin County to fulfill the responsibility for hazard mitigation planning. The intent of the plan is to reduce the actual threat of specific hazards by limiting the impact of damages and losses.

1.1.1 Scope

The Aitkin County Emergency Management Director, the University of Minnesota Duluth Geospatial Analysis Center and the Arrowhead Regional Development Commission (ARDC) have combined efforts to update the Aitkin County 2005 Mitigation Plan.

This Hazard Mitigation Plan evaluates and ranks the major natural hazards affecting Aitkin County as determined by frequency of event, economic impact, deaths, and injuries. Mitigation recommendations are based on input from state and local agencies, public input, and national best practices.

The University of Minnesota Duluth Geospatial Analysis Center (GAC) performed a hazard risk assessment for a 100-year flood in Aitkin County using the Hazus-MH GIS tool. In recognition of the importance of planning in mitigation activities, FEMA created Hazards USA Multi-Hazard (Hazus-MH), a powerful geographic information system (GIS)-based disaster risk assessment tool. This tool enables communities of all sizes to predict estimated losses from floods, hurricanes, earthquakes, and other related phenomena and to measure the impact of various mitigation practices that might help reduce those losses. The Minnesota Homeland Security and Emergency Management office has determined that Hazus-MH should play a critical role in Minnesota's risk assessments, and therefore the 100-year flood event hazard analysis is introduced in this plan.

This plan is a multi-jurisdictional plan that covers Aitkin County, its school districts, and the cities of Aitkin, Hill City, McGrath, McGregor, Palisade, and Tamarack. The Mille Lacs Reservation, part of which lies in Aitkin County, currently has its own All-Hazard Mitigation Plan, updated in 2012.

Members from each of these jurisdictions actively participated in the planning process by attending workgroup meetings, providing information, suggesting mitigation strategies and reviewing the plan document. Each jurisdiction will adopt the plan by resolution after approval by FEMA. Copies of the resolutions can be found in Appendix D in the back of the plan.

Aitkin County has specified the following goals for this Hazard Mitigation Plan:

- To evaluate and rank the hazards that impact Aitkin County.
- To determine the extent of existing mitigation programs and policy capabilities within Aitkin County.
- To create a detailed, working document that will establish a standardized process for ensuring coordination of hazard mitigation efforts and to implement an ongoing and comprehensive hazard mitigation strategy.
- To familiarize state and local officials and the general public about hazard mitigation in Aitkin County and obtain their support.

1.1.2 Hazard Mitigation Definition

Hazard mitigation may be defined as any action taken to eliminate or reduce the long-term risk to human life and property from natural and technological hazards. Potential types of hazard mitigation measures include the following:

- Structural hazard control or protection projects
- Retrofitting of facilities
- Acquisition and relocation of structures
- Development of mitigation standards, regulations, policies, and programs
- Public awareness and education programs
- Development or improvement of warning systems

1.1.3 Benefits of Mitigation Planning

The benefits of hazard mitigation planning include the following:

- Saving lives, protecting the health of the public, and reducing injuries
- Preventing or reducing property damage
- Reducing economic losses
- Minimizing social dislocation and stress
- Reducing agricultural losses
- Maintaining critical facilities in functioning order
- Protecting infrastructure from damage
- Protecting mental health

- Reducing legal liability of government and public officials

1.2 State Mitigation Plan Overview

FEMA currently has three mitigation grant programs that are administered by the State of Minnesota: the Hazard Mitigation Grant Program (HMGP), the Pre-Disaster Mitigation program (PDM), and the Flood Mitigation Assistance (FMA) program. The HMGP, PDM and FMA are administered through the Department of Public Safety, Division of Homeland Security and Emergency Management.

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SECTION 2 – PUBLIC PLANNING PROCESS

2.1 Steering Committee Information

The Aitkin County Multi-Hazard Mitigation Plan steering committee is headed by the Aitkin County Emergency Management Director, who is the primary point of contact. University of Minnesota Duluth staff under contract with Aitkin County includes Stacey Stark (GAC Director) and Steve Graham (GAC Research Analyst). UMD GAC also collaborated with the Arrowhead Regional Development Commission (ARDC) to update this plan. Members of the Aitkin County MHMP steering committee include representatives from the public, private, and governmental sectors. Table 1 identifies steering committee individuals and the organizations they represent.

Table 1. Multi-Hazard Mitigation Plan Steering Committee 2014

Organization	Title	Name
Aitkin County Sheriff's Office	Emergency Management Director/ Sheriff	Scott Turner
Aitkin County Sheriff's Office	Program Coordinator	Karla White
Aitkin County GIS	Coordinator	Dan Haasken
Aitkin County Highway Dept.	County Engineer	John Welle
Aitkin County Planning & Zoning	Environmental Services Director	Terry Neff
Aitkin County Public Health	Public Health Educator	Stacey Durgin
Aitkin County Maintenance	Maintenance Supervisor	Bill Thompson
City of Aitkin	Mayor	Gary Tibbitts
City of Aitkin	Clerk	Kathy Brophy
City of Aitkin Public Utilities	Manager	Dave Cuff
City of Aitkin Street Dept.	Street Commissioner	Bob Nicko
Hill Qty	Mayor	Larry Baker
Hill Qty	Clerk	Diana Gillson
Hill Qty Public Works	Head of Maintenance / Public Works	George Casper
McGrath	Mayor	Cory Eken
McGrath	Clerk	Dawn Clark
McGregor	Mayor	Jerry Farley
McGregor	Clerk	Judy Drilli
McGregor Public Works		Larry Paukert
Palisade	Mayor	Charles Carlson
Palisade	Clerk	Gaylene Spolarich
Tamarack	Mayor	Robert Johnson
Tamarack	Clerk	Stephanie Meld
Tamarack Emergency Planning Team		Ellen Cyrus
Aitkin Fire Department / MN DNR Forestry	Fire Chief / DNR Incident Command Team Leader	Brian Fzarek
Jacobson Fire Department	Chief	Dale Thompson

Organization	Title	Name
Hill Qty Fire Department	Fire Chief	Jeremy Nelson
McGrath Fire Department		Bob Dresser
McGregor Fire Department	Fire Chief	James Carr
Palisade Fire Department	Fire Chief	Bruce Robinson
Aitkin Public Schools ISD1	Superintendent	Bernie Novak
Hill Qty Schools ISD2	Superintendent / Principal	Dean Yocum
McGregor Area Schools ISD4	Superintendent / Elementary Principal	Paul Grams
Rice Lake National Wildlife Refuge	Manager	Walt Ford
Savanna Portage State Park	Park Manager	Sandi Weller
U.S Army Corps of Engineers	Northern Headwaters Section Supervisor	Jeff Steere
East Central Energy	Loss Control / Emergency Preparedness Administrator	Jan Lahtonen
Lake Country Power		
Mille Lacs Energy Cooperative	Operations Manager	Steve Meld
American Red Cross	Disaster Program Manager- Northern Minnesota Region	Tony Guerra
Mille Lacs Band	Emergency Management Coordinator	Monte Fronk
Riverwood Healthcare Center	Emergency Department Manager	Tony Sundholm
Aitkin County Soil and Water Conservation District	District Manager	Steve Hughes

Jurisdictional representatives participating on the steering committee were contacted throughout the plan update process to provide feedback on the hazards of concern to their community and the mitigation actions which they would seek to implement upon plan adoption. The list of final mitigation actions was divided into jurisdiction-specific mitigation action charts so that each could see and address those actions that applied specifically to their cities (see Appendix G: Mitigation Actions by Jurisdiction).

2.2 Review of Existing Plans

Aitkin County and its local communities utilized a variety of planning documents to direct identification of mitigation strategies and local preparedness. Section 4.4 details the review of plans and programs in place as related to each natural hazard facing Aitkin County; in addition, program gaps and deficiencies were reviewed and documented. This review of information was used to inform the identification of hazards, mitigation strategies and actions. Table 2 highlights additional planning documents that were used in this plan.

Table 2. Planning Documents used for MHMP Planning Process

Author(s)	Year	Title	Description	Where Used
Aitkin County	2009	Aitkin County Comprehensive Local Water Management Plan	Aitkin County Comprehensive Local Water Management Plan update.	Sections 3, 5.1.1
Aitkin County	2013	Threat and Hazard Identification Risk Analysis (THIRA)	Guide for reviewing the identification and ranking of hazards which face Aitkin County.	Section 4
Minnesota Division of Homeland Security and Emergency Management	2014	Minnesota All-Hazard Mitigation Plan Update	Statewide hazard mitigation plan.	Section 5.2

This plan draws on a variety of guidance documents and data sources including the State of Minnesota and Homeland Security Emergency Management Critical Infrastructure Strategy for the State of Minnesota (2010), FEMA's Local Mitigation Planning How-to Guide Integrating Manmade Hazards into Mitigation Planning (2003), and the State of Minnesota Multi Hazards Identification Risk Assessment.

2.3 Planning Process Timeline and Steps

In order to update the 2005 Aitkin County Hazard Mitigation Plan, UMD consultants worked in coordination with the Aitkin County Emergency Management Director, State of Minnesota Hazard Mitigation officials, ARDC and members of the steering committee. The goals of the updating process were to include more recent data documenting the critical infrastructure and hazards faced by Aitkin County, reformat and reorganize the plan to reflect definitions of hazards as expressed in the 2008 State of Minnesota Multi-Hazard Identification and Risk Assessment Plan, and reflect current hazard mitigation priorities in Aitkin County. Therefore, the new plan includes not only new data documenting the types of hazards faced by county residents and emergency planning officials, but also new thinking about how to best address these hazards.

This is a multi-jurisdictional plan that covers Aitkin County, its school jurisdictions, and the cities of Aitkin, McGrath, Hill City, Palisade, Tamarack, and McGregor. The Aitkin County risks and mitigation activities identified in this plan also incorporate the concerns and needs of townships and other entities participating in this plan.

Two in-person meetings took place with the Aitkin County Steering Committee. The first meeting was held on September 24, 2013 at the McGregor Community Center in McGregor and served as an introductory kick-off to the plan update. The steering committee was provided with an overview of the purpose, process and timeline for the Aitkin County Multi-Hazard Mitigation Plan update, as well as the role and responsibilities of steering committee members. The second meeting was held on March 20, 2014 at same location. During this meeting the steering committee was provided with an overview of the draft plan's progress, and they discussed the hazards facing Aitkin County and the development of

new mitigation actions to include in the plan. Appendix E provides documentation of steering committee meeting summaries, including participant sign-in sheets and presentation slides.

Between the first and second meetings, steering committee members were also engaged in providing feedback on plans and programs in place or program gaps or deficiencies as they relate to hazards facing the county. This information was used to inform the development of mitigation strategies in the updated plan.

Hazards addressed in the plan were prioritized according to the Calculated Priority Risk Index (CPRI) used in the 2013 THIRA, and additional discussion to rank natural hazards in high, moderate and low risk categories. New hazard mitigation actions were discussed for inclusion in the plan. For more information about hazard identification, see sections 4.1.1-4.1.3, and for the mitigation action planning process see sections 5 and 6.

Public input was sought through meetings and direct conversations (see Appendix F: Public Meeting Notices and Meeting Notes). Two public comment meetings were held in Aitkin County, described in Table 3. These meetings were facilitated by UMD consultants and ARDC, and attended by the Aitkin County Emergency Management Director (See Appendix F). Meetings were publicized using a news release sent to the Brainerd Dispatch, KKN radio, the News Hopper and the Bargain Hunter; and distribution of an informational meeting flyer to the jurisdictions participating in the MHMP for electronic distribution or posting at key locations within their communities. The flyer was also posted on the Aitkin County Sheriff's Office Facebook page and on the Aitkin County website. A project website (<http://www.arrowheadplanning.org/default.asp?PageID=1111>) was provided for the public to access draft documents for review and comment. At these meetings members of the public learned about the hazard mitigation process, received an update on the pace of updating the 2005 plan, and discussed new mitigation actions that could be added to the 2014 plan. Meeting attendees were provided with an evaluation and comment form to turn in after the meeting. The draft plan was revised to include public feedback on mitigation actions following these meetings.

Table 3. Aitkin County Hazard Mitigation Update Meetings

Meeting Type	Date	Location
Steering Committee	9/24/2013	McGregor Community Center
Steering Committee	3/20/2014	McGregor Community Center
Public Meeting	6/17/2014, 3:00 pm	Palisade Community Center
Public Meeting	6/17/2014, 6:30 pm	Aitkin County Sheriff's Office

At the close of these meetings, UMD and ARDC consultants worked with the Aitkin County Emergency Management Director and members of the steering committee to incorporate comments from the public hearings into the overall hazard mitigation plan.

SECTION 3 – AITKIN COUNTY PROFILE

This section offers a general overview of Aitkin County to provide a basic understanding of the characteristics of the community, such as the physical environment, population, and the location and distribution of services.

3.1 General County Description

Aitkin County is located in north-central Minnesota, approximately 100 miles north of the Minneapolis/ St. Paul metropolitan area and 60 miles west of the Duluth/ Superior region. According to 2010 U.S. Census data, the county covers 1,995 square miles (1,276,800 acres) and the county's estimated population in 2010 was 16,202. Aitkin is the county seat and the largest city in the county. Part of the Mille Lacs Indian Reservation is also located in the county.

The 6 cities in Aitkin County are Aitkin (2,165), McGrath (80), Hill City (633), Palisade (167), Tamarack (94), and McGregor (391). The County has 55 full or fractional townships, with 41 being organized and 14 unorganized. Between 2000 and 2010 the county saw a population growth of 6%.

Aitkin County is richly endowed with lakes, rivers, and streams. Much of the northern part of the county is state forest land, in addition to Savanna Portage State Park, home to the historic Savanna Portage, and Grayling State Wildlife Management Area (WMA). The Mille Lacs lake in the southwestern corner of the county is one of the largest lakes in Minnesota, covering over 128,000 acres. State and local government, construction, and services are the largest industries within Aitkin County. The County is connected to the extensive state highway system and the county has three general aviation airports, one in Aitkin (Aitkin Municipal Airport-Steve Kurtz Field), one in McGregor (Isædor Iverson Field), and one in Hill City (Hill City-Quadna Mountain Airport).

3.2 Environmental Characteristics

Aitkin County has a variety of surface landforms that are the result of past glacial activities. The glacial lakes of Upham and Aitkin, which once covered most of the area, influence the topography of the Mississippi River corridor. The landscape is flat and the streams meander through glacial material. The shrub swamp is a distinctive vegetative community with speckled alder, willows, bog birch, and pussy willow shrubs growing 10 to 15 feet tall. Ferns, tall asters, sedges, and wildflowers grow beneath these dense thickets. Agriculture has been a significant land use in the past and many parcels are held in large acreage.

The topography of Aitkin County is the result of glacial activity that occurred over 10,000 years ago. The county has land varying from flat to hilly. This varied topography is due to glacial deposition that formed moraines and left outwash sediments. At one time, there were large lakes covering portions of the county. This glacial activity is important to recognize because it created the landscape, soil types, and watersheds, and therefore affects the county's development patterns.

Aitkin County has a wide variety of soil types, all of which are acidic. Most of them have reddish brown subsoil and a foundation from glacial drift. Approximately 48% of the county consists of nearly level soils. Organic soils make up 50% of these soils, or encompass about 25% of the county.

Most of the terrain in Aitkin County is used for woodland recreation and wildlife habitat. Not much of the soil is used for farming due to short, cool growing seasons that limit the types of crops suitable for the area.

3.3 Hydrography

Water resources within Aitkin County are important to the community because they provide recreational and aesthetic value, as well as enhanced economic opportunity. Important water resources include surface and ground water from aquifers, watersheds, lakes, rivers, and wetlands, providing water for riparian habitats, fish, wildlife, households, livestock, recreation, and aesthetic and industrial uses. Aquifers are supplemented by an average precipitation of 28 inches annually in Aitkin County and flows into three major drainage basins, which are the Great Lakes Basin, the Upper Mississippi River Basin, and the St. Croix River Basin. The county contains 6 major watersheds, including the Mississippi River – Headwaters, St. Louis River, Mississippi River – Brainerd, Rum River, Kettle River, and Shake River watersheds.

The Mississippi River, flowing south into Aitkin County, enters a flat and forested plain, which makes up the bed of glacial Lake Aitkin. The river is deep, slow and sinuous in this stretch, with many oxbows forming islands surrounded by slack water.

3.3.1 Groundwater

The primary water sources within Aitkin County are from sand plain shallow aquifers. Approximately half of the wells in Aitkin County use sand and gravel aquifers found at depths less than 100 feet, generally situated in the sand plain area. Approximately one-quarter of the wells are in sand and gravel aquifers at depths greater than 100 feet. The remaining wells draw water from bedrock aquifers.

The location and the character of the Onanegozie's Sand Plain Aquifers have the greatest effect on water resources in the County.

3.3.2 Lakes

According to the Minnesota DNR, there are 443 lakes over 2 acres in size in the county, the largest of which is Mille Lacs, (64,895 of its 128,223 acres are in Aitkin County). These lakes cover 112,664 of the county's 1,276,800 acres (8.8%).

Impaired waters are an increasing problem as Aitkin County has many lakes, creeks and rivers that are on the Minnesota Pollution Control Agency Impaired Waters lists, including the Mississippi and Moose Rivers, Mille Lacs, Big Sandy Lake, and Minnewawa Lake (Minnesota Pollution Control Agency). Impaired waters have become a priority issue because they do not meet state water quality standards, they affect growth and health of communities and economies, and the Clean Water Act has a mandate requiring every state to address impairments.

Residents of Aitkin County rely heavily on the quality of water resources in the form of lakes, rivers, wetlands, and other water resources, both for the tourism industry and quality of life. Surface water has become especially important due to the increase in development on those water resources. The county also has an unknown number of abandoned and improperly sealed wells. The effects of abandoned wells could be substantial in terms of the contamination of water resources.

3.3.3 Rivers

Rivers and streams in Aitkin County combine to create a broad spectrum of recreational opportunities, natural habitats, and scenic views. The abundance of lakes and rivers in the county is a benefit from repeated glaciations. Melting ice created great rivers that carved valleys now occupied by smaller streams. The present-day drainage of surface water in Aitkin County is accomplished by several rivers (notably the Mississippi, Snake, Willow, Rice, Sandy, Swan, and Prairie Rivers) and many smaller creeks, brooks and ditches (Aitkin County).

The Upper Mississippi River Drainage includes nearly two-thirds of Aitkin County. Its major tributaries are the Sandy, Willow, Rice and Prairie Rivers. Floods are unusual in areas of swamp and interrupted drainage patterns, but the low areas of the county, especially near Aitkin, have experienced periodic flooding of up to 30,000 acres. In 1951, a Federal Flood Control Project made possible the construction of a 6-mile bypass channel to divert high waters around the city of Aitkin. This project was completed in 1957. A dike, 7,500 feet long, was constructed in 1969 around the northern part of the city of Aitkin. Since the completion of the bypass channel and the dike, flood frequency and severity in and near the city of Aitkin have been greatly reduced (Aitkin County). This dike is an unmaintained structure that does not meet current standards. Its reliability during periods of flooding is unknown.

3.3.4 Wetlands

Wetlands mapped by the National Wetlands Inventory cover 545,063 acres (851 square miles) in Aitkin County. Wetlands are one of the most efficient natural water filters, as wetland plants and soils clean the water before it goes into groundwater or rivers. After being slowed by a wetland, water moves around plants allowing suspended sediments to drop out and settle on the wetland floor. Plant roots and microorganisms in the soil often absorb nutrients from fertilizer application, manure, leaking septic systems, and municipal sewage. Wetlands also serve as a storage area for excess water during times of flooding.

Wetlands in Aitkin County consist of 6 types, including wet meadow, shallow marsh, deep marsh, shrub swamp, wooded swamp and bogs.

Exotic plants such as Eurasian watermilfoil and purple loosestrife have invaded many wetlands in Minnesota. The Minnesota DNR has documented both of these invasive species within Aitkin County. These plants can take over entire native communities and can threaten native wetland ecosystems.

3.4 Climate

The climate of Aitkin County is classified as a continental climate regime characterized by wide variations in temperature. Temperatures can range from 100° F in the summer to -47° F in the winter.

The western portion of Aitkin County averages 28 inches of precipitation annually, while the eastern portion averages 30 inches annually. The median seasonal snowfall is 45 inches in the western portion of the county and 50 inches in the eastern portion. Aitkin County averages approximately 115 days each year with snow cover, or about 31.5% of the year. The average date of the last frost in the spring in Aitkin County is May 19 with the first fall frost occurring on September 23.

3.5 Demographics

Aitkin is the largest city in Aitkin County and the designated county seat. Within the county there are 6 cities and 55 full or fractional townships, with 41 being organized and 14 unorganized. Part of Districts II and Ila of the Mille Lacs Indian Reservation are also located within the county. The reservation's total population in 2010 was 4,907. According to the 2012 Mille Lacs Reservation All-Hazard Mitigation Plan, the combined population of districts II and Ila was 325. Table 4 summarizes population by community according to the 2010 U.S. Census.

Figure 1 shows Aitkin County population density by census block.

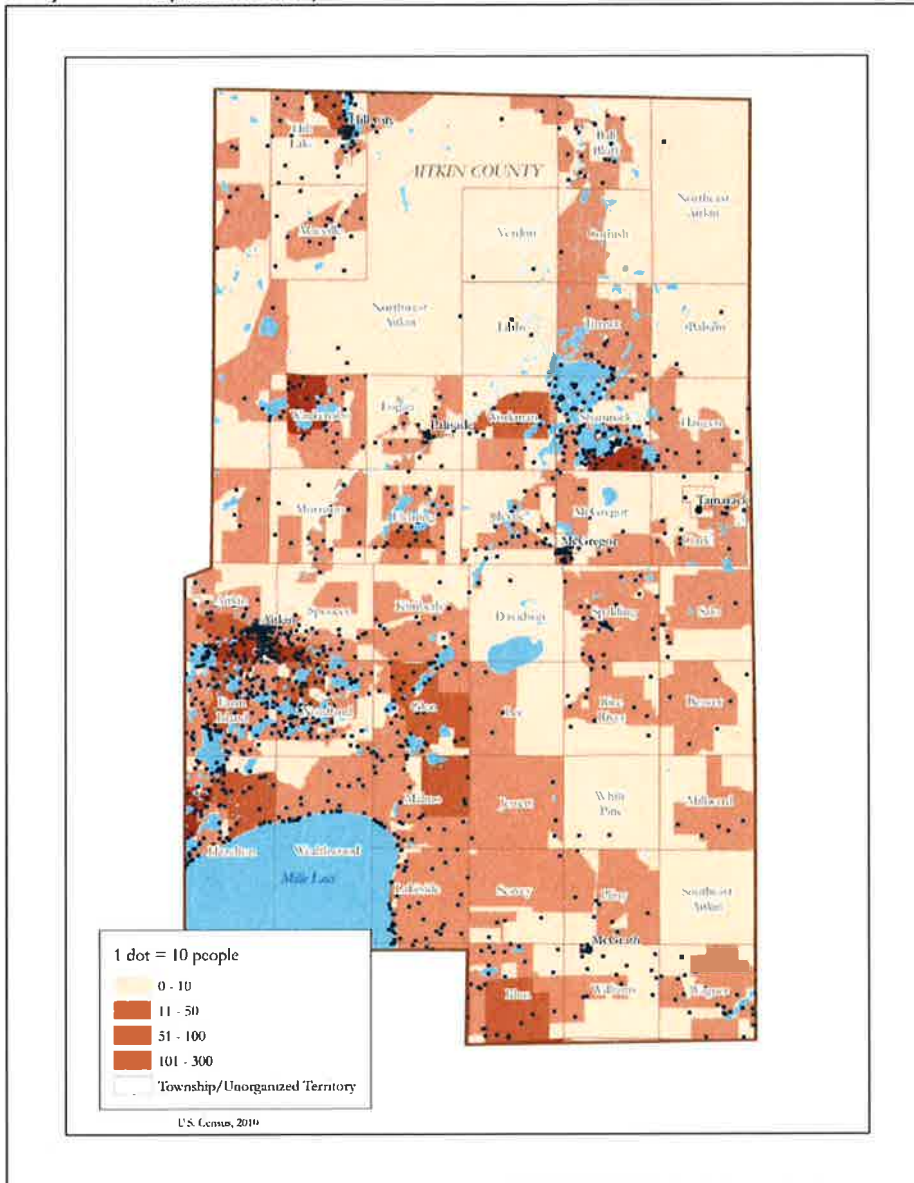
Table 4. Aitkin County Population by Community

Community	2010 Population	% of County
Aitkin	2,165	13.4%
Hill Cty	633	4.0%
McGrath	80	0.5%
McGregor	391	2.4%
Palisade	167	1.0%
Tamarack	94	0.6%
Aitkin Township	856	5.3%
Ball Bluff Township	278	1.7%
Balsam Township	42	0.3%
Beaver Township	53	0.3%
Clark Township	169	1.0%
Cornish Township	28	0.2%
Davidson Unorganized Territory	42	0.3%
Farm Island Township	1,099	6.8%
Fleming Township	312	1.9%
Gen Township	450	2.8%
Haugen Township	178	1.1%
Hazelton Township	844	5.2%
Hill Lake Township	430	2.7%
Idun Township	259	1.6%
Jevne Township	322	2.0%
Jewett Unorganized Territory	47	0.3%
Kimberly Township	195	1.2%
Lakeside Township	463	2.9%

Community	2010 Population	% of County
Lee Township	50	0.3%
Libby Township	45	0.3%
Logan Township	184	1.1%
McGregor Township	105	0.6%
Macville Township	206	1.3%
Malmö Township	337	2.0%
Millward Township	72	0.4%
Morrison Township	200	1.2%
Nordland Township	972	6.0%
Northeast Aitkin Unorganized Territory (Includes contiguous unorganized townships in the northeast part of Aitkin County)	11	0.1%
Northwest Aitkin Unorganized Territory (Includes contiguous unorganized townships in the northwest part of Aitkin County)	342	2.1%
Piny Township	109	0.7%
Rice River Township	136	0.8%
Salo Township	102	0.6%
Seavey Township	61	0.4%
Shamrock Township	1,272	7.9%
Spalding Township	329	2.0%
Spencer Township	518	3.2%
Turner Township	208	1.3%
Verdon Township	45	0.3%
Wagner Township	332	2.0%
Waukenabo Township	316	2.0%
Wealthwood Township	268	1.7%
White Pine Township	34	0.2%
Williams Township	144	0.9%
Workman Township	207	1.3%
Total:	16,202	

Source: U.S. Census, 2013

Figure 1. Aitkin County Population, 2010 (Note dots are randomly distributed within census blocks to reflect density and do not represent residences)



Population growth trends have an important influence on the needs and demands of a variety of services such as transportation, law enforcement, and emergency response. An understanding of population trends and location of population concentrations is important for making projections regarding potential impacts in the event of a disaster.

In 2010, Aitkin County had a population of 16,202 residents, averaging 9 persons per square mile. Aitkin, the largest city in the county and the county seat, had a population of 2,165.

Aitkin County's population increased 23% between 1990 and 2000, and then grew only 5% from 2000 to 2010. The county's population has fluctuated substantially during the past 70 years, decreasing 36% between 1940 and 1970. While the population has slowly been increasing again, 2010 levels remain below those of 1940. Table 5 below shows the population change in Aitkin County between 1940 and 2010.

Table 5. Aitkin County Population Change (1940-2010)

1940	1950	1960	1970	1980	1990	2000	2010	Change 1940-2010	Change 2000-2010
17,865	14,327	12,162	11,403	13,404	12,425	15,301	16,202	-9%	+6%

Source: U.S. Census Bureau, 2013

Aitkin County's population is projected to decline by 14% between 2015 and 2045. Table 6 below shows population projections for Aitkin County until 2045.

Table 6. Aitkin County Population Projections (2015-2045)

2015	2020	2025	2030	2035	2040	2045	Projected Change 2015-2045
17,460	17,488	17,086	16,477	15,809	15,327	15,076	-14%

Source: Minnesota State Demographic Center, 2014

3.6 Economy

In 2012 Aitkin County was dominated by the Education and Health Services industry, with 28% of jobs in the county, and Trade, Transportation & Utilities, with another 26% of jobs. The third largest industry in the county is Leisure and Hospitality, with 14%. Major industrial companies in Aitkin County include Aitkin Iron Works and FLOE International. Other major employers are the county, public schools, and health care centers (Aitkin County Housing Authority).

According to the Minnesota Department of Employment and Economic Development, the number of jobs in the county rose by 2.5% between 2000 and 2012. Table 7 provides an overview of the annual average employment by major industry sector in Aitkin County.

Table 7. Annual Average Employment by Major Industry Sector, Aitkin County

Industry	Number of Jobs/ Percent of Total (2000)	Number of Jobs/ Percent of Total (2012)
Construction	N/A	159/4%
Manufacturing	532/15%	260/7%
Trade, Transportation, Utilities	896/25%	952/26%
Information	62/2%	62/2%
Financial Activities	112/3%	116/3%
Professional and Business Services	165/5%	112/3%
Education and Health Services	836/24%	1,030/28%
Leisure and Hospitality	450/13%	510/14%
Public Administration	355/10%	298/8%
Other Services	125/4%	122/3%
Total Number of Jobs:	3,533	3,621

Source: Minnesota Dept. of Employment and Economic Development

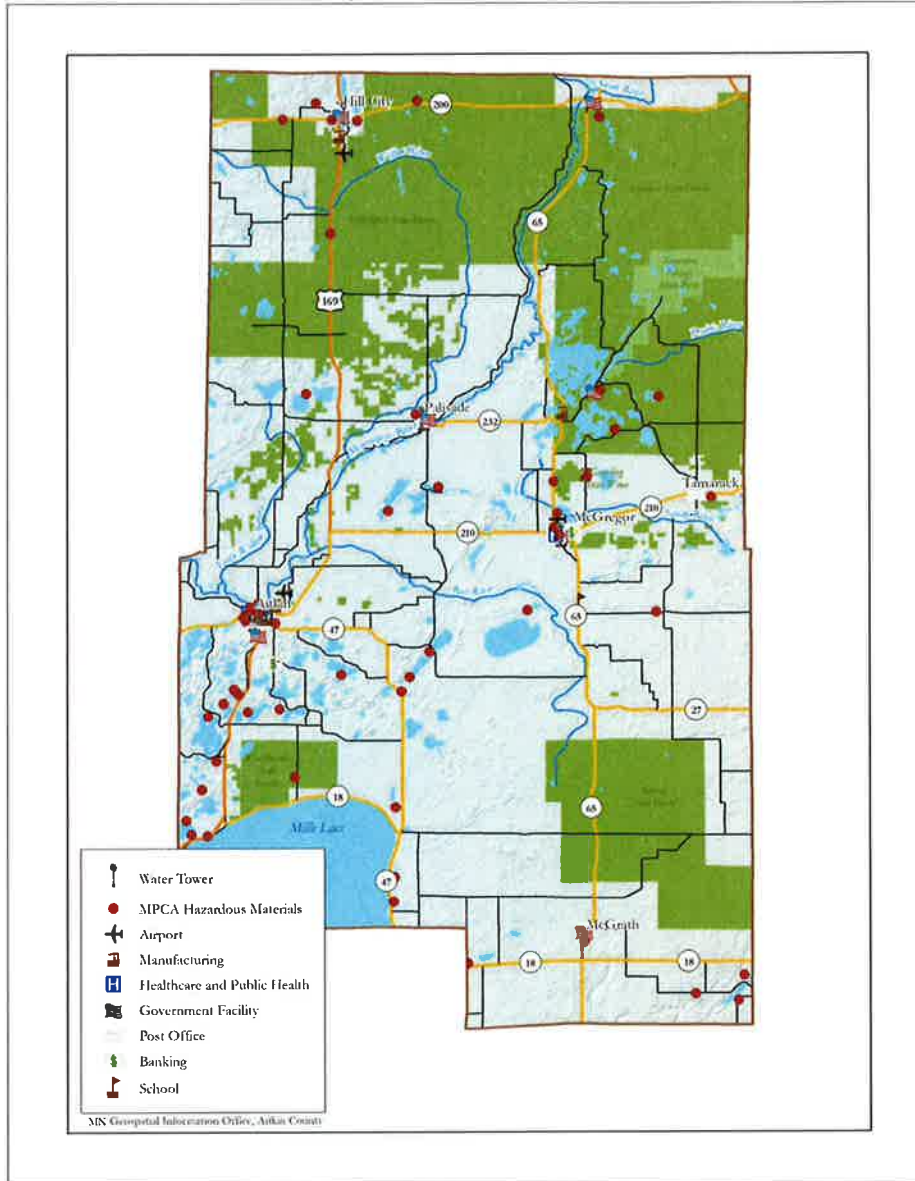
The 2011 median household income was \$41,301 in the county, compared to a Minnesota average of \$56,954. The median household income in Aitkin County increased over 32% from 2000 to 2011. The percent of the county's population living below the poverty level in 2011 was 12.2%, compared to 11.9% for the state of Minnesota.

The Minnesota Department of Employment and Economic Development reported that 78% of the workforce in Aitkin County was employed in the private sector in 2012.

3.7 Aitkin County Community Services & Infrastructure

The following section provides an overview on community services and infrastructure within Aitkin County. Examples of community services include healthcare and public safety, while examples of community infrastructure include power utilities, water and sewer facilities, and the transportation network. Figure 2 below shows critical facilities in the county, and a table of all critical facilities can be found in Appendix B.

Figure 2. Critical Facilities in Atkin County



3.7.1 Health Care Providers

There is only one hospital located in Aitkin County. The Riverwood Healthcare Center is a 24-bed critical access hospital with primary care clinics in Aitkin, McGregor and Garrison.

Ambulance services are available in the cities of Aitkin and McGregor. If needed, other ambulances come from outside of the county.

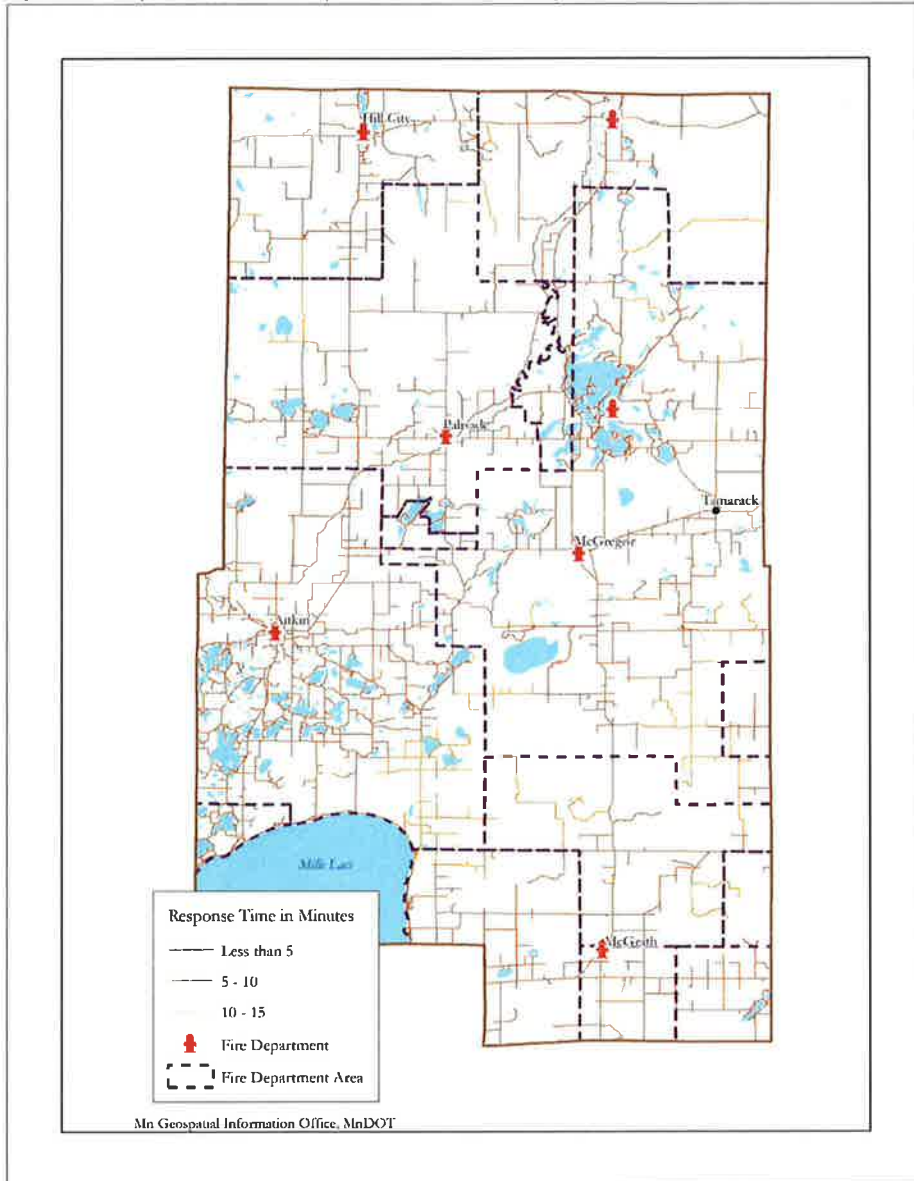
Figure A – 16 in Appendix A depicts health services within Aitkin County.

3.7.2 Public Safety Providers/ Government Services

The Aitkin County Sheriff's Department in the city of Aitkin provides services to the entire county. The sheriff is the chief law enforcement officer in the county. The following cities in Aitkin County have police departments: Aitkin, McGregor, and Hill City. Figure A – 4 in Appendix A depicts government and emergency facilities, which includes city halls, fire departments, police departments, sheriff's department, and the Aitkin County Courthouse.

Figure 3 shows fire departments and fire response times in Aitkin County. These drive times were created using ArcGIS Network Analyst and MnDOT road data. Speed limits from the MnDOT highway speed limit database were used when available; all other roads were calculated using either 35 or 55 MPH speed limits, per MnDOT's recommendation. According to this model, all areas of the county are within 15 minutes of a fire department, and nearly all areas are within 10 minutes of a fire department. Only 2 short road segments southwest of Hill City are in the 10-15 minute range.

Figure 3. Fire Departments and Fire Response Times in Aitkin County



3.7.3 Utilities/ Communications

There are 4 electrical power companies located within Aitkin County: Mille Lacs Energy Cooperative, Lake Country Power, and East Central Energy, and Aitkin Public Utilities. Figure A – 5 in Appendix A depicts Aitkin County utilities including power substations, electric transmission lines, and FM/AM radio towers.

There are several propane companies serving Aitkin County: Lakes Gas, Amerigas, Cap Propane Plus, CAP-TRICO, Federated Co-op, Federated Propane, Isle Co-op Oil, Northwest Gas, and Suburban Propane.

Fuel oil companies serving the county include: CAP-TRICO, Cummings Oil, Finlayson Co-op, Isle Co-op, Norbon Oil, Palisade Co-op Oil, Sturgeon Lake Oil, and West Range Oil.

Established in 2004, the Allied Radio Matrix for Emergency Response (ARMER) Program, administered in coordination with the Minnesota Statewide Radio Board, manages the implementation of a 700/800 megahertz (MHz) shared digital trunked radio communication system. In Aitkin County, there are 7 ARMER towers. Figure A – 6 shows the ARMER tower locations.

There are 3 types of wastewater treatment systems in Aitkin County, including public sewer systems operated by municipalities and sanitary districts, community systems operated by homeowner associations, and individual sewage treatment systems.

Water service in Aitkin County is provided by municipalities, water districts, private water associations, and individual wells.

3.7.4 Transportation

The county transportation system is composed of roads, highways, airports, public transit, railroads and trails, designed to serve all residents, businesses, industries and tourists.

Eight highways administered by the Minnesota Department of Transportation (Mn/DOT) serve Aitkin County. These highways include U.S. Highways and State Trunk Highways, which are the most heavily used in the county. In total, there are 3,462 miles of roadway in Aitkin County.

There are 41 bridges on county, township and city roads. All county bridges are the responsibility of the County Engineer at the Aitkin County Highway Department. The bridges are inspected on a rotating basis depending upon the type of structure.

There is one main railroad company operating within Aitkin County. This is the Burlington Northern-Santa Fe (BNSF) Railroad. The largest volumes of goods transported on this railroad are raw materials such as coal to be shipped via the Duluth/Superior Port. The BNSF railroad company is a nationally operated railroad company that serves a variety of industrial and commercial customers. BSNF operates two main lines in northeast Minnesota, including the 39.31 miles of track in Aitkin County.

Three airports in the county provide air service. The Aitkin Municipal Airport (Steve Kurtz Field) is a public-use airport 2 miles northeast of the city of Aitkin, with Aitkin County having two-thirds ownership

and the City of Aitkin one-third ownership. Situated at an elevation of 1,206 feet, the airport has 2 runways: one asphalt (4,018' long) and one turf (3,335' long). The McGregor Isedor Iverson Airport is owned by the city of McGregor, located at an elevation of 1,228 feet, just north of town. One asphalt runway is extant (3,400' long). The Hill City-Quadna Mountain Airport lies south of Hill City at an elevation of 1,289 feet. Owned by the city, the airport has one turf runway (2,850').

Arrowhead Transit provides the major public transit services in Aitkin County. It is a rural public transit system providing coordinated public transit service to the residents within the eight-county arrowhead region of northeastern Minnesota. The Arrowhead Economic Opportunity Agency (AEOA), a private non-profit agency, operates the transit system. The transit system provides scheduled, dial-a-ride, and rural rides.

3.8 Land Use and Ownership

Aitkin County has a total of 1,276,800 acres, of which 111,123 (9%) are covered by water. According to the Aitkin County Environmental Services Director there are 727,500 acres of wetlands in Aitkin County.

The 2012 U.S. Census of Agriculture reports that 471 farms exist in the county, covering 122,591 acres. Of this farming land, 50% is cropland, 26% is woodland, 14% is pasture, and 9% is classified as "other uses." The number of farms in the county decreased by 12% between 2007 and 2012, while the acres farmed decreased by 8% (Census of Agriculture, 2012).

Land ownership categories from the 2008 GAP analysis are shown in Figure A – 9 (Appendix A). Land cover is also mapped in Figure A – 8.

3.9 Recreation Areas/ Facilities

Aitkin County is home to Savanna Portage State Park, home to the historic Savanna Portage which connects the Mississippi River and Lake Superior watersheds. The park is over 15,000 acres in area, and has 61 campsites, 7 backpack sites, 2 cabins, 1 group camp, a beach and picnic shelter and 4 fishing lakes.

On the northwestern edge of Big Sandy Lake is the Sandy Lake Recreation Area, north of McGregor. An Army Corps campground is located there.

There are many campground facilities throughout the county, including the county campgrounds of Aitkin Campground, Berglund Campground, Jacobson Campground, and the Snake River Campground; and two private campgrounds on Big Sandy Lake: Eagle Point and Fisherman's Bay. In addition, there are numerous resorts around Big Sandy Lake and Lake Minnewawa including Eagle Point, Big Sandy Lodge, Aitkin Lake and Hillcrest.

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SECTION 4 – RISK ASSESSMENT

The goal of mitigation is to reduce the future impacts of a hazard including loss of life, property damage, disruption to local and regional economies, and the expenditure of public and private funds for recovery. Sound mitigation practices must be based on sound risk assessment. A risk assessment involves quantifying the potential loss resulting from a disaster by assessing the vulnerability of buildings, infrastructure, and people.

Basing risk assessments on the best information available is important in developing effective mitigation actions that benefit communities. Geographic Information System (GIS) tools are not only helpful in producing maps, but they also show structures at risk and may determine damage estimates for potential hazard scenarios. MN Homeland Security and Emergency Management (HSEM) mitigation staff encourages the use of GIS tools in risk assessments because they produce good information to be used in the risk assessment process. In recognition of the importance of planning in mitigation activities, FEMA created Hazards USA Multi-Hazard (HazuS-MH), a powerful GIS-based disaster risk assessment tool. This tool enables communities to predict estimated losses from floods, hurricanes and other related phenomena and to measure the impact of various mitigation practices that might help reduce those losses. HazuS-MH was used by UMD Geospatial Analysis Center (GAC) staff in the hazard risk assessment wherever applicable.

This assessment identifies the characteristics and potential consequences of a disaster, how much of the community could be affected by a disaster, and the impact on community assets. A risk assessment consists of three components—hazard identification, risk profile, and vulnerability profile. The last step is the risk ranking for each jurisdiction.

4.1 Hazard Identification/ Profile

4.1.1 Hazard Identification

The cornerstone of the risk assessment is identification of hazards that affect jurisdictions. To facilitate the planning process, several sources were employed to ensure that natural hazards are identified prior to assessment.

The county maintenance of the plan includes continual updates of the hazards identified in the initial plan. The steering committee decided to compare the hazards in the initial plan to current publications to determine if new hazards should be considered or if some should be deleted.

Natural hazards are identified in the FEMA publication "Multi-Hazard Identification and Risk Assessment – A Cornerstone of the National Mitigation Strategy" also known as MHIRA. FEMA Region V developed a list based on state mitigation plans in the region. The list was divided into natural (Table 8) and other hazards (Table 9) as was done in the 2014 Minnesota State Hazard Mitigation Plan.

Table 8. FEMA MHIRA Natural Hazards in the 2014 Minnesota State Hazard Mitigation Plan

Flooding	Hail	Drought
Dam/Levee Failure	Lightning	Extreme Heat
Wildfire*	Winter Storms	Extreme Cold
Windstorms	Erosion	Earthquakes
Tornadoes	Land Subsidence (Sinkholes & Karst)	

* Addressed in the State Mitigation Plan because Minnesota is a heavily forested state compared to other states in Region V.

For the purpose of this plan, FEMA defines other hazards or human-induced as technological hazards and terrorism. These are distinct from natural hazards primarily in that they originate from human activity. In contrast, while the risks presented by natural hazards may be increased or decreased as a result of human activity, they are not inherently human-induced. The term "technological hazards" refers to the origins of incidents that can arise from human activities such as the manufacture, transportation, storage, and use of hazardous materials. For the sake of simplicity, this guide assumes that technological emergencies are accidental and that their consequences are unintended. The term "terrorism" refers to intentional, criminal, and malicious acts. There is no single, universally accepted definition of terrorism, and it can be interpreted in many ways. For the purposes of this plan, FEMA refers to "terrorism" as the use of Weapons of Mass Destruction (WMD), including biological, chemical, nuclear, and radiological weapons; arson, incendiary, explosive, and armed attacks; industrial sabotage and intentional hazardous materials releases; and "cyber terrorism."

Table 9. FEMA MHIRA Other Hazards in the 2014 Minnesota State Hazard Mitigation Plan

Terrorism	Nuclear Generating Plant Incidents	Ground and Surface Water Supply Contamination*
Infectious Disease Outbreak	Hazardous Materials Incidents	
Fires (Structures and Vehicles)	Transportation Incidents	

* Addressed in the State Hazard Mitigation Plan because Minnesota has made a high investment in its prized resource, water.

4.1.2 Vulnerability Assessment by Jurisdiction

The steering committee met multiple times to review and update the hazards faced by residents of Aitkin County, update the existing mitigation actions published in the 2005 Hazard Mitigation Plan, and propose new mitigation actions.

To engage in this process the committee drew on a number of data sources. First, the committee examined the hazards identified in the 2005 Aitkin County Hazard Mitigation Plan (Table 10). These hazards were discussed and adjusted to reflect the definitions of natural hazards used in the State of Minnesota 2014 Multi-Hazard Identification and Risk Assessment list of natural hazards (Table 8). This was done in order to assure that the risks faced by Aitkin County were categorized the same way as the priority hazards established by the State of Minnesota.

Table 10. Hazards identified in the 2005 Aitkin County Multi-Hazard Mitigation Plan

Natural Hazards	Man-made Hazards
Violent Winter Storms	Fire
Violent Summer Storms	Hazardous Materials
Extreme Temperatures	Water Supply Contamination
Flooding	Wastewater Treatment System Failure
Drought	Dam Failure
Wildfire	Terrorism
Infectious Diseases	
Solar Storms	

While the MHMP mainly deals with natural hazards, this planning took place with the understanding that many non-natural hazards could occur as a result of natural disasters (i.e. disruption in electrical service due to freezing rain causing problems for both utility corporations and vulnerable populations dependent on electricity for heat).

Based on the committee's comparison of these two sets of hazards, the committee developed a list of hazards faced by Aitkin County to address in the 2014 plan update (Table 11). The steering committee decided that this plan will focus solely on natural hazards because there are other county plans in place which serve as the primary planning documents to address non-natural hazards. The County's Emergency Operations Plan addresses all hazards, and fire departments and Aitkin County Public Health respond to non-natural hazards with more specific plans. Dam failure is not addressed in this plan because the steering committee feels it is well-addressed in dam operator Emergency Operations Plans.

Table 11. Hazards Faced by Aitkin County using definitions from FEMA MHIRA

Natural Hazards		
Severe Winter Storms	Tornadoes	Drought
Thunderstorms	Extreme Cold	Flash Flood
Lightning	Extreme Heat	Riverine Flood
Hailstorms	Windstorms	Wildfire

* In this plan, Thunderstorms, Lightning, Hailstorms, Windstorms and Tornadoes are grouped under "Severe Summer Storms"; and Flash Flood and Riverine Flood are grouped together.

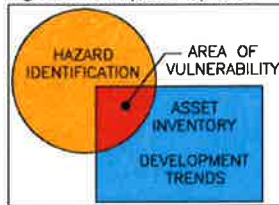
The natural hazards addressed in the 2012 Mille Lacs Reservation All-Hazard Mitigation Plan include wildfire, flooding, violent storms, extreme temperatures, drought, dam failure, earthquakes, sinkholes and land subsidence, landslides, and solar storms and flares.

The committee drew on the natural hazards as ranked in the 2013 Aitkin County Threat and Hazard Identification Risk Assessment (THIRA) to prioritize each of the natural hazards for inclusion in the plan. The THIRA ranked hazards are based on a Calculated Priority Risk Index, or CPRI. The methodology of the CPRI is outlined below.

4.1.3 Calculated Priority Risk Index

The vulnerability assessment builds upon the previously developed hazard information by identifying the community assets and development trends and intersecting them with the hazard profiles to assess the potential amount of damage that could be caused by each hazard event. This concept is generally illustrated in Figure 4. A summary of Calculated Priority Risk Index (CPRI) Categories and Risk Levels is shown in Table 12.

Figure 4. Conceptual Depiction of a Vulnerability Analysis



Definitions of CPRI Categories in Table 12

Probability – a guide to predict how often a random event will occur. Annual probabilities are expressed between 0.001 or less (low) up to 1 (high). An annual probability of 1 predicts that a natural hazard will occur at least once per year.

Magnitude/Severity – indicates the impact to a community through potential fatalities, injuries, property losses, and/or losses of services. The vulnerability assessment gives information that is helpful in making this determination for each community.

Warning Time – plays a factor in the ability to prepare for a potential disaster and to warn the public. The assumption is that more warning time allows for more emergency preparations and public information.

Duration – relates to the span of time local, state, and/or federal assistance will be necessary to prepare, respond, and recover from a potential disaster event.

Table 12. Summary of Calculated Priority Risk Index (CPRI) Categories and Risk Levels

CPRI Category	DEGREE OF RISK			Assigned Weighting Factor
	Level ID	Description	Index Value	
Probability	Unlikely	Extremely rare with no documented history of occurrences or events. Annual probability of less than 0.001	1	45%
	Possible	Rare occurrences with at least one documented or anecdotal historic event. Annual probability that is between 0.01 and 0.001.	2	
	Likely	Occasional occurrences with at least two or more documented historic events. Annual probability that is between 0.1 and 0.01.	3	
	Highly Likely	Frequent events with a well-documented history of occurrence. Annual probability that is greater than 0.1.	4	
Magnitude/Severity	Negligible	Negligible property damages (less than 5% of critical and non-critical facilities and infrastructure). Injuries or illnesses are treatable with first aid and there are no deaths. Negligible quality of life lost. Shutdown of critical facilities for less than 24 hours.	1	30%
	Limited	Slight property damages (greater than 5% and less than 25% of critical and non-critical facilities and infrastructure). Injuries or illnesses do not result in permanent disability and there are no deaths. Moderate quality of life lost. Shut down of critical facilities for more than 1 day and less than 1 week.	2	
	Critical	Moderate property damages (greater than 25% and less than 50% of critical and non-critical facilities and infrastructure). Injuries or illnesses result in permanent disability and at least one death. Shut down of critical facilities for more than 1 week and less than 1 month.	3	
	Catastrophic	Severe property damages (greater than 50% of critical and non-critical facilities and infrastructure). Injuries or illnesses result in permanent disability and multiple deaths. Shut down of critical facilities for more than 1 month.	4	
Warning Time	Less than 6 hours	Self-explanatory.	4	15%
	6 to 12 hours	Self-explanatory.	3	
	12 to 24 hours	Self-explanatory.	2	
	More than 24 hours	Self-explanatory.	1	
Duration	Less than 6 hours	Self-explanatory.	1	10%
	Less than 24 hours	Self-explanatory.	2	
	Less than one week	Self-explanatory.	3	
	More than one week	Self-explanatory.	4	

The prioritized list of hazards is presented in Table 13 and is based on the ranking of hazards in the 2013 Aitkin County THIRA.

Table 13. Priorities of Risks Faced by Aitkin County

Natural Hazards	
Type	Risk Severity
Ice Storm	High
Tornado	High
Wildfire	Moderate
Severe Winter Storm	Moderate
Drought	Moderate
Straight-line Wind	Moderate
Flood/Rash Flood	Moderate
Extreme Heat	Low
Extreme Cold	Low

4.1.4 Hazard Risk Assessment by Jurisdiction

The risk assessments identify the characteristics and potential consequences of a disaster, how much of the community could be affected by a disaster, and the impact on community assets. In some cases in a multi-jurisdictional plan, individual jurisdictions will rank hazards differently. However, all jurisdictions in Aitkin County agreed to the same ranking of hazards in their communities as the county.

4.1.5 GIS and Hazus-MH

The risk analysis step in this assessment quantifies the risk to the population, infrastructure, and economy of the community. Hazards that can be geographically identified (wildland fires, windstorms, tornadoes, hail, floods) were mapped using Geographic Information Systems software.

Hazus-MH was used to estimate the damages incurred for a 100-year flood event and for general asset assessment. Hazus-MH also generates a combination of site-specific and aggregated loss estimates for the entire county due to a 100-year flood event. Aggregate inventory loss estimates, which include building stock analysis, are based upon the assumption that building stock is evenly distributed across each census block. Therefore, it is possible that overestimates of damage will occur in some parts of areas while underestimates will occur in other areas. With this in mind, total losses tend to be more reliable over larger geographic areas (groups of many blocks) than for individual census blocks. It is important to note that Hazus-MH is not intended to be a substitute for detailed engineering studies. Rather, it is intended to serve as a planning aid for communities interested in assessing their risk to flood-, earthquake-, and hurricane-related hazards. This documentation does not provide full details on the processes and procedures completed in the development of this project. It is only intended to highlight the major steps that were followed during the project.

Site-specific analysis is based upon loss estimations for individual structures. For flooding, analysis of site-specific structures takes into account the depth of water in relation to the structure. Hazus-MH also

takes into account the actual dollar exposure to the structure for the costs of building reconstruction, content, and inventory. However, damages are based upon the assumption that each structure will fall into a structural class, and structures in each class will respond in a similar fashion to a specific depth of flooding. Site-specific analysis is also based upon a point location rather than a polygon, therefore the model does not account for the percentage of a building that is inundated. These assumptions suggest that the loss estimates for site-specific structures as well as for aggregate structural losses need to be viewed as approximations of losses that are subject to considerable variability rather than as exact engineering estimates of losses to individual structures.

4.1.6 National Climatic Data Center (NCDC) Records

Historical storm event data was compiled from the National Climatic Data Center (NCDC). NCDC records are estimates of damage reported to the National Weather Service (NWS) from various local, state, and federal sources. However, these estimates are often preliminary in nature and may not match the final assessment of economic and property losses related to given weather events.

The NCDC data included 295 reported events in Aitkin County between 1952 and May 31, 2014. However, some weather event categories only had available data going back as recent as 2002. No records before 1952 were available. A summary table of events related to each hazard type is included in the hazard profile sections that follow. A table listing all events, including additional details, is included in Appendix C. NCDC hazard categories used in this plan are listed in Table 14.

Table 14. National Climatic Data Center Historical Hazards

Hazard	
Tornadoes	Hail
Thunderstorm Wind	Flood/Flash Flood
Lightning	Cold/Wind Chill
Heavy Snow/Winter Storm/Winter Weather	

4.1.7 FEMA Declared Disasters

Another historical perspective is derived from FEMA-declared disasters. Thirteen federal disaster declarations in Aitkin County have been made since 1957 (Figure 5).

Figure 5. FEMA-Declared Disasters and Emergencies in Minnesota

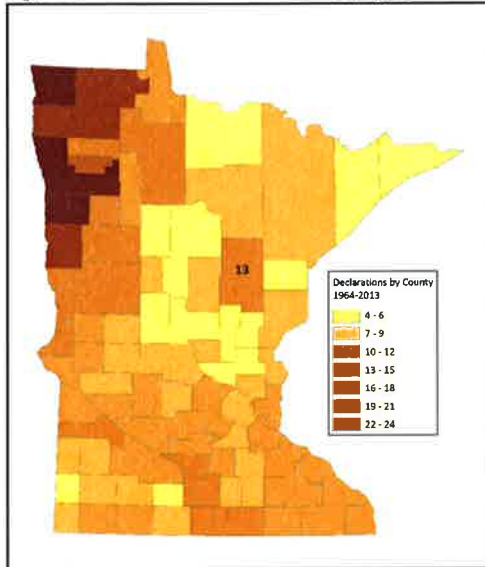


Table 15 and Table 16 show the details of the disasters including FEMA hazard mitigation funding and total assistance. No declarations were made for the other storms listed in the NCCD database. Reviewing the federal payments for damages from the declared disasters is a way of correlating the impact from the NCCD report.

Table 15. FEMA-Declared Major Disasters in Aitkin County (1957-November 2014)

Incident	Declaration Date and Disaster Number	Incident Period	Total PA Obligated by FEMA for Disaster in Minnesota	Total PA Obligated by FEMA for Disaster in Aitkin County	Individual Assistance in Minnesota	Individual Assistance in Aitkin County
Severe Storms, Flooding	07/06/2012 DR-4069	06/14/2012 to 06/21/2012	\$51,189,191	\$1,756,175	\$0	\$0
Flooding	05/16/2001 DR-1370	03/23/2001 to 07/03/2001	\$36,227,573	\$424,299	\$0	\$44,128 (Total Individual and Household Program)
Severe Storms, Winds, Flooding	07/28/1999 DR-1283	07/04/1999 to 08/02/1999	\$11,679,939	\$54,289	Unknown	\$0
Severe Storms, Flooding	04/08/1997 DR-1175	03/21/1997 to 05/24/1997	\$230,488,750	\$177,660	\$0	\$0
Flooding	06/01/1996 DR-1116	03/14/1996 to 06/17/1996	\$9,233,910	\$15,898	\$0	\$0
Severe Storm, Thunderstorm, High Winds, Flooding, Tornadoes, Heat	08/18/1995 DR-1064	07/09/1995 to 07/14/1995	\$5,895,352	\$9,115	\$0	\$0

Incident	Declaration Date and Disaster Number	Incident Period	Total PA Obligated by FEMA for Disaster in Minnesota	Total PA Obligated by FEMA for Disaster in Aitkin County	Individual Assistance in Minnesota	Individual Assistance in Aitkin County
Flooding, Severe Storm, Tornadoes	06/11/1993 DR-993	05/06/1993 to 08/25/1993	\$98,169,850	\$62,979	\$0	\$0
Severe Storms, Flooding	04/30/1979 DR-582	04/30/1979	Unknown	Unknown	Unknown	Unknown
Flooding	07/05/1975 DR-473	07/05/1975	Unknown	Unknown	Unknown	Unknown
Severe Storms, Flooding	08/01/1972 DR-347	08/01/1972	Unknown	Unknown	Unknown	Unknown
Flooding	04/18/1969 DR-255	04/18/1969	Unknown	Unknown	Unknown	Unknown
Flooding	03/22/1966 DR-215	03/22/1966	Unknown	Unknown	Unknown	Unknown
Flooding	04/11/1965 DR-188	04/11/1965	Unknown	Unknown	Unknown	Unknown

*Data provided by FEMA Region V on December 2, 2014, MNHSEM on December 10, 2014, and <https://www.fema.gov/media-library/assets/documents/28331> accessed on December 10, 2014

Table 16. FEMA-Declared Emergencies in Aitkin County (1976-November 2014)

Incident	Declaration Date and Disaster Number	Incident Period	Individual Assistance in MN	Public Assistance (all affected areas)
Hurricane Katrina Evacuation	09/13/2005 EM-3242	08/29/2005 to 10/1/2005	\$0	\$2,470,003
Drought	06/17/1976 EM-3013	06/17/1976	Unknown	Unknown

*Note the Public Assistance totals are for ALL counties affected in the disaster. Data accessed Dec. 4, 2014 at https://www.fema.gov/disasters/grid/state-tribal-government/57?field_disaster_type_term_tid_1=All

Table 17 depicts the historical projects in Aitkin County resulting from hazard mitigation funding.

Table 17. Historical Hazard Mitigation Funding in Aitkin County

Year	Project Description	Sub-Grantee	Federal Share
1996	Dike to protect 115kv substation serving City of Aitkin	Aitkin Public Utilities Company	\$73,329
1997	Construction of shelter building, NOAA weather radio transmitter, antenna, and emergency generator. This is a 5% state initiative project.	Aitkin County	\$92,481
1998	Replace part of an existing storm sewer on main street with a new catch basin and pipe to prevent frequent erosion and damage to the street.	City of Aitkin	\$87,519
2013	Aitkin County Hazard Mitigation Plan	Aitkin County	\$34,000
	Total HMA Funding – Aitkin County		\$287,329

4.2 Vulnerability Assessment

4.2.1 Asset Inventory

The Hazus-MH defaults, critical facilities, and essential facilities have been updated based on the most recent available data sources. The Hazus-MH default essential facilities have been updated based on current data available from the state and county. The essential facility updates (schools, medical care facilities, fire stations, and police stations) were integrated into the Hazus-MH input database. Other critical facilities identified by the county were geocoded and overlaid with the Hazus-MH flood model output.

Critical facilities are defined by the Department of Homeland Security in the Automated Critical Asset Management System (ACAMS). Aitkin County used the 18 sectors included in ACAMSto identify their critical infrastructure and key resources. Table 18 below identifies the critical facilities that were included in the analysis. Essential facilities are a subset of critical facilities. Names and locations of all critical facilities are found in Appendix B. Figure 6 below maps the critical facilities in the City of Aitkin, while Figure 7 depicts critical facilities in Hill City. Figure 8 maps critical facilities in McGregor.

Table 18. Aitkin County Critical Infrastructure and Facilities

ACAMSCategory	Number of Facilities
Agriculture and Food	1
Banking and Finance	8
Chemical and Hazardous Materials	5
Commercial Facilities	0
Communications	2
Dams	36
Defense Industrial Base	0
Emergency Services	12
Energy	6
Government Facilities	44
Healthcare and Public Health	8
Information Technology	1
Manufacturing	6
National Monuments and Icons	0
Nuclear	0
Postal and Shipping	6
Transportation	9
Water	6

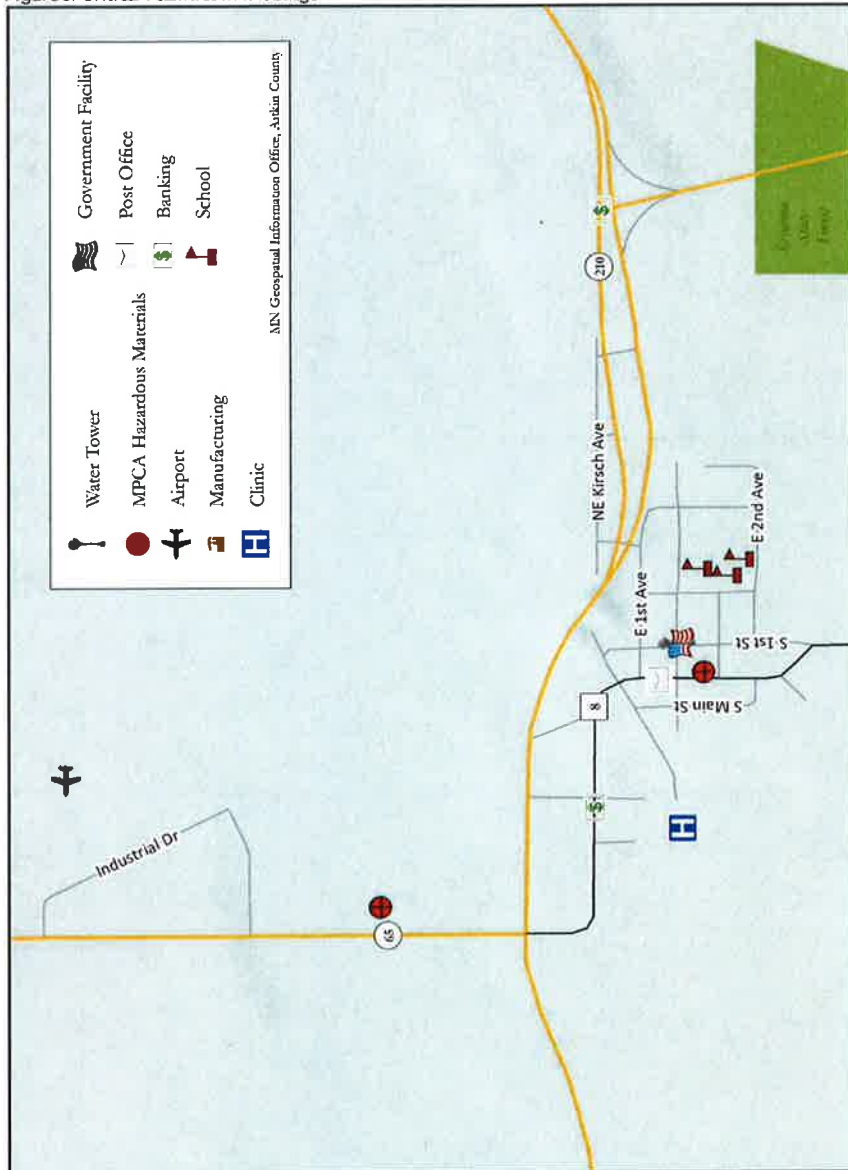
Figure 6. Critical Facilities in the City of Aitkin



Figure 7. Critical Facilities in Hill City



Figure 8. Critical Facilities in McGregor



4.2.2 Facility Replacement Costs

Hazus-MHMR4 contains the base aggregated general building stock used for estimating building exposure. Hazus-MHMR4 contains aggregated general building stock updated to Dun & Bradstreet 2006 and building valuations were updated to R.S. Means 2006. Building counts based on census housing unit counts are available for RES1 (single-family dwellings) and RES2 (manufactured housing) classifications instead of actual building counts.

Facility replacement costs and total building exposure are identified in Table 19, which also includes the estimated number of buildings within each occupancy class as calculated by Hazus general building stock.

Table 19. Aitkin County Total Building Exposure

General Occupancy	Estimated Total Buildings	Total Building Exposure (in \$1000s)
Agriculture	1,517	\$83,409
Commercial	405	\$38,246
Education	13	\$38,830
Government	140	\$24,722
Industrial	45	\$12,430
Religious/Non-Profit	115	\$41,782
Residential	15,782	\$972,529
Total:	18,017	\$1,211,948

4.3 Future Development

Because Aitkin County is vulnerable to a variety of natural hazards, the county government—in partnership with state government—must make a commitment to prepare for the management of these events. Aitkin County is committed to ensuring that county elected and appointed officials become informed leaders regarding community hazards so that they are better prepared to set and direct policies for emergency management and county response.

The Aitkin County Emergency Management Director will work to keep the jurisdictions covered by the Multi-Hazard Mitigation Plan engaged and informed during the plan's 5-year planning cycle. By keeping jurisdictional leaders actively involved in the monitoring, evaluation and update of the MHMP, they will keep their local governments aware of the hazards that face their communities and how to mitigate those hazards through planning and project implementation. Each jurisdiction has identified mitigation strategies that they will seek to implement in their communities (see Appendix G: Mitigation Actions by Jurisdiction). Jurisdictions will include considerations for hazard mitigation in relation to future development when updating local comprehensive plans or other plans that may influence such development.

4.4 Hazard Profiles

4.4.1 Wildfire

A wildfire is an uncontrolled fire spreading through vegetative fuels, posing danger and destruction to property. Wildfires can occur in undeveloped areas and spread to urban areas where structures and other human developments are more concentrated. While some wildfires start by natural causes like lightning, humans cause 4 out of every 5 wildfires. Debris burns, arson or carelessness are the leading causes of wildfires. As a natural hazard, a wildfire is often the direct result of a lightning strike that may destroy personal property and public land areas, especially on national and state forest lands. The dangers from wildfire include the destruction of timber, property and wildlife, and injury or loss of life to people living in the affected area or using the area for recreational facilities.

While wildfires are often viewed in a negative light, they are a naturally occurring part of the environment. Wildfires are an important component of healthy forest and prairie ecology, and can be beneficial by reducing dangerously high fuel levels and putting nutrients into the ground that spur new growth. In addition, many flora species require fire for seed germination. However, as people settled this country and began clearing land and building homes, roads, railroads, and campgrounds, new artificial causes of wildfire emerged and their frequency and level of destruction increased.

Causes of wildfires vary from state to state. For example, in Florida, lightning ignites approximately half of all wildfires, while in Minnesota lightning causes less than 5% of all wildfires. These variations are due to climate, vegetation, topography, and weather. People burning debris cause most wildfires in Minnesota. However, wildfires are also caused by vehicle exhaust, sparks from trains and heavy equipment, camping, smoking, and lightning.

Topography affects the movement of air and fire over the ground surface. The slope and shape of terrain can change the rate of speed at which the fire travels. Weather impacts the probability of wildfire and has a significant effect on its behavior. Temperature, humidity and wind affect the severity and duration of wildfires.

Homes threatened by wildfire are primarily those located in the "wildland-urban interface." This is the zone where homes and subdivisions have been located in wildland areas where natural wildfires can have an impact. While wildfires are necessary for healthy ecosystems, they burn whatever fuel is in their path, whether vegetation or buildings.

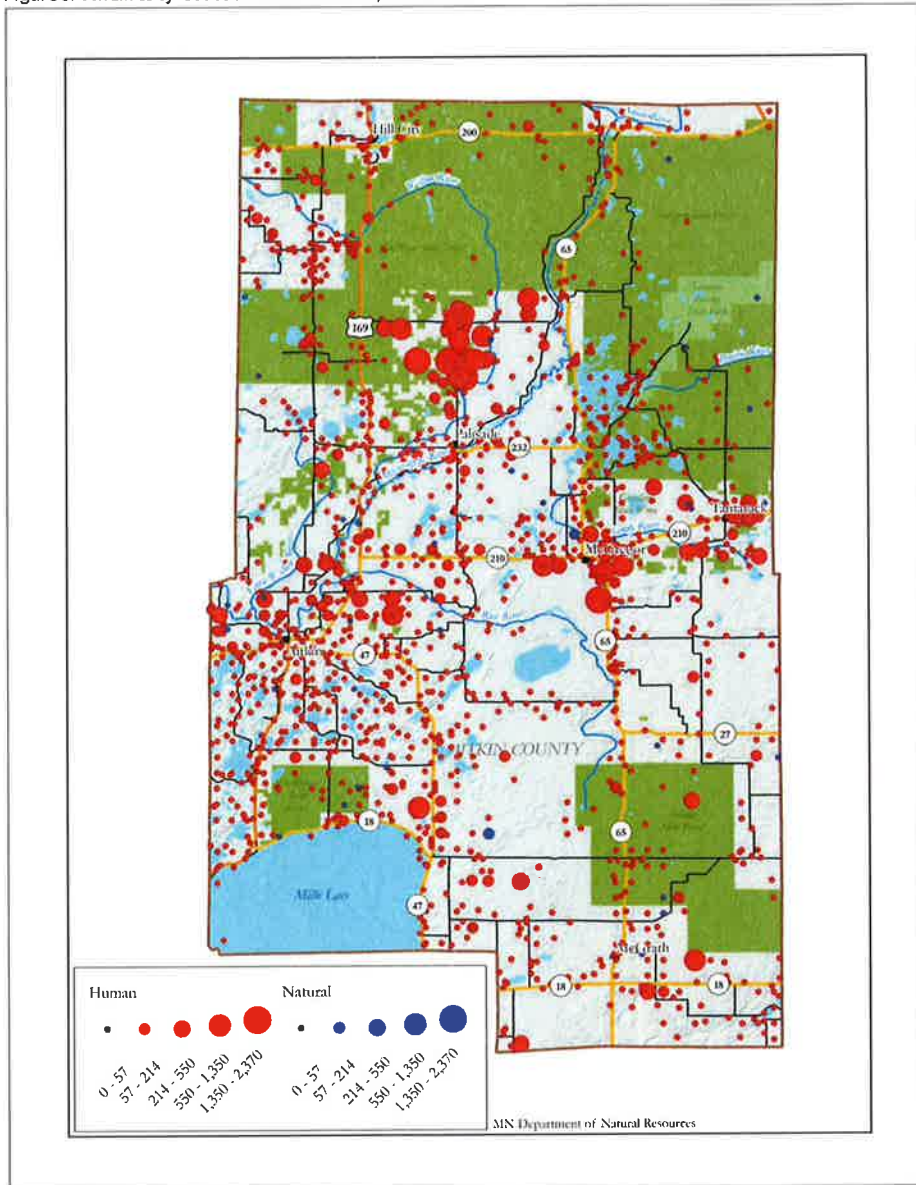
One of the most common causes of a home being damaged or destroyed is due to radiant heat. In a wildfire, radiant heat is the heat given off by burning vegetation. The high temperatures of some wildfires can cause the deck, siding, or roof of a home to ignite, because the fire was too near the home. Studies in western wildfires have shown that approximately 85% of homes surviving a major wildfire had 30-50 feet of defensible space around them, coupled with fire-resistant roofing.

Wildfire History in Aitkin County

Approximately 1,600 wildfires occurred in Minnesota each year on average from 1976-2011 (MN DNR). Wildfires occur throughout the spring, summer and fall; however, most wildfires in Minnesota take place in March, April, and May. During this period, much of the existing vegetation has been killed due to winter temperatures and is dead, brown and combustible. Also, there is little green vegetation to serve as a barrier for a moving wildfire.

The Minnesota DNR tracked 1,956 wildfires in Aitkin County between 1985 and 2013, burning a total of 54,734 acres (Figure 9). These include fires not only on state lands, but also rural private lands for which there is not another agency with primary responsibility. Wildfires that are not included in this data are those that occur on federal and Native American lands, and those that are responded to by local fire departments.

Figure 9. Wildfires by Cause and Acres Burned, 1985-2013



Wildfire and Climate Change

Temperatures are predicted to rise in the state, which could lead to more extreme heat events and associated wildfire risks. As Minnesota's climate changes, weather fluctuations between drought and extreme rain events and increasing temperatures will result in changes to forest composition and/or distribution. The northern boreal forest may give way to more deciduous forests or grassland, with a period of dying or diseased trees during the transition. This weather fluctuation can lead to dry conditions that may cause increased fire risk in both grassland and forest environments.

Relationship to other Hazards

Public Health - Air quality is adversely affected by wildfires.

Floods/ Erosion - Floods combined with landslides or severe erosion in areas with steep terrain could occur if a large fire is followed by significant rainfall.

Plans and Programs in Place

Subdivision Standards - Aitkin County Subdivision standards regulate driveways and access roads. Adequate space for access roads is critical for emergency response vehicles to be able to access a property.

Dry Hydrants and Water Access - Aitkin County maintains a GIS database of dry hydrant locations. Individual fire departments are responsible for updating the county with information when new hydrants are installed or existing ones moved. All volunteer fire departments have water transportation capacity.

Wildfire Response - The Minnesota Department of Natural Resources has mutual aid agreements with all fire departments to assist as needed with wildfire response. The Rice Lake Wildlife National Refuge Area has its own personnel and equipment for fighting wildland fires and is also covered by the McGregor Fire Department.

Burning Permits/Restrictions - Regulation of open burning and the use of burning permits has been an important tool in preventing wildfire in Minnesota. Burning permits are required by the MN DNR when the ground is not snow-covered. Permits can be obtained from MN DNR Forestry offices, fire wardens or purchased online. When risk of wildfire is very high, burning is not permitted.

National Fire Plan - The USDA Forest Service maintains the National Fire Plan that is updated annually for effective use of national resources to combat wildfires in the United States. Further information in the National Fire Plan can be found at www.fireplan.gov.

Wildfire Condition Monitoring - The MN DNR Division of Forestry collects weather data on a daily basis. This data is monitored by a U.S. Department of Agriculture (USDA) Forest Service computer, which uses the National Fire Danger Rating System to determine daily and forecasted fire danger indices. This information combined with fire weather forecasts from the National Weather Service (NWS) are used to develop short-range guidelines for scheduling detection, equipment standby, and personnel.

Minnesota Interagency Fire Center (MIFC) - Located in Grand Rapids, MN, the purpose of the MIFC is to increase the efficiency and effectiveness of wildfire management by facilitating interagency exchange of fire resources, providing a common point for the collection and dissemination of fire intelligence and streamlining dispatch procedures. These responsibilities include assigning state firefighting crews, tracking resource orders and their distribution, and dispatching air tankers and helicopters to needed areas. Partners include the MN DNR, USFS, US Fish and Wildlife Service, National Park Service, Bureau of Indian Affairs and the MN Department of Public Safety – Division of Homeland Security and Emergency Management. While firefighting is under local control of the ground crews and local DNR or Forest Service field command, the status of a fire is monitored constantly by the MIFC. If local resources do not contain the fire, the MIFC calls in more help from other stations in the region.

Public Warning and Notification - In the event of emergencies or hazardous conditions that require timely and targeted communication to the public, Aitkin County utilizes the CodeRED Mass Notification System and the Aitkin County Sheriff's Office Facebook page, as well as local news media. Aitkin County promotes the use of NOAA weather radios by critical facilities and the public to receive information broadcast from the National Weather Service.

Firewise Program - In 2012 Aitkin County used funding from the MN DNR Firewise Program to do public education at different events, conduct a broad countywide risk assessment and to make egress improvements in the southeast corner of the county. Aitkin County plans to do more Firewise risk assessments in 2014 with the assistance of local fire departments.

Aitkin County Forest Management Plan - the county maintains a Forest Management Plan, which is a strategic plan that is updated every ten years to guide forest management. The plan was last updated in 2012. Forest management practices are applied to keep forests healthy, which helps reduce the potential for wildfire. This includes fuel reduction (removal of suppressed trees) as well as removal of dead or infected trees from insect and disease outbreaks.

The Tamarack Sportsman's Club owns a J5 to assist with wildfire response.

Program Gaps or Deficiencies

Dry Hydrants and Water Access - Not all areas of Aitkin County have good access to water resources for fighting fires. Installation of dry hydrants and static storage tanks can help alleviate this problem. Some properties dependent on private wells may not have an adequate supply of water for firefighting needs.

Community Wildfire Protection Plan (CWPP) - In 2014 Aitkin County is working on developing a CWPP, currently one is not in place. A CWPP allows communities to develop collaborative strategies to reduce their risk from wildfire and restore healthier, more resilient conditions in their surrounding forests.

4.4.2 Severe Winter Storms – Blizzards, Ice Storms

Blizzards are storms that contain heavy snowfall, strong winds, and cold temperatures. The combination of these elements creates blinding snow with near zero visibility, deep snowdrifts, and life-threatening wind chill temperatures. Blizzards are the most dramatic and destructive of all winter storms that occur

within Aitkin County, and are generally characterized as storms bearing large amounts of snow accompanied by strong winds. They have the ability to completely immobilize travel in large areas and can be life-threatening to humans and animals. According to the National Weather Service (NWS), there is no fixed temperature requirement for blizzard conditions, but the life-threatening nature of low temperatures in combination with blowing snow and poor visibility increases dramatically when temperatures fall below 20°F. Blizzards typically occur between October and April; however, they occur most frequently from early November to late March.

Severe Winter Storm History in Aitkin County

An overview of some of the most notable winter storm events affecting the county can be found in Table 20.

Table 20. North-Central Minnesota Winter Storm Events

Date	Type	Cost	Deaths	Injuries	Description
January 1997	Blizzard	N/A	N/A	N/A	21" in Duluth, 23" in Pequot Lakes, 18" in Finlayson, 16" in Two Harbors, and 12" in Babbitt.
October 1991	Blizzard	N/A	N/A	N/A	Halloween Blizzard. Over 28" at MSP, nearly 37" at Duluth. Nasty wind chill conditions, deep snow drifts harsh on wildlife, many roads closed for days. Perhaps one of the largest and longest lasting blizzards in state history.
November 1988	Blizzard	N/A	N/A	N/A	Blizzard struck over most of the state. Winds reached 63 mph at Windom, snow drifts up to 7' high. Snowfalls up to 14" in east central MN.
January 1893	Blizzard	N/A	N/A	N/A	Park Rapids, MN temperature drop of 40° F in less than 5 hours.

Figure 10. Every Year Aitkin County is Vulnerable to Severe Winter Weather



The greatest numbers of blizzards historically have occurred in the months of January, followed by March and November, respectively. Aitkin County, along with all areas of Minnesota, is susceptible to blizzards.

Damages from blizzards can range from human and livestock deaths to significant snow removal costs. Stranded drivers can make uninformed decisions, such as leaving the car to walk in conditions that put them at risk. Because of the blinding potential of

heavy snowstorms, drivers are also at risk of collisions with snowplows or other road traffic. Further, drivers and homeowners without emergency plans and kits are vulnerable to the life-threatening effects of heavy snow storms such as power outages, cold weather, and inability to travel, communicate, obtain goods or reach their destinations. Heavy snow loads can cause structural damage, particularly in areas

where there are no building codes or for residents living in manufactured home parks. The frequency of structural fires tends to increase during heavy snow events, primarily due to utility disruptions and the use of alternative heating methods by residents.

Between the years of 1975 and 1991, there were 49 deaths associated with blizzards statewide, or an average of three deaths per year. Deaths attributable to blizzards have dropped in recent years, primarily due to increased weather awareness and warning capabilities across the state. The economic costs of winter storms are generally not recorded by the NCCDC; however, a winter storm in November 2001 resulted in property damage of \$500,000.

Ice storms are described as occasions when damaging accumulations of ice occur due to freezing rain. The terms freezing rain and freezing drizzle warn the public that a coating of ice is expected on the ground and on other exposed surfaces. Heavy accumulations of ice can bring down trees, electrical wires, telephone poles and lines, and communication towers.

Communications and power can be disrupted for days while utility companies work to repair extensive damage. Ice forming on exposed objects generally ranges from a thin glaze to coatings more than one inch thick. Even small accumulations of ice on sidewalks, streets, and highways may cause extreme hazards to Aitkin County motorists and pedestrians. Sleet does not stick to trees and wires, but sleet of sufficient thickness does cause hazardous driving conditions. Heavy sleet is a relatively rare occurrence, defined as an accumulation of ice pellets covering the ground to a depth of one-half inch or more.

Ice and sleet storms typically occur from October through April. The NWS notes that over 85% of ice storm-related deaths are the result of traffic accidents. No freezing rain or freezing drizzle events have been recorded in Aitkin County by the NCCDC; however, the entire state of Minnesota is susceptible to these hazards.

Observing winter storm watches and warnings and adequate preparation can usually lessen the impact of blizzard events in Minnesota. Technical advances made in transportation, including safer vehicles and improved construction and maintenance of roads, have also contributed to the decline in deaths related to blizzard events. Historical estimates of dollar losses associated with blizzard events were not available for the purposes of this analysis. However, costs incurred by state and local government for snow removal associated with disaster declaration DR1158 (January 1997) totaled over \$27,300,000 dollars. Blizzards rank ninth out of the 10 natural hazards economically impacting Minnesota according to the statewide risk analysis. The chance that another winter storm affecting Aitkin County will occur is highly probable.

Severe Winter Storms and Climate Change

Historically, winter storms have had a large impact on public safety in Minnesota. This will continue, with a possible increase in snowstorm frequency and annual total snowfall. Winter weather is often a cause of power outages. Pressures on energy use, reduced reliability of services, potential outages and potential rise in household costs for energy are major climate change risks to public health.

The number of heavy snowfall years for the Midwest has fluctuated throughout the 1900-2006 time period. The periods of 1900-1920 and 1960-1985 had numerous years with snowfall totals over the 90th percentile. In the recent three decades, the number of heavy seasonal snowfall totals has been much lower. Despite these generally lower seasonal snowfall totals, some areas of the Midwest have still experienced significant snow totals in the most recent decade. The 100-year linear trends based on decadal values show that the upper Midwest had statistically significant (1% level) upward linear trends in snowstorm frequency from 1901 to 2000 (Kunkel, et al., 2013).

Relationship to other Hazards

Flooding - Melting from heavy snows can cause localized flooding which can impact property and infrastructure such as roads.

Wildland or Structural Fire - Heavy storms that result in large amounts of downed timber can result in an increase of dead or dying trees left standing, thus providing an increased fuel load for a wildfire. There is an additional risk of increased frequency of structural fires during heavy snow events, primarily due to utility disruptions and the use of alternative heating methods by residents.

Public Safety - Drivers stranded in snowstorms may make uninformed decisions that can put them at risk; residents who are unprepared or vulnerable may not be able to obtain goods or reach their destinations. EMS providers may be slowed by road conditions to respond to emergencies. Ice storms may result in power outages due to downed power lines, putting people at risk for cold temperature exposure and reducing the ability to spread emergency messages to the public via television, radio or computer.

Plans and Programs in Place

Snow Removal - The Aitkin County Transportation Department has capabilities for snow removal and highway treatment in order to maintain safe winter driving conditions. The department carries out snow removal and ice control operations. Paved routes within Aitkin County receive priority for snow plowing. MnDOT handles snow removal on trunk highways within Aitkin County. The county has agreements with several townships to do snow plowing. All other city and township jurisdictions either have their own equipment for snow removal or contract for services to do so.

Backup Power - In the courthouse complex there is an emergency generator for the jail, and from that power can be provided to serve the courthouse, boiler room and I.T. office. Across the street there is a small emergency generator that will serve to power EMS, fire and police radio systems. In the city of Aitkin, the fire department has portable generators, one of which is dedicated to water supply and another that can be located as needed.

Burying Power Lines - Burying power lines helps eliminate loss of power due to snow and ice storms. Mille Lacs Energy Cooperative and Lake County Power work to accommodate requests for installation of underground power lines to residents or businesses receiving connection of new power in areas where it is feasible. East Central Energy buries lines in areas where it makes sense to do so, but does not offer this as a regular customer option.

NOAA Weather Radio Transmitter Towers - The National Weather Service delivers storm warnings and key information during severe winter weather events over its radio towers. The extreme southeastern part of Aitkin County is covered by Pine County. Most of the rest of the county is covered by the Aitkin transmitter which is located southeast of the city of Aitkin. The Coleraine transmitter covers the extreme northeastern part of the county.

School Closings - All school districts within Aitkin County have a school closing policy and communications plan in place if inclement weather or temperatures create a hazardous situation for students or staff. Schools have notification systems which allow them to notify all families who are registered in the school system with up-to-date information.

Public Warning and Notification - In the event of emergencies or hazardous conditions that require timely and targeted communication to the public, Aitkin County utilizes the CodeRED Mass Notification System and the Aitkin County Sheriff's Office Facebook page as well as local news media. Aitkin County promotes the use of NOAA weather radios by critical facilities and the public to receive information broadcast from the National Weather Service.

Public Education and Awareness - Aitkin County promotes the National Weather Service's "Winter Hazard Awareness Week" held in November each year. The event seeks to educate residents on the dangers of winter weather and how to properly deal with it.

Program Gaps or Deficiencies

Backup Power - Not all county facilities have backup power in the event of a disaster.

4.4.3 Summer Storms – Thunderstorms, Lightning, Hailstorms, Tornadoes and Windstorms

Summer storms, including thunderstorms, hailstorms, and windstorms affect Aitkin County on an annual basis. Thunderstorms are the most common summer storm in the county, occurring primarily during the months of May through August, with the severest storms most likely to occur from mid-May through mid-July. Thunderstorms are usually locally produced by cumulonimbus clouds, always accompanied by lightning, and often have strong wind gusts, heavy rain and sometimes hail and tornadoes. Tornadoes are the greatest concerns for Aitkin County.

Lightning

Lightning is caused by the discharge of electricity between clouds or between clouds and the surface of the earth. In a thunderstorm there is a rapid gathering of particles of moisture into clouds and forming of large drops of rain. This gathers electric potential until the surface of the cloud (or the enlarged water particles) is insufficient to carry the charge, and a discharge takes place, producing a brilliant flash of light.

The power of the electrical charge and intense heat associated with lightning can electrocute on contact, split trees, ignite fires, and cause electrical failures. Most lightning casualties occur in the summer months, during the afternoon and early evening. The NODC has recorded 2 lightning strikes in

Aitkin County since 2000, but no deaths or injuries were reported. A 2010 report published by Minnesota Department of Natural Resources (MN DNR) reports a 20-year average of 23 lightning-caused wildfires a year on public land. In 2011, 22 wildfires were caused by lightning in the state. Based on statistics maintained by the MN DNR Division of Forestry, the 22 average lightning-caused wildfires per year resulted in average annual suppression costs totaling \$54,864 dollars and average annual damages totaling \$10,357 dollars.

Lightning and Climate Change

The projected possible intensity and frequency of tornadoes, hail, and damaging thunderstorm winds, the conditions associated with lightning, are uncertain (National Climate Assessment Development Advisory Committee, 2013). Severe rain events are becoming more common and may include an additional risk of lightning.

Hailstorms

Hailstorms are a product of severe thunderstorms. Hail is formed when strong updrafts within the storm carry water droplets above the freezing level, where they remain suspended and continue to grow larger, until their weight can no longer be supported by the winds. Hailstones can vary in size, depending on the strength of the updraft. The NWS uses the following descriptions when estimating hail sizes: pea size is ¼ inch, marble size is ½ inch, dime size is ¾ inch, quarter size is 1 inch, golf ball size is 1 ¾ inches, and baseball size is 2 ¾ inches. Individuals who serve as volunteer "storm spotters" for the NWS are located throughout the state, and are instructed to report hail dime size (¾ inch) or greater. Hailstorms can occur throughout the year; however, the months of maximum hailstorm frequency are typically between May and August. Although hailstorms rarely cause injury or loss of life, they can cause significant damage to property.

Table 21 shows storms producing hail greater than 1-inch diameter in Aitkin County.

Table 21. Storms producing hail of greater than 1-inch diameter in Aitkin County (1972-2013)

Date	Hail Size (inches)	Injuries	Date	Hail Size (inches)	Injuries
8/29/2013	1.75 in.	0	6/13/2001	1.75 in.	0
8/29/2013	1.75 in.	0	8/14/2000	2.00 in.	0
8/04/2012	1.50 in.	0	7/8/2000	1.75 in.	0
7/04/2012	1.50 in.	0	6/1/1998	1.75 in.	0
5/28/2012	1.75 in.	0	9/13/1990	2.00 in.	0
6/17/2010	2.00 in.	0	9/5/1990	2.75 in.	0
6/17/2010	2.00 in.	0	8/4/1986	1.75 in.	0
8/27/2007	2.75 in.	0	6/5/1980	2.75 in.	0
8/27/2007	1.75 in.	0	8/5/1972	2.00 in.	0
8/27/2007	1.75 in.	0			

Source: National Climatic Data Center

According to the 41-year NCCDC record, there is a 54% chance of a significant hailstorm any year in Aitkin County and a 27% chance in each year that there will be a hailstorm that produces hail greater than 1 inch in size.

Hailstorms and Climate Change

Winter storms have increased slightly in frequency and intensity, and their tracks have shifted northward over the U.S. Other trends in severe storms, including the numbers of hurricanes and the intensity and frequency of tornadoes, hail, and damaging thunderstorm winds are uncertain. Since the impact of more frequent or intense storms can be larger than the impact of average temperature, climate scientists are actively researching the connections between climate change and severe storms (National Climate Assessment Development Advisory Committee, 2013).

The occurrence of very heavy precipitation has increased in Minnesota in recent decades and future projections also indicate this will continue (International Climate Adaptation Team, 2013). While it is unknown if this precipitation will occur during severe storms that produce hail, the possibility has not been ruled out.

Windstorms and Tornadoes

Windstorms can and do occur in all months of the year; however, the most severe windstorms usually occur during severe thunderstorms in the warm months. Aitkin County frequently experiences winds blowing at over 50 knots. According to NCCDC records, in Aitkin County there have been 82 thunderstorm wind events reported between 1972 and May 2014, with wind speeds of up to 61 knots. These winds can inflict damage to buildings and in some cases overturn high-profile vehicles.

Associated with strong thunderstorms, downbursts are severe localized downdrafts from a thunderstorm or rain shower. This outflow of cool or colder air can create damaging winds at or near the surface. Winds up to 130 miles per hour have been reported in the strongest thunderstorms. Downburst winds can cause as much damage as a small tornado and are frequently confused with tornadoes because of the extensive damage they cause. As these downburst winds spread out they are often referred to as straight-line winds. They can cause major structural and tree damage over a relatively large area. The most recent severe wind and hail storms in Aitkin County are shown in Figure 11.

Tornadoes are defined as violently-rotating columns of air extending from thunderstorms to the ground, with wind speeds between 40-300 mph (Figure 12). They develop under three scenarios: (1) along a squall line; (2) in connection with thunderstorm squall lines during hot, humid weather; and (3) in the outer portion of a tropical cyclone. Funnel clouds are rotating columns of air not in contact with the ground; however, the column of air can reach the ground very quickly and become a tornado.

Since 2007, tornado strength in the United States is ranked based on the Enhanced Fujita scale (EF scale), replacing the Fujita scale introduced in 1971. The EF scale uses similar principles to the Fujita scale, with six categories from 0-5, based on wind estimates and damage caused by the tornado. The EF Scale is used extensively by the NWS in investigating tornadoes (all tornadoes are now assigned an EF

Scale number), and by engineers in correlating damage to buildings and techniques with different wind speeds caused by tornadoes. To see a comparative table of F and EF scales, see <http://www.spc.noaa.gov/faq/tornado/ef-scale.html>.

Figure 11. Most Recent Severe Wind and Hail Storms in Aitkin County

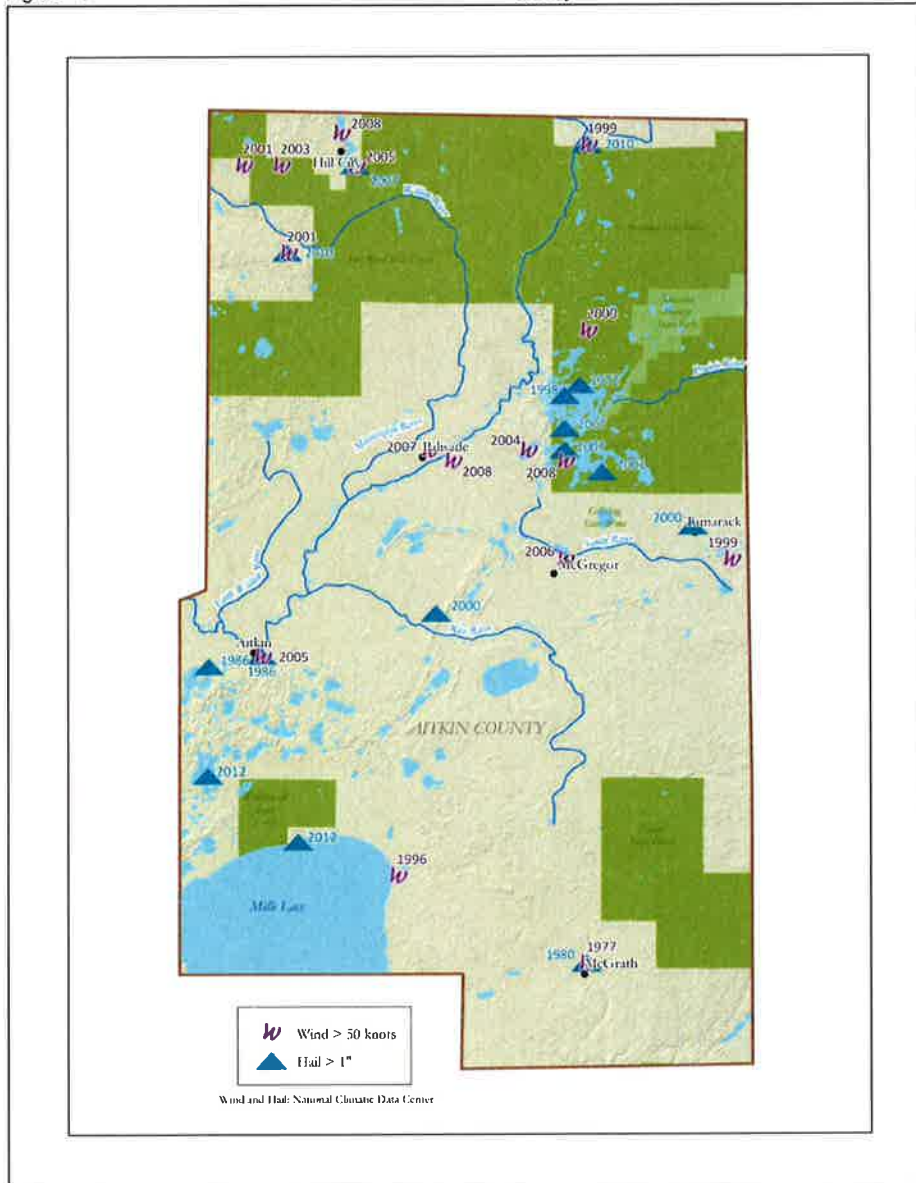


Figure 12. Damage from tornado in Aitkin County, 8/29/2013



In Minnesota, the peak months of tornado occurrence are June and July. The typical time of day for tornadoes in Minnesota ranges between 4:00 P.M. and 7:00 P.M. Most of these are minor tornadoes, with wind speeds under 125 miles per hour. A typical Minnesota tornado lasts approximately 10 minutes, has a path length of 5 to 6 miles, is nearly as wide as a football field, has a forward speed of about 35

miles an hour, and affects less than 0.1% of the county warned.

According to the NCDC, 16 tornadoes were reported in Aitkin County between 1952 and June 2014, causing 1 death, 3 injuries, and over \$3.5 million dollars in property damage. Tornado classification ranged from F0 to F4 on the Fujita Scale. While most of the tornadoes in Aitkin County have been F0, F1, or F2 classification, tornadoes ranked at F3 and F4 have also occurred, including an F4 in 1969 that caused \$2.5 million in property damage. The most recent tornado in the county was on August 29, 2013, in the northwestern portion of the county, rated EF1. The Aitkin County Sheriff's Department reported numerous fallen trees and blocked roads. See Figure 12 (National Weather Service, 2013). One house north of Remer experienced severe damage, but otherwise property damage was limited to small structures (National Weather Service, 2013).

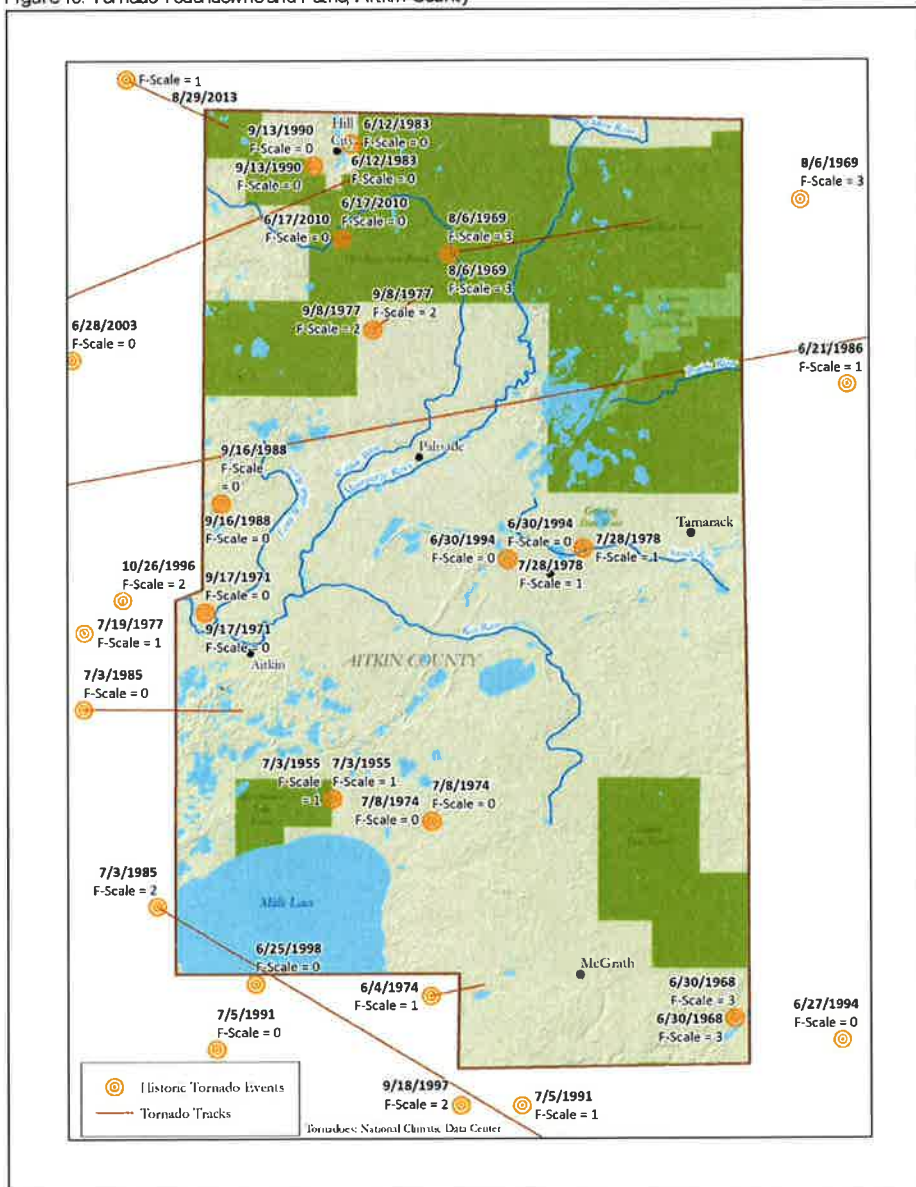
Figure 13 below shows tornado touchdown points and tracks in Aitkin County since 1955. Historic tornado events in the county are listed in Table 22. The county has experienced tornadoes in 14 of the 61 complete years on record. According to these statistics, there is a 23% chance of a tornado affecting Aitkin County each year.

Table 22. Historic Tornado Events in Aitkin County (1952-June 2014)

Location or County	Date	Magnitude	Deaths	Injuries	Property Damage	Length in miles	Width in yards
Shovel Lake	8/29/2013	EF1	0	0	0	12.8	300
Haypoint	6/17/2010	F0	0	0	0	1	25
McGregor	6/30/1994	F0	0	0	0	0.1	10
Aitkin County	9/13/1990	F0	0	0	0	0.1	10
Aitkin County	7/3/1985	F2	0	0	25K	2	200
Aitkin County	7/3/1985	F0	0	0	250K	3	100
Aitkin County	6/12/1983	F0	0	0	2.5K	3	400
Aitkin County	7/28/1978	F1	0	0	250K	18	880
Aitkin County	9/8/1977	F2	0	0	250K	3.6	660
Aitkin County	6/25/1973	F0	0	0	2.5K	0.8	100
Aitkin County	9/17/1971	F0	0	0	0	0.1	30
Aitkin County	8/6/1969	F3	1	3	250K	12.5	1500
Aitkin County	8/6/1969	F4	0	0	2.5M	10.1	833
Aitkin County	6/30/1968	F3	0	0	2.5K	0.1	10
Aitkin County	7/3/1955	F1	0	0	0.25K	0	33
Aitkin County	7/16/1952	F2	0	0	25K	9.4	333

Source: National Climatic Data Center

Figure 13. Tornado Touchdowns and Paths, Aitkin County



Windstorms/Tornadoes and Climate Change

According to the Federal Advisory Committee Draft National Climate Assessment (NCA), wind storms have increased slightly in frequency and intensity, and their tracks have shifted northward over the U.S. Lack of high-quality long-term data sets make assessment of changes in wind speeds very difficult (Kunkel, et al., 2013). One analysis generally found no evidence of significant changes in wind speed distribution. Other trends in severe storms, including the numbers of hurricanes and the intensity and frequency of tornadoes, hail, and damaging thunderstorm winds are uncertain. Since the impact of more frequent or intense storms can be larger than the impact of average temperature, climate scientists are actively researching the connections between climate change and severe storms (National Climate Assessment Development Advisory Committee, 2013).

Tornadoes and other severe thunderstorm phenomena frequently cause as much annual property damage in the U.S. as do hurricanes, and often cause more deaths. Although recent research has yielded insights into the connections between global warming and the factors that cause tornadoes and severe thunderstorms, such as atmospheric instability and increases in wind speed with altitude (Del Genio, Yao, & Jbnas, 2007), these relationships remain mostly unexplored, largely because of the challenges in observing thunderstorms and tornadoes and simulating them with computer models (National Climate Assessment Development Advisory Committee, 2013).

Relationship to other Hazards

Flooding - Thunderstorms with heavy amounts of rainfall can cause localized flooding, which can impact property and infrastructure such as roads.

Public Health - Public health can be impacted as a result of wastewater spills due to flooding.

Wildland Fire - Lightning strikes may ignite a wildland fire. Windstorms that result in downed timber increase the fuel load in a forest that may increase the risk of wildfire.

Structural Fire - Lightning strikes may ignite a wildland or structural fire.

Plans and Programs in Place

SKYWARN Program - The National Weather Services (NWS) has a Northland SKYWARN Program, offering annual training sessions to volunteers in Aitkin County. There is a network of trained SKYWARN spotters in Aitkin County. These volunteers help keep their local communities safe by providing timely and accurate reports of severe weather to their local National Weather Service office.

Storm Shelters - Mobile home parks are required to meet Minnesota Department of Health requirements for storm shelters based on number of manufactured homes and date of licensing. Big Sandy Lake Campground is operated by the Army Corps of Engineers and has a root cellar and concrete restrooms that serve as storm shelters for the public. Savanna Portage State Park uses its restroom facilities as shelters within the main park. A concrete root cellar serves as another storm shelter for the group camp located on Savanna Lake. Hill City School has two rooms designated as tornado shelters, and is a shelter for the Red Cross. The Aitkin Fire Hall is used as a public storm shelter.

Outdoor Warning Sirens - Outdoor warning sirens are in place on the Sandy Lake Indian Reservation, East Lake, and the cities of Aitkin, Tamarack, McGregor, and Hill City. Sirens are activated in the event of a tornado warning or severe thunderstorms with winds of 70 mph or greater. Warning sirens are not used for the dual purpose of summoning emergency management workers in the event of an emergency.

Backup Power - For the courthouse complex there is an emergency generator for the jail, and from that power can be provided to serve the courthouse, boiler room and I.T. Office. Across the street there is a small emergency generator that will power EMS, fire and police radio systems. In the city of Aitkin, the fire department has portable generators, one of which is dedicated to water supply and another that can be located as needed.

Burying Power Lines - Burying power lines helps eliminate loss of power due to severe summer storms. Mille Lacs Energy Cooperative and Lake County Power work to accommodate requests for installation of underground power lines to residents or businesses receiving connection of new power in areas where it is feasible. East Central Energy buries lines in areas where it makes sense to do so, but does not offer this as a regular customer option.

Vegetation Management - The Aitkin County Transportation Department strives to clear the right of way of its improved, high-volume roads to reduce tree blowdown in the event of severe summer storms.

School Closings - All school districts within Aitkin County have a school closing policy and communications plan in place if inclement weather or temperatures create a hazardous situation for students or staff. Schools have notification systems which allow them to notify all families who are registered in the school system with up-to-date information.

NOAA Weather Radio Transmitter Towers - The National Weather Service delivers storm warnings and key information during severe winter weather events over its radio towers. The extreme southeastern part of Aitkin County is covered by Pine County. Most of the rest of the county is covered by the Aitkin transmitter which is located southeast of the city of Aitkin. The Coleraine transmitter covers the extreme northeastern part of the county.

Public Warning and Notification - In the event of emergencies or hazardous conditions that require timely and targeted communication to the public, Aitkin County utilizes the CodeRED Mass Notification System and the Aitkin County Sheriff's Office Facebook page, as well as local news media. Aitkin County promotes the use of NOAA weather radios by critical facilities and the public to receive information broadcast from the National Weather Service.

Public Education and Awareness - Aitkin County promotes the National Weather Service's "Severe Weather Awareness Week" held in April each year. The event seeks to educate residents on the dangers of severe summer storm events and highlights the importance of preparing for severe weather before it strikes.

Public Schools and Safe Rooms—A survey of Aitkin County school district superintendents was completed to assess hazard preparation in county schools (Table 23).

Table 23. Aitkin County MHMP School and Safe Room Information Survey

Name of Superintendent, School District and Email	Plans or Programs in Place Information regarding any Plans or Programs in Place (i.e., do you have schools that have designated as safe rooms? Are schools community partners for mass sheltering in the event of disaster? Do you exercise tornado drills for students and staff? etc.)	Program Gaps or Deficiencies Information regarding any Program Gaps or Deficiencies (i.e., Do have a need to establish safe room capabilities in your schools? etc.)
Dean Yocum – Superintendent / Principal Hill City School dyocum@hillcity.k12.mn.us	<p>In Hill City we have a Crisis Team made of school district employees, local law enforcement, and the fire department.</p> <p>We have plans in place for a variety of situations. We run fire drills, lockdown drills, and 1 tornado drill with staff and students. In addition, this past fall we did a full lockdown and evacuation drill. We have two rooms designated as tornado shelters.</p> <p>We are designated as a shelter for the Red Cross. They have come to our building to get a great deal of information. I believe the information they gathered dealt with our ability to mass shelter people.</p>	<p>I am not sure what the definition is of a safe room.</p> <p>We have not done much of anything to plan or train for a community disaster.</p>
Paul Grams, McGregor ISD # 004 pgrams@mcgregor.k12.mn.us	Yes. We do have crisis plans that involve fire & tornado drills, evacuation plans and lockdown in place plans.	I don't know of gaps.
Bernie Novak, Aitkin Public Schools bnovak@aitkin.k12.mn.us	Yes. We do have crisis plans that involve fire & tornado drills, evacuation plans and lockdown in place plans.	No gaps that I am aware of.

Program Gaps or Deficiencies

Outdoor Warning Sirens - The city of McGrath does not have a warning siren.

Storm Shelters - Not all Aitkin County public schools have designated safe rooms.

Backup Power - Not all county facilities have backup power in the event of a disaster.

4.4.4 Extreme Cold

Winter in Aitkin County can be a brutal time, and especially dangerous for disabled citizens and outdoor workers. Record temperature lows and arctic-like wind chill factors can cause cold-related illnesses such

as frostbite and hypothermia, which can be deadly. Hypothermia is the greatest and most life-threatening cold weather danger.

In Aitkin County cold winter weather can have severe or fatal impacts. Hypothermia occurs when core body temperature drops below 96°F. Anyone who is exposed to severe cold without enough protection can develop hypothermia. Frostbite occurs when skin tissue and blood vessels are damaged from exposure to temperatures below 32°F. It most commonly affects the toes, fingers, earlobes, chin, cheeks, nose, and other body parts that are often left uncovered in cold temperatures. The NWS issues "Extreme Cold" warnings when it feels like -30°F or colder across a wide area for several hours. Extreme cold watches are issued a day or two before the conditions are expected.

Extreme Cold History in Aitkin County

Below zero temperatures occur almost every winter for a period of time. January is the coldest month, with daytime highs averaging 20°F and nighttime lows averaging 0°F. However, these averages do not tell the whole story. Maximum temperatures in January have been as high as 54°F and minimums as low as -47°F (The Weather Channel, 2014).

Extreme cold temperatures affect the county nearly every year. Extremely cold air settled over the area on January 31st of 1996, and remained entrenched through February 4th. A new record low temperature for Minnesota was set in the town of Tower on February 2, 1996, at -60°F. Numerous record low temperatures were set during the period at St. Cloud, Rochester and the Twin Cities. Minneapolis/St. Paul set three new record low temperatures as well as recording the second coldest day on February 2, 1996. A mean temperature of -25°F was measured that day with a high of -17°F and a low of -32°F in the Twin Cities. This was within two degrees of tying the all-time record low temperature set in the Twin Cities and the coldest temperature recorded this century. Many central and southern Minnesota locations set new record low temperatures the morning of the 2nd. The governor closed all schools that day.

Extreme Cold and Climate Change

There is not yet any observable trend related to extreme cold events and climate change in Minnesota. Cold temperatures have always been a part of Minnesota's climate and extreme cold events will continue. However, an increase in extreme precipitation or storm events such as ice storms as the climate changes could lead to a higher risk of residents being exposed to cold temperatures during power outages or other storm-related hazards during extreme cold.

Relationship to other Hazards

Wildfire - Extreme cold directly impacts firefighting, making fire suppression more difficult and increasing the likelihood of equipment damage.

Public Health - Frozen septic systems can lead to the release of increased levels of untreated wastewater into the environment.

Public Safety - Anyone exposed to extremely cold temperatures can develop frostbite and hypothermia. The elderly, children and those who engage in outdoor work or recreation may be most susceptible to the danger of extremely cold temperatures.

Plans and Programs in Place

School Closings - All school districts in Aitkin County have a school closing policy and communications plan in place if inclement weather or temperatures create a hazardous situation for students or staff. Schools have notification systems which allow them to notify all families who are registered in the school system with up-to-date information.

Public Warning and Notification - In the event of emergencies or hazardous conditions that require timely and targeted communication to the public, Aitkin County utilizes the CodeRED Mass Notification System and the Aitkin County Sheriff's Office Facebook page, as well as local news media. Aitkin County promotes the use of NOAA weather radios by critical facilities and the public to receive information broadcast from the National Weather Service.

Public Education and Awareness - Aitkin County promotes the National Weather Service's "Winter Hazard Awareness Week" held in November each year. The event seeks to educate residents on the dangers of winter weather and how to properly deal with it.

Program Gaps or Deficiencies

No program gaps or deficiencies were identified.

4.4.5 Extreme Heat

Human beings need to maintain a constant body temperature if they are to stay healthy. Working in high temperatures induces heat stress when more heat is absorbed into the body than can be dissipated out. Heat illness such as prickly heat, fainting from heat exhaustion, or heat cramps are visible signs that people are working in unbearable heat. In the most severe cases, the body temperature control system breaks down altogether and body temperature rises rapidly. This is a heat stroke, which can be fatal. The NWS issues a heat advisory when, during a 24-hour period, the temperature ranges from 105°F to 114°F during the day, and remains at or above 80°F at night.

Extreme Heat History in Aitkin County

Summer temperatures in Aitkin have reached 100°F (August 1976). July is the warmest month, with an average high of 80°F (The Weather Channel, 2014).

Extreme Heat and Climate Change

Minnesota's average temperature has increased more than 1.5°F since recordkeeping began in 1895, with increased warming happening in recent decades (International Climate Adaptation Team, 2013). Annual temperatures in the Midwest have generally been well above the 1901-1960 average since the late 1990s, with the decade of the 2000s being the warmest on record (Kunkel, et al., 2013). The Midwest has experienced major heat waves and their frequency has increased over the last six decades

(Perera, Sanford, White-Newsome, Kalkstein, Vanos, & Weir, 2012). In the U.S, mortality increases 4% during heat waves compared with non-heat wave days (Anderson & Bell, 2011). During July 2011, 132 million people across the U.S were under a heat alert, and on July 20 the majority of the Midwest experienced temperatures in excess of 100°F. Heat stress is projected to increase as a result of climbing summer temperatures and humidity (Schoof, 2012).

Relationship to other Hazards

Drought and Wildfire - Dry, hot conditions can reduce the protective moisture of woodlands and increase the risk of wildfire.

Public Safety - Anyone exposed to extreme heat can develop heat exhaustion and heat stroke. The elderly, children and those who engage in outdoor work or recreation may be most susceptible to the danger of extreme heat.

Plans and Programs in Place

School Closings - All school districts in Aitkin County have a school closing policy and communications plan in place if inclement weather or temperatures create a hazardous situation for students or staff. Schools have notification systems which allow them to notify all families who are registered in the school system with up-to-date information.

Public Warning and Notification - In the event of emergencies or hazardous conditions that require timely and targeted communication to the public, Aitkin County utilizes the CodeRED Mass Notification System and the Aitkin County Sheriff's Office Facebook page, as well as local news media. Aitkin County promotes the use of NOAA weather radios by critical facilities and the public to receive information broadcast from the National Weather Service.

Program Gaps or Deficiencies

No program gaps or deficiencies were identified.

4.4.6 Flash Flood and Riverine Flood

Flooding is a significant natural hazard throughout the United States. The type, magnitude, and severity of flooding are functions of the amount and distribution of precipitation over a given area, the rate at which precipitation infiltrates the ground, the geometry and hydrology of the catchment, and flow dynamics and conditions in and along the river channel. Upstream floods, also called flash floods, occur in the upper parts of drainage basins and are generally characterized by periods of intense rainfall over a short duration. These floods arise with very little warning and often result in locally intense damage, and sometimes loss of life, due to high energy of the flowing water. Flood waters can snap trees, topple buildings, and easily move large boulders or other structures. Six inches of rushing water can upend a person; another 18 inches might carry off a car. Generally, upstream floods cause damage over relatively localized areas, but they can be quite severe. Urban flooding is a type of upstream flood, which involves the overflow of storm drain systems and can be the result of inadequate drainage combined with heavy rainfall or rapid snowmelt. Upstream or flash floods can occur at any time of the year in Minnesota, but

they are most common in the spring and summer. Two flash floods have been recorded in Aitkin County since 2002.

Downstream floods, sometimes called riverine floods, refer to floods on large rivers at locations with large upstream catchments. Downstream floods are typically associated with precipitation events that are of relatively long duration and occur over large areas. Flooding on small tributary streams may be limited, but the contribution of increased runoff may result in a large flood downstream. The lag time between precipitation and the flood peak is much longer for downstream floods than for upstream floods, generally providing ample warning for people to move to safe locations and, to some extent, secure some property against damage.

Flood History in Aitkin County

Flooding in Aitkin County is a major concern because the Mississippi River floodplain consumes a large portion of the county. There has been some flooding in the history of Aitkin County associated with the Mississippi River. In 1950, heavy spring flooding culminated in a substantial flood, ultimately causing the local government to develop a solution to prevent future damages. The Mississippi River Diversion Channel, located north of Aitkin, was part of that solution. It stands as the only diversion channel on the Mississippi river between Lake Aitkin and the Gulf of Mexico. Later in the 1970s, a dike system was established to further protect the city.

In April of 1995, the Mississippi River began rising due to rapid snowmelt and heavy rainfall from a storm system passing over the county. Property damage was minimal, with only one house in Brainerd that reported flooding. However, many secondary roads were washed out or had standing water.

An area where erosion is a problem by the Mississippi River is along Aitkin County State-Aid Highway (CSAH) 10. The riverbank failed most recently on August 16th, 1998. The failure affected one lane of the highway, and the county closed it to traffic. The Aitkin County Board requested a Stream Bank Protection study from the U.S. Army Corps of Engineers in August 1998. The St. Paul District completed the study and the project was approved on May 10, 1999. Rock placement was completed in February 2001. Willow plantings and seeding were completed in November 2001.

In the spring of 2001, lingering snow pack with a high water content, combined with three heavy rainfall events during the month of April, led to significant flooding along parts of the Mississippi River, Sandy River, and Big Sandy Lake. The water level came within 4 inches of rendering the City of Aitkin sewage treatment plant inoperative. During this time, the wastewater treatment plant went into emergency operation. Despite sandbagging efforts, thousands of dollars in damage to homes, businesses, and roads occurred. Damage to public property was estimated at \$675,000 countywide. Dollar loss to private property was not available for this study. The 2001 flood reached the second highest elevation since 1950. The flooding along the Mississippi River in 2001 was also accompanied by flooding on Big Sandy Lake resulting in approximately 200 homes being flooded. These houses were all located within the water easement used by the Army Corps of Engineers. Some township roads around Big Sandy were under water.

Aitkin Township is located in a natural floodplain, causing flooding on individual properties when dams are released upstream. In Idun Township flooding is experienced nearly every year resulting in road damages and washouts. Kimberly Township has indicated that flooding from excessive rainfall is a problem and causes roads and culverts to wash out. Farm Island Township received money from FEMA to repair road damages caused by heavy rains in April 2001. Flooding in the spring of 2001 also caused road damages in Spencer Township. Logan Township has two rivers within its borders that have caused damages in the past when water levels have risen above normal. Spring flooding in Shamrock Township on Big Sandy Lake can occur and cause water and ice damages along the lakeshore. Road washouts in the springtime have also been a problem in Lakeside Township.

The most recent flooding event in Aitkin County occurred in June of 2012. Heavy precipitation in Aitkin County, the upper Mississippi Headwaters Region and the Big Sandy Lake watershed caused severe flooding along the Mississippi River and Big Sandy Lake. The flooding persisted on Big Sandy Lake and the Mississippi River for weeks. The crest on the Mississippi River at Aitkin of 18.71 feet was the highest level since the diversion channel was constructed following the 1950 flood. The crest on Big Sandy Lake at 1222.93 feet was over a foot higher than 2001 and the highest level since records started being kept in 1972. This flood event resulted in over 100,000 sandbags being deployed, electrical services being disrupted and roads being impassable - cutting off a significant population from emergency services. This disaster (Federal Disaster Declaration: DR-4069) affected hundreds of homes and had public sector cost of over \$1.7 million dollars.

Numerous roads in the county were closed due to washed out roadbeds and culverts, and high water levels. Cabins, roads, and boatlifts around Big Sandy Lake were under water, as heavy rains caused lake levels to rise 6' above normal. Homes along the Rice River also flooded (CBS Minnesota, 2012).

In an interview with Minnesota Public Radio in late June, 2012, Aitkin County Sheriff Scott Turner figured that more than 250 homes across the county were affected by high water. The town of Aitkin ran 3 bilge pumps nonstop to keep water from backing up into the wastewater treatment system, pumping around 14 million gallons a day (Robertson, 2012).

Table 24 below lists Aitkin County's historical floods since 1996 as recorded by the NODC.

Table 24. Aitkin County Historical Floods (1996-May 2014)

Location or County	Date	Type	Deaths	Injuries	Property Damage
Aitkin	5/1/2013	Flood	0	0	0
Aitkin	4/30/2013	Flood	0	0	0
Libby	7/1/2012	Flood	0	0	0
Aitkin	7/1/2012	Flood	0	0	0
Libby	6/20/2012	Flood	0	0	0
Aitkin	6/17/2012	Flood	0	0	0
Libby	6/1/2012	Flood	0	0	0
Aitkin	6/1/2012	Flood	0	0	0
Aitkin	5/26/2012	Flood	0	0	0

Location or County	Date	Type	Deaths	Injuries	Property Damage
Aitkin	5/5/2011	Flood	0	0	0
Aitkin	4/11/2011	Flood	0	0	0
Nichols	12/7/2010	Flood	0	0	0
Aitkin Airport	11/1/2010	Flood	0	0	0
Aitkin	7/14/2009	Flash Flood	0	0	0
Redtop	7/7/2002	Flash Flood	0	0	0
Highest Value Property Damage:					0

Source: National Climatic Data Center

The National Oceanic and Atmospheric Administration (NOAA) Advanced Hydrologic Prediction Service provides information from gage locations at points along various rivers across the United States. There is one stream gage in Aitkin County, on the Mississippi River at the city of Aitkin.

Table 25. Historical Flood Crests for USGS gaging station on the Mississippi River at Aitkin

Date	Gage Height (Feet)	Streamflow (cfs)
May 20, 1950	22.49	20,000
Jun. 1888	19.80	13,100
Jul. 06, 1905	19.50	12,400
Apr. 29, 1916	19.30	12,000
Jun. 09, 1944	18.80	12,600
Apr. 27, 1948	18.77	12,000
May 12, 1938	18.70	12,000
Jun. 28, 2012	18.61	15,200
1899	18.40	10,900
Jun. 15, 1908	18.20	10,300

Vulnerability and Future Development

For all new development, Aitkin County Planning and Zoning's Department has a stand-alone Floodplain Ordinance (June 6, 2001) that requires all new roads and driveways be built within 2 feet of the regulatory flood elevation, which is 1 foot above the 100-year flood mark for flood protection elevation. In addition, county GIS capabilities for making land use decisions is considerably greater than it was 10 years ago, and reduces chances of making mistakes when it comes to any new development in flood-prone areas. Prior to any new construction, parcel data is reviewed to make a determination if it is inside or outside of the floodplain. If there is a difficult time determining this, a surveyor will visit the property to make an official determination. If a property is deemed to be built within the floodplain, then an Elevation Certificate must be provided by the builder to prove that they have built on fill above the required flood protection elevation through mitigation efforts (Terry Neff, Aitkin County Environmental Services Director).

All cities in Aitkin county report that they address improvements to culverts on an annual basis to assist with water drainage as needed to mitigate against road flooding.

The City of Aitkin has been trying to get easements for the dike/levee that is currently in place. The dike is in need of maintenance; however, back in the day, easements were not recorded. Getting easements now has been a lengthy process and is not complete. Until Aitkin has all of the easements, the city cannot begin to work on maintenance of the dike.

According to John Welle, Aitkin County Engineer,

We are constantly working to reduce potential impacts to our local road system resulting from disaster events. Improving drainage along our unimproved roadways and raising roadways in flood-prone areas makes those roads less susceptible to flood damage. Replacing culverts when they are deteriorated greatly reduces the probability of road washouts during flooding events. Clearing of trees that are close to the road reduces the risk of downed trees blocking highways during wind or ice events. We also try to remove beaver dams that are holding back dangerously high volumes of water, although this is often complicated by land ownership issues.

Hazus-MH Hazard Analysis

Hazus-MH was used to estimate the damages incurred for a 100-year flood event in Aitkin County using a Q3 and a 10-meter DEM (digital elevation model) to create a flood depth grid.

Aitkin County specific building data was sourced from the parcel tax databases and building location point databases included building valuations and occupancy class. Building counts were aggregated from the individual parcel records to the relevant census administrative boundaries. There are an estimated 18,017 buildings in the region with a total replacement value (excluding contents) of \$1.2 billion (2006 dollars). Approximately 87.6% of the buildings (and 80.25% of the building value) are associated with residential housing. Using the Aitkin County general building stock, the Hazus model reported an estimated 403 buildings will be at least moderately damaged. This is over 28% of the total number of buildings in the scenario. There are an estimated 204 buildings that will be completely destroyed.

The total economic loss estimated for the flood is \$73 million dollars, which represents 8.5% of the total replacement value of the scenario buildings. Building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood. The total building-related losses were \$72.6 million dollars. 1% of the estimated losses were related to the business interruption of the region. Residential occupancies made up 72.8% of the total loss.

The reported building counts should be interpreted as degrees of loss rather than an exact number of buildings exposed to flooding. These numbers were derived from aggregate building inventories which

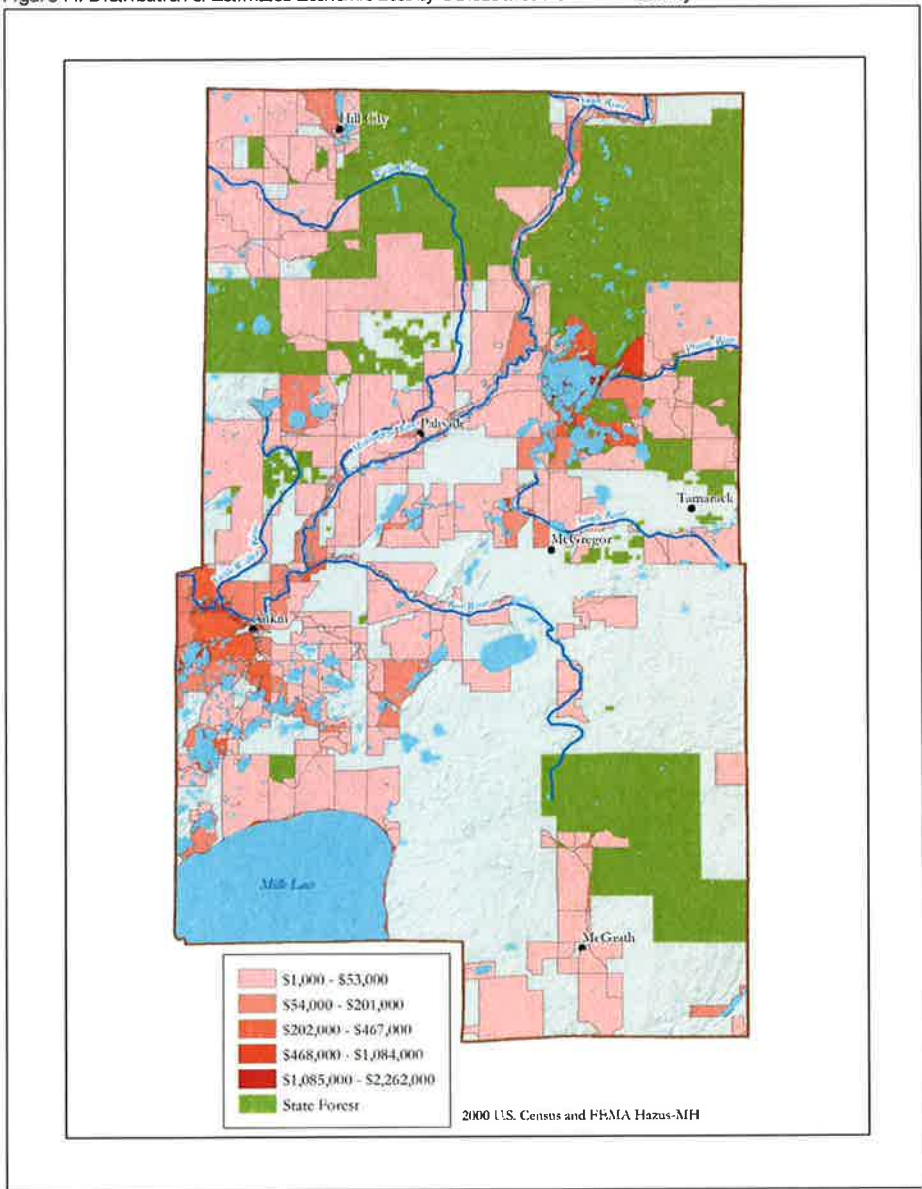
are assumed to be dispersed evenly across census blocks. Hazus-MH requires that a predetermined amount of square footage of a typical building sustain damage in order to produce a damaged building count. If only a minimal amount of damage to buildings is predicted, it is possible to see zero damaged building counts while also seeing economic losses. The total estimated number of damaged buildings, total building losses, and estimated total economic losses are shown in

Table 26. The distribution of economic losses for Aitkin County is depicted in Figure 14.

Table 26. Aitkin County Total Economic Loss from 100-Year Flood

General Occupancy	Estimated Total Buildings	Total Damaged Buildings	Total Building Exposure (In \$1000s)	Total Economic Loss (In \$1000s)	Building Loss (In \$1000s)
Agricultural	1517	9	\$83,409	\$8,382	\$1,144
Commercial	405	7	\$38,246	\$3,855	\$715
Education	13	0	\$38,830	\$1,073	\$164
Government	140	0	\$24,722	\$1,482	\$199
Industrial	45	0	\$12,430	\$479	\$94
Religious/ Non-Profit	115	0	\$41,782	\$4,622	\$818
Residential	15,782	394	\$972,529	\$53,193	\$35,387
Total	18,017	410	\$1,211,948	\$73,086	\$38,521

Figure 14. Distribution of Estimated Economic Loss by Census Block for Aitkin County in 100-Year Flood



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 because values are distributed evenly in a census block. The 3 census blocks showing the highest estimated loss values are shown in Table 27, with their spatial extents shown in Figure 15, Figure 16, and Figure 17.

Table 27. Aitkin County Census Blocks with the Greatest Estimated Total Losses in the 100-Year Floodplain

Census Block Number	Total Estimated Loss	Location
270019901001127	\$2,262,000	Big Sandy Lake
270019901001164	\$2,256,000	Big Sandy Lake
270019901001168	\$1,521,000	Big Sandy Lake

Figure 15. Census Block 270019901001127 and 100-Year Floodplain on Big Sandy Lake

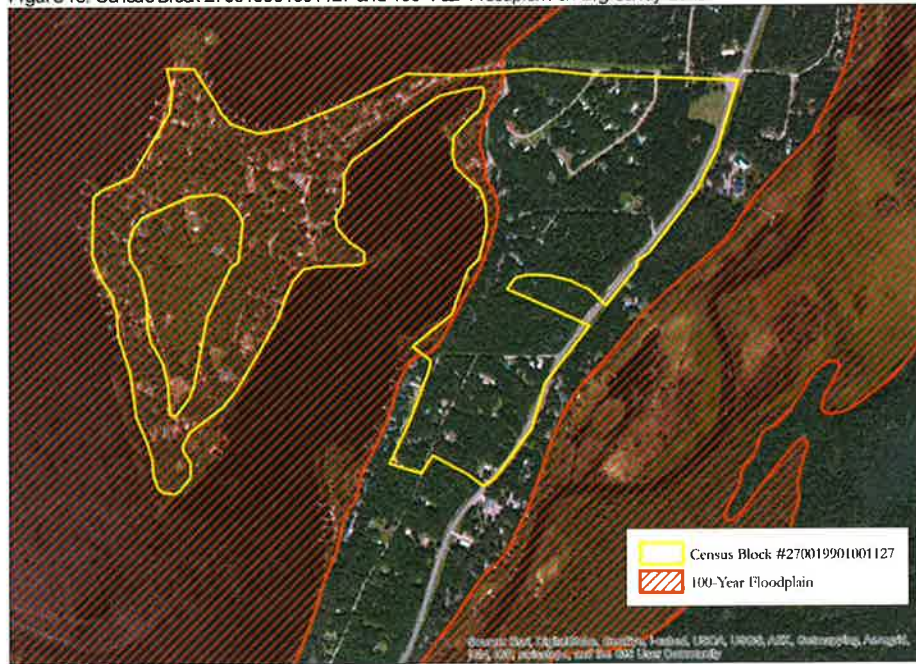


Figure 16. Census Block 270019901001164 and 100-Year Floodplain on Big Sandy Lake



Figure 17. Census Block 270019901001168 and 100-Year Floodplain on Big Sandy Lake



Another analysis was performed by selecting only the parcels with the highest values (building plus contents) that fell within the 100-year floodplain. The results of this analysis (and total values) are shown in Table 28.

Table 28. Aitkin County Properties with Highest Building/Contents Value Intersecting 100-Year Floodplain

Edited Parcel ID Number	Parcel Building + Contents Total Value	Class Description	Building Area (ft ²)
29-1-377600	\$3,015,800	Churches/Non-Profit	34,945
56-0-157800	\$1,573,200	Residential Multi-dwellings (5-9 units)	13,040
56-0-158300	\$1,388,600	Retail Trade	4
56-0-175100	\$1,150,200	Residential Multi-dwellings (5-9 units)	12,686
01-0-051700	\$912,600	General Government Services	1
56-0-158000	\$902,200	Retail Trade	24,810
08-0-019600	\$798,000	General Government Services	12,024
56-0-124307	\$763,600	Retail Trade	26,976
56-0-158200	\$759,800	Retail Trade	10,561
29-0-014404	\$620,100	Single Family Dwelling	11,612
Total	\$11,884,100		

Hazus-MH Essential Facility Loss Analysis

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). Only 1 of the essential facilities (care facilities, fire stations, police stations, and schools) included in the Hazus-MH analysis falls within the flood boundary, a fire station in Jacobson, with expected damage classified as "At Least Moderate" (Table 29 and Figure 18).

Table 29. Aitkin County Essential Facilities within estimated 100-Year Flood Boundary

Type	Name	Site Address	City
Fire Station	Jacobson Fire Department	68368 198th Avenue	Jacobson

Figure 18. Jacobson Fire Department and 100-Year Floodplain



Hazus-MH Shelter Requirement Analysis

Hazus-MH estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus-MH also estimates those displaced people that may require accommodations in temporary public shelters. The model estimates 726 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, the model estimates 794 people (out of a total 2000 census population of 15,301) may seek temporary shelter in public shelters.

Hazus-MH Debris Generation Analysis

Hazus estimates the amount of debris that may be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 33,042 tons of debris may be generated. Finishes composes 37% of the total and structural composes another 37% of the total. If the debris tonnage is converted into an estimated number of truckloads, it will require 1,322 truckloads (@25 tons/truck) to remove the debris generated by the flood.

Flooding and Climate Change

As Minnesota's climate changes, the quantity and character of precipitation is changing. Average precipitation has increased in the Midwest since 1900, with more increases in recent years. The Midwest has seen a 45% increase in very heavy precipitation (defined as the heaviest 1% of all daily events) from 1958 to 2011 (National Climate Assessment Development Advisory Committee, 2013). This precipitation change has led to amplified magnitudes of flooding. Increased precipitation may also show seasonal changes, trending toward wetter springs and drier summers and falls. An example of a recent year with this character was 2012, when many MN counties were eligible for federal disaster assistance for drought, while others were eligible for flooding, and seven were eligible for both in the same year (Seeley, 2013).

Relationship to other Hazards

Severe storms and blizzards - Slow moving thunderstorms and snow melt can contribute to flooding and, under the right circumstances, flash flooding.

Dam Failure - Flood events can compromise the structural integrity of dams.

Public Health - Public health can be affected as a result of wastewater spills due to flooding or power failures.

Water Main Breaks - Surges in water pressure as a result of water pumps starting after power outages can lead to water main breaks.

Plans and Programs in Place

Floodplain Ordinances - The Aitkin County Office of Zoning and Environmental Services and cities within the county have floodplain ordinances in place which regulate development and setbacks on shorelines and include the state floodplain and shoreland standards. These programs set minimum standards for local units of government that regulate development within shoreland and floodplain areas. Aitkin County and the cities of Aitkin, Hill City, McGregor, and Palisade have adopted floodplain ordinances, though the Hill City and McGregor ordinances need to be amended.

National Flood Insurance Program (NFIP) - The NFIP is a federal program created by Congress to mitigate future flood losses nationwide through sound, community-enforced building and zoning ordinances and to provide access to affordable, federally-backed flood insurance protection for property owners. The NFIP is designed to provide an insurance alternative to disaster assistance to meet the escalating costs of repairing damage to buildings and their contents caused by floods. Participation in the NFIP is based on an agreement between local communities and the federal government that states that if a community will adopt and enforce a floodplain management ordinance to reduce future flood risks to new construction in Special Flood Hazard Areas (SFHAs), the federal government will make flood insurance available within the community as a financial protection against flood losses. Aitkin County and the cities of Aitkin, Hill City, McGregor, and Palisade are members of the National Flood Insurance Program. Aitkin, Hill City, McGregor, and Palisade are FEMA Mapped High Risk Areas. The cities of McGrath and Tamarack are not members of the NFIP, but neither have FEMA Mapped High Risk Areas.

Road Infrastructure and Drainage - Public Works staff at the county, city and township level work on culvert and ditch maintenance to prevent road flooding. Ice dams in culverts are monitored and addressed to reduce road flooding during spring thaws. The county has put a priority on culvert improvements to avoid road washouts.

Stream Gauging - The National Weather Service and the U.S Geological Society provide real-time websites that gauge stream flow in area streams and rivers. Mississippi River flowage levels for the city of Aitkin can be accessed online and used to inform the public of areas expected to be flooded as the river level rises.

U.S Army Corps of Engineers (USACE) - The Army Corps of Engineers has a notification list of at-risk properties within Aitkin County, and provides hourly updates on flowage at the Big Sandy Lake dam. The USACE also has a GIS inventory of structures and roads within their identified flowage easements.

Repetitive Loss Structures - Aitkin County has the ability to purchase repetitive loss properties. However, there are no repetitive loss properties in the county.

Mississippi River Diversion Channel - The Mississippi River Diversion Channel, located north of Aitkin, was constructed to protect the city of Aitkin from flooding by the Mississippi River. Later in the 1970s, a dike system was established to further protect the city. Local officials continue to advocate for additional infrastructure improvements to reduce the impacts of Mississippi River flooding in the Aitkin, Palisade and Big Sandy Lake areas.

Public Warning and Notification - In the event of emergencies or hazardous conditions that require timely and targeted communication to the public, Aitkin County utilizes the CodeRED Mass Notification System and the Aitkin County Sheriff's Office Facebook page, as well as local news media. Aitkin County promotes the use of NOAA weather radios by critical facilities and the public to receive information broadcast from the National Weather Service.

Program Gaps or Deficiencies

Diversion Channel - Ongoing maintenance and repairs are needed to the Mississippi Diversion Channel north of the city of Aitkin.

Mississippi River Dike Easement - If the city of Aitkin wants to inspect the dike which surrounds the low parts of Aitkin, they do not have an easement to do so and do not have the ability to maintain the dike. With legal authority this would be possible, but landowners have resisted granting an easement to the city.

Beaver Dams and Flood Risk - Beaver dams have impounded many areas with water, and under normal rain events they are not a problem. However, in the event of flash flooding, when beaver dams break, road infrastructure is burdened with a major additional flow of water.

Road and Culvert Improvements - Aitkin County strives to constantly improve its road and culvert infrastructure against flooding, but is limited by financial resources to go beyond maintenance on some projects.

4.4.7 Drought

A drought refers to an extended period of deficient rainfall relative to the statistical mean for a region. Drought can be defined according to meteorological, hydrological, socioeconomic, and agricultural criteria. Meteorological drought is qualified by any significant deficit of precipitation. Hydrological drought is manifest in noticeably reduced river and stream flow and critically low groundwater tables. The term agricultural drought indicates an extended dry period that results in crop stress and harvest reduction. Socioeconomic drought refers to the situation that occurs when water shortages begin to affect people and their lives. It associates economic goods with the elements of meteorological, agricultural, and hydrological drought. Many supplies of economic goods (e.g., water, food grains, and hydroelectric power) are greatly dependent on the weather. Due to natural variations in climate, water supplies are high in some years but low in others. Fluctuating long-term climate variations make drought difficult to predict.

Drought History in Aitkin County

National Climatic Data Center records show no droughts in Aitkin County. However, the county was part of a 2003 U.S. Department of Agriculture designation of 62 counties in Minnesota as primary agricultural disaster areas due to drought.

The hazard ranking of drought in Aitkin County is moderate. A drought may not have a severe impact on human life due to decreased water access; however, droughts in Aitkin County are of particular concern because of the potential for forest fires as well as the impacts lower lake levels have on recreation.

Drought and Climate Change

Droughts have been happening throughout Minnesota's history and it is not yet clear how climate change may impact this (International Climate Adaptation Team, 2013). While there was no apparent change in drought duration in the Midwest over the past century (Dai, 2011), the average number of days without precipitation is projected to increase in the future (National Climate Assessment Development Advisory Committee, 2013).

Even in areas where precipitation does not decrease, projected higher air temperatures will cause increased surface evaporation and plant water loss, leading to drier soils. As soil dries out, a larger proportion of the incoming heat from the sun goes into heating the soil and adjacent air rather than evaporating its moisture, resulting in hotter summers under drier climatic conditions (Mueller & Seneviratne, 2012).

Relationship to other Hazards

Wildfires - A drought situation can significantly increase the risk of wildfire.

Plans and Programs in Place

Aitkin County Comprehensive Water Plan - Aitkin County has a water plan in place that describes major aquifers and addresses water needs within the county. The Aitkin County Soil and Water Conservation District (SWCD) oversees updating the plan and identifying priorities for surface water and ground quality and quantity. Cities in Aitkin County are covered under the plan.

Well Monitoring - The Aitkin County SWCD routinely monitors six wells throughout the county for water levels for ground waters.

Program Gaps or Deficiencies

No program gaps or deficiencies were identified.

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SECTION 5 – MITIGATION STRATEGY

The goal of mitigation is to protect lives and reduce the future impacts of hazards including property damage, disruption to local and regional economies, the amount of public and private funds spent to assist with recovery, and to build disaster-resistant communities. Mitigation actions and projects should be based on a well-constructed risk assessment, provided in Section 4 of this plan. Mitigation should be an ongoing process adapting over time to accommodate a community's needs.

5.1 Community Capability Assessment

The capability assessment identifies current activities used to mitigate hazards. The capability assessment identifies the policies, regulations, procedures, programs, and projects that contribute to the lessening of disaster damages. The assessment also provides an evaluation of these capabilities to determine whether the activities can be improved in order to more effectively reduce the impact of future hazards. The following sections identify existing plans and mitigation capabilities within all of the communities.

5.1.1 National Flood Insurance Program (NFIP)

The NFIP is a federal program created by Congress to mitigate future flood losses nationwide through sound, community-enforced building and zoning ordinances and to provide access to affordable, federally-backed flood insurance protection for property owners. The NFIP is designed to provide an insurance alternative to disaster assistance to meet the escalating costs of repairing damage to buildings and their contents caused by floods. Participation in the NFIP is based on an agreement between local communities and the federal government that states that if a community will adopt and enforce a floodplain management ordinance to reduce future flood risks to new construction in Special Flood Hazard Areas (SFHAs), the federal government will make flood insurance available within the community as a financial protection against flood losses.

Aitkin County and the cities of Aitkin, Hill City, McGregor, and Palisade are members of the National Flood Insurance Program. Aitkin, Hill City, McGregor, and Palisade are FEMA Mapped High Risk Areas. The cities of McGrath and Tamarack are not members of the NFIP, but neither have FEMA Mapped High Risk Areas. According to the 2009 update of the Aitkin County Comprehensive Local Water Management Plan, areas of the base (100-year) flood have been identified by the National Flood Insurance Program. These floodplain areas are represented on Flood Insurance Rate Maps (F.I.R.M.) as of March 15, 1982.

There are no repetitive loss properties in the county.

5.1.2 Plans and Ordinances

Aitkin County and its incorporated communities have a number of plans and ordinances in place to ensure the safety of residents and the effective operation of communities. These include the Comprehensive Land Use Plan, Comprehensive Local Water Management Plan, Comprehensive Recreation Trail Plan, and ordinances relating to law enforcement, land & recreation, environmental services, planning & zoning, and food/beverages/lodging. In Section 4.4 of this plan (Hazard Profiles) a review of the plans and programs in place as well as any identified program gaps or deficiencies was

included as related to each of the natural hazards addressed in the plan. Information was collected through phone interviews and email surveys with representatives of the county, cities, and school districts. The review of this information was used to inform the development of mitigation strategies for the 2014 plan update.

5.2 Mitigation Goals

In Section 4.0 of this plan, the risk assessment identified Aitkin County as prone to a number of natural hazards. The steering committee members understand that although hazards cannot be eliminated altogether, Aitkin County can work toward building disaster-resistant communities.

The goals, strategies and objectives listed in the 2014 Minnesota State Hazard Mitigation Plan were adopted for use in the Aitkin County Plan (Table 30). This framework will allow for integration of the mitigation actions that are listed by Aitkin County and its jurisdictions into the state plan. The state will then be able to develop a statewide strategy that will benefit all of Minnesota.

Table 30. Goals, Strategies, and Objectives from 2014 Minnesota State Hazard Mitigation Plan

Flooding Goal: Reduce deaths, injuries, property loss and economic disruption due to all types of flooding (riverine, flash flooding, dam/levee failure)	
Mitigation Strategy	Objectives
Prevention:	Planning, technical studies, training, adoption of ordinances and legislation, acquisition and use of equipment, establishing shelters, and encouraging participation in NFIP and CRS will be used to prevent or reduce risks to lives and property from flooding.
Property Protection:	Acquisition, repair, or retrofitting of property and acquisition and use of equipment will be used to prevent or reduce risks to property from flooding.
Public Education and Awareness	Public education and access to information will be used to raise public awareness of risks from flooding in order to prevent or reduce those risks.
Natural Resource Protection:	Stream corridor protection projects and restoration and soil erosion control projects will be used to prevent or reduce risks and increase the protection of natural resources from flooding.
Emergency Services:	Technological improvements, warning systems, responder training, emergency response services, acquisition and use of equipment, and planning will provide emergency services to prevent or reduce the risks to lives and property from flooding.
Structural Improvements:	Construction and maintenance of drains, sewer drainage and separation projects, floodwalls, dams, culverts, levees, roads, bridges, and general flood protection projects will be used to prevent or reduce damages from flooding, loss of services to critical equipment, and the risks they pose to lives, property, and the natural environment.
Wildfire Goal: Reduce deaths, injuries, property loss, natural resource and economic disruption due to wildfire.	
Mitigation Strategy	Objectives

Prevention:	Enforcement of regulations, adoption of ordinances, technical studies, and planning will be used to prevent or reduce wildland fires and the risks they pose to lives, property, and the natural environment.
Property Protection:	Vegetation management, defensible space, and water treatment measures (for example, sprinklers) will be used to prevent or reduce the risk of wildland fires.
Public Education and Awareness:	Public education and access to information will be used to raise public awareness of risks from wildland fires in order to prevent or reduce those risks, specifically the Firewise program.
Emergency Services:	Planning, responder training, acquisition and use of equipment, evacuations, warning systems, technological improvements, and emergency response services will provide emergency services to prevent or reduce risks to lives and property from wildland fires.
Structural Improvements:	New or retrofit construction utilizing fire resistant building materials and installation and maintenance of sprinkler and warning systems will be used to prevent or reduce the risk of wildland fires.
Windstorms Goal: Reduce deaths, injuries, property loss, and economic disruption due to windstorms.	
Mitigation Strategy	Objectives
Prevention:	Planning, training, technical studies, acquisition and use of equipment, adoption of ordinances and legislation, and construction of new or retrofitting safe rooms will be used to prevent or reduce risks from windstorms to lives, property, and economic activity.
Property Protection:	Constructing safe rooms and storm shelters, retrofitting, and vegetation management will be used to prevent or reduce risks to the protection of property from windstorms.
Public Education and Awareness:	Public education, warning systems, and access to information will be used to raise public awareness of risks from windstorms in order to prevent or reduce those risks.
Emergency Services:	Warning systems, responder training, emergency response services, technological improvements, and response and recovery planning will provide emergency services to prevent or reduce risks from windstorms.
Structural Improvements:	Construction of storm shelters and safe rooms and maintenance of other structural projects will be used to prevent or reduce risks from windstorms.
Severe Winter Storms Goal: Reduce deaths, injuries, property loss, and economic disruption due to severe winter storms.	
Mitigation Strategy	Objectives
Prevention:	Acquisition and use of equipment, adoption and enforcement of ordinances and legislation, planning, training, and technical studies will be used to prevent or reduce risk to the protection of lives, property, and economic activity from the risks from severe winter storms.
Property Protection:	Acquisition and use of equipment and vegetation management will be used to prevent or reduce risks to property from severe winter storms.
Public Education and Awareness:	Public education, warning systems, access to information, and outreach projects will be used to raise public awareness of the risks from severe winter storms in order to reduce those risks.

Emergency Services:	Acquisition and use of equipment, emergency response services, warning systems, technological improvements, planning, and responder training will provide emergency services to prevent or reduce risks from severe winter storms.
Structural Improvements:	Structural projects for critical infrastructure will be implemented and maintained to prevent or reduce risks from severe winter storms.
Lightning Goal: Reduce deaths, injuries, property losses, loss of services, and economic disruption due to lightning	
Mitigation Strategy	Objectives
Prevention:	Planning, technical studies, acquisition and use of equipment, adoption of ordinances and legislation, and establishing shelters will be utilized to prevent or reduce the risks from lightning.
Property Protection:	Retrofits and construction of safe rooms and storm shelters will be used to prevent or reduce the risks to property from lightning.
Public Education and Awareness:	Public education, outreach projects, and access to information will be used to raise public awareness of risks from lightning in order to prevent or reduce those risks.
Emergency Services:	Responder training, warning systems, emergency response services, planning, acquisition and use of equipment, and technological improvements will provide emergency services to prevent or reduce risks to lives and property from lightning.
Structural Improvements:	The construction of safe rooms, shelters, and underground utility lines as well as maintenance of structural projects will be used to prevent or reduce risks from lightning.
Tornado Goal: Reduce deaths, injuries, property loss, and economic disruption due to tornadoes.	
Mitigation Strategy	Objectives
Prevention:	Adoption of ordinances and legislation, acquisition and use of equipment, planning, conducting technical training, studies, and retrofit or construction of safe rooms will be used to prevent or reduce risks to lives, property, and economic activity from tornadoes.
Property Protection:	Constructing safe rooms and storm shelters, and retrofits will be used to prevent or reduce risks to property from tornadoes.
Public Education and Awareness:	Warning systems, IPAWS, public education, and access to information will be used to raise public awareness of risks from tornadoes in order to prevent or reduce those risks.
Emergency Services:	Warning systems, technological improvements, responder training, planning, emergency response services, and acquisition and use of equipment will provide emergency services to prevent or reduce risks from tornadoes.
Structural Improvements:	Construction of storm shelter and safe rooms and maintenance of other structural projects will be used to prevent or reduce risks from tornadoes.
Drought Goal: Reduce economic loss and environmental impacts due to drought	
Mitigation Strategy	Objectives
Prevention:	Planning, acquisition and use of equipment, and technical studies will be used to prevent or reduce risks from drought.

Property Protection:	Water treatment measures will be used to prevent or reduce risks to property from drought.
Public Education and Awareness:	Public education and access to information will be used to raise public awareness of risks from drought in order to prevent or reduce those risks.
Natural Resource Protection:	Planning and implementing watershed plans will be used to prevent or reduce risks from drought.
Structural Improvements:	Technological improvements and acquisition of equipment for structural projects will be used to prevent or reduce risks from drought.
Extreme Heat Goal: Reduce deaths, injuries, and economic disruption due to extreme heat.	
Mitigation Strategy	Objectives
Prevention:	Planning and the acquisition and use of equipment will be used to prevent or reduce risks from extreme heat.
Property Protection:	Acquisition and use of equipment will be used to prevent or reduce risks to property and economic disruption from extreme heat.
Public Education and Awareness:	Public education and access to information will be used to raise public awareness of the risks from extreme heat in order to prevent or reduce those risks.
Structural Improvements:	Planning, responder training, warning systems, establishing shelters, and technological improvements will provide emergency services to prevent or reduce risks from extreme heat.
Extreme Cold Goal: Reduce deaths, injuries, property loss, and economic disruption due to extreme cold.	
Mitigation Strategy	Objectives
Prevention:	Planning and the acquisition and use of equipment will be used to prevent or reduce risks from extreme cold.
Property Protection:	Acquisition and use of equipment will be used to prevent or reduce risks to property and economic disruption from extreme cold.
Public Education and Awareness:	Public education and access to information will be used to raise public awareness of the risks from extreme cold in order to prevent or reduce those risks.
Structural Improvements:	Planning, responder training, warning systems, establishing shelters, and technological improvements will provide emergency services to prevent or reduce risks from extreme cold.

5.3 Mitigation Actions and Projects

Upon completion of the risk assessment and development of the goals and objectives, the planning committee was provided a list of the six mitigation measure categories from the FEMA State and Local Mitigation Planning How to Guides. The List of Mitigation Actions by Strategy provided by HSEM was used to assist in identifying mitigation action strategies. The measures are listed as follows:

- Prevention: Government, administrative, or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to

reduce hazard losses. Examples include planning and zoning, building codes, capital improvement programs, open space preservation, and stormwater management regulations.

- Property Protection:** Actions that involve the modification of existing buildings or structures to protect them from a hazard or removal from the hazard area. Examples include acquisition, elevation, structural retrofits, storm shutters, and shatter-resistant glass.
- Public Education and Awareness:** Actions to inform and educate citizens, elected officials, and property owners about the hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and school-age and adult education programs.
- Natural Resource Protection:** Actions that, in addition to minimizing hazard losses, preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- Emergency Services:** Actions that protect people and property during and immediately after a disaster or hazard event. Services include warning systems, emergency response services, and protection of critical facilities.
- Structural Projects:** Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, levees, floodwalls, seawalls, retaining walls, and safe rooms.

In the review and discussion of selected mitigation strategies and actions, steering committee members and public meeting participants were asked to consider the ranking of mitigation actions by priority for implementation. Guidance for ranking mitigation activities is drawn from FEMA evaluation criteria. The evaluation criteria (STAPLE+E) involved the following categories and questions.

Social:

- Will the proposed action adversely affect one segment of the population?
- Will the action disrupt established neighborhoods, break up voting districts, or cause the relocation of lower income people?

Technical:

- How effective is the action in avoiding or reducing future losses?
- Will it create more problems than it solves?
- Does it solve the problem or only a symptom?
- Does the mitigation strategy address continued compliance with the NFIP?

Administrative:

- Does the jurisdiction have the capability (staff, technical experts, and/or funding) to implement the action, or can it be readily obtained?
- Can the community provide the necessary maintenance?
- Can it be accomplished in a timely manner?

Political:

- Is there political support to implement and maintain this action?

- Is there a local champion willing to help see the action to completion?
- Is there enough public support to ensure the success of the action?
- How can the mitigation objectives be accomplished at the lowest cost to the public?

Legal:

- Does the community have the authority to implement the proposed action?
- Are the proper laws, ordinances, and resolutions in place to implement the action?
- Are there any potential legal consequences?
- Is there any potential community liability?
- Is the action likely to be challenged by those who may be negatively affected?
- Does the mitigation strategy address continued compliance with the NFIP?

Economic:

- Are there currently sources of funds that can be used to implement the action?
- What benefits will the action provide?
- Does the cost seem reasonable for the size of the problem and likely benefits?
- What burden will be placed on the tax base or local economy to implement this action?
- Does the action contribute to other community economic goals such as capital improvements or economic development?
- What proposed actions should be considered but be "tabled" for implementation until outside sources of funding are available?

Environmental:

- How will this action affect the environment (land, water, endangered species)?
- Will this action comply with local, state, and federal environmental laws and regulations?
- Is the action consistent with community environmental goals?

Implementation of the mitigation plan is critical to the overall success of the mitigation planning process. The first step is to decide, based upon many factors, which action will be undertaken first. In order to pursue the top priority first, an analysis and prioritization of the actions is important.

Table 31 lists the factors to consider in the analysis and prioritization of actions. Some actions may occur before the top priority due to financial, engineering, environmental, permitting, and site control issues. Public awareness and input of these mitigation actions can increase knowledge to capitalize on funding opportunities and monitoring the progress of an action.

Table 31. STAPLE+E Planning Factors

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 a 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, comply with federal, state, and local environmental regulations, and are consistent with the community's environmental goals, have mitigation benefits while being environmentally sound.

5.3.1 Hazard Mitigation Actions

Aitkin County and its included municipalities share a common Multi-Hazard Mitigation plan and worked closely to develop it. These people work together with their city councils and the Aitkin County Emergency Management Director to insure that the hazards and mitigation actions included in this plan are accurate and addressed in their jurisdictions. The jurisdictions responsible for each action are:

- Aitkin County
- Aitkin
- McGrath
- Hill City
- Palisade
- Tamarack
- McGregor
- Aitkin County School Districts

Table 32 lists all mitigation actions for Aitkin County and its jurisdictions. Appendix G contains separate mitigation action tables for each jurisdiction. Each of these mitigation action charts detail the hazard, the mitigation action to address it, the priority ranking for implementation (1=High Priority; 2= Moderate Priority; 3= Low Priority), its current stage of implementation, the timeframe for implementation going forward, the jurisdictions who have identified they will work to implement the action, the responsible parties to carry through with implementation, and comments on how the plan

will be implemented through existing planning mechanisms and funding to make implementation happen.

All of the mitigation actions identified in the 2005 Aitkin County Hazard Mitigation Plan have been carried over into the 2014 plan, based on the advisement of the Aitkin County Emergency Management Director and the consensus of the steering committee. None of the 2005 mitigation actions have been fully completed and are identified in the 2014 plan to reflect their ongoing implementation. Appendix I Documentation of Aitkin County 2005 Mitigation Actions for 2014 MHMP Update documents the carryover of these actions and the language revisions that they underwent for the 2014 plan to clarify or improve the wording of the mitigation action.

The status designations are:

- New – actions have not yet started
- Ongoing – actions require continuing application
- In Progress – actions are currently being acted upon
- Complete – the action is complete
- Deferred – no progress has been made
- Deleted – the action is no longer relevant

The mitigation types are defined as follows:

- P= Prevention
- PP= Property Protection
- PE= Public Education
- NRP= Natural Resource Protection
- ES=Emergency Services
- SI= Structural Improvement

Table 32. All Mitigation Actions for Aitkin County

Action Number	Hazard	Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
1	Violent Storms	Work with campground operators to post information regarding storm shelters and safety during strong summer storms.	2	PE	Ongoing	Ongoing	Aitkin County, Cities: Aitkin, Hill Cty, Palisade	County and City emergency managers, Aitkin County Environmental Services, MN DNR and concessionaires	Aitkin County Environmental Services will work with local jurisdictions that have campgrounds to provide information to campground operators. Funding to deliver task via staff time of EM and others participating.
2	Violent Storms	Work with the appropriate jurisdictions or agencies to place safety information at boat landings throughout Aitkin County regarding what to do in case of severe weather.	1	PE	Ongoing	Ongoing	Aitkin County, Cities: Aitkin, McGregor, Hill Cty, Palisade	Aitkin County Sheriff's Dept. and MN DNR	Aitkin County EM will work with local jurisdictions or MN DNR that own/operate boat launches. Funding to deliver task via staff time of EM and others participating.

Action Number	Hazard	Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
3	Violent Storms	Work with mobile home park owners to ensure they are meeting the standards set by the Minnesota Department of Health for approved storm shelters or evacuation plans for times of high winds or tornadoes.	1	P	Ongoing	Ongoing	Aitkin County, Cities: Aitkin	Aitkin County Environmental Services, mobile home park operators	Aitkin County Environmental Services will work to provide information and direct outreach to mobile home park operators not in compliance. Funding to deliver task via staff time of EM and others participating.

Action Number	Hazard	Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
4	Violent Storms	Promote the National Weather Service's "Severe Weather Awareness Week" held in April of each year. The event seeks to educate residents on the dangers of severe summer storm events and highlights the importance of preparing for severe weather before it strikes.	2	PE	Ongoing	Ongoing	Aitkin County, Cities: Aitkin, McGregor, Hill City, Palisade, Aitkin Public Schools ISD #1, Hill City School District ISD #2, McGregor Area School District ISD #4	National Weather Service, County and City emergency managers, School District Superintendents and school staffs, Aitkin County Public Health	The Aitkin County Sheriff's Office does this in conjunction with the National Weather Service annually. Information will be posted on the Sheriff's Facebook page and discussed with local jurisdictions. Testing of community warning sirens, media releases and use of county website will also serve as outreach tools. Funding to deliver task via staff time of EM and others participating.

Action Number	Hazard	Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
5	Violent Storms	Promote the National Weather Service's "Winter Hazard Awareness Week" held in November of each year. The event seeks to educate residents on the dangers of winter weather and how to properly deal with it.	2	FE	Ongoing	Ongoing	Aitkin County, Cities Aitkin, Palisade, Aitkin Public Schools ISD #1, Hill City School District ISD #2, McGregor Area School District ISD #4	Same as above	Same as above (Minus the siren testing)
6	Violent Storms	Review current information and delivery systems in place for public awareness and education of preparedness for severe winter and summer storms and improve upon them as needed.	1	FE	New	Ongoing	Aitkin County, Cities Aitkin, Palisade, Aitkin Public Schools ISD #1, Hill City School District ISD #2, McGregor Area School District ISD #4	County EM and local city emergency management, MN DNR, School District Superintendents and school staffs, Aitkin County Public Health	Aitkin County EM and local jurisdiction EMs will review the effectiveness of public outreach tools and improve upon them as needed. Funding to deliver task via staff time of EM and others participating.

Action Number	Hazard	Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
7	Violent Storms	Participate in annual "Skywarn Training" from the National Weather Service to train new storm spotters in Aitkin County and ensure existing storm spotters maintain their storm-spotting skill.	1	ES	Ongoing	Ongoing	Aitkin County, Cities Aitkin, McGregor, Hill Cty, Palisade, Aitkin Public Schools ISD #1, Hill City School District ISD #2, McGregor Area School District ISD #4	County EM and local city emergency management, MN DNR, and emergency response staff including EMS and Police	The Aitkin County Sheriff's Office does this in conjunction with the National Weather Service annually. County EM will work to keep jurisdictions informed and engaged in training. Also to inform and invite the public to attend. Funding to deliver task via staff time of EM and others participating.
8	Violent Storms	Continue to ensure that procedures are in place so that emergency management personnel, county sheriffs, and other emergency response teams are notified as soon as possible in the event of an approaching storm.	2	ES	Ongoing	Short-term	Aitkin County, Cities Aitkin, McGregor, Hill Cty, Palisade	County EM and local city emergency management, MN DNR, emergency response staff including EMS and Police	Aitkin County EM participates in NOAA webinars in advance of approaching storms that county/city can and do listen into and provide feedback. Funded by NOAA. Other funding to deliver task via staff time of EM and others participating.

Action Number	Hazard	Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
9	Violent Storms	Ensure that communication procedures are in place to effectively provide warning to residents and visitors in advance of approaching severe weather.	1	ES	New	Short-term	Aitkin County, Cities: Aitkin, Tamarack, Hill City, Palisade	County EM and local city emergency management, and emergency response staff including EMS and Police	Aitkin County Sheriff's Office will regularly review with local jurisdictions and MN DNR. Funding to deliver task via staff time of EM and others participating.
10	Violent Storms	Provide information to Aitkin County visitors and residents regarding how they can obtain information on severe weather and how to respond to dangerous weather conditions. Increase strategically located signage along roadways informing people about emergency information radio frequencies.	1	ES	Ongoing	Mid-Term	Aitkin County, Cities: Aitkin, McGregor	County EM and local city emergency management, Aitkin County Public Health, Aitkin County Highway Department	Aitkin County EM will use local news, websites, social media and work with local jurisdictions to help promote and raise awareness. County will fund road signage along County roads for emergency radio information.

Action Number	Hazard	Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
11	Violent Storms	Promote and educate Aitkin County residents, agencies, and communities about the use of NOAA weather radios for relaying weather-related emergency information.	1	PE	Ongoing	Ongoing	Aitkin County, Oties Aitkin, Palisade	County EM and local city emergency management, Aitkin County Public Health	Aitkin County EM will use local news, websites, social media and work with local jurisdictions to help promote and raise awareness. Funding to deliver task via staff time of EM and others participating.
12	Violent Storms	Work with local utility companies that serve Aitkin County to locate power lines underground or strengthen where it is feasible and cost effective to reduce the risk of power outages from downed lines during a severe storm. This could be done as part of new construction or as retrofit in areas deemed as high-priority.	2	S	Ongoing	Ongoing	Aitkin County, Oties Aitkin	Utility companies that serve Aitkin County: (Mille Lacs Electric, MN Power, Aitkin Public Utilities Commission); Partners include MN DNR, Aitkin County Land Department, City Public Works and Highway Departments	Aitkin County EM will work with respective utilities and participating jurisdictions as needed on a case-by-case basis. Projects may be eligible under FEMA HMA funding.

Action Number	Hazard	Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
13	Violent Storms	Maintain an aggressive right-of-way clearing program in order to reduce risks of downed trees interrupting the power supply.	2	P	Ongoing	Ongoing	Aitkin County, Cities: Aitkin	Utility companies have the lead responsibility. Partners include Mille Lacs Electric, the MN DNR, Aitkin County Land Department, City Public Works, and Highway Department	Aitkin County EM will work with the County Transportation Department and public works departments of local jurisdictions to identify any areas of concern that warrant action. County funding will address ROW clearing on County-owned roads.
14	Violent Storms	Maintain an aggressive brushing program in order to reduce the amount debris that could block a road after a severe windstorm or winter storm.	2	P	Ongoing	Ongoing	Aitkin County, Cities: Aitkin	Highway Departments are responsible for right of ways. DNR is a partner where applicable. Mille Lacs Electric	Same as above

Action Number	Hazard	Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
15	Violent Storms	Maintain an updated database of facilities in the county that have shelter agreements with the American Red Cross and the capabilities of each shelter to provide mass care in the event of violent storms.	1	ES	New / In Progress	Short-term	Aitkin County, Oties: Aitkin, McGregor, Tamarack, Palisade	County emergency managers, American Red Cross, Aitkin County Public Health	Aitkin County Public Health works with the Red Cross to obtain and keep a database of updated information. Funding to deliver task via staff time of EM and others participating. Aitkin County Public Health will coordinate with Red Cross in training personnel in 2014.
16	Violent Storms	Ensure there are personnel trained in shelter management within the County and each of its jurisdictions, engaging those who would play a role in emergency response leadership in the event of needing to activate a shelter for mass care.	1	ES	New / In Progress	Short-term	Aitkin County, Oties: Aitkin, Tamarack, Hill Qty, Palisade	Aitkin County Emergency Manager, Aitkin County Public Health, and American Red Cross	Funding provided to HSEM Region 2 for training under Mass Care grant in 2014. Other funding to deliver task via staff time of EM and others participating.

Action Number	Hazard	Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
17	Violent Storms	Research possible storm shelter and safe room locations within the County and each of its government jurisdictions including schools, mobile home parks, campgrounds or other areas where there are populations (residents or visitors) vulnerable to high winds and tornado events.	1	P	New	Long-term	Aitkin County, Cities: Aitkin, McGregor, Tamarack, Palisade, Aitkin Public Schools ISD #1, Hill City School District ISD #2, McGregor Area School District ISD #4	County EM and local city emergency management, School District Superintendents and school staffs, Red Cross, MN DNR, owners of private campgrounds and mobile home parks.	Aitkin County EM will work with respective jurisdictions as appropriate to research possible locations. Safe Room construction or retrofit projects may be eligible under FEMA HMA funding (see Action Item #16).

Action Number	Hazard	Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
18	Violent Storms	<p>Retrofit or construct new storm, shelter and safe room facilities in the identified vulnerable locations with specific information on location and building type to construct or retrofit.</p> <p>The term "safe room" applies to extreme wind (tornado), residential, non-residential and community safe rooms and tornado community safe rooms.</p> <p>(Locations may include schools, mobile home parks, campgrounds or other areas where there are populations - residents or visitors - vulnerable to high winds and tornadoes).</p>	1	S	New	Long-term	Aitkin County, Cities: McGregor, Tamarack, Palisade, Aitkin Public Schools ISD #1, Hill City School District ISD #2, McGregor Area School District ISD #4	County EM and local city emergency management, School District Superintendents and school staffs, Red Cross, MN DNR, owners of private campgrounds and mobile home parks.	<p>Aitkin County EM will work as needed with respective jurisdictions as appropriate that pursue construction of a safe room.</p> <p>Safe Room construction or retrofit projects of both single and dual-use facilities may be eligible under FEMA HMA funding.</p>

Action Number	Hazard	Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
19	Violent Storms	Identify critical facilities within the County and each of its jurisdictions that do not have a generator to supply backup power in the event of a severe storm taking out primary power for its facilities and essential functions. Critical facilities may include: police and fire stations, hospitals, water and sewer treatment facilities, and other facilities that the county deems critical.	1	ES	New	Mid-term	Aitkin County, Otis McGregor, Tamarack, Hill Qty, Palisade, Aitkin Public Schools ISD #1, Hill Qty School District ISD #2, McGregor Area School District ISD #4	County EM and local city emergency management, Aitkin County and local Qty public works departments, MN DNR	Aitkin County EM will work at the County level and with respective jurisdictions to identify critical facilities in need of backup power. Generators and/or related equipment purchases may be eligible for FEMA HMA funding (see Action Item #18).

Action Number	Hazard	Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
20	Violent Storms	Purchase generators or related equipment (e.g., generator hook-ups) that will support the operation of essential functions in identified County- and jurisdiction-owned critical facilities in the event of severe storms. Critical facilities may include: police and fire stations, hospitals, water and sewer treatment facilities, and other facilities that the county deems critical (see Appendix B, Aitkin County Critical Facilities).	1	ES	New	Mid-term	Aitkin County, Cities McGregor, Tamarack, Hill City, Palisade, Aitkin Public Schools ISD #1, Hill City School District ISD #2, McGregor Area School District ISD #4	County EM and local city emergency management, Aitkin County and local City public works departments, MN DNR	Aitkin County EM will work at the County level and with respective jurisdictions to pursue funding for critical facilities in need of backup power. Generators and/or related equipment purchases may be eligible for FEMA HMA funding.
21	Violent Storms	Work with respective road authorities to plant "living snow fences" or tree lines along identified problem areas of identified roads that can reduce snow drifts on the roads.	2	P	New	Mid-term	Aitkin County, Cities Aitkin, Tamarack, Palisade	County, City and MnDOT public works and transportation departments	Aitkin County EM will work with the County Transportation Department and other cities to identify any areas of concern that warrant action. Funding via County or local jurisdiction transportation budgets.

Action Number	Hazard	Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
22	Violent Storms	Raise public awareness on driving conditions and snow removal policies for certain routes during times of dangerous snow or ice conditions.	1	PE	Ongoing	Ongoing	Aitkin County	County EM and local city emergency management	Aitkin County Sheriff's office does this currently with use of Facebook page and local news media, and will continue to do so. Funding to deliver task via staff time of EM and others participating.
23	Violent Storms	Assure the functionality of warning systems for the areas with warning sirens in place. Warning sirens should be able to be remotely activated by the Aitkin County Sheriff's Office.	2	ES	Ongoing	Mid-term	Aitkin County, Cities: McGregor, Hill City	County EM and local city emergency management	Aitkin County EM, in coordination with local EMS, will continue to stay aware of the functioning of warning systems. Funding unknown at this time for improvements.

Action Number	Hazard	Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
24	Violent Storms	Identify jurisdictions that do not have warning siren systems in place and have an expressed need for acquiring one to alert people in high risk, vulnerable areas (such as campgrounds, parks and rural residents out of reach of other existing warning siren systems) to approaching severe weather.	1	ES	New	Short-term	Aitkin County, Oties, Tamarack, Hill City, Palisade	County EM and local city emergency management, MN DNR	Aitkin County EM will work with local jurisdictions to assess needs. McGrath and Palisade do not have one. Funding for new warning siren systems may be eligible under FEMA's HMA 5% Initiative.
25	Violent Storms	Install new warning systems in identified vulnerable locations (jurisdictions that do not have warning siren systems in place and have an expressed need for acquiring one to alert people in high risk, vulnerable areas such as campgrounds, parks and rural residents out of reach of other existing warning siren systems) to approaching severe weather. Warning sirens should be able to be remotely activated by the Aitkin County Sheriff's Office.	1	ES	New	Short-term	Aitkin County, Oties, Tamarack, Hill City, Palisade	County EM and local city emergency management, MN DNR	Aitkin County EM will work with identified jurisdictions as appropriate on efforts to install new warning systems. Funding for new warning siren systems may be eligible under FEMA's HMA 5% Initiative.

Action Number	Hazard	Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
26	Violent Storms	Work with local jurisdictions, MN DNR and other key stakeholders to develop an Evacuation Plan for Aitkin County in the event of severe weather. The plan should make sure to address the evacuation of vulnerable populations, such as those in nursing homes or remote locations (such as Savanna Portage State Park or rural residential areas).	1	ES	New	Short-term	Aitkin County, Cities: Aitkin, McGregor, Tamarack, Hill City, Palisade	County EM and local city emergency management	Aitkin County EM will work with local jurisdiction leaders in emergency management and MN DNR to develop a plan. Aitkin County will review other existing plans in HSBM Region 2. Funding to deliver task via staff time of EM and others participating.
27	Violent Storms	Work to install shatter-resistant glass and other identified retrofitting measures to protect against the impact of severe summer storms at Riverwood Healthcare Center.			New		City of Aitkin, Riverwood Healthcare Center	Riverwood Healthcare Center	Riverwood Healthcare will work to incorporate this mitigation action into their strategic plan. Funding for implementation not currently identified.
28	Violent Storms	Work to provide increased first responder training for those that work in remote areas and serve the public in the County			New		Aitkin County, Cities: Aitkin, Tamarack, Hill City, Palisade, MN DNR and township governments	County EM in cooperation with local governments such as townships and the MN DNR	Aitkin County EM will address planning for this with the Preparedness Committee. Funding for implementation not currently identified.

Action Number	Hazard	Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
29	Violent Storms	Investigate "Storm Ready" designation by the National Weather Service and submit an application if deemed appropriate.	2	P	New	Mid-term	Aitkin County, Cities: Aitkin, Tamarack, Palisade	County EM and local city emergency management	Aitkin County EM will work with interested jurisdictions as appropriate on efforts to develop Storm Ready applications and to meet local requirements.
30	Extreme Temperatures	Expand information on risks of heat-related illnesses. Key audiences are the elderly and the younger population engaging in physically strenuous activities.	1	PE	Ongoing	Ongoing	Aitkin County, Cities: Aitkin, Aitkin Public Schools ISD #1, Hill City School District ISD #2, McGregor Area School District ISD #4	County EM and local city emergency management, School District Superintendents and school staffs, Aitkin County Public Health	Aitkin County EM will work with its Preparedness Committee, School Districts and Public Health to keep the public informed. Funding to deliver task via staff time of EM and others participating. Other potential funding unknown at this time.

Action Number	Hazard	Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
31	Extreme Temperatures	Continue the winter storm awareness program. Key audiences are the elderly and the younger populations who may be more susceptible to the effects of freezing temperatures when outside.	1	PE	Ongoing	Ongoing	Aitkin County, Cities: Aitkin, Hill City, Palisade, Aitkin Public Schools ISD #1, Hill City School District ISD #2, McGregor Area School District ISD #4	County EM and local city emergency management, School District Superintendents and school staffs, Aitkin County Public Health	Aitkin County EM will work with its Preparedness Committee, School Districts and Public Health to keep the public informed. Funding to deliver task via staff time of EM and others participating. Other potential funding unknown at this time.
32	Extreme Temperatures	Promote and educate Aitkin County residents, agencies, and communities about the use of NOAA weather radios for relaying weather-related emergency information.	1	PE	New	Ongoing	Aitkin County, Cities: Tamarack, Palisade	Emergency managers, Sheriff's Department and local Police Departments	Aitkin County EM and Preparedness Committee will work to get out information via websites and public presentations when available. Funding to deliver task via staff time of EM and others participating.

Action Number	Hazard	Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
33	Extreme Temperatures	Maintain an updated database of facilities in the county that have shelter agreements with the American Red Cross and the capabilities of each shelter to provide mass care in the event of extreme temperatures.	1	ES	New / In Progress	Short-term	Aitkin County, Cities: Aitkin, McGregor, Tamarack, Palisade	County EM and local city emergency management, Aitkin County Public Health and Red Cross	The Red Cross has provided the Aitkin County EM with an updated database. Funding to deliver task via staff time of EM and others participating.
34	Extreme Temperatures	Ensure there are personnel trained in shelter management within the County and each of its jurisdictions, engaging those who would play a role in emergency response leadership in the event of needing to activate a shelter for mass care.	1	ES	New / In Progress	Short-term	Aitkin County, Cities: Aitkin, McGregor, Tamarack, Palisade	County EM and local city emergency management, Aitkin County Public Health, Red Cross	An HSBM grant for Mass Care to Region 2 is providing training to emergency managers during 2014. Funding to deliver task via staff time of EM and others participating.
35	Wildfire	Educate area residents through the Firewise program on what they can do to reduce the risk of wildfires doing damage to their property through vegetation management and the use of fire resistant building materials.	1	PE	Ongoing	Ongoing	Aitkin County, Cities: Aitkin	County EM and local city emergency management, Fire Departments, DNR Firewise Program	Aitkin County EM and local city emergency management will work with local fire departments to use Firewise materials. Potential funding can be sought through the MN Firewise program.

Action Number	Hazard	Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
36	Wildfire	Promote the use of financial assistance for fuel reduction efforts through the Firewise program by area property owners.	1	P	Ongoing	Ongoing	Aitkin County, Oties, McGregor	County EM and local city emergency management, Fire Departments, DNR Firewise Program	Same as #35.
37	Wildfire	Promote, through new building codes, the use of building materials that can reduce the chance of property damage related to structural fires.	1	P	Ongoing	Ongoing	Aitkin County, Oties, McGregor	DNR Firewise Program, City Planning & Zoning, County Board and Aitkin County Planning Commission	Aitkin County Zoning and Environmental Services will address as needed. County Staff time to fund deliverables.
38	Wildfire	Pursue additional funding sources, if available, to supplement programs such as Firewise.	1	P	New	Ongoing	Aitkin County, Oties, Tamarack	County EM and local city emergency management, Fire Departments	Aitkin County and fire departments will review FEMA HMA funding available for wildfire mitigation projects.
39	Wildfire	Maintain an ongoing effort to educate people how to respond in case of a large wildfire event so both residents and area visitors will know how to respond to warnings and are aware of evacuation routes.	1	PE	Ongoing	Ongoing	Aitkin County, Oties, Aitkin, Hill Cty, Palisade	County EM and local city emergency management, Fire Departments	Aitkin County EM and local fire departments will use media releases, social media and local events to raise awareness. Funding to deliver task via staff time of EM and others participating.

Action Number	Hazard	Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
40	Wildfire	Work with fire departments to inventory areas where firefighting capacity is limited through availability of water and consider strategic installation of dry fire hydrants or water holding tanks.	1	P/ES	Ongoing	Ongoing	Aitkin County, Cities	County EM and local city emergency management in coordination with all jurisdictional Fire Departments	Aitkin County EM and local fire departments will work together to identify areas of need and best solutions. Potential funding may be from Firewise for installations.
41	Wildfire	Planning staff on the city and county level, along with area fire chiefs, should coordinate to ensure new development will have adequate access and egress for emergency response vehicles.	1	P/ES	Ongoing	Ongoing	Aitkin County, Cities, Aitkin	All jurisdictional Fire Departments, City Planning & Zoning, County Board and Aitkin County Planning Commission	Aitkin County Environmental Services/ Planning and Zoning and local fire departments will address. Funding to deliver task via staff time of EM and others participating.
42	Wildfire	Continue inter-agency and multi-jurisdictional efforts to identify, contain, and extinguish wildfires.	1	ES	Ongoing	Ongoing	Aitkin County, Cities, Aitkin	County EM and local city emergency management, Local Fire Departments, MN DNR.	Aitkin County EM will continue to work in partnership with others on this effort. Funding to deliver task via staff time of EM and others participating.

Action Number	Hazard	Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
43	Wildfire	Explore development of a Community Wildfire Protection Plan for Aitkin County with guidance from the MN DNR Firewise Community Specialist for Northeast Minnesota. Create plan as advised by MN DNR	3	NR	New	Mid-term	Aitkin County, Cities: Aitkin, Tamarack	County emergency manager, MN DNR	Aitkin County EM will discuss with MN DNR and local fire departments. Funding for a CWPP may be eligible through the Firewise program.
44	Wildfire	Identify projects to mitigate at-risk structures and associated loss of life from the threat of wildfire through activities such as the creation of defensible space for wildfire, application of ignition-resistant construction, hazardous fuels reduction, and installation of external wildfire sprinkler systems and apply for appropriate funding for implementation.	1	PE/NR	New	Mid-term	Aitkin County, Cities: Aitkin, Tamarack, Palisade	County EM and local city emergency management, Aitkin County Soil and Water Conservation District, local fire departments	Aitkin County EM will discuss with MN DNR and local fire departments. The mitigation actions noted may be eligible for Firewise or FEMA HMA funding.
45	Wildfire	In the event of a blow-down of trees from a severe storm, work with respective partners in natural resources to manage removal of trees to reduce wildland fire fuel.	2	NR	New	Ongoing	Aitkin County, Cities: Aitkin, Tamarack, Palisade	County EM and local city emergency management, MN DNR	Aitkin County EM will discuss with MN DNR and local fire departments. Fuel reduction projects (removal of flammable vegetation) may be eligible for Firewise or FEMA HMA funding.

Action Number	Hazard	Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
46	Flash Flood and Riverine Flood	Maintain bridge, road, and culvert infrastructure at a level that it is capable of sustaining a major storm event and will not be vulnerable to washouts	1	S	Ongoing	Ongoing	Aitkin County, Oties, Aitkin, Palisade	Aitkin County Highway Department, local jurisdictions' public works and transportation departments	Aitkin County Transportation Department and local jurisdictions' public works and transportation departments will address on an ongoing basis. Funding for improvement projects unknown at this time.
47	Flash Flood and Riverine Flood	Steer development away from areas that may be difficult to serve with reliable road access.	1	P	Ongoing	Ongoing	Aitkin County, Oties, Aitkin, Palisade	Local Planning and Zoning Authorities	Aitkin County Environmental Services/ Planning and Environmental Services Department along with local jurisdictions will address with zoning regulations. County Staff time to fund deliverables.

Action Number	Hazard	Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
48	Flash Flood and Riverine Flood	Address ice dams that may impact the road system in a timely manner in order to prevent damage to infrastructure, in particular during spring thaw.	1	P	Ongoing	Ongoing	Aitkin County, Cities: Aitkin, Palisade	Aitkin County Public Works and Highway Department, All local jurisdiction public works and transportation departments	Aitkin County Transportation Department and local jurisdictions' transportation or public works will address on an annual basis Funding from County or City department budgets.
49	Flash Flood and Riverine Flood	Within the County and its jurisdictions, identify public infrastructure in areas that are prone to flooding (such as culverts, roads and bridges, and government buildings) and pursue funding for making specific mitigation improvements to those identified pieces of infrastructure.	1	P	New	Ongoing	Aitkin County, Cities: Aitkin, McGregor, Tamarack, Palisade, Aitkin Public Schools ISD #1, Hill City School District ISD #2, McGregor Area School District ISD #4	Aitkin County Public Works and Highway Department, All local jurisdiction public works and transportation departments	Aitkin County Transportation Department and local jurisdictions' transportation or public works will address on an annual basis Mitigation projects may be eligible for FEMA HMA funding for "Infrastructure Retrofit" (measures to reduce risk to existing utility systems, roads, and bridges).

Action Number	Hazard	Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
50	Flash Flood and Riverine Flood	Maintain, and, where necessary, add storm water retention ponds to protect wastewater treatment facilities throughout Aitkin County.	2	S	Ongoing	Mid-term	Aitkin County, Cities: Aitkin, McGregor, Palisade	County and City Public Works Departments, Pipeline and Utility Companies, MnDOT	Aitkin County Transportation Department and local jurisdictions' transportation or public works will address on an annual basis. Funding from County or City department budgets.
51	Flash Flood and Riverine Flood	Work to increase communication between the Aitkin County Planning and Zoning department and the United States Army Corps of Engineers regarding flooding and flowage easements	1	P	Ongoing	Short-term	Aitkin County, Cities: Aitkin, Palisade	Local Planning and Zoning Authorities, United States Army Corps of Engineers	Aitkin County Environmental Services/ Planning and Zoning will address in cooperation with local city governments as needed to the USACE Funding from County or City department budgets.

Action Number	Hazard	Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
52	Flash Flood and Riverine Flood	Review stormwater management guidelines currently in place to ensure that they are adequate to limit post-development run-off and will not result in storm water run-off created flood damages.	2	P	Ongoing	Mid-term	Aitkin County, Cities: Aitkin, Palisade	Local Planning and Zoning Authorities, MPCA	Aitkin County Environmental Services/ Planning and Zoning will address in cooperation with local city governments as needed. Funding from County or City department budgets.
53	Flash Flood and Riverine Flood	Communities without floodplain or shore land ordinances should develop such ordinances. The State Floodplain Management Act requires flood prone communities to adopt floodplain management regulations when adequate technical information is available to identify floodplain areas and enroll and maintain eligibility in the National Flood Insurance Program (NFI).	1	P	New	Mid-term	Aitkin County, Cities: Aitkin, Tamarack	DNR, Local Planning and Zoning Authorities	

Action Number	Hazard	Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
54	Flash Flood and Riverine Flood	Work to update the floodplain maps for Aitkin County. Current floodplain maps are over 20 years old.	1	P	Ongoing	Mid-term	Aitkin County, Cities: Aitkin, McGregor, Hill City	MN DNR, Local Planning and Zoning Authorities	Aitkin County GIS Mapping department will address in consultation with MN DNR. Funding from County budget.
55	Flash Flood and Riverine Flood	Continue to enforce city and county ordinances governing development and setbacks in shoreline area.	1	P	Ongoing	Ongoing	Aitkin County, Cities	Local Planning and Zoning Authorities, MN DNR	Aitkin County Environmental Services/ Planning and Zoning along with local jurisdictions will address with zoning regulations. County Staff time to fund deliverables.

Action Number	Hazard	Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
56	Flash Flood and Riverine Flood	Identify minor localized flood reduction projects identified to lessen the frequency or severity of flooding and decrease predicted flood damages, such as the installation or modification of culverts, stormwater management activities, such as creating retention and detention basins, protection of sanitary sewer lift stations in flood-prone areas.	1	P/S	New	Ongoing	Aitkin County, Cities: Tamarack, Palisade, Aitkin Public Schools ISD #1, Hill City School District ISD #2, McGregor Area School District ISD #4	Aitkin County Public Works and Highway Department, All local jurisdiction public works and transportation departments	Aitkin County Environmental Services/Planning and Zoning and Transportation Department, along with local jurisdictions will address with ongoing review and planning. Minor Localized Flood Reduction Projects may be eligible for FEMA HMA funding. They may not duplicate the flood prevention activities of other Federal agencies and may not constitute a section of a larger flood control system.
57	Flash Flood and Riverine Flood	Install flow-rate meters (stream gauges) on rivers and streams that are prone to flooding high-risk, vulnerable properties.	1	P/S	New	Ongoing	Aitkin County, Cities: Tamarack, Palisade	Same as #56	Same as #56

Action Number	Hazard	Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
58	Flash Flood and Riverine Flood	Acquire flood prone properties in the special flood hazard area and physically relocate existing structure(s) to outside of the special flood hazard area.	1	P/S	New	Ongoing	Aitkin County, Oties, Tamarack, Palisade	Same as #56	Eligible for FEMA HMA funding. The property must be deed-restricted in perpetuity to open space uses to restore and/or conserve natural floodplain functions.
59	Flash Flood and Riverine Flood	Acquire at-risk structures and the underlying land in special flood hazard areas and demolish flood prone structures for the conversion of the land to open space.	1	P/S	New	Ongoing	Aitkin County, Oties, Aitkin	Same as #56	Same as #58
60	Flash Flood and Riverine Flood	Reduce potential infrastructure flood damages on utilities such as wastewater treatment, pipelines, and power facilities by dry proofing or wet proofing facilities that are flood prone.	1	P/S	New	Mid-term	Aitkin County, Oties, Aitkin	Same as #56	Dry floodproofing activities are eligible for FEMA HMA funding.
61	Drought	Continue to implement the monitoring of water table levels	3	P	New	Ongoing	Aitkin County, Oties	Aitkin County Soil and Water Conservation District	Aitkin County Soil and Water Conservation District will address in implementation of its water management plan. Funding through County SWCD budget.

Action Number	Hazard	Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
62	Drought	Educate the public on water conservation measures in times of approaching drought conditions and develop plans to limit water use for nonessential purposes, such as lawn watering, car washing, etc., during drought periods as necessary.	2	FE/P	New	Ongoing	Aitkin County, Oties, McGregor, Tamarack, Hill Qty, Palisade	Aitkin County Soil and Water Conservation District, Aitkin County Public Health	Aitkin County EM will work with SWCD and MN DNR to provide outreach to public via local news sources, social media. County staff time to fund deliverables
63	Drought	Strategically place livestock watering ponds on farms in the county to help offset the impact of drought on local farmers.	3	NR	New	Ongoing	Aitkin County, Oties, Tamarack	Aitkin County Soil and Water Conservation District in coordination with farmers	Aitkin County SWCD will work with identified farmers as appropriate. Potential funding unknown at this time.

5.3.2 Mitigation Actions by Community

This is a multi-jurisdictional plan that covers Aitkin County, its school districts, and the 6 cities of Aitkin, McGrath, Hill City, Palisade, Tamarack, and McGregor. The Aitkin County risks and mitigation activities identified in this plan also incorporate the concerns and needs of townships and other entities participating in this plan.

Mitigation actions by jurisdiction for the above cities and school districts are separated out in Tables G-1 through G-7 in Appendix G.

SECTION 6 – PLAN MAINTENANCE

6.1 Monitoring, Evaluation, and Updating the Plan

The Aitkin County Multi-Hazard Mitigation Plan (MHMP) should be considered a living document. The plan should be reviewed at a minimum of every 5 years. The guidance in this section will function as the primary tool when reviewing progress on the implementation of the Aitkin County MHMP.

In order to monitor, evaluate and update the MHMP during the 5-year planning cycle, the Aitkin County Emergency Manager will conduct a semi-annual review of the mitigation actions and progress with the Aitkin County Public Health Preparedness Group, County department heads, and City Councils of the cities of Aitkin, Hill City, McGrath, McGregor, Tamarack, and Palisade throughout the year. These departmental and jurisdictional partners will be encouraged to continue to seek public participation by bringing information back to their departments or communities and gathering any feedback to return to the Aitkin County Emergency Management Director.

If needed, the Aitkin County Emergency Manager will convene a group to discuss any projects or grant opportunities that arise and require larger group discussion. If there is a need for a special meeting due to new developments or a declared disaster occurring in the county, the Aitkin County Emergency Management Director will gather stakeholders to update pertinent mitigation strategies. Depending on grant opportunities and fiscal resources, mitigation projects may be implemented independently by individual communities or through local partnerships.

Updates or modifications to the MHMP during the 5-year planning process will require a public notice and a meeting prior to submitting revisions to the individual jurisdictions for approval. The plan will be updated via written changes, submissions as the committee deems appropriate and necessary, and as approved by the county commissioners.

6.2 Implementation

Aitkin County and its jurisdictions share a common Multi-Hazard Mitigation Plan and work together closely to develop, revise, and implement it. This MHMP provides a comprehensive chart of mitigation actions for Aitkin County and its jurisdictions (see Section 5.3.1, Hazard Mitigation Actions). Jurisdictions participated in the MHMP planning process and identified the specific mitigation strategies that they would seek to implement in their communities during the 5-year planning cycle. These mitigation actions are provided in Appendix G: Mitigation Actions by Jurisdiction.

A number of implementation tools are available to address hazards. Many of these tools are below, however, in some cases additional discussion is needed in order to identify what strategies are most appropriate to use. This will be part of an ongoing discussion as Aitkin County looks for opportunities for plan implementation. The following tools should be considered:

Education: In many cases education of residents has been identified as one of the most effective mitigation strategies.

Capital Investments: Capital investments such as fire and ambulance equipment, sprinkler systems and dry hydrants are tools that can limit risks and impacts of natural and man-made hazards.

Data Collection and Needs Assessments: Data collection and needs assessments can aid in gaining a better understanding of threats and allow planning for mitigation strategies accordingly. As resources are limited for this part of the planning process, additional data collection is likely to be an ongoing activity as resources become available.

Coordination: Responsibilities for mitigation strategies run across various county departments, local fire and ambulance departments, city and township governments, and a host of state and federal agencies. Ongoing coordination is an important tool to ensure resources are used efficiently. Coordination can also avoid duplication of efforts or prevent gaps that are created because of unclear roles and responsibilities. The mitigation plan review process can function as a tool to have an ongoing discussion of roles, responsibilities, and opportunities for coordination.

Regional Cooperation: Counties and public safety service providers throughout the north-central region of Minnesota often share similar challenges and concerns. In some cases a regional approach may be warranted as a mitigation strategy in order to save resources. Mutual aid agreements are a tool already in use for a number of services. Needs assessments for fire and ambulance services and development of assistance for volunteer recruiting, training, and retention could benefit from a regional approach. Cooperation among counties could also help in lobbying for certain funding priorities that address concerns relating to challenges in service delivery in rural areas. Organizations such as Region V Emergency Management, and the MN Department of HSEM through the Regional Program Coordinator can offer tools and resources to assist in these cooperative efforts.

Regulation: Regulation is an important mitigation tool for Aitkin County. Regulation plays a particularly important role for land use, access to structures and the protection of water resources and public health.

6.3 Continued Public Involvement

Continued public involvement is critical to the successful implementation of the Aitkin County Multi-Hazard Mitigation Plan. The Aitkin County Emergency Management Director and the steering committee members from the participating jurisdictions of the cities of Aitkin, Hill City, McGrath, McGregor, Tamarack, and Palisade will continue to engage new public stakeholders in planning discussions and project implementation during the 5-year cycle of this plan.

During the 5-year period before the plan is updated, these steering committee members will be responsible for keeping their city councils, city departments, schools, and community members updated and engaged in the implementation of their respective mitigation action charts (see Appendix G Mitigation Actions by Jurisdiction). Each respective jurisdiction will report their progress in this area to the Aitkin County Emergency Management Director on a periodic basis. Jurisdictions will use numerous means of public outreach to engage new public stakeholders in providing input on mitigation efforts or concerns on hazards by sharing information at city council meetings and special events, working with

local schools and partner organizations, and posting information on relevant local or social media that their communities use to inform and engage the public. As local mitigation projects are implemented, jurisdictions will work to keep the public updated and engaged in those local efforts. In addition, the Aitkin County Emergency Management Director will meet with the Aitkin County Public Health Preparedness Committee periodically during the year to seek their participation in advancing mitigation actions identified in the plan.

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Appendices

Aitkin County Multi-Hazard Mitigation Plan, 2014

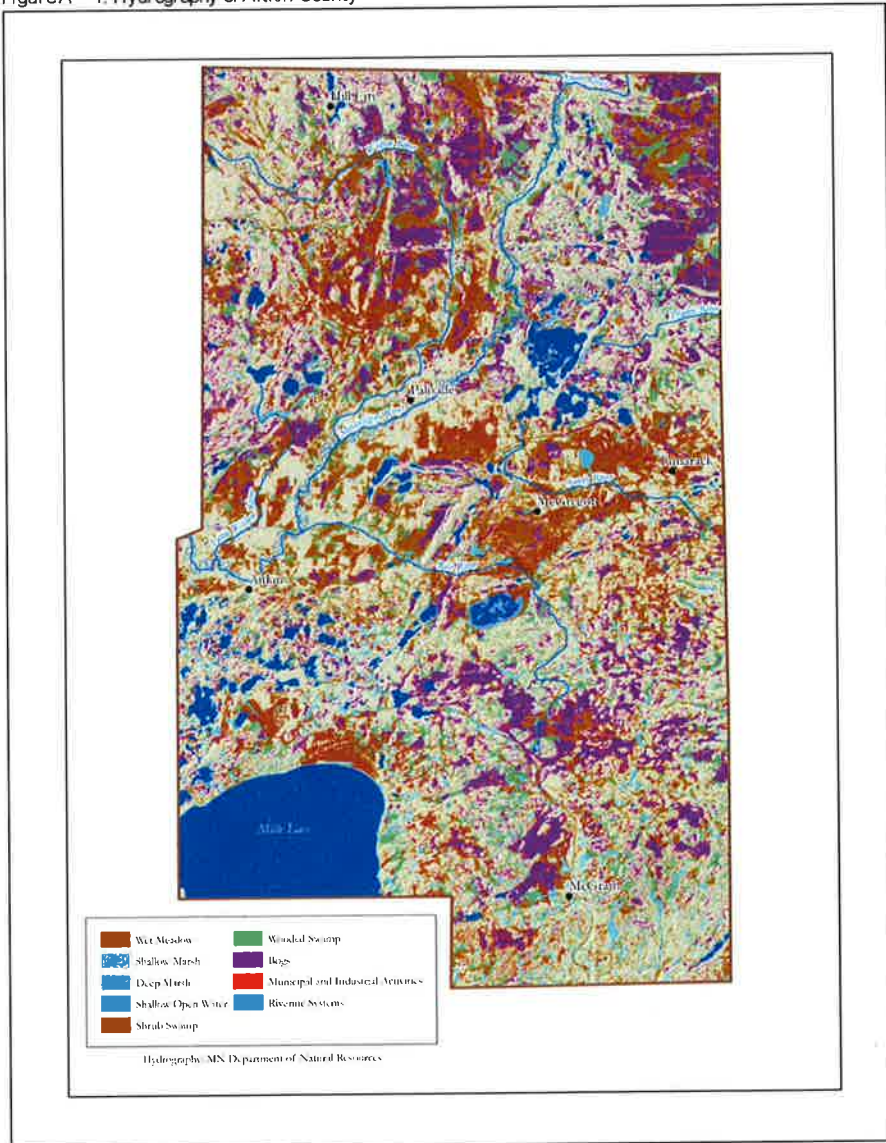
- Appendix A – Aitkin County Maps
- Appendix B – Aitkin County Critical Facilities
- Appendix C – Aitkin County Hazard Events
- Appendix D – Adopting Resolutions
- Appendix E – Steering Committee Meeting
- Appendix F – Public Meeting Notices and Meeting Notes
- Appendix G – Mitigation Actions by Jurisdiction
- Appendix H – Works Cited
- Appendix I – Documentation of Aitkin County 2005 Mitigation Actions for 2014
MHMP Update

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Appendix A

Aitkin County Maps

FigureA – 1. Hydrography of Aitkin County



FigureA – 2. Aitkin County Population by Census Block, 2010

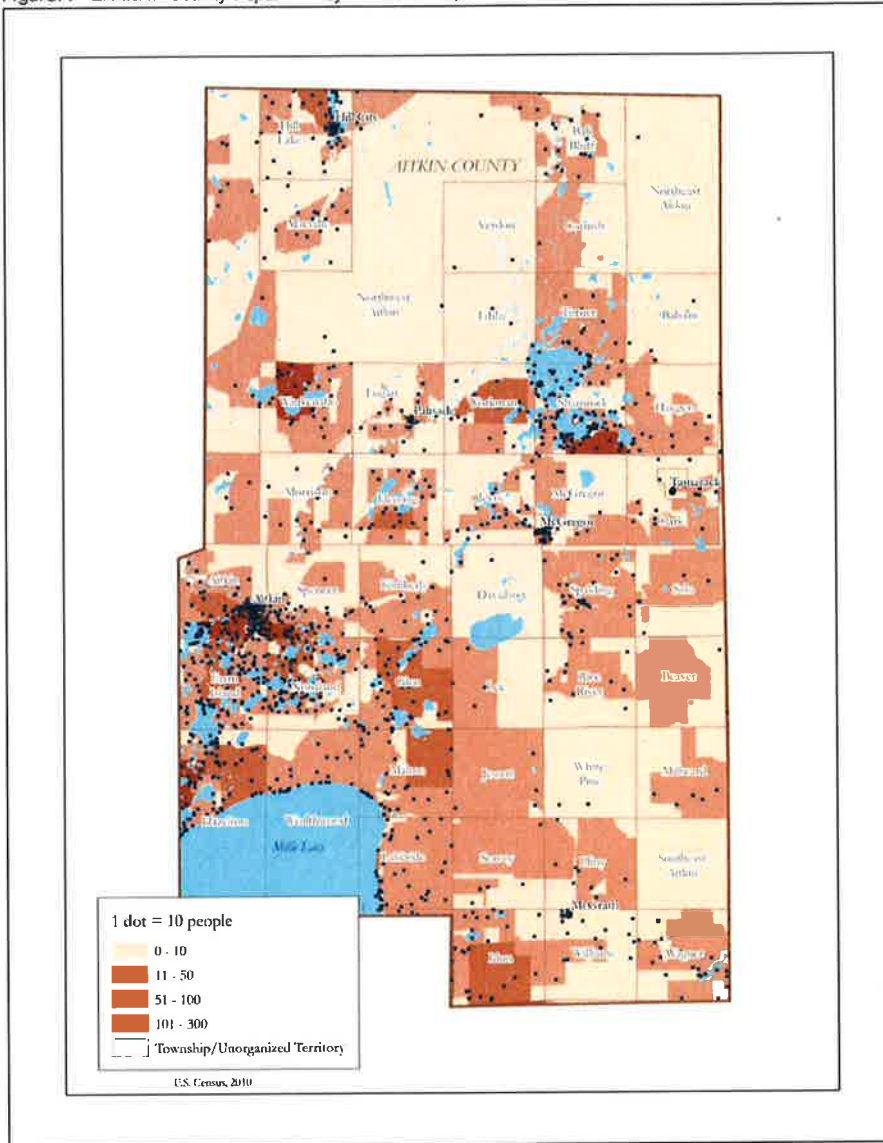
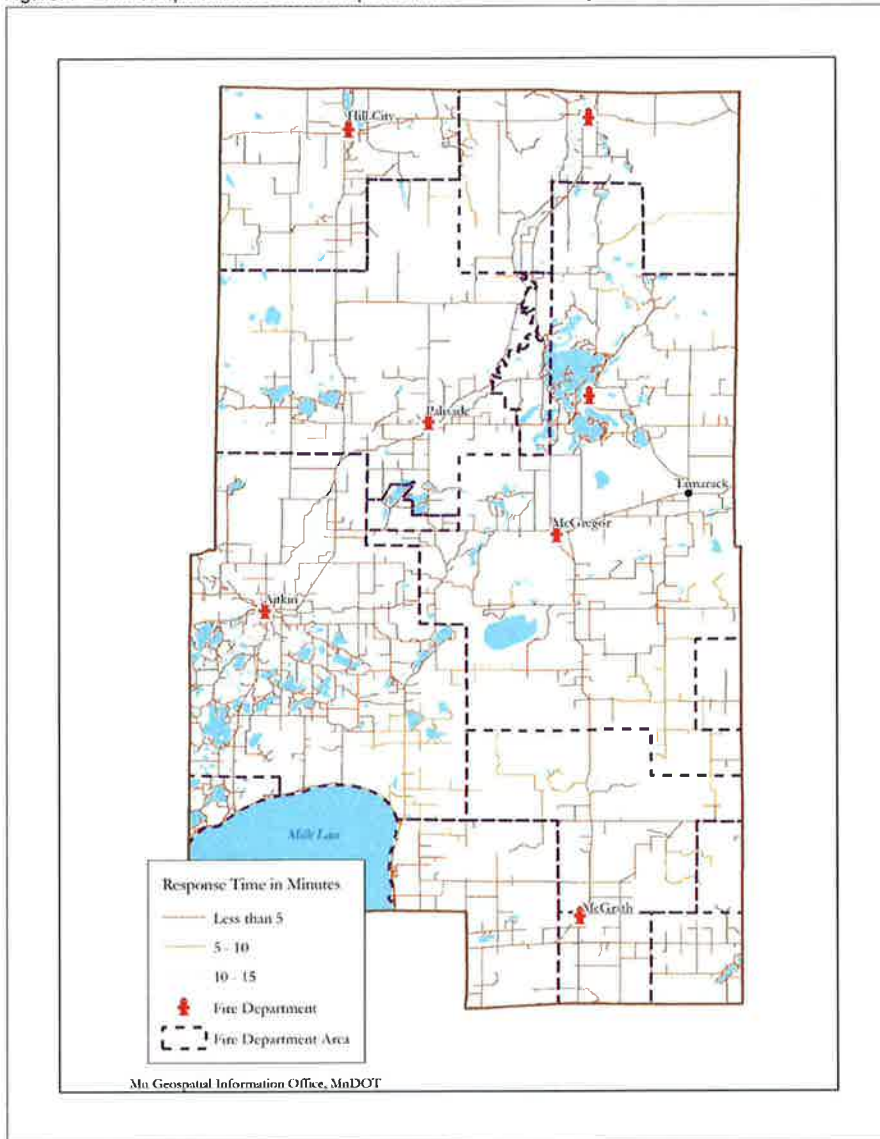
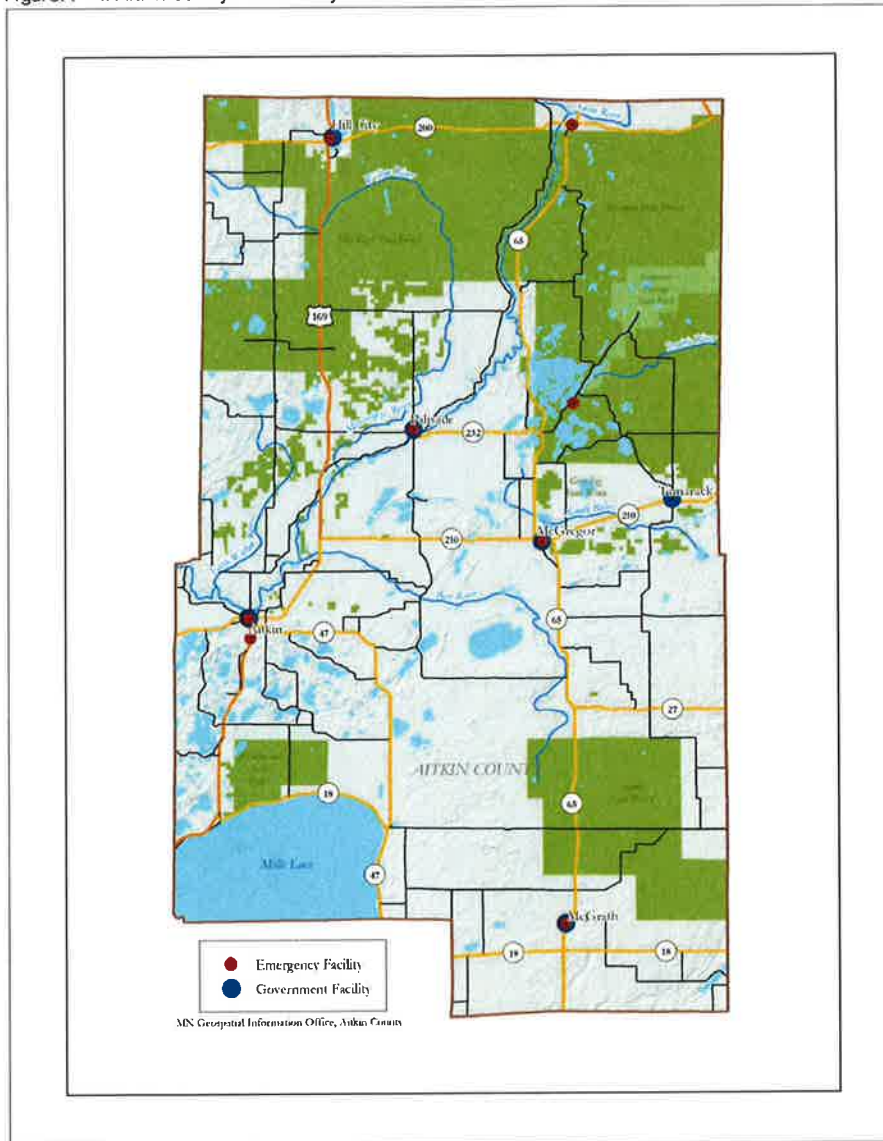


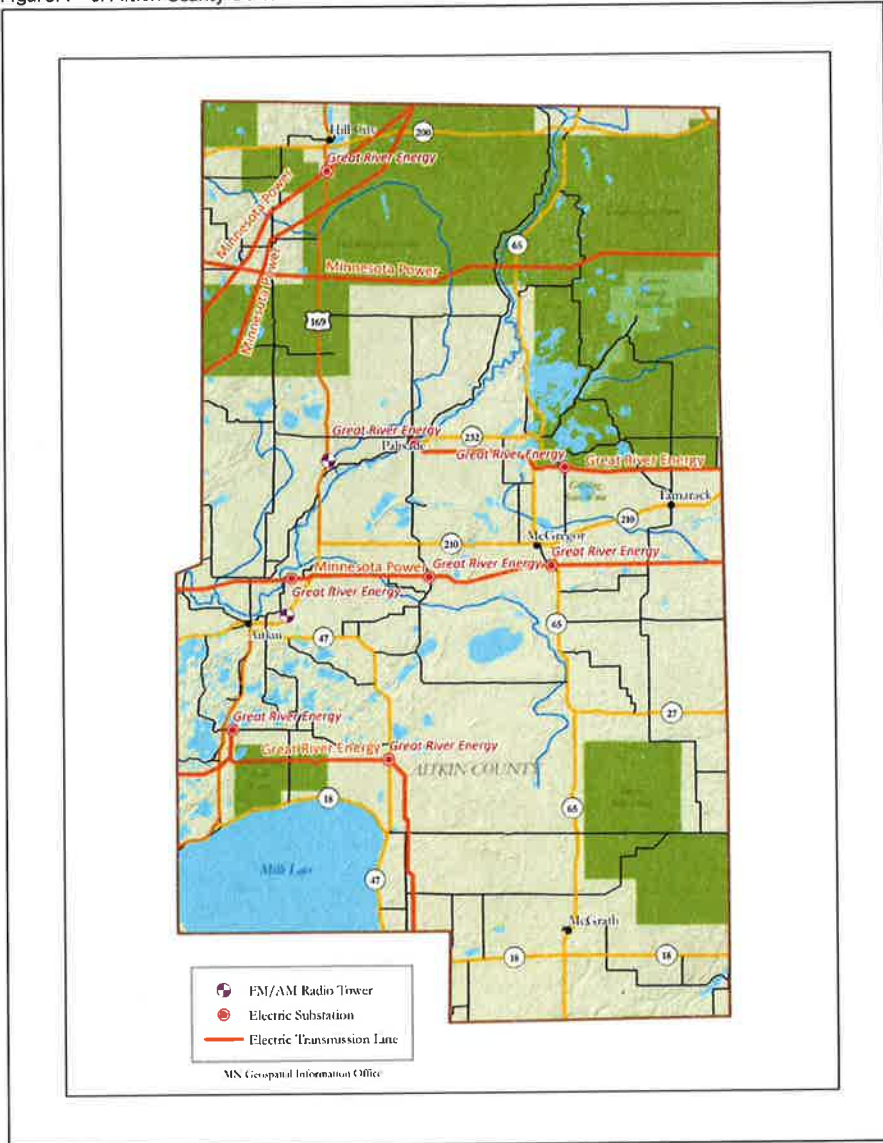
Figure A – 3. Fire Departments and Fire Response Times in Aitkin County



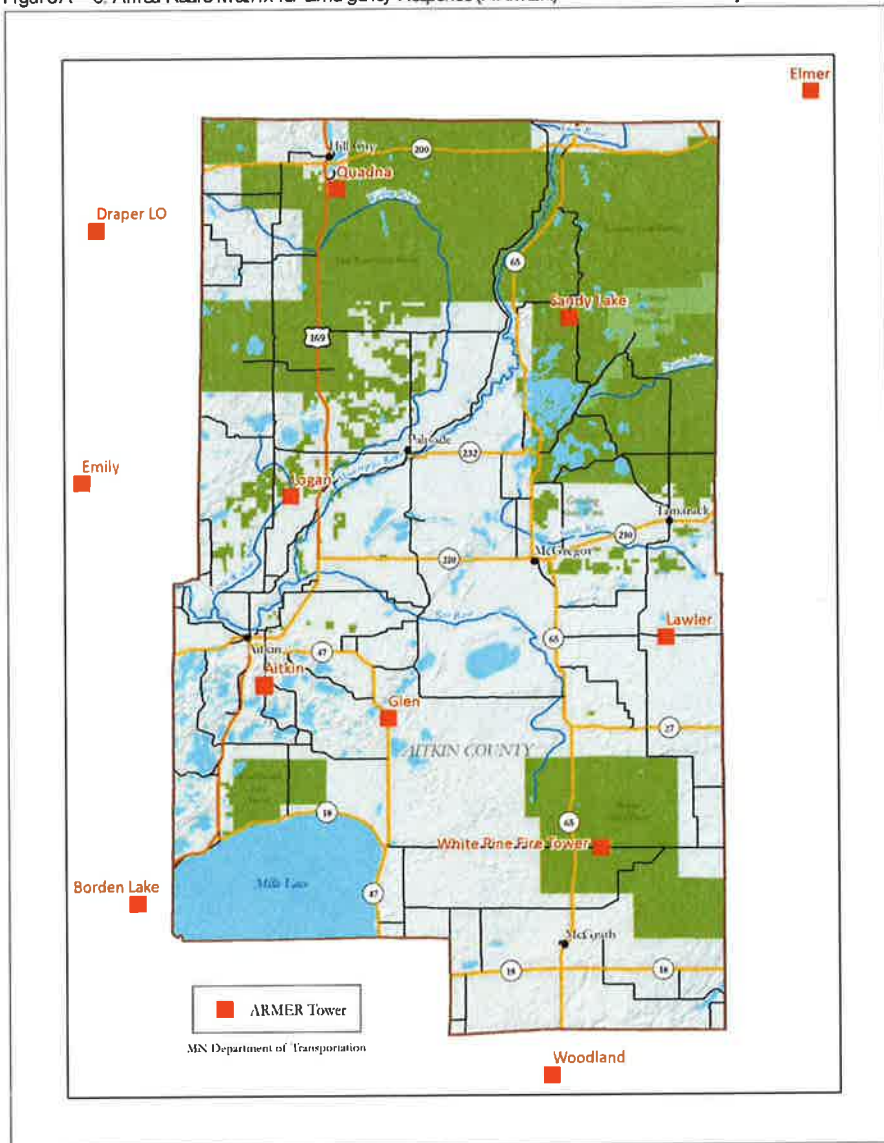
FigureA – 4. Aitkin County Public Safety and Government Services



FigureA – 5. Aitkin County Utilities and Communication Infrastructure



FigureA – 6. Allied Radio Matrix for Emergency Response (ARMER) Sites in Aitkin County



FigureA – 7. Aitkin County Transportation Infrastructure

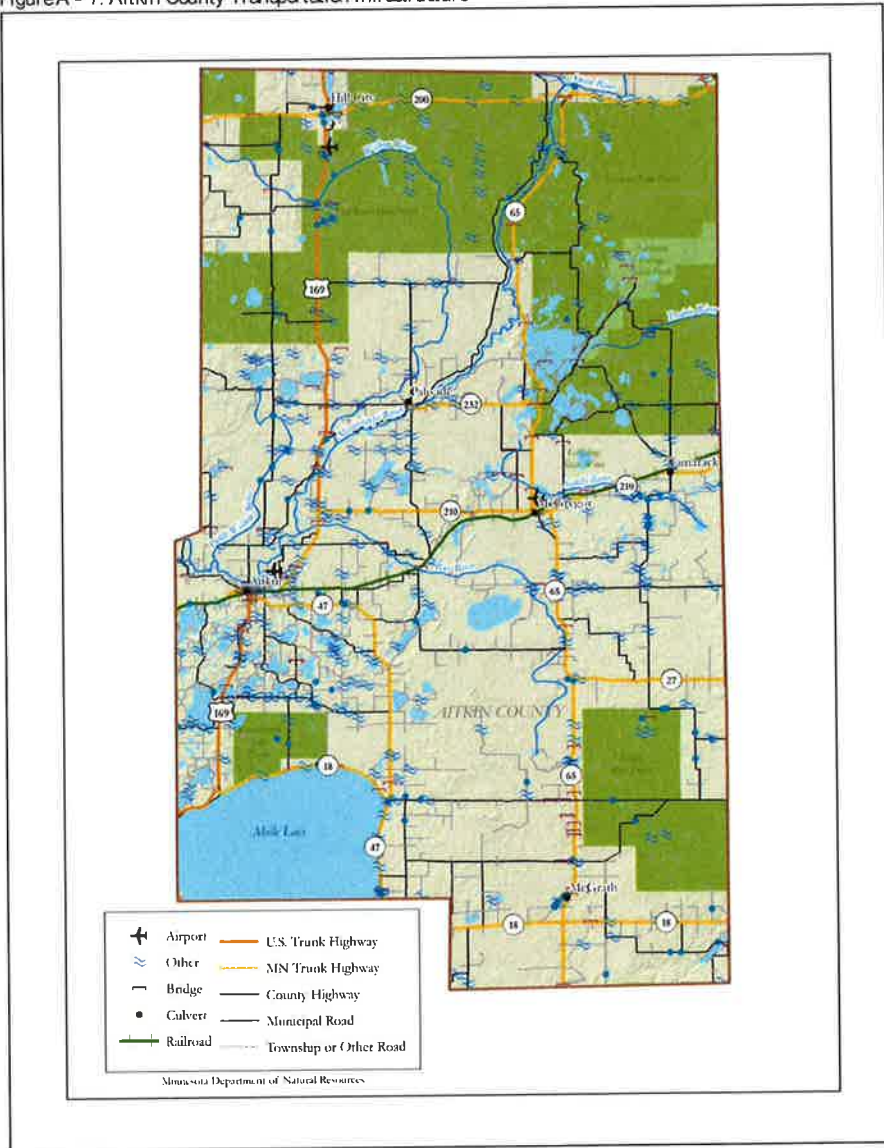


Figure A – 8. Aitkin County Land Cover, National Land Cover Database, 2006

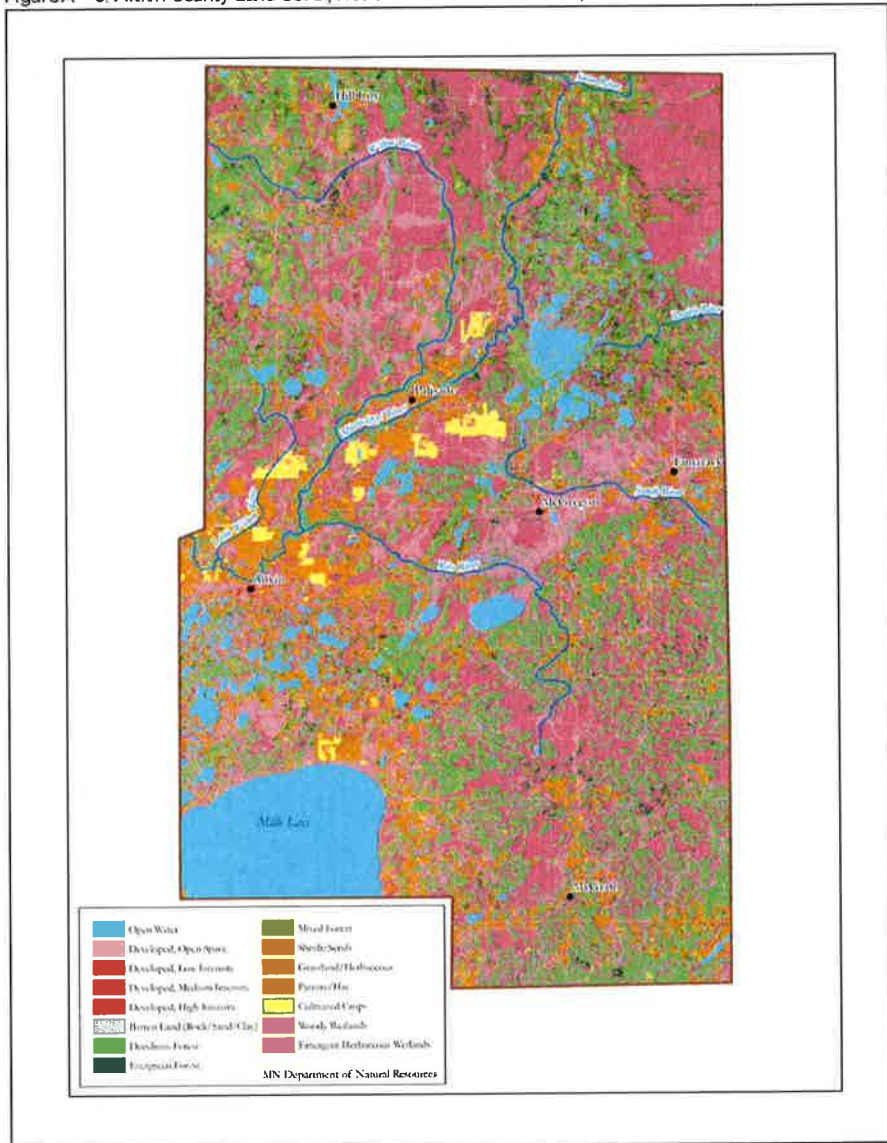


Figure A – 9. Land Ownership by Agency

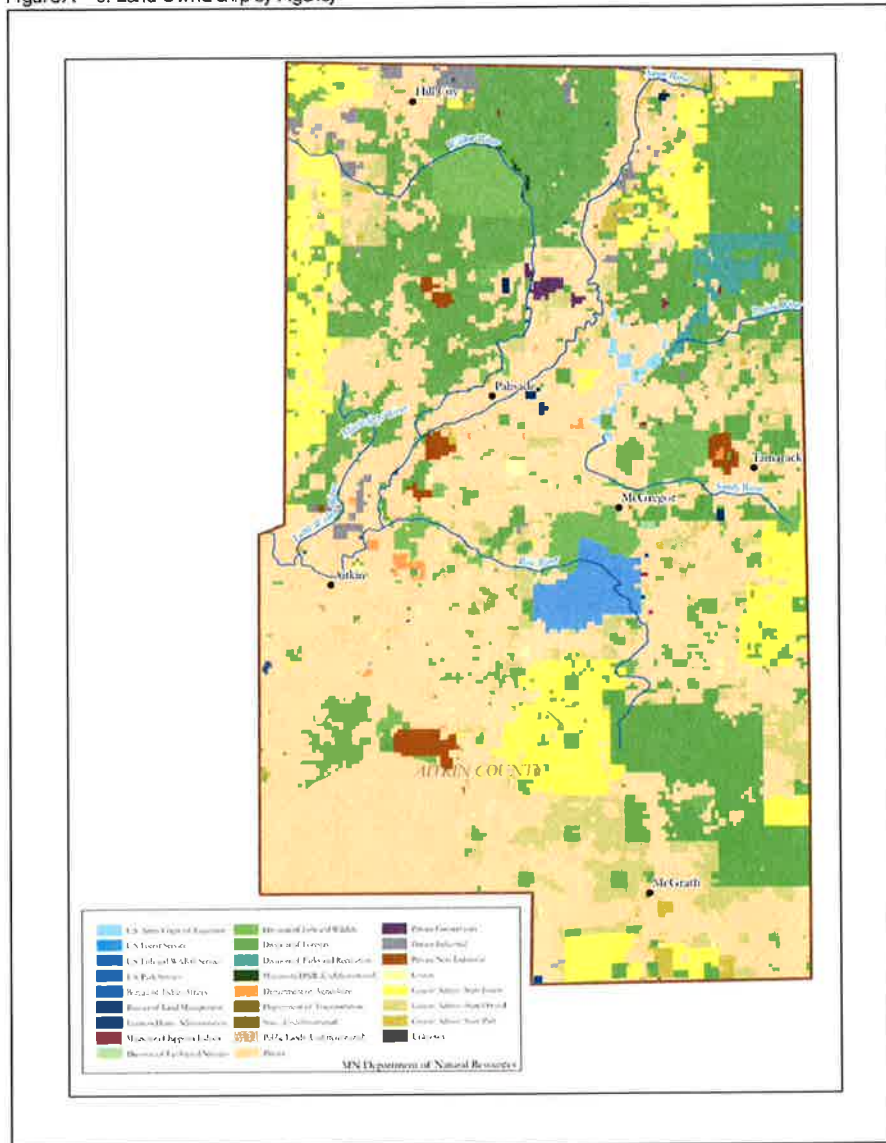


Figure A – 10. Severe Wind and Hai Storms in Atkin County

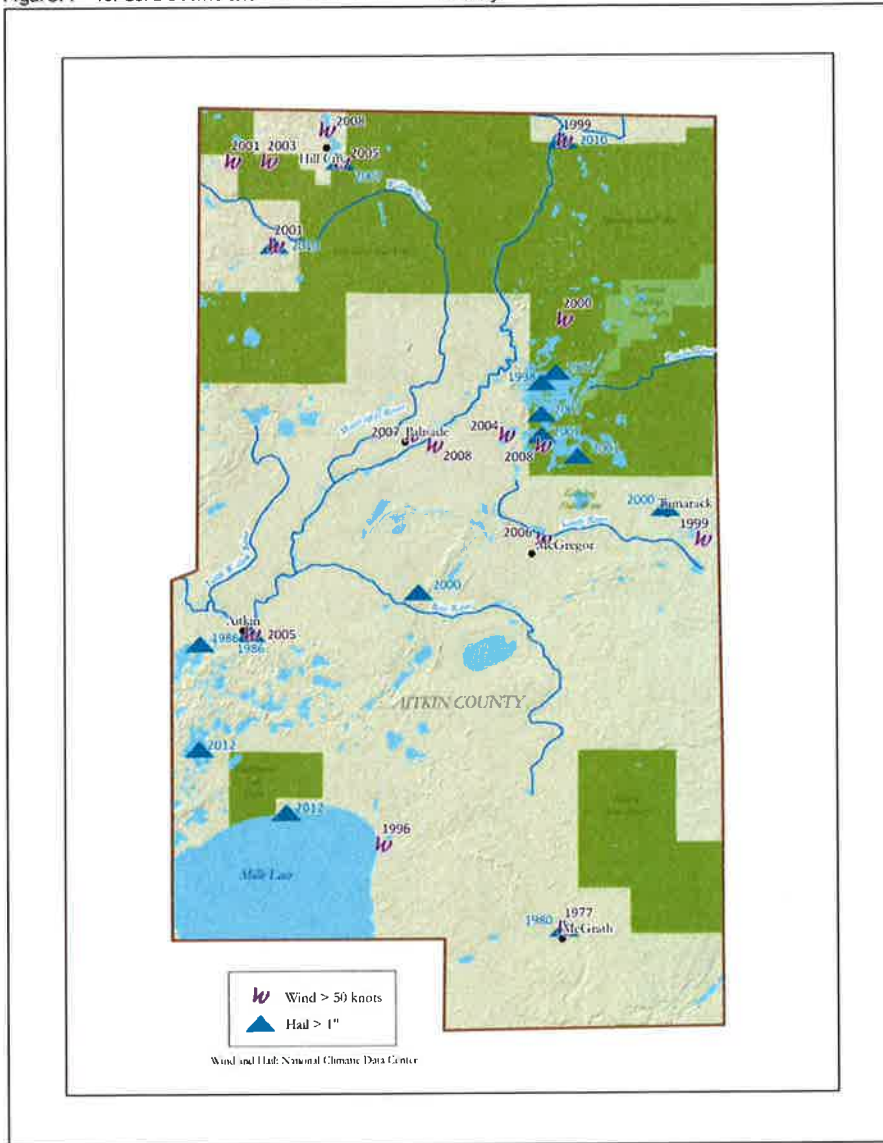
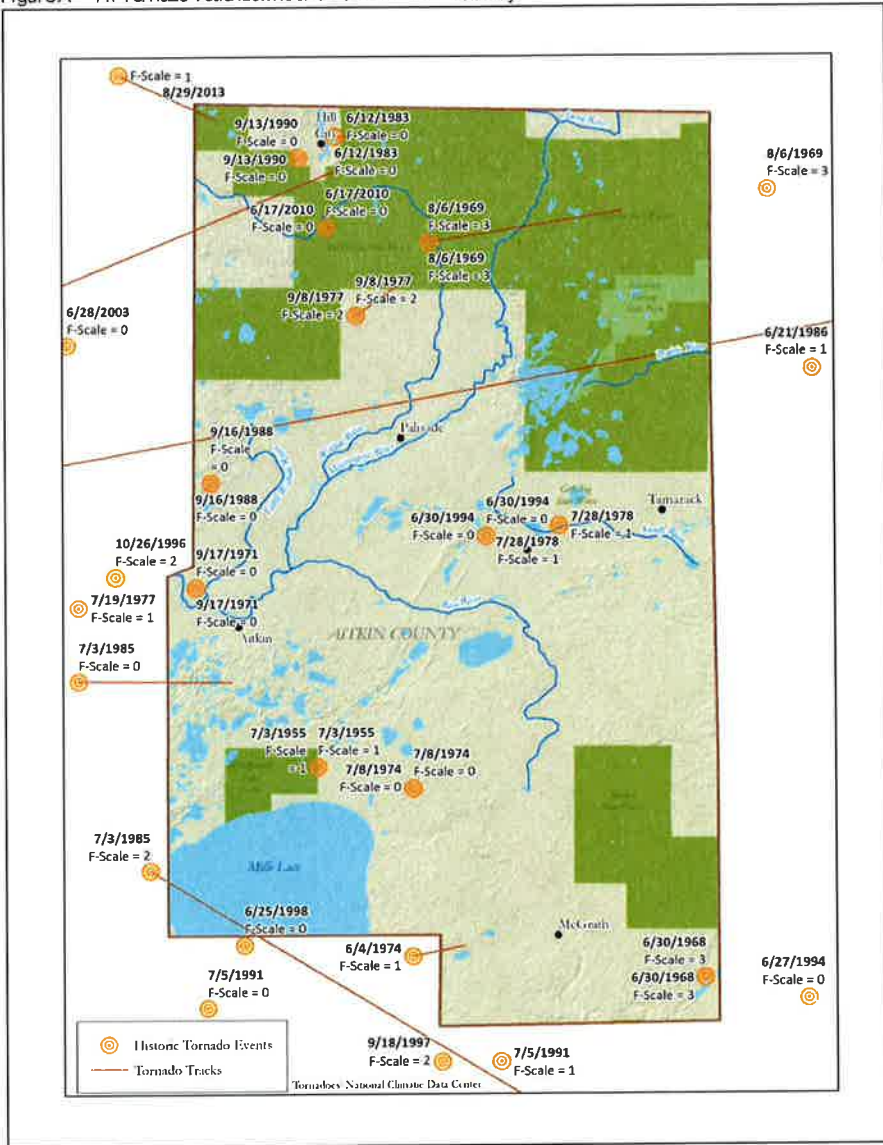
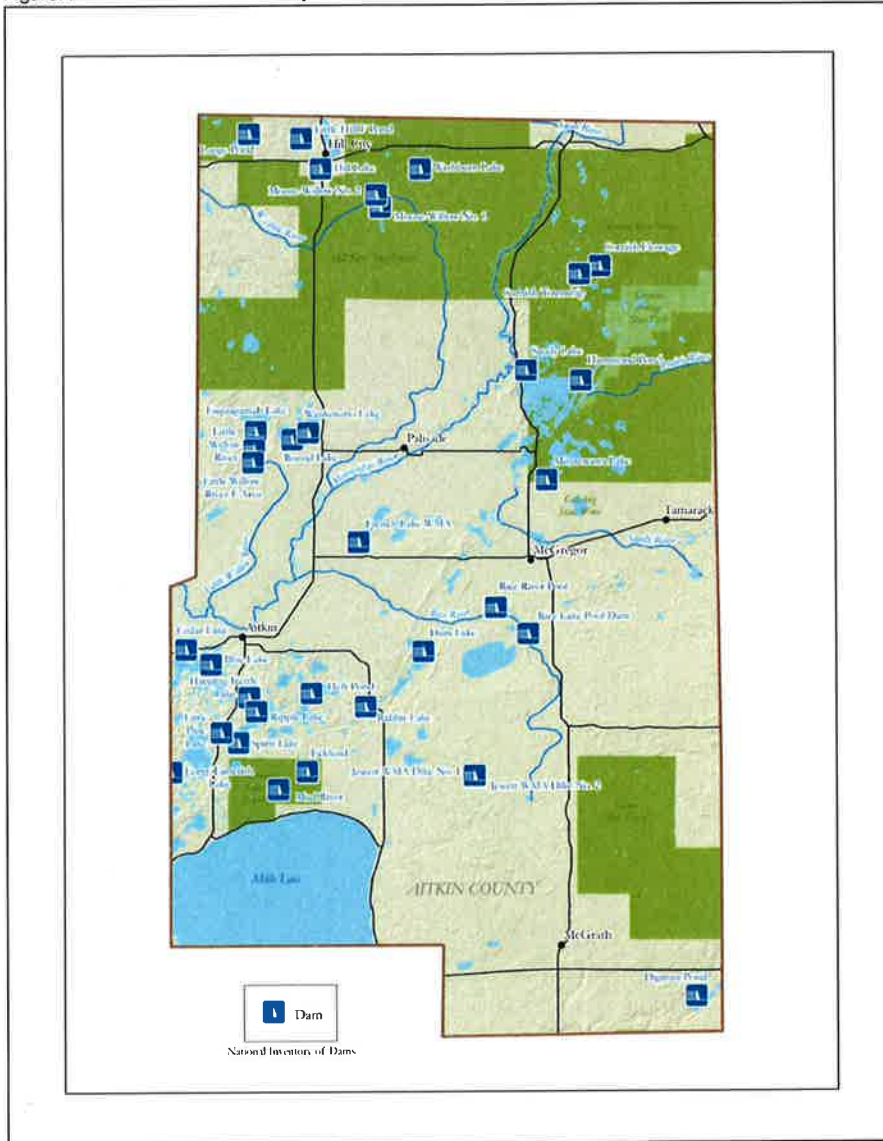


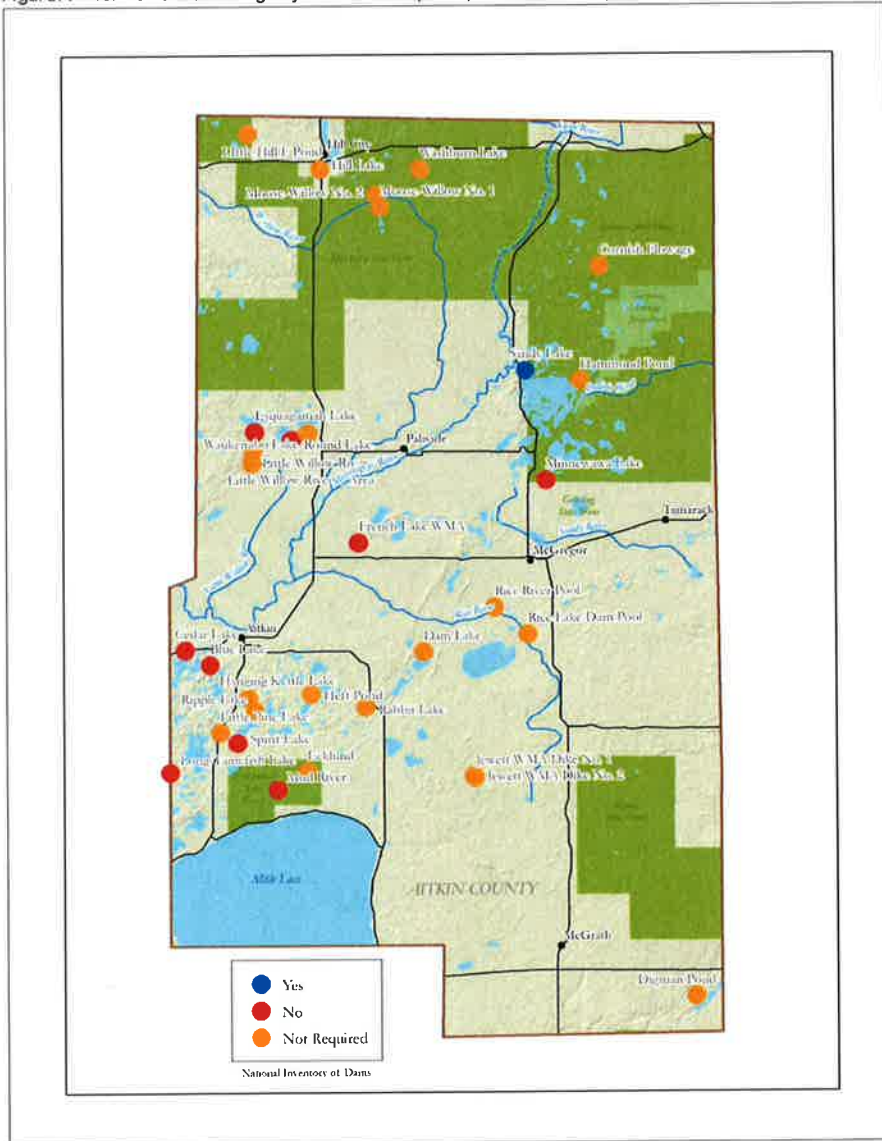
Figure A – 11. Tornado Touchdowns and Paths in Aitkin County



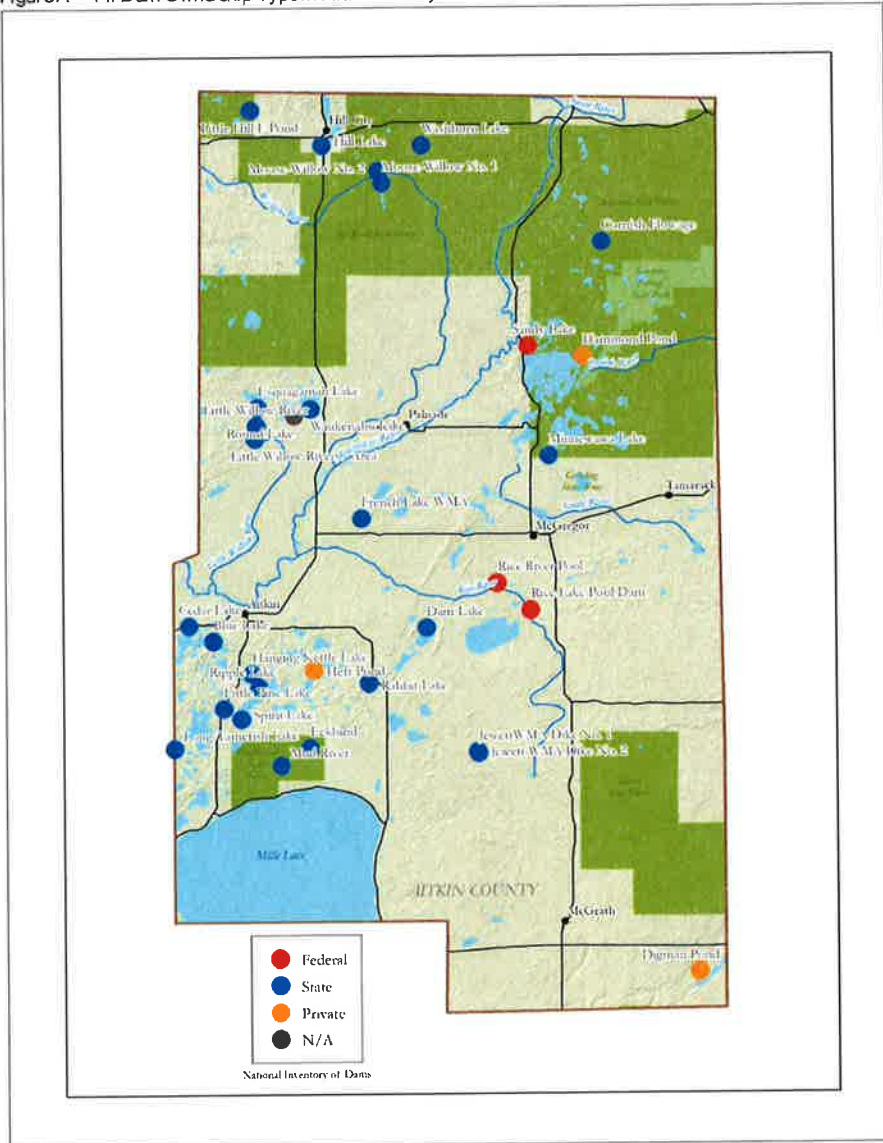
FigureA – 12. Dams in Aitkin County



FigureA – 13. Dams with Emergency Action Plans (EAPs) in Aitkin County



FigureA – 14. Dam Ownership Type in Aitkin County



FigureA – 15, Sites with Hazardous or Chemical Waste in Aitkin County

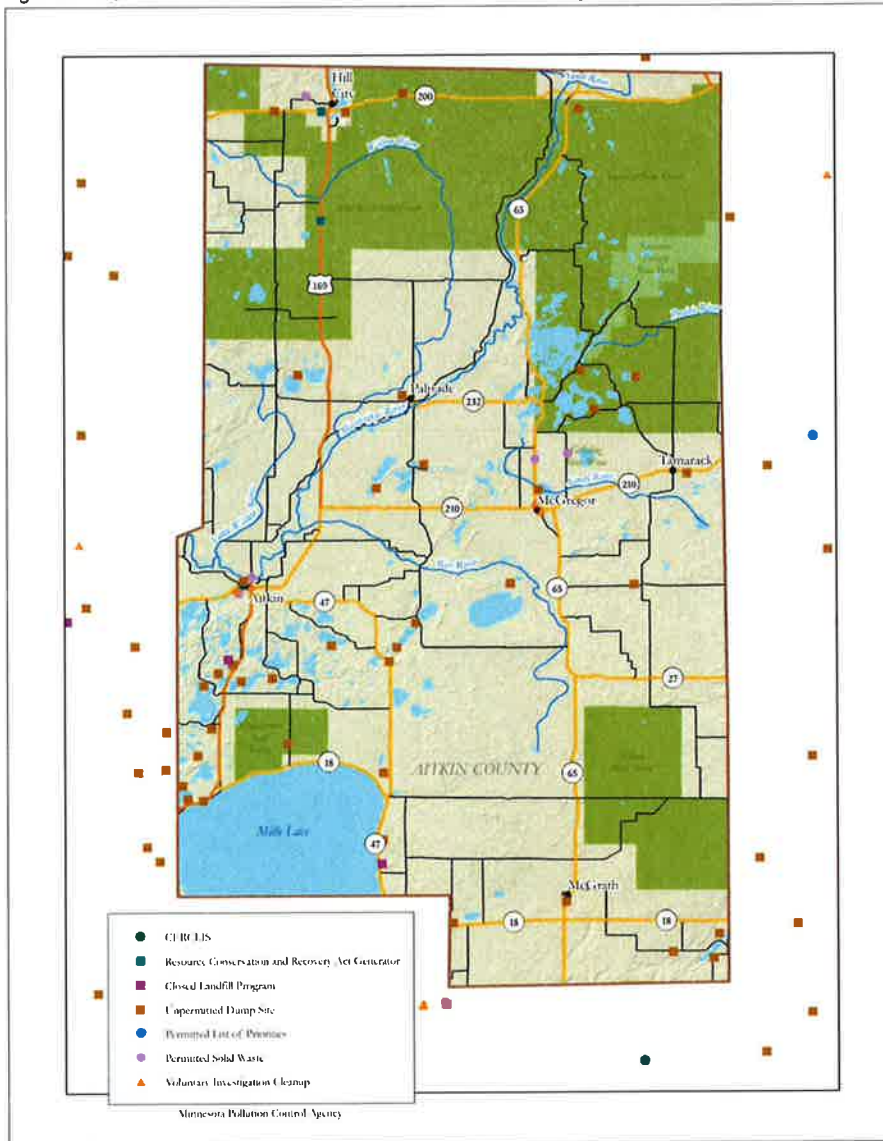
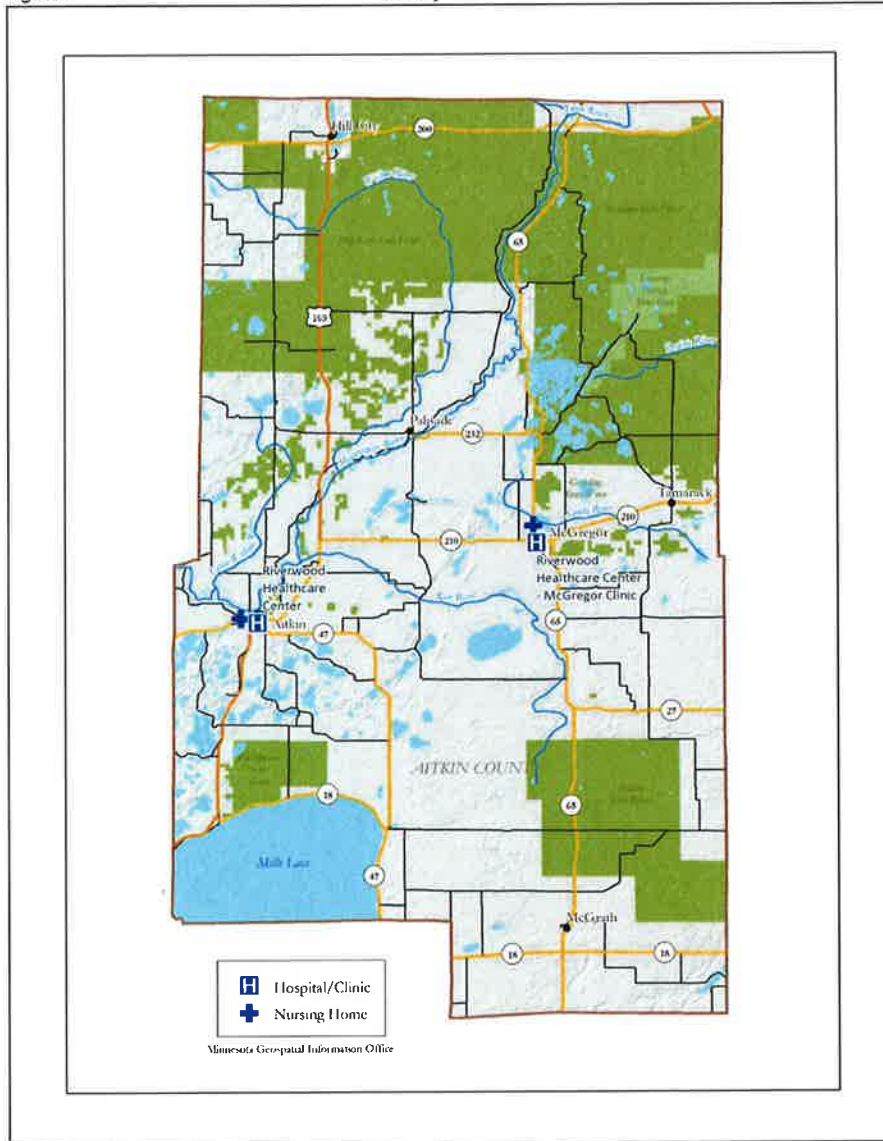
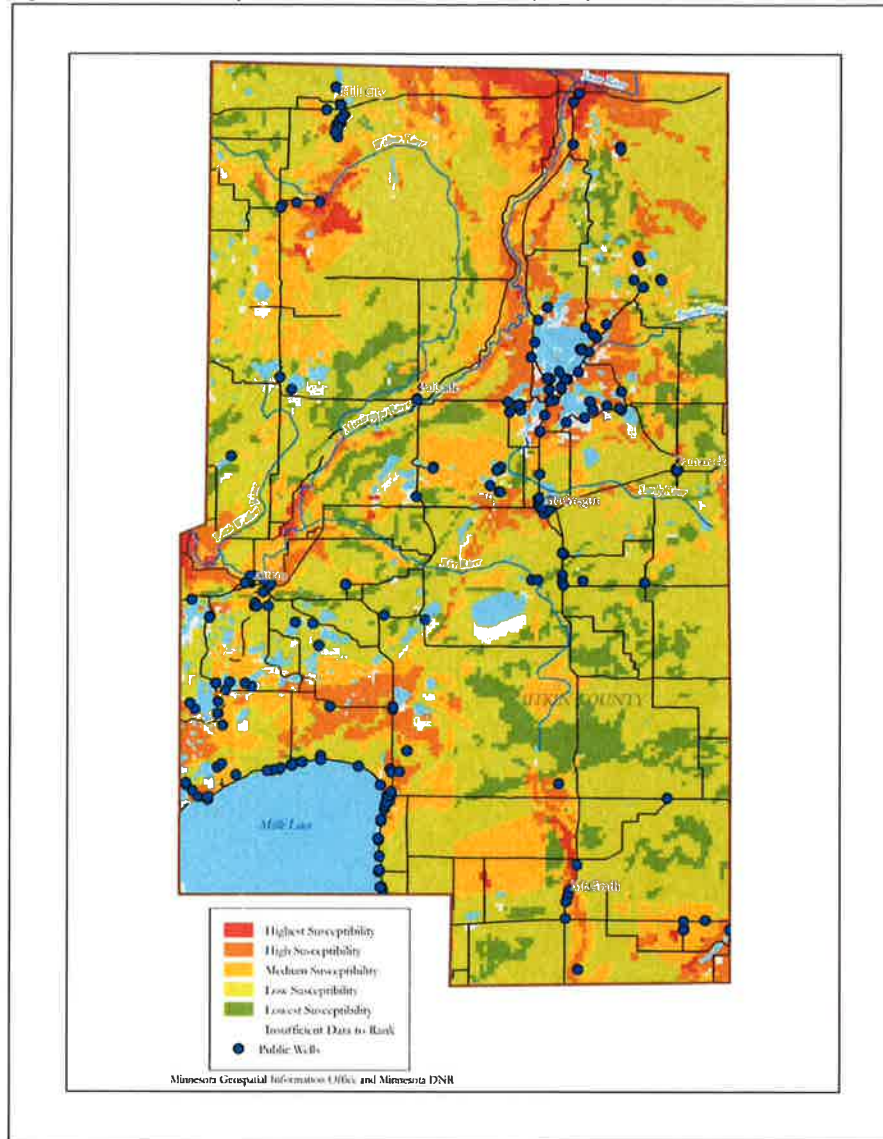


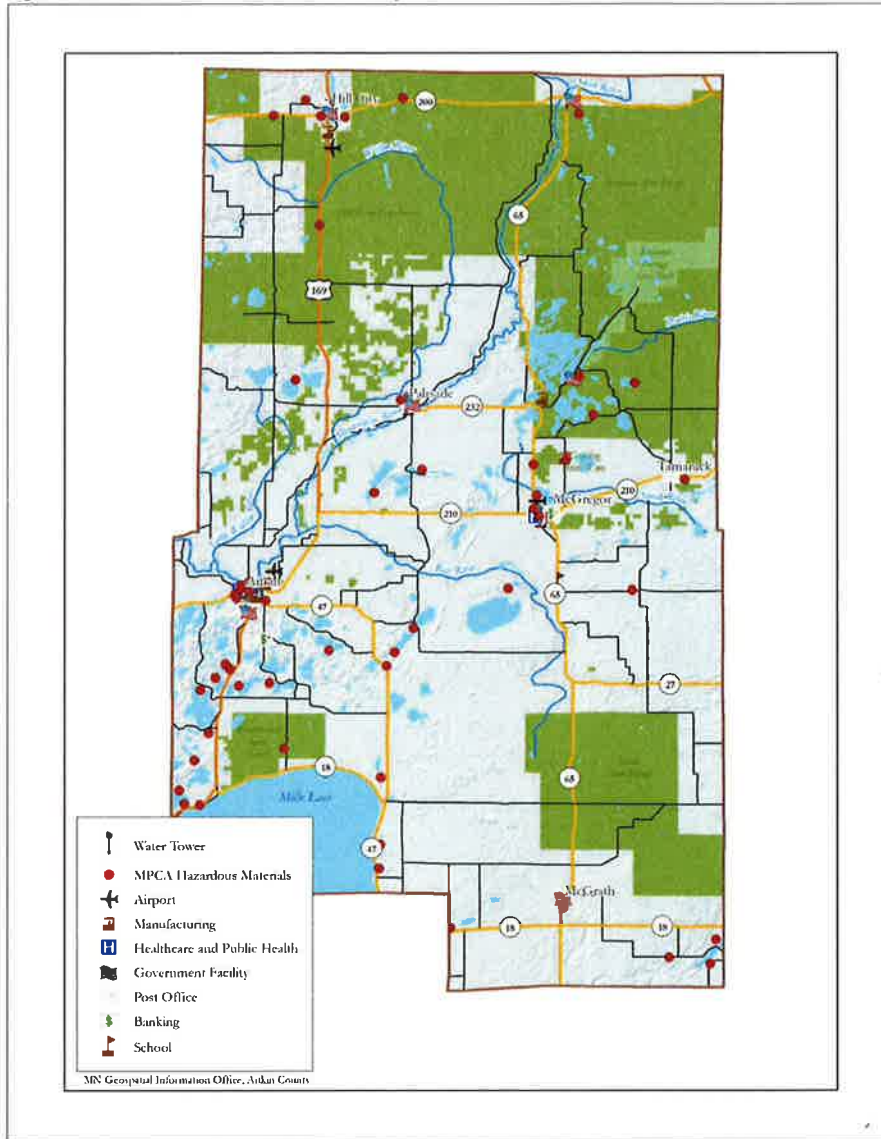
Figure A – 16. Health Care Providers in Aitkin County



FigureA – 17. Aitkin County Groundwater Contamination Susceptibility and Wells



FigureA – 18. Critical Facilities in Aitkin County



FigureA - 19. Critical Facilities in the City of Aitkin

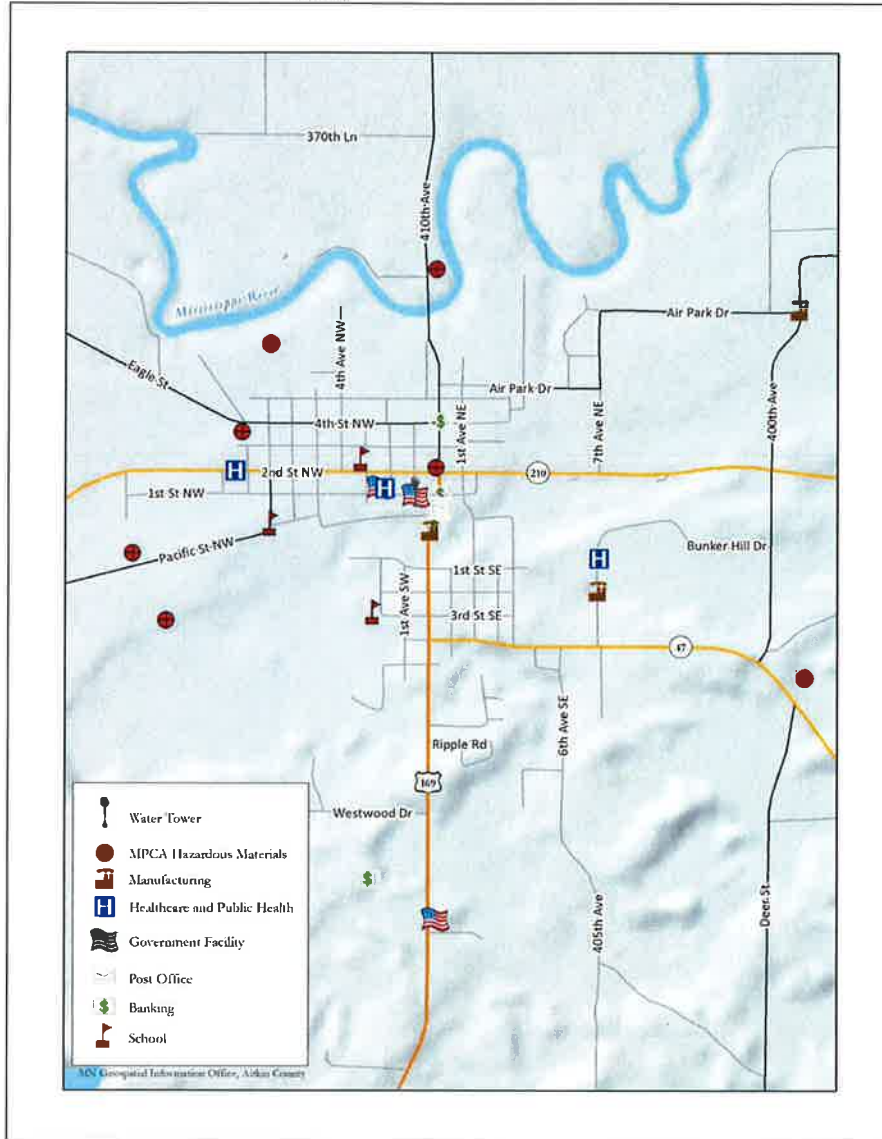


Figure A - 20. Critical Facilities in Hill City

Figure A - 21. Critical Facilities in McGregor

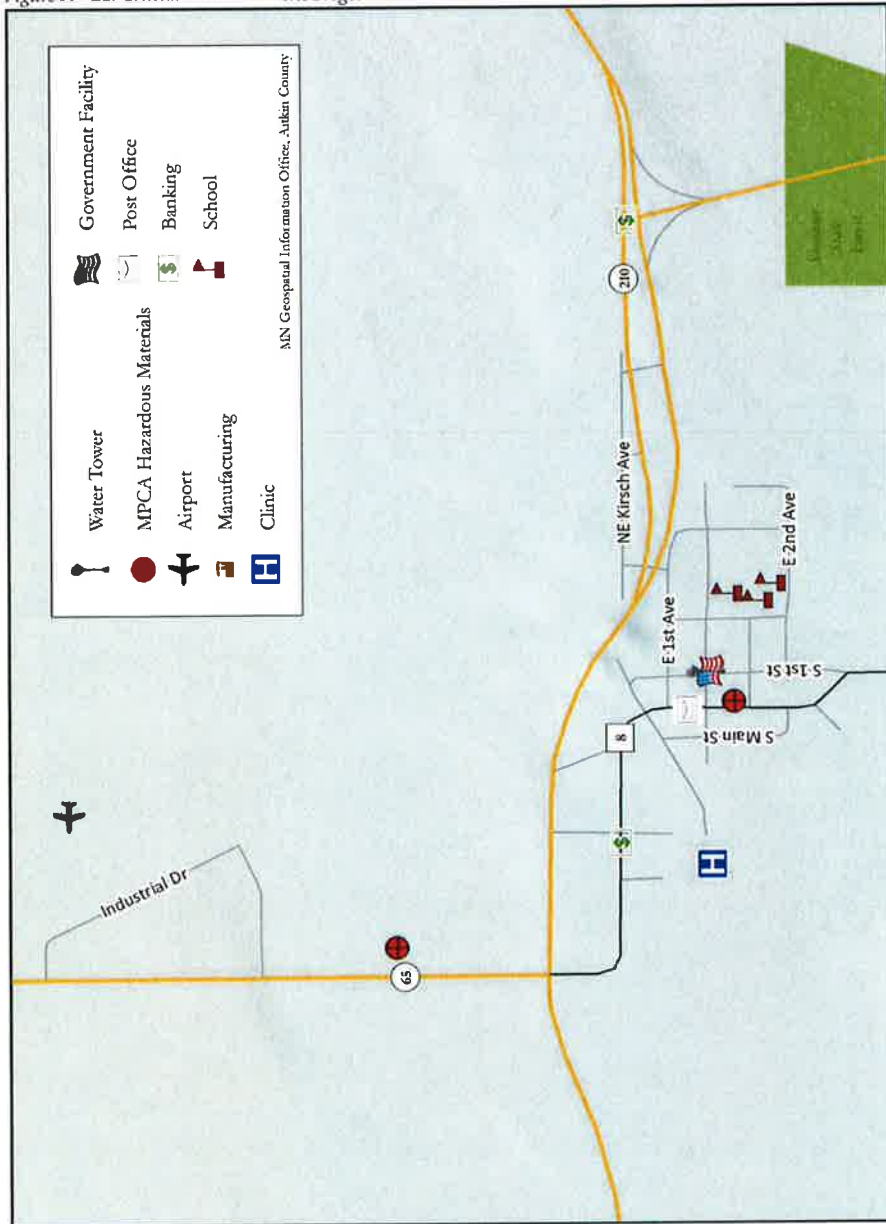


Figure A - 22. Distribution of Estimated Economic Loss by Census Block for Aitkin County in 100-Year Flood

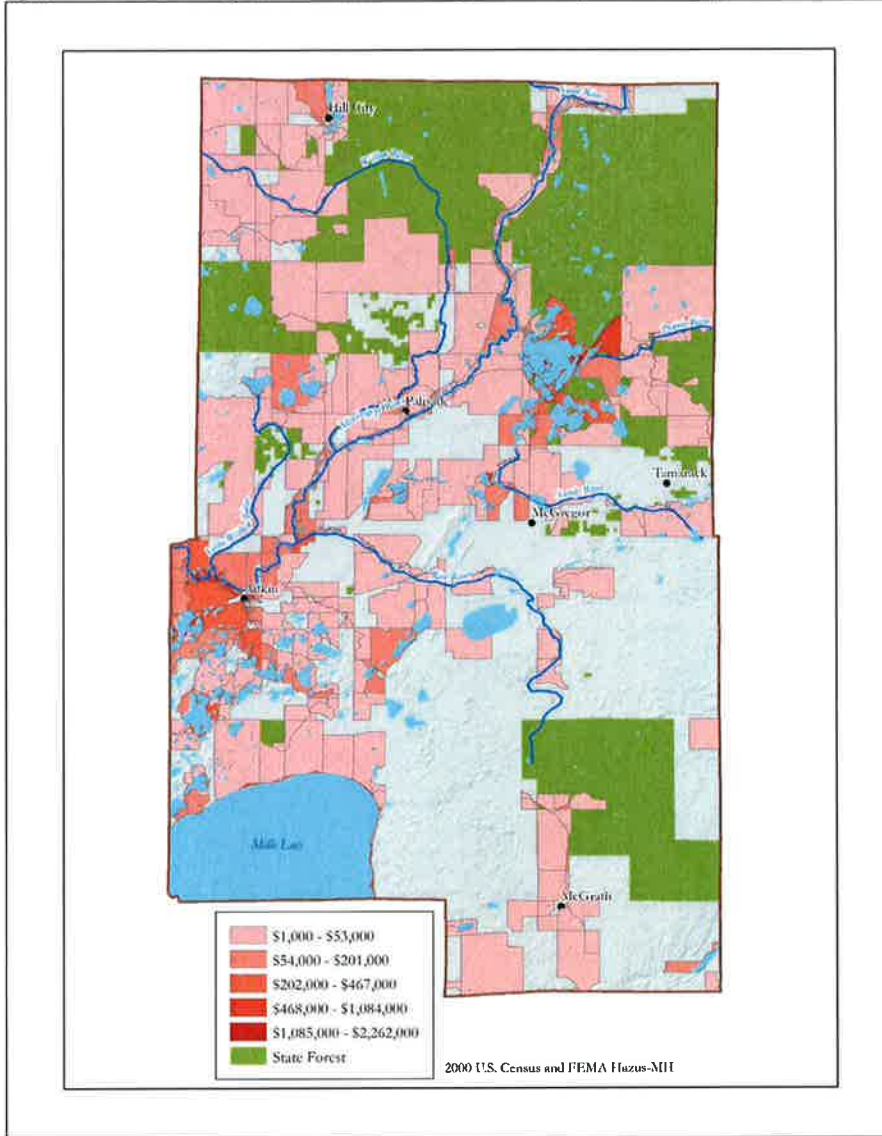


Figure A - 23. Census Block 270019901001127 and 100-Year Floodplain on Big Sandy Lake



Figure A - 24. Census Block 270019901001164 and 100-Year Floodplain on Big Sandy Lake



Figure A - 26. Jacobson Fire Department and 100-Year Floodplain

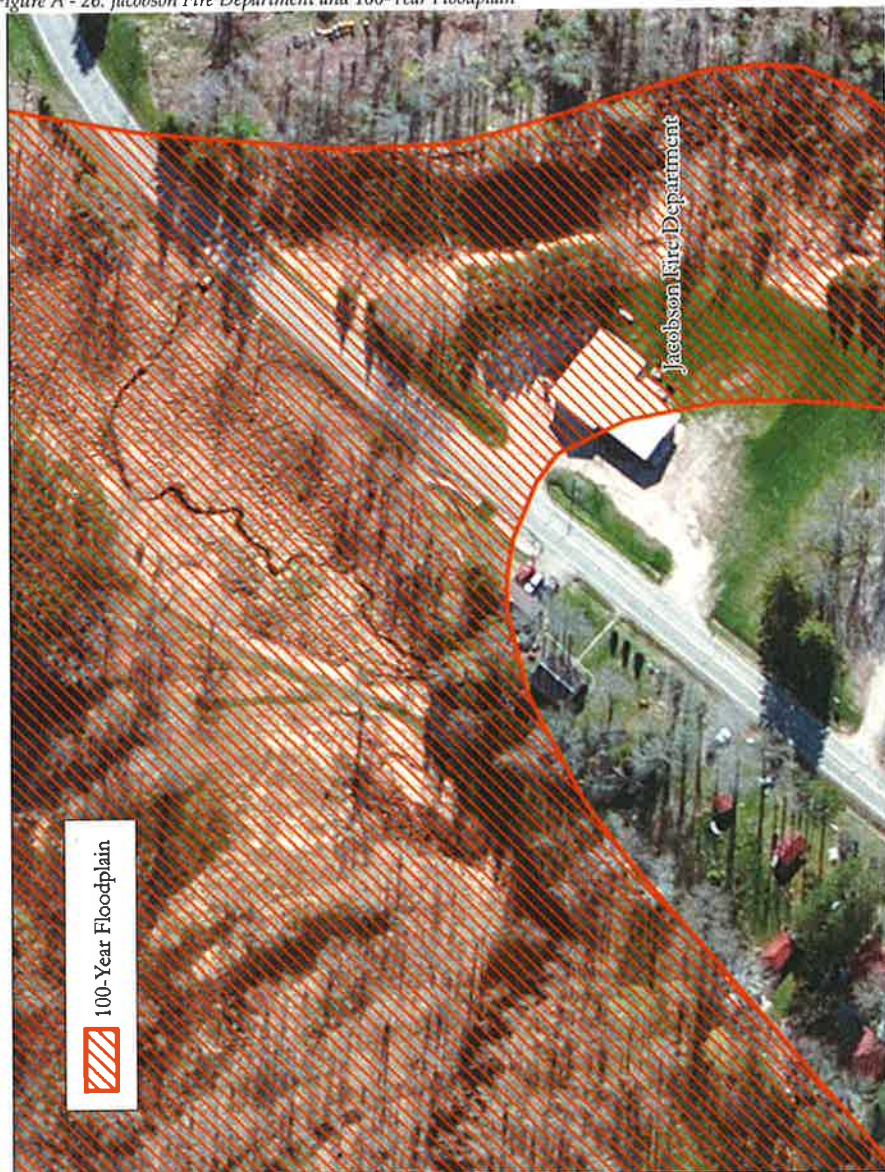


Figure A - 27. Wildfires by Cause and Acres Burned, 1985-2013

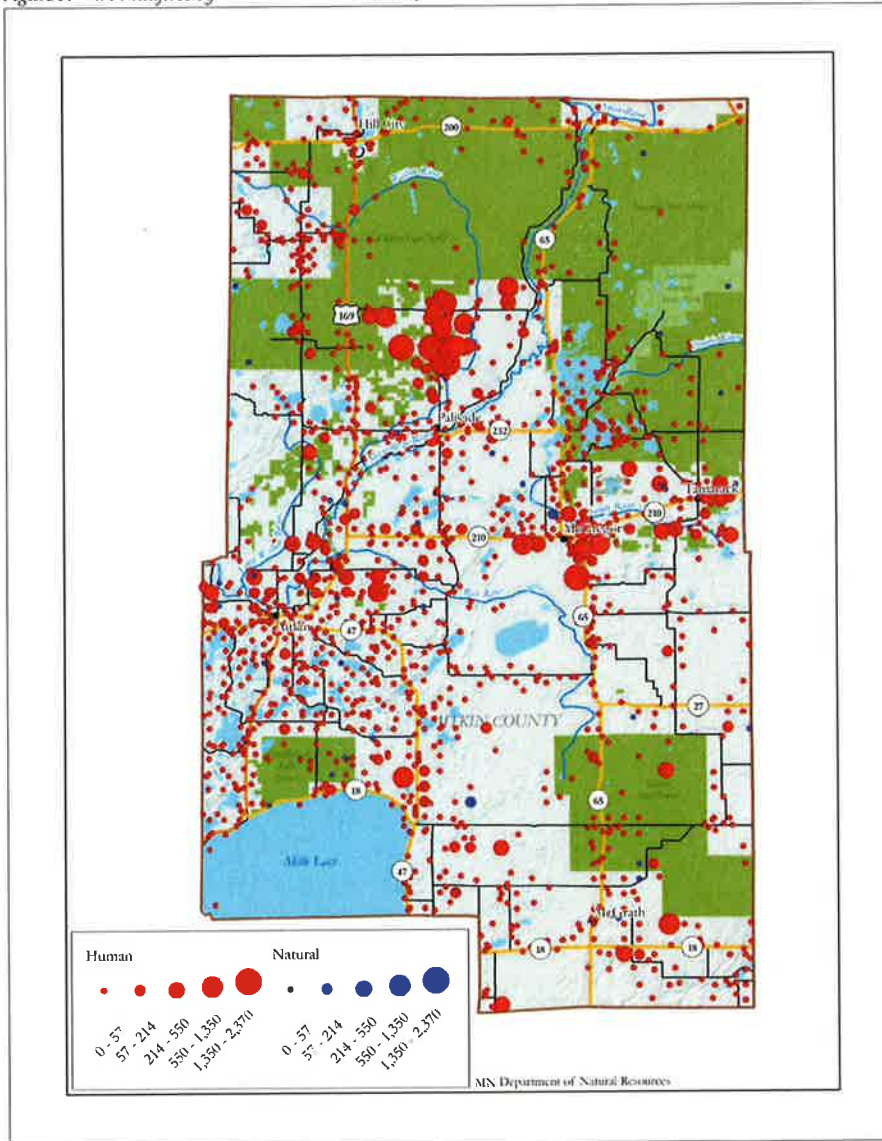
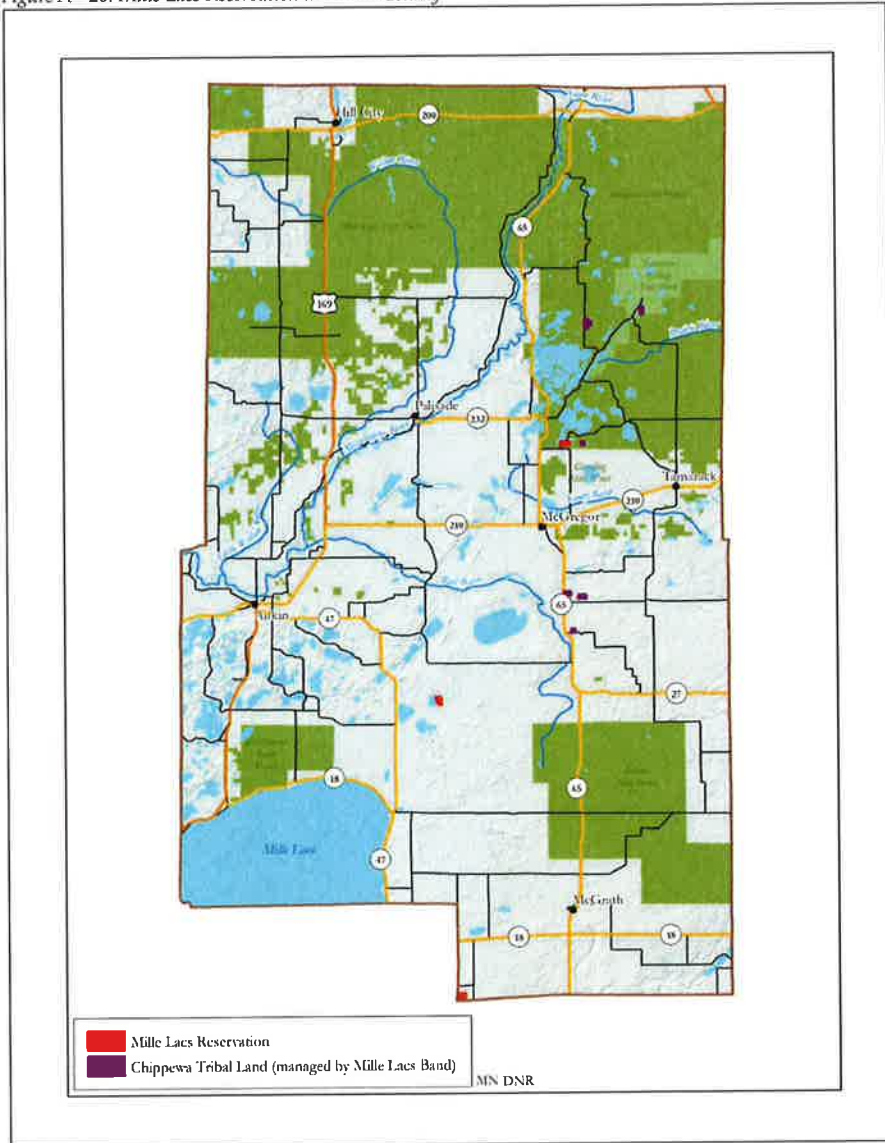


Figure A - 28. Mille Lacs Reservation in Aitkin County



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Appendix B

Aitkin County Critical Facilities

AGRICULTURE & FOOD

Aitkin Feed and Farm Supply	108 Airpark Drive	Aitkin	MN	56431
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BANKING & FINANCE

Security State Bank of Aitkin	402 Minnesota Ave. N	Aitkin	MN	56431
Bremer Bank	101 Minnesota Ave. N.	Aitkin	MN	56431
Members Co-Operative Credit Union	181st Street NE	Aitkin	MN	56431
Neighborhood National Bank	15 Minnesota Ave. S.	Aitkin	MN	56431
Security State Bank	171 Red Oak Drive #500	Aitkin	MN	56431
Grand Timber Bank	204 N. Maddy Street	McGregor	MN	55760
Members Co-Op Credit Union	State Highway 65	McGregor	MN	55760
Woodland Bank	675 U.S. Highway 169	Hill City	MN	55748

CHEMICAL AND HAZARDOUS MATERIALS

Aitkin Waste Water Treatment Plant	4 th Ave NW	Aitkin	MN	56431
AT&T Communications (Citizen's Telecomm.)	448 Maddy St	McGregor	MN	55760
MN Central Office (Century Link)	103 2 nd St NW	Aitkin	MN	56431
Palisade Water Treatment Plant	Main St/5 th Ave	Palisade	MN	56469
Riverwood Healthcare Center	200 Bunker Hill Drive	Aitkin	MN	56431

DAMS

Blue Lake			MN	
Cedar Lake			MN	
Cornish Flowage			MN	
Cornish Township			MN	
Dam Lake			MN	
Digman Pond			MN	
Digman Pond			MN	
Ecklund			MN	
Esquagamah Lake			MN	
French Lake WMA			MN	
Hammond Pond			MN	
Hanging Kettle Lake			MN	
Heft Pond			MN	
Hill Lake			MN	
Jewett WMA Dike No. 1			MN	

DAMS	
Jewett WMA Dike No. 2	MN
Lange Pond	MN
Little Hill F Pond	MN
Little Pine Lake	MN
Little Willow River	MN
Little Willow River F Area	MN
Long-Tamefish Lake	MN
Minnewawa Lake	MN
Moose-Willow No. 1	MN
Moose-Willow No. 2	MN
Mud River	MN
Rabbit Lake	MN
Rice Lake Pool	MN
Rice River Pool	MN
Ripple Lake	MN
Round Lake	MN
Sand Lake Dam & Lock	MN
Sandy Lake	MN
Spirit Lake	MN
Washburn Lake	MN
Waukenabo Lake	MN

ENERGY				
Aitkin Public Utilities	120 1 st St NW	Aitkin	MN	56431
East Central Energy	412 Main Ave N	Braham	MN	55006
Lake Country Power	21532 484 th Ln	McGregor	MN	55760
Mille Lacs Energy Cooperative	36559 U.S. 169	Aitkin	MN	56431

EMERGENCY SERVICES				
Aitkin Police Department	109 1 st Avenue NW	Aitkin	MN	56431
Aitkin County Sheriff's Office	217 2 nd Street NW	Aitkin	MN	56431
Hill City Police Department	125 Lake Avenue East	Hill City	MN	55748
McGregor Police Department	101 E Center Ave	McGregor	MN	55760
Aitkin Fire Department	108 1 st Ave NW	Aitkin	MN	56431
Jacobson Fire Department	68368 198 th Avenue	Jacobson	MN	55752
Hill City Fire Department	111 Henrietta Ave	Hill City	MN	55748
McGrath Fire Department	303 Main Street	McGrath	MN	56350

EMERGENCY SERVICES

McGregor Fire Department	101 Center Ave	McGregor	MN	55760
Palisade Fire Department	48052 Nature Ave	Palisade	MN	56469
North Memorial Ambulance	Bunker Hill Dr	Aitkin	MN	56431
McGregor Ambulance	101 Center Ave	McGregor	MN	55760

INFORMATION TECHNOLOGY

Aitkin County IT Department	209 2 nd St NW	Aitkin	MN	56431
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COMMUNICATIONS

AT&T Communication	448 Maddy St	McGregor	MN	55760
MN Central Office (Century Link)	103 2 nd St NW	Aitkin	MN	56431

POSTAL AND SHIPPING

U.S. Post Office	15 Minnesota Ave N.	Aitkin	MN	56431
U.S. Post Office	133 Lake Avenue	Hill City	MN	55748
U.S. Post Office	300 Main Street W.	McGrath	MN	56350
U.S. Post Office	26 N. Maddy Street	McGregor	MN	55760
U.S. Post Office	301 Main Street	Palisade	MN	56469
U.S. Post Office	275 Main Street N.	Tamarack	MN	55787

GOVERNMENT FACILITIES

Aitkin County Courthouse	209 2 nd St NW	Aitkin	MN	56431
Aitkin City Hall	109 1 st Ave NW	Aitkin	MN	56431
Hill City City Hall	111 Henrietta Ave	Hill City	MN	55748
McGrath City Hall	PO Box 194 Main St	McGrath	MN	56350
McGregor City Hall	101 East Center Ave	McGregor	MN	55760
Palisade City Hall	PO Box 144 Main St	Palisade	MN	56469
Tamarack City Hall	255 Main St N	Tamarack	MN	55787
Aitkin High School	306 2 nd St NW	Aitkin	MN	56431
Aitkin Rippleside Elementary School	225 2 nd Ave SW	Aitkin	MN	56431
Hill City School	500 lone Ave	Hill City	MN	55748
McGregor School	148 South 2 nd St	McGregor	MN	55760
Minisinaakwaang Leadership Academy	20930 367 th Ln	McGregor	MN	55760
Army Corp of Engineers Libby Dam	22205 531 st Ln	McGregor	MN	55760

GOVERNMENT FACILITIES

Rice Lake National Wildlife Refuge	36289 State Hwy 65	McGregor	MN	55760
Savanna Portage State Park	55626 Lake Pl	McGregor	MN	55760
Ball Bluff Town Hall	68447 198 th Ave	Jacobson	MN	55752
Balsam Town Hall	52985 145 th Pl	Tamarack	MN	55787
Beaver Town Hall	3005 140 th Pl	Sturgeon Lk	MN	55783
Farm Island Town Hall	32788 416 th Ave	Aitkin	MN	56431
Fleming Town Hall	29977 430 th Ln	Aitkin	MN	56431
Glen & Kimberly Town Hall	32631 Dam Lake St	Aitkin	MN	56431
Haugen Town Hall	48019 Kestrel Ave	Tamarack	MN	55787
Hazelton Town Hall	24248 US Hwy 169	Aitkin	MN	56431
Jevne Town Hall	43512 247 th Pl	McGregor	MN	55760
Libby Town Hall	54989 Great River Rd	Palisade	MN	56469
Macville Town Hall	38946 605 th St	Swatara	MN	55785
Malmö Town Hall	31947 260 th Ln	Aitkin	MN	56431
McGregor Town Hall	41549 200 th Ave	McGregor	MN	55760
Millward Town Hall	23459 Kestrel Ave	McGrath	MN	56350
Morrison Town Hall	36031 405 th Ln	Aitkin	MN	56431
Nordland Town Hall	31310 Oriole Ave	Aitkin	MN	56431
Rice River Town Hall	32270 State Hwy 65	McGregor	MN	55760
Salo Town Hall	36303 Kestrel Ave	McGregor	MN	55760
Seavey Town Hall	26411 180 th St	McGrath	MN	56350
Shamrock Town Hall	49954 Lake Ave	McGregor	MN	55760
Spalding Town Hall	36418 208 th Pl	McGregor	MN	55760
Spencer Town Hall	35588 387 th Ave	Aitkin	MN	56431
Turner Town Hall	52988 Loon Ave	McGregor	MN	55760
Verdon Town Hall	62010 Great River Rd	Jacobson	MN	55752
Wagner Town Hall	11550 State Hwy 18	Finlayson	MN	55735
Waukenabo Town Hall	36797 Grove St	Palisade	MN	56469
Wealthwood Town Hall	24249 385 th Ave	Aitkin	MN	56431
White Pine Town Hall	22020 210 th Ave	McGrath	MN	56350
Workman Town Hall	24301 480 th St	McGregor	MN	55760

HEALTHCARE AND PUBLIC HEALTH

Aicota Health Care Center	850 2 nd Street NW	Aitkin	MN	56431
Aicota Assisted Living	840 2 nd St NW	Aitkin	MN	56431
Aitkin County Health & Human Services	204 1 st Street NW	Aitkin	MN	56431
Aitkin Health Services	301 MN Ave S	Aitkin	MN	56431
Golden Horizons	518 7 th Ave NE	Aitkin	MN	56431
Northland Assisted Living	22027 420 th St	McGregor	MN	55760
Riverwood Healthcare Center Hospital & Clinic	200 Bunker Hill Drive	Aitkin	MN	56431
Riverwood Healthcare Center – McGregor Clinic	2 East Center Avenue	McGregor	MN	55760

TRANSPORTATION

Aitkin Municipal Airport	1190 Air Park Drive	Aitkin	MN	56431
Hill City Quadna Mountain Airport	125 Lake Ave	Hill City	MN	55748
McGregor Municipal Airport	111 Center Ave E	McGregor	MN	55760
Aitkin County Highway Department	1211 Air Park Drive	Aitkin	MN	56431
Aitkin County Highway Department Jacobson Shop	68507 Great River Rd	Jacobson	MN	55752
Aitkin County Highway Department McGrath Shop	20208 220 th St	McGrath	MN	56350
Aitkin County Highway Department McGregor Shop	20129 State Hwy 210	McGregor	MN	55760
Aitkin County Highway Department Palisade Shop	47652 Nature Ave	Palisade	MN	56469
Aitkin County Highway Department Swatara Shop	36371 610 th St	Hill City	MN	55748

WATER

Aitkin Wastewater Treatment Plant	4th Ave NW	Aitkin	MN	56431
Palisade Water Treatment Plant	Main St on 5th Ave	Palisade	MN	56469
Aitkin Water Tower	109 1 st Ave NW	Aitkin	MN	56431
Hill City Water Tower	111 Henrietta Ave	Hill City	MN	55748
McGregor Water Tower	101 East Center Ave	McGregor	MN	55760
Palisade Water Tower	PO Box 144 Main St	Palisade	MN	56469

MANUFACTURING

Aitkin Iron Works	301 Bunker Hill Drive	Aitkin	MN	56431
FLOE International	48473 Minnesota 65	McGregor	MN	55760
Lake States Lumber	995 Pacific St N W	Aitkin	MN	56431
National Innovative Visions Inc.	65742 US Hwy 169	Hill City	MN	55748
Savanna Pallets	106 1st Ave E	McGregor	MN	55760
Stern Rubber Company	1104 Air Park Drive	Aitkin	MN	56431

Appendix C

Aitkin County Hazard Events

The National Climatic Data Center Database was queried for all notable events on record, through May 2014. However, some categories of events do not have records prior to 2002.

Table C - 1. All severe tornado events recorded by NCDC, 1952-May 2014

Location or County	Date	Magnitude	Deaths	Injuries	Property Damage	Length in miles	Width in yards
1. Shovel Lake	8/29/2013	EF1	0	0	0	NA	NA
2. Haypoint	6/17/2010	F0	0	0	0	1	25
3. McGregor	6/30/1994	F0	0	0	0	0.1	10
4. Aitkin County	9/13/1990	F0	0	0	0	0.1	10
5. Aitkin County	7/3/1985	F2	0	0	25K	2	200
6. Aitkin County	7/3/1985	F0	0	0	250K	3	100
7. Aitkin County	6/12/1983	F0	0	0	2.5K	3	400
8. Aitkin County	7/28/1978	F1	0	0	250K	18	880
9. Aitkin County	9/8/1977	F2	0	0	250K	3.6	660
10. Aitkin County	6/25/1973	F0	0	0	2.5K	0.8	100
11. Aitkin County	9/17/1971	F0	0	0	0	0.1	30
12. Aitkin County	8/6/1969	F3	1	3	250K	12.5	1500
13. Aitkin County	8/6/1969	F4	0	0	2.5M	10.1	833
14. Aitkin County	6/30/1968	F3	0	0	2.5K	0.1	10
15. Aitkin County	7/3/1955	F1	0	0	0.25K	0	33
16. Aitkin County	7/16/1952	F2	0	0	25K	9.4	333
Highest Value Property Damage:					2.5M		

Table C - 2. All severe hail storm events recorded by NCDC, 1972-May 2014

Location or County	Date	Magnitude	Deaths	Injuries	Property Damage
17. Hill City	8/29/2013	1.75 in.	0	0	0
18. Hill City	8/29/2013	1.75 in.	0	0	0
19. Hill City Quadna Airport	8/29/2013	1.00 in.	0	0	0
20. Cutler	08/04/2012	1.00 in.	0	0	0
21. Wealthwood	08/04/2012	1.50 in.	0	0	0
22. Kimberly	08/04/2012	1.00 in.	0	0	0
23. Cutler	07/04/2012	1.00 in.	0	0	0
24. Wealthwood	07/04/2012	1.50 in.	0	0	0
25. Kimberly	07/04/2012	1.00 in.	0	0	0
26. Bennettville	05/28/2012	1.75 in.	0	0	0
27. Aitkin	05/28/2012	1.00 in.	0	0	0
28. Jacobson	8/8/2011	1.00 in.	0	0	0
29. McGregor	9/2/2010	1.00 in.	0	0	0
30. Swatara	6/17/2010	2.00 in.	0	0	0

Location or County	Date	Magnitude	Deaths	Injuries	Property Damage
31. Jacobson	6/17/2010	2.00 in.	0	0	0
32. Jacobson	6/17/2010	1.00 in.	0	0	0
33. Hill City	6/17/2010	1.00 in.	0	0	0
34. Aitkin	4/22/2009	1.00 in.	0	0	0
35. Hill City	8/28/2008	0.88 in.	0	0	0
36. Glory	6/27/2008	0.88 in.	0	0	0
37. Hassman	6/27/2008	0.75 in.	0	0	0
38. Hill City	8/27/2007	0.88 in.	0	0	0
39. McGregor	8/27/2007	2.75 in.	0	0	0
40. McGregor	8/27/2007	1.75 in.	0	0	0
41. Hill City	8/27/2007	1.75 in.	0	0	0
42. Hill City	8/27/2007	0.75 in.	0	0	0
43. McGregor	6/7/2007	0.88 in.	0	0	0
44. Aitkin	5/18/2007	0.75 in.	0	0	0
45. Aitkin	4/22/2007	0.75 in.	0	0	0
46. Swatara	7/30/2006	1.00 in.	0	0	0
47. Aitkin	5/29/2006	1.00 in.	0	0	0
48. Aitkin	5/29/2006	1.00 in.	0	0	0
49. McGregor	8/9/2005	1.00 in.	0	0	0
50. Hill City	6/27/2005	0.75 in.	0	0	0
51. Hassman	6/28/2003	0.75 in.	0	0	0
52. Lawler	6/13/2001	0.75 in.	0	0	0
53. Sheshebee	6/13/2001	1.75 in.	0	0	0
54. Tamarack	8/14/2000	2.00 in.	0	0	0
55. Pallsade	8/14/2000	0.75 in.	0	0	0
56. Kimberly	7/8/2000	1.75 in.	0	0	0
57. McGregor	6/6/1999	0.75 in.	0	0	0
58. Aitkin	6/6/1999	1.00 in.	0	0	0
59. Hill City	6/16/1998	0.75 in.	0	0	0
60. McGregor	6/1/1998	1.75 in.	0	0	0
61. Aitkin County	6/9/1991	0.75 in.	0	0	0
62. Aitkin County	9/13/1990	2.00 in.	0	0	0
63. Aitkin County	9/5/1990	2.75 in.	0	0	0
64. Aitkin County	7/17/1990	0.75 in.	0	0	0
65. Aitkin County	6/1/1987	1.00 in.	0	0	0
66. Aitkin County	5/10/1987	0.75 in.	0	0	0
67. Aitkin County	8/4/1986	1.75 in.	0	0	0
68. Aitkin County	6/25/1985	0.87 in.	0	0	0
69. Aitkin County	6/5/1980	2.75 in.	0	0	0

Location or County	Date	Magnitude	Deaths	Injuries	Property Damage
70. Aitkin County	7/22/1976	0.75 in.	0	0	0
71. Aitkin County	7/6/1976	1.00 in.	0	0	0
72. Aitkin County	8/5/1972	2.00 in.	0	0	0
73. Aitkin County	8/5/1972	1.00 in.	0	0	0
Highest Value Property Damage:					OK

Table C-3. All severe thunderstorm wind events recorded by NCDC, 1972-May 2014

Location or County	Date	Magnitude (knots)	Deaths	Injuries	Property Damage
74. Hill City	8/31/2013	52	0	0	0
75. Libby	8/29/2013	52	0	0	0
76. Kimberly	8/29/2013	52	0	0	0
77. Thorp	8/29/2013	52	0	0	0
78. Thorp	8/29/2013	52	0	0	0
79. Wealthwood	8/4/2012	50	0	0	0
80. Hill City	8/4/2012	50	0	0	0
81. Wealthwood	7/4/2012	60	0	0	0
82. Hill City	7/4/2012	50	0	0	0
83. Hill City	7/2/2012	50	0	0	0
84. Minnewawa	6/19/2012	50	0	0	0
85. Palsade	6/19/2012	50	0	0	0
86. Aitkin	7/10/2011	61	0	0	0
87. Cutler	5/30/2011	50	0	0	0
88. McGregor	8/20/2010	50	0	0	0
89. Rush City Municipal Airport	7/11/2008	60	0	0	0
90. Palisade	7/11/2008	56	0	0	0
91. Hill City	5/17/2008	52	0	0	0
92. Minnewawa	5/17/2008	52	0	0	0
93. Palisade	9/24/2007	52	0	0	0
94. McGregor	7/29/2006	55	0	0	0
95. McGregor	7/29/2006	55	0	0	0
96. Aitkin	8/9/2005	60	0	0	0
97. Hill City	6/27/2005	52	0	0	0
98. Aitkin	9/23/2004	60	0	0	0
99. Palisade	4/28/2004	60	0	0	0
100. Hill City	8/20/2003	55	0	0	0
101. McGregor	7/2/2003	50	0	0	0

Location or County	Date	Magnitude (knots)	Deaths	Injuries	Property Damage
102. McGrath	7/21/2002	50	0	0	0
103. Aitkin	7/8/2002	50	0	0	0
104. Hill City	4/16/2002	50	0	0	0
105. Hill City	8/8/2001	50	0	0	0
106. Swatara	8/8/2001	55	0	0	0
107. Hill City	7/17/2001	52	0	0	0
108. Aitkin	6/13/2001	50	0	0	0
109. Aitkin	6/11/2001	55	0	0	0
110. McGregor	8/14/2000	50	0	0	0
111. Jacobson	8/14/2000	60	0	0	0
112. Hill City	8/14/2000	50	0	0	0
113. Swatara	8/14/2000	60	0	0	0
114. Hill City	8/14/2000	60	0	0	0
115. Palisade	7/25/1999	55	0	0	0
116. Jacobson	7/25/1999	55	0	0	0
117. Tamarack	7/25/1999	60	0	0	0
118. McGregor	7/23/1999	50	0	0	0
119. Aitkin	7/23/1999	61	0	0	0
120. Hill City	7/4/1999	52	0	0	0
121. Hill City	6/26/1999	50	0	0	0
122. McGregor	6/1/1998	50	0	0	0
123. Tamarack	5/15/1998	50	0	0	0
124. Aitkin	6/28/1997	55	0	0	0
125. Jacobson	8/25/1996	50	0	0	0
126. Aitkin	8/6/1996	50	0	0	0
127. Malmo	6/29/1996	55	0	0	0
128. Tamarack	5/17/1996	50	0	0	0
129. Hill City	7/13/1995	N/A	0	0	0
130. Aitkin	7/12/1995	N/A	0	0	0
131. Aitkin County	8/12/1994	60	0	0	0
132. Aitkin	6/19/1994	N/A	0	0	0.5K
133. Aitkin	6/19/1994	N/A	0	0	0
134. Aitkin County	9/17/1992	N/A	0	0	0
135. Aitkin County	6/28/1991	N/A	0	0	0
136. Aitkin County	6/27/1991	N/A	0	0	0
137. Aitkin County	9/5/1990	N/A	0	0	0
138. Aitkin County	8/26/1990	N/A	0	0	0
139. Aitkin County	8/30/1989	N/A	0	0	0
140. Aitkin County	7/4/1986	N/A	0	0	0

Location or County	Date	Magnitude (knots)	Deaths	Injuries	Property Damage
141. Aitkin County	6/3/1986	N/A	0	0	0
142. Aitkin County	6/21/1985	N/A	0	0	0
143. Aitkin County	6/6/1984	N/A	0	0	0
144. Aitkin County	6/16/1979	N/A	0	0	0
145. Aitkin County	8/14/1978	N/A	0	0	0
146. Aitkin County	8/14/1978	N/A	0	0	0
147. Aitkin County	6/7/1977	55	0	0	0
148. Aitkin County	6/7/1977	N/A	0	0	0
149. Aitkin County	7/22/1976	N/A	0	0	0
150. Aitkin County	7/2/1975	N/A	0	0	0
151. Aitkin County	7/2/1975	N/A	0	0	0
152. Aitkin County	7/2/1975	N/A	0	0	0
153. Aitkin County	7/13/1974	N/A	0	0	0
154. Aitkin County	6/25/1973	N/A	0	0	0
155. Aitkin County	8/5/1972	N/A	0	0	0
Highest Value Property Damage:					0.5K

Table C - 4. All extreme flood events recorded by NCDC, 2002-May 2014

Location or County	Date	Type	Deaths	Injuries	Property Damage
156. Aitkin	5/1/2013	Flood	0	0	0
157. Aitkin	4/30/2013	Flood	0	0	0
158. Libby	7/1/2012	Flood	0	0	0
159. Aitkin	7/1/2012	Flood	0	0	0
160. Libby	6/20/2012	Flood	0	0	0
161. Aitkin	6/17/2012	Flood	0	0	0
162. Libby	6/1/2012	Flood	0	0	0
163. Aitkin	6/1/2012	Flood	0	0	0
164. Aitkin	5/26/2012	Flood	0	0	0
165. Aitkin	5/5/2011	Flood	0	0	0
166. Aitkin	4/11/2011	Flood	0	0	0
167. Nichols	12/7/2010	Flood	0	0	0
168. Aitkin Airport	11/1/2010	Flood	0	0	0
169. Aitkin	7/14/2009	Flash Flood	0	0	0
169. Redtop	7/7/2002	Flash Flood	0	0	0
Highest Value Property Damage:					0

Table C - 5. All severe lightning events recorded by NCDC, 2000-May 2014

Location or County	Date	Deaths	Injuries	Property Damage
170. Aitkin	6/19/2002	0	0	0
171. Aitkin	7/8/2000	0	0	0
Highest Value Property Damage:				0

Table C - 6. All severe cold/wind chill events recorded by NCDC, 1997-May 2014

Location or County	Date	Type	Deaths	Injuries	Property Damage
172. Northern Aitkin	3/1/2014	Cold/Wind chill	0	0	0
173. Southern Aitkin	2/27/2014	Cold/Wind chill	0	0	0
174. Northern Aitkin	2/27/2014	Cold/Wind chill	0	0	0
175. Southern Aitkin	2/27/2014	Cold/Wind chill	0	0	0
176. Northern Aitkin	2/27/2014	Cold/Wind chill	0	0	0
177. Northern Aitkin	1/27/2014	Cold/Wind chill	0	0	0
178. Southern Aitkin	1/27/2014	Cold/Wind chill	0	0	0
179. Northern Aitkin	1/27/2014	Cold/Wind chill	0	0	0
180. Southern Aitkin	1/27/2014	Cold/Wind chill	0	0	0
181. Southern Aitkin	1/22/2014	Cold/Wind chill	0	0	0
182. Northern Aitkin	1/22/2014	Cold/Wind chill	0	0	0
183. Southern Aitkin	1/22/2014	Cold/Wind chill	0	0	0
184. Northern Aitkin	1/22/2014	Cold/Wind chill	0	0	0
185. Southern Aitkin	1/8/2014	Cold/Wind chill	0	0	0
186. Northern Aitkin	1/8/2014	Cold/Wind chill	0	0	0
187. Southern Aitkin	1/8/2014	Cold/Wind chill	0	0	0
188. Northern Aitkin	1/8/2014	Cold/Wind chill	0	0	0
189. Southern Aitkin	1/4/2014	Cold/Wind chill	0	0	0
190. Northern Aitkin	1/4/2014	Cold/Wind chill	0	0	0
191. Southern Aitkin	1/4/2014	Cold/Wind chill	0	0	0
192. Northern Aitkin	1/4/2014	Cold/Wind chill	0	0	0
193. Southern Aitkin	12/30/2013	Cold/Wind chill	0	0	0
194. Northern Aitkin	12/30/2013	Cold/Wind chill	0	0	0
195. Northern Aitkin	12/11/2013	Cold/Wind chill	0	0	0
196. Southern Aitkin	1/21/2013	Cold/Wind chill	0	0	0
197. Northern Aitkin	1/21/2013	Cold/Wind chill	0	0	0
198. Southern Aitkin	1/18/2011	Cold/Wind chill	0	0	0
199. Northern Aitkin	2/9/2008	Cold/Wind chill	0	0	0
200. Southern Aitkin	2/9/2008	Cold/Wind chill	0	0	0
201. Southern Aitkin	2/17/2006	Cold/Wind chill	0	0	0

Location or County	Date	Type	Deaths	Injuries	Property Damage
202. Northern Aitkin	2/17/2006	Cold/Wind chill	0	0	0
203. Southern Aitkin	1/14/2005	Cold/Wind chill	0	0	0
204. Northern Aitkin	1/14/2005	Cold/Wind chill	0	0	0
205. Southern Aitkin	1/15/1997	Cold/Wind chill	0	0	0
206. Northern Aitkin	1/15/1997	Cold/Wind chill	0	0	0
Highest Value Property Damage:					0

Table C - 7. All severe winter weather, winter storms, and heavy snows recorded by NCDC, 1996-May 2014

Location or County	Date	Type	Deaths	Injuries	Property Damage
207. Southern Aitkin	3/27/2014	Heavy Snow	0	0	0
208. Southern Aitkin	3/17/2014	Heavy Snow	0	0	0
209. Southern Aitkin	2/20/2014	Heavy Snow	0	0	0
210. Southern Aitkin	12/2/2013	Heavy Snow	0	0	0
211. Northern Aitkin	12/2/2013	Heavy Snow	0	0	0
212. Southern Aitkin	4/22/2013	Heavy Snow	0	0	0
213. Southern Aitkin	4/11/2013	Heavy Snow	0	0	0
214. Northern Aitkin	3/9/2013	Heavy Snow	0	0	0
215. Southern Aitkin	3/4/2013	Heavy Snow	0	0	0
216. Northern Aitkin	3/4/2013	Heavy Snow	0	0	0
217. Southern Aitkin	2/10/2013	Heavy Snow	0	0	0
218. Northern Aitkin	2/10/2013	Heavy Snow	0	0	0
219. Northern Aitkin	12/9/2012	Heavy Snow	0	0	0
220. Northern Aitkin	12/9/2012	Heavy Snow	0	0	0
221. Northern Aitkin	2/28/2012	Heavy Snow	0	0	0
222. Southern Aitkin	2/28/2012	Heavy Snow	0	0	0
223. Northern Aitkin	12/30/2010	Heavy Snow	0	0	0
224. Northern Aitkin	12/20/2010	Heavy Snow	0	0	0
225. Southern Aitkin	11/29/2010	Heavy Snow	0	0	0
226. Northern Aitkin	5/7/2010	Winter Weather	0	0	0
227. Southern Aitkin	12/23/2009	Winter Storm	0	0	0
228. Northern Aitkin	12/23/2009	Winter Storm	0	0	0
229. Northern Aitkin	4/1/2009	Winter Storm	0	0	0
230. Northern Aitkin	3/31/2009	Winter Storm	0	0	0
231. Southern Aitkin	3/10/2009	Winter Storm	0	0	0
232. Northern Aitkin	3/10/2009	Winter Storm	0	0	0
233. Northern Aitkin	1/3/2009	Heavy Snow	0	0	0

Location or County	Date	Type	Deaths	Injuries	Property Damage
234. Southern Aitkin	12/30/2008	Heavy Snow	0	0	0
235. Northern Aitkin	12/20/2008	Heavy Snow	0	0	0
236. Southern Aitkin	12/13/2008	Winter Storm	0	0	0
237. Northern Aitkin	12/13/2008	Winter Storm	0	0	0
238. Northern Aitkin	4/10/2008	Winter Storm	0	0	0
239. Southern Aitkin	4/10/2008	Winter Storm	0	0	0
240. Northern Aitkin	4/5/2008	Winter Storm	0	0	0
241. Northern Aitkin	12/1/2007	Winter Storm	0	0	0
242. Southern Aitkin	12/1/2007	Winter Storm	0	0	0
243. Northern Aitkin	4/3/2007	Winter Storm	0	0	0
244. Southern Aitkin	4/3/2007	Winter Storm	0	0	0
245. Northern Aitkin	3/1/2007	Winter Storm	0	0	0
246. Southern Aitkin	3/1/2007	Winter Storm	0	0	0
247. Northern Aitkin	2/24/2007	Winter Storm	0	0	0
248. Southern Aitkin	2/24/2007	Winter Storm	0	0	0
249. Northern Aitkin	12/30/2006	Winter Storm	0	0	0
250. Northern Aitkin	2/24/2006	Heavy Snow	0	0	0
251. Southern Aitkin	1/21/2005	Heavy Snow	0	0	0
252. Northern Aitkin	1/21/2005	Heavy Snow	0	0	0
253. Northern Aitkin	1/1/2005	Winter Storm	0	0	0
254. Southern Aitkin	1/25/2004	Heavy Snow	0	0	0
255. Northern Aitkin	1/25/2004	Heavy Snow	0	0	0
256. Northern Aitkin	11/22/2003	Heavy Snow	0	0	0
257. Southern Aitkin	11/22/2003	Heavy Snow	0	0	0
258. Northern Aitkin	3/9/2002	Heavy Snow	0	0	0
259. Southern Aitkin	3/9/2002	Heavy Snow	0	0	0
260. Southern Aitkin	3/7/2002	Heavy Snow	0	0	0
261. Northern Aitkin	3/7/2002	Heavy Snow	0	0	0
262. Southern Aitkin	2/24/2002	Heavy Snow	0	0	0
263. Southern Aitkin	11/26/2001	Winter Storm	0	0	0
264. Northern Aitkin	11/26/2001	Winter Storm	0	0	0
265. Southern Aitkin	2/24/2001	Heavy Snow	0	0	0
266. Northern Aitkin	2/24/2001	Heavy Snow	0	0	0
267. Southern Aitkin	2/7/2001	Heavy Snow	0	0	0
268. Northern Aitkin	2/7/2001	Heavy Snow	0	0	0
269. Southern Aitkin	3/15/2000	Heavy Snow	0	0	0
270. Northern Aitkin	3/15/2000	Heavy Snow	0	0	0
271. Southern Aitkin	2/15/2000	Heavy Snow	0	0	0
272. Northern Aitkin	2/15/2000	Heavy Snow	0	0	0

Location or County	Date	Type	Deaths	Injuries	Property Damage
273. Northern Aitkin	3/8/1999	Heavy Snow	0	0	0
274. Southern Aitkin	3/8/1999	Heavy Snow	0	0	0
275. Southern Aitkin	11/9/1998	Winter Storm	0	0	0
276. Northern Aitkin	11/9/1998	Winter Storm	0	0	0
277. Northern Aitkin	3/31/1998	Heavy Snow	0	0	0
278. Southern Aitkin	3/31/1998	Heavy Snow	0	0	0
279. Southern Aitkin	11/13/1997	Heavy Snow	0	0	0
280. Southern Aitkin	3/13/1997	Heavy Snow	0	0	0
281. Northern Aitkin	3/13/1997	Heavy Snow	0	0	0
282. Southern Aitkin	1/23/1997	Heavy Snow	0	0	0
283. Northern Aitkin	1/23/1997	Heavy Snow	0	0	0
284. Southern Aitkin	1/4/1997	Winter Storm	0	0	0
285. Northern Aitkin	1/4/1997	Winter Storm	0	0	0
286. Northern Aitkin	4/12/1996	Winter Weather	0	0	0
287. Southern Aitkin	4/12/1996	Winter Weather	0	0	0
288. Northern Aitkin	3/24/1996	Heavy Snow	0	0	0
289. Southern Aitkin	3/24/1996	Heavy Snow	0	0	0
290. Southern Aitkin	2/26/1996	Heavy Snow	0	0	0
291. Northern Aitkin	2/26/1996	Heavy Snow	0	0	0
292. Southern Aitkin	1/28/1996	Heavy Snow	0	0	0
293. Northern Aitkin	1/28/1996	Heavy Snow	0	0	0
294. Northern Aitkin	1/17/1996	Heavy Snow	0	0	0
295. Southern Aitkin	1/17/1996	Heavy Snow	0	0	0
Highest Value Property Damage:					0

Appendix D Adopting Resolutions

Appendix E

Steering Committee Meetings

Aitkin County - Multi-Hazard Mitigation Plan Update

September 24, 2013 Kick-Off Planning Team Meeting
McGregor Community Center, McGregor MN
3:30 – 5:00p.m.

Meeting Summary:

On September 24th, Aitkin County Sheriff Scott Turner convened a group of identified key stakeholders from local jurisdictions and other key agencies or organizations in Aitkin County who are asked to participate on the Aitkin County MHMP planning team.

The meeting was facilitated by Scott Turner and Bonnie Hundrieser, Senior Planner with the Arrowhead Regional Development Commission. Scott opened the meeting with welcoming comments, participant introductions, and background information about the FEMA grant awarded for the 5-year update of the Aitkin County MHMP.

Bonnie then did a powerpoint presentation to provide an overview to the planning team of the purpose and process of the MHMP update, including planning team responsibilities and expected project timeline.

After the presentation, the group engaged in a discussion of questions and answers. Jurisdictions expressed interest in the future opportunity for applying for HMGP grants for potential local mitigation projects. No participants expressed any confusion or concern about the project and the planning process.

The planning team was informed that local jurisdictions and other key stakeholders will be contacted on a one-on-one basis as needed by Hundrieser before the next planning team meeting (slated for February, 2014) for information on relevant plans, policies, etc. in place that will be relevant to the MHMP update process.

Attached to this meeting summary are the following:

1. September 24th Meeting Agenda
2. Participant sign in sheets
3. Powerpoint presentation slides

Meeting summary prepared by:
Bonnie Hundrieser, Senior Planner
Arrowhead Regional Development Commission
Phone: (218) 529-7527
Email: bhundrieser@ardc.org

Aitkin County Multi-Hazard Mitigation Plan Update

*September 24, 2013 Kick-Off Planning Team Meeting
McGregor Community Center, McGregor MN
3:30 – 5:00p.m.*

AGENDA

1. Opening Comments and Introductions (Aitkin County Sheriff Scott Turner)
2. Overview of the Aitkin County Multi-Hazard Mitigation Plan purpose, process, and timeline (Bonnie Hundrieser, Arrowhead Regional Development Commission)
3. Questions

Aitkin County Multi Hazard Mitigation Plan Kick-Off Meeting

September 24, 2013

Name	Agency/Department	Phone	Email
Brian Pisarek	DNR/Aitkin Fire Kick Lake WUP	218-927-4040	brian.pisarek@state.mn.us
Duane King	U.S. Fish & Wildlife Service	218-768-2402	duane-king@fws.gov
Bernie Novak	Aitkin Schools	218-927-2115	bnovak@aitkin.k12.mn.us
Tony Sundholm	Rivewood Healthcare	(218) 921-5570	asundholm@rivewoodhealthcare.org
Kathy Bryphy	City of Aitkin	218-927-2527	cityclerk@ci.aitkin.mn.us
Monte Fromm	MSU Extension	218-571-4451	monte.fromm@msu.edu
James Carr	McGregor Fire	218-820-1888	James.Carr@ftr.com
MAXine Dolan	TAEP - TAMARACK AREA Emergency Planning	218-768-2230	
Ellen Cyrus		218-768-2313	
Tony Ness	Hill City Green Services	927-7747	Tony.Ness@hillcity-mn.com
Melina Gillen	City of Hill City	697-7301	cityhall@hillcity-mn.com
Joni Greden	City of Hill City	697-2500	joni.greden@yahoo.com
George Casper	City of Hill City	697-2301	CityHall@hillcity-mn.com
Jeff Madson	Hill City Police Dept.	259-3885	jmadson@hillcity-mn.com
Stacy Durgin	ACHHS	927-7224	stacy.durgin@achhs.org
Waine Marsyla	TAEP	768-2165	wemarsyla@frontier.net
Stacy Tyren	Northland Village Assisted Living	768-3350	Stacy@NorthlandVillage.org

Aitkin County Multi Hazard Mitigation Plan Kick-Off Meeting

September 24, 2013

Name	Agency/Department	Phone	Email
Laura Reid	City Tamarac/T&EP	706-335-6	l5f@frontiernet.net
Jeanette Hone	Riverwood	218-927-2121	jlehone@riverwood.org
Anne Espeseth	Mill Lake Energy	218-927-8223	anne@mlc.mn.com
Steve Mehl	Mill Lake Energy	218-927-8229	smehl@mlc.mn.com
Larry Pantner	City of McGregor	218-768-2117	cityofm-gregor@hotmail.com
Paul Grams	McGregor School	(218) 768-2111	pgram@mcgregor.k12.mn.us
Patrick Wesson	Aitkin County	218-927-7276	
Scott Turner	Aitkin County	218-927-7420	scott.turner@co.aitkin.mn.us
Karla White	Aitkin Co	218-927-7436	kwhite@co.aitkin.mn.us

Aitkin County Multi-Hazard Mitigation Plan Update



Working together towards a safe and disaster-resilient Aitkin County

September 24, 2013 - Planning Team Kick Off Meeting


What is Hazard Mitigation?

- HM is **sustained** action to reduce or eliminate long-term risk to people and their property from hazards.
- HM Planning is the process local government use to identify risks and vulnerabilities associated with natural disasters, and develop long-term strategies for protecting people and property from future hazard events.
- HM planning allows communities to strategically plan for and work together to implement activities that are cost effective, technically feasible and environmentally sound ... **BEFORE** a disaster strikes.

About the Plan

- The Multi-Hazard Mitigation Plan (MHMP) is a requirement of the Federal Disaster Mitigation Act of 2000 (DMA 2000). The development of a local government plan is required in order to maintain eligibility for certain federal disaster assistance and hazard mitigation funding programs.
- In order for the National Flood Insurance Program (NFIP) communities to be eligible for future mitigation funds, they must **adopt** an MHMP.

Aitkin County



- This plan is a multi-jurisdictional plan and covers Aitkin County and its 6 cities and 55 townships.
- **The County and Cities must adopt the plan.** Townships are covered under the County adoption of the plan.

The MHMP will:

- Include a description of the type, location, extent, and probability of reoccurrence of all natural hazards that can affect communities.
- Develop mitigation goals and policies/strategies that will reduce or avoid long-term vulnerabilities to hazards.
- Identify hazard mitigation projects that can be selected for future funding.
- Be developed over the course of 18 months (July 2013 – December, 2014).

What Hazards are Addressed?

- A Multi-Hazard Mitigation Plan looks primarily at natural disasters, including:
 - WINTER STORMS, ICE STORMS, THUNDERSTORMS, HAILSTORMS, LIGHTNING, TORNADOES, WINDSTORMS, EXTREME TEMPERATURES, FLOODING, DROUGHT, WILDFIRE, INFECTIOUS DISEASES, EARTHQUAKES, SOLAR STORMS, STRUCTURAL FIRES, HAZARDOUS MATERIALS, WATER SUPPLY CONTAMINATION, WASTEWATER SYSTEM FAILURE, DAM FAILURE, RADIOLOGICAL TERRORISM.
- The non-natural hazards are not required by the DMA 2000 to be addressed in the MHMP, but all sections of the existing Aitkin County plan will be updated, including these sections, as desired by the County.



Recent Incidents in Aitkin County

Incident type	Incident period	Notes
Severe Storms, Flooding	06/11/2012 to 07/06/2012	FEMA Disaster Declaration 07/06/2012 DR-4504 County-wide
Hail Storm, 1.75"	5/29/2012	Fares Island Township
Hill City Tornado	8/29/2013	F1 scale 11 E extending 300 yds wide



Hazard Ranking

As part of the Multi-Hazard Mitigation Plan, hazards are ranked for their degree of risk.

CPI is the Calculated Priority Risk Index - FEMA's suggested way to prioritize hazards into High, Medium, and Low.

Hazard	Frequency	Severity	CPI
Severe Storms, Flooding	High	High	High
Hail Storms	Medium	Medium	Medium
Tornadoes	Low	High	Medium
Earthquakes	Low	Low	Low
Wildfires	Medium	Medium	Medium
Aviation	Low	Low	Low
Marine	Low	Low	Low
Power	Low	Low	Low
Transportation	Low	Low	Low
Water	Low	Low	Low
Weather	Low	Low	Low

Mitigation Strategies

FEMA requires that the following six categories be used to identify mitigation strategies for each hazard identified in the Multi-Hazard Mitigation Plan:

1. PREVENTION
2. PROPERTY PROTECTION
3. PUBLIC EDUCATION AND AWARENESS
4. NATURAL RESOURCE PROTECTION
5. EMERGENCY SERVICES
6. STRUCTURAL PROJECTS

The MHMP Planning Team

Role of the Planning Team:

1. Provide input on development of the plan.
2. Rank Hazards, prioritize mitigation strategies and identify projects for implementation.
3. Assist with public outreach and participate in public meetings.
4. Review draft plan and provide feedback.
5. Facilitate final adoption of the MHMP by local government.

Meetings

- **Two public meetings** will be held different parts of the County. Anticipated for Spring, 2014.
- **Three Planning Team Meetings** to review and discuss the MHMP hazard ranking and prioritization of mitigation strategies:
 1. September, 2013 Kick off Meeting
 2. February, 2014 Meeting
 3. June, 2014 Meeting

Aitkin County MHMP Contact:

- **Scott Turner, Aitkin County Sheriff and Emergency Management Coordinator**
- Phone: 218-927-7420
- Email: scott.turner@co.aitkin.mn.us

Aitkin County - Multi-Hazard Mitigation Plan Update

March 20, 2014 Planning Team Meeting #2
McGregor Community Center, McGregor, MN
3:00 – 4:30p.m.

Meeting Summary:

On March 20, 2014 Scott Turner, Aitkin County Sheriff and Emergency Management Director, convened the Aitkin County MHMP planning team for Planning Team Meeting #2 under the Aitkin County MHMP Update planning process. The meeting was facilitated by Scott Turner, Bonnie Hundrieser, Senior Planner with the Arrowhead Regional Development Commission and Stacey Stark, Director of the University of Minnesota Duluth Geospatial Analysis Center.

Sheriff Turner opened the meeting with welcoming comments and participant introductions. Stacey Stark and Bonnie Hundrieser then did a powerpoint presentation covering the following five items:

1. MHMP Planning Team Purpose
2. Aitkin County Community Profile and Asset Inventory
3. Hazards Facing Aitkin County
4. Review and Update Risks and Vulnerabilities
5. Development of Mitigation Actions

During and after the presentation, the group engaged in a discussion regarding hazards facing Aitkin County and the development of mitigation strategies in the following categories of Prevention, Property Protection, Public Education and Awareness, Natural Resource Protection, Emergency Services and Structural Projects. A worksheet was provided to participants to record their ideas for any mitigation actions that may fall into these categories, especially if they relate to a specific jurisdiction.

The planning team was informed of next steps in the MHMP update process, which would include holding two public meetings in different parts of Aitkin County, to be scheduled in May. It was agreed that one meeting would be held at the McGregor Community Center, and another meeting would be held in Hill City.

Attached to this meeting summary are the following:

1. March 20th Meeting Agenda
2. Participant sign in sheets
3. Powerpoint presentation slides

Meeting summary prepared by:
Bonnie Hundrieser, Senior Planner - Arrowhead Regional Development Commission
Phone: (218) 529-7527 / Email: bhundrieser@ardc.org

**Aitkin County Multi-Hazard Mitigation Plan (MHMP) Update
Steering Committee Meeting #2
March 20, 2014**

Meeting Purpose

To review and prioritize the hazards to be included in the MHMP, as well as discuss mitigation actions that address each hazard at the County and jurisdiction level.

AGENDA

1. Welcome and Introductions
2. Status of MHMP Update
3. Aitkin County Community Profile and Asset Inventory
4. Hazard Profiles
5. Review and Prioritization of Hazards (Natural / Technological) for inclusion in MHMP
6. Discussion of Mitigation Strategies and Actions
7. Estimated Timeline of Next Steps
 - March/April – Revisions and additions to MHMP mitigation action chart
 - May – Hold 2 public meetings on draft MHMP; revise as needed
 - June/July – Review by HSEM and FEMA
 - July/August – Revisions if needed
 - September – Review and approval of final plan by HSEM and FEMA. County to proceed with local jurisdictional adoptions of plan.

For questions regarding the Aitkin County Hazard Mitigation Plan Update:

- Bonnie Hundrieser, Senior Planner: Arrowhead Regional Development Commission
218-529-7527, bhundrieser@ardc.org
- Stacey Stark, Director: Geospatial Analysis Center UMD
218-726-7438, slstark@t.umn.edu
- Karla White, Aitkin County Sheriff's Office
218) 927-7436, kwhite@co.aitkin.mn.us

Aitkin County Multi Hazard Mitigation Plan
 Second Steering Committee Meeting

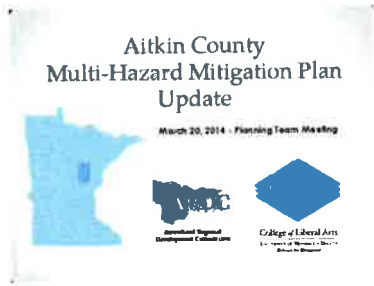
March 20, 2014

Name	Agency/Department	Phone	Email
Michelle Proulx	1855 Maple Leaf Ave	320-531-7401	MProulx@aitkin.mn.us
Karen Reid	Town	436-3356	kareid@aitkin.mn.us
George Casper	High City	244-0440	
Ellen Cyrus	Tamarack	768-2313	
Maxine Bolney		768-2230	
Elaine Marsden	Tamarack	768-2165	wendyglace@frontier.net
Larry Panter	City of Mays	765-1717	CityofMays@hotmail.com
Walt Ford	USFWS Rice Lake NWR	768-7402	walt_ford@fws.gov
Stacy Tyren	Northland Village School	768-3356	stacy@northlandhigh.org
Tony Weber	Red Cross		
Scott Turner	Aitkin Co Sheriff	218-927-7400	turners@co.aitkin.mn.us
Karen White	Aitkin Co Sheriff's Office	218-927-7434	kwhite@co.aitkin.mn.us

Aitkin County Multi Hazard Mitigation Plan
 Second Steering Committee Meeting

March 20, 2014

Name	Agency/Department	Phone	Email
Duane King	U.S. Fish & Wildlife Service	218-830-9173	duane.king@fws.gov
Tony Sundblom	Riverwood	218-927-5570	tsundblom2@healthcare.org <small>Riverwood</small>
Anne Espeseth	Mille Lacs Energy	218-927-8223	anne@mlc.mn.com
Service Director
Mark Wedel	Aitkin County Board	218-937-6500	mark.wedel@itaco.com
Jean West	AI HHS	218-927-2256	jean.west@coaitkin.mn.us
William McManis	City of Hill City	218-697-2301	cityhall@hillcity-mn.com
Jeff Madson	Hill City PD	218-697-8200	jmadson@hillcity-mn.com
Dean Yocum	Hill City School	218-697-2394	dyocum@hillcity-mn.com
Robert Olesch	MILKATE FIRE	218-232-5136	rob@olech2001@itaco.com



Agenda

- Welcome and Introductions
- Status of MHMP Update
- Aitkin County Community Profile and Asset Inventory
- Hazard Profiles
- Review and Prioritization of Hazards (Natural / Technological) for inclusion in MHMP
- Discussion of Mitigation Strategies and Actions
- Estimated Timeline of Next Steps

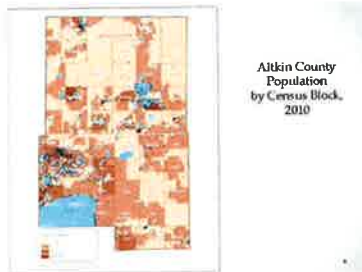
The MHMP Planning Team

- **Role of the Planning Team:**

1. Provide input on development of the plan.
2. Rank Hazards, prioritize mitigation strategies and identify projects for implementation.
3. Assist with public outreach and participate in public meetings.
4. Review draft plan and provide feedback.
5. Facilitate final adoption of the MHMP by local government.

Community Profile and Asset Inventory for Vulnerability Assessment

- Aitkin County physical and social profile
 - Demographic information
 - Land use, ownership
 - Environmental characteristics
 - Hydrographical features
- Essential Facilities (defined by FEMA)
 - fire stations, fire stations, police stations and schools, emergency operation centers
- Table of Critical Facilities (defined by Aitkin County)
 - additional critical infrastructure



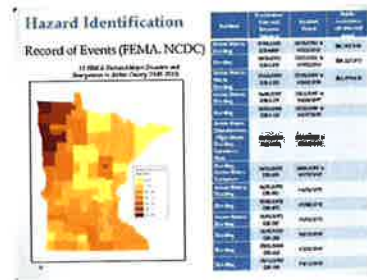
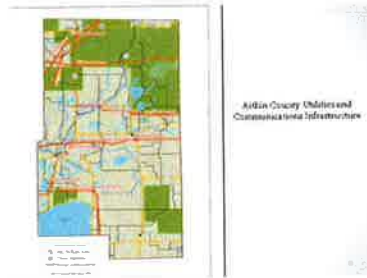
• This plan is a multi-jurisdictional plan and covers Aitkin County and its 40 townships and 4 unorganized territories. **The County and Cities must adopt the plan.** Townships are covered under the County adoption of the plan.

Community	2010 Population	% of County
Aitkin	2,165	13.60%
USC City	633	4.00%
McLeod	80	0.50%
McGregor	311	2.40%
Pullman	167	1.00%
Township	94	0.60%

Year	1970	1975	1980	1985	1990	1995	2000	2010	Change 1970-2010	Change 1990-2010
Population	11,763	14,527	13,242	11,403	11,945	12,423	15,361	16,282	+4,519	+921

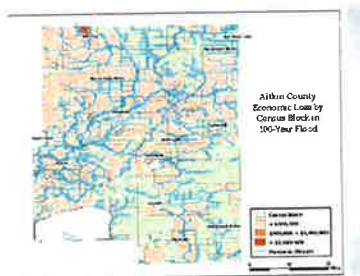
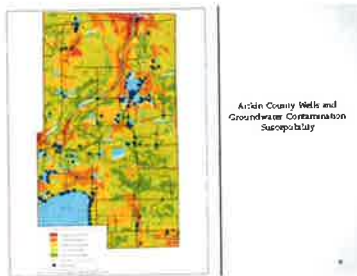
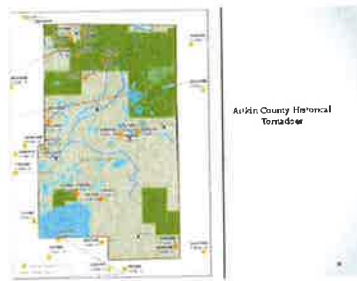
Critical Facility Categories

Agencies and Local	Government Facilities
Banking and Finance	Healthcare and Public Health
Chemical and Hazardous Materials	Industrial Facilities
Commercial Facilities	Manufacturing
Construction Sites	Nuclear Powerplants and Sites
Courts	Religious
Defense Facilities and	Railroad Shipping
Emergency Services	Transportation
Energy	Water



Hazard Identification

- Existing County Plans
- Record of Events (FEMA, NCDC)
- GIS and HAZUS-MH (Flood only)
- Hazard Ranking Methodology

FEMA Multi-Hazard Identification and Risk Assessment
Natural Hazards
(and groupings by HSE in MN HMP)

Rain Flood	Tornadoes	Severe Winter Storms
River Flood	Windsloam	Extreme Cold
Coastal Flooding *	Thunderstorm	Extreme Heat
Dam / Levee Failure	Lightning	Landslide
Earthquake	Ice Storms	Land Subsidence / Sinkholes
Wildfire	Drought	Erosion (Coastal / River / Stream)
	Fog *	Expansive Ice *

Addressed in TIDRA, 2008 plan * Not addressed in M33 State 2014P



Appendix F Public Meeting Notices and Meeting Notes

Aitkin County Multi-Hazard Mitigation Plan Public Meetings

Tuesday, June 17th, 2014 at 3:00 p.m. – 4:30 p.m. at the Palisade Community Center, located at 48052 Nature Ave in Palisade at the junction of Main Street and Nature Ave and at 6:30 p.m. – 8:00 p.m. at the Aitkin County Sheriff's Office 217 2nd St NW in Aitkin.



Two public meetings regarding the Aitkin County Multi-Hazard Mitigation Plan (MHMP) will be held on Tuesday, June 17th, 2014. The first meeting will be held from 3:00 p.m. – 4:30 p.m. at the Palisade Community Center, located at 48052 Nature Ave in Palisade at the junction of Main Street and Nature Ave and the second meeting will be held from 6:30 p.m. – 8:00 p.m. at the Aitkin County Sheriff's Office 217 2nd St NW in Aitkin. The Plan details the natural hazards that face the County and identifies specific mitigation strategies and actions to reduce the impact of disasters.

In the fall of 2013 Aitkin County received a grant from the Federal Emergency Management Agency (FEMA) to prepare an update of its multi-jurisdictional MHMP. Seven jurisdictions are part of the plan, including Aitkin County and the cities of Aitkin, Hill City, McGregor, McGrath, Palisade and Tamarack.

Public input is a required step in the MHMP planning process. Community members and staff from the County and participating cities are strongly encouraged to attend the scheduled public meetings. The meetings will provide local residents, businesses, agencies and organizations an opportunity to learn about the draft plan, ask questions and provide feedback on mitigation strategies and recommended actions for implementation.

A draft of the Aitkin County Multi-Hazard Mitigation Plan contents is available for public review at www.arrowheadplanning.org/aitkinmhmp.

For more information, contact:
Bonnie Hundrieser, Arrowhead Regional Development Commission
bhundrieser@ardc.org or 218-529-7527



**ARROWHEAD REGIONAL
DEVELOPMENT COMMISSION**

Leading • Planning • Connecting in the counties of Aitkin • Carlton • Cook • Itasca • Koochiching • Lake • St. Louis

June 10, 2014
FOR IMMEDIATE RELEASE
Contact: Bonnie Hundrieser
218-529-7527 (direct)
1-800-232-0707 (toll free)
bhundrieser@ardc.org

NEWS RELEASE

Aitkin County to Hold Public Input Meetings on Multi-Hazard Mitigation Plan

(Duluth, MN) Two public meetings regarding the Aitkin County Multi-Hazard Mitigation Plan (MHMP) will be held on Tuesday, June 17th, 2014. The first meeting will be held from 3:00 p.m. – 4:30 p.m. at the Palisade Community Center, located at 48052 Nature Ave in Palisade at the junction of Main Street and Nature Ave, and the second meeting will be held from 6:30 p.m. – 8:00 p.m. at the Aitkin County Sheriff's Office 217 2nd St NW in Aitkin. The Plan details the natural hazards that face the County and identifies specific mitigation strategies and actions to reduce the impact of disasters.

In the fall of 2013 Aitkin County received a grant from the Federal Emergency Management Agency (FEMA) to prepare an update of its multi-jurisdictional MHMP. Seven jurisdictions are part of the plan, including Aitkin County and the cities of Aitkin, Hill City, McGregor, McGrath, Palisade and Tamarack. Staff from the Arrowhead Regional Development Commission (ARDC) is facilitating the planning process.

Public input is a required step in the MHMP planning process. Community members and staff from the County and participating cities are strongly encouraged to attend the scheduled public meetings. The meetings will provide local residents, businesses, agencies and organizations an opportunity to learn about the draft plan, ask questions and provide feedback on mitigation strategies and recommended actions for implementation.

A draft of the Aitkin County Multi-Hazard Mitigation Plan content is available for public review at www.arrowheadplanning.org/aitkinmhmp. Comments or questions on the plan or public meetings may be directed to Bonnie Hundrieser, ARDC (218) 529-7527 or bhundrieser@ardc.org.

The Arrowhead Regional Development Commission is a regional comprehensive planning and development agency serving the counties of Aitkin, Carlton, Cook, Itasca, Koochiching, Lake and St. Louis in Northeast Minnesota. ARDC's mission is to serve the people of the Arrowhead Region by providing local units of government and citizen groups a means to work cooperatively in identifying needs, solving problems and fostering local leadership.

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218.722.5545 • 800.232.0707 • 218.529.7592 (Fax) • info@ardc.org • www.ardc.org
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**Aitkin County Multi-Hazard Mitigation Plan (MHMP) 2014 Update
PUBLIC MEETINGS – TUESDAY, JUNE 17TH 2014**

AGENDA

1. **Welcome and Introductions** (*Sheriff Scott Turner, Aitkin County Emergency Manager*)
2. **Presentations:**
 - State of Minnesota's Hazard Mitigation Program
(*Matti Gurney, HSEM Hazard Mitigation Planner*)
 - Overview of Hazard Mitigation, the State of MN Hazard Mitigation Plan, Hazard Mitigation Program Funding, Historical Hazard Mitigation Funded Projects in MN, and a highlight of Statewide hazard mitigation projects
 - Aitkin County Multi-Hazard Mitigation Plan (MHMP) Update
(*Bonnie Hundrieser, Arrowhead Regional Development Commission and Stacey Stark, University of Minnesota-Duluth Geospatial Analysis Center*)
 - Overview of the Purpose of the MHMP and Process of the Plan Update, Overview of Content of the MHMP (natural hazards addressed and mitigation strategies and actions for implementation)
3. **Public Feedback:** Questions about the plan, discussion of mitigation strategies and actions for implementation.
4. **Next Steps & Anticipated Timeline:**
 - June – Revisions made and posted for 2nd public review period.
 - July - Draft MHMP submitted to State of Minnesota Department of Homeland Security and Emergency Management (HSEM) for review
 - Revisions made if needed based on HSEM review; resubmit final plan for review and approval by HSEM and FEMA.
 - August/September – Aitkin County to proceed with local jurisdiction's adoptions of the plan.

For questions regarding the Carlton County Hazard Mitigation Plan Update:

- Karla White, Aitkin County Emergency Management Coordinator
(218) 927-7436, kwhite@co.aitkin.mn.us
- Bonnie Hundrieser, Senior Planner: Arrowhead Regional Development Commission
218-529-7527, bhundrieser@ardc.org
- Stacey Stark, Director: Geospatial Analysis Center UMD
218-726-7438, slstark@d.umn.edu

Please be sure to return your evaluation & comment form at the end of the meeting. Thank You!

Palisade

Aitkin County Multi Hazard Mitigation Plan
Public Meeting

June 17, 2014

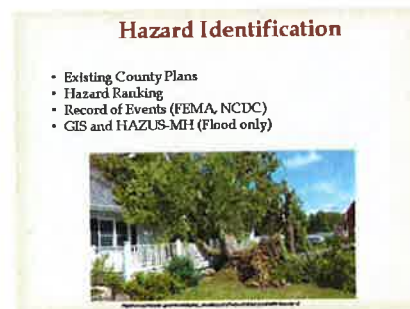
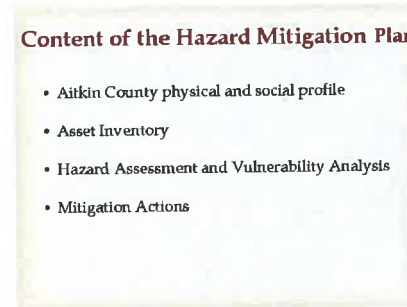
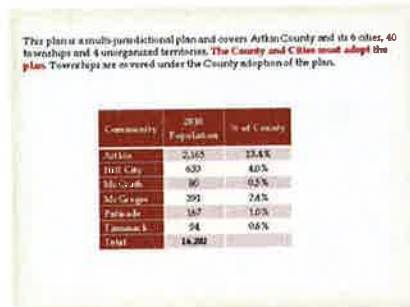
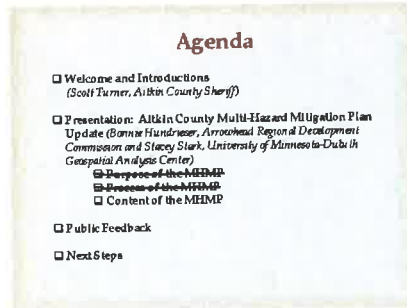
Name	Agency/Department	Phone	Email
ARNE DOLNEY	TEAP	218 768-2230	
Roberta Elvecrog	Glen Twp	218-549-3614	relvecrog@frontiernet.net
Walt Ford	Fish & Wildlife Service	218-768-2402	walt_ford@fws.gov
Karen Reid	TEAP (Toumaac)	218-426-3356	ksf@frontiernet.net
Ellen Cyrus	TEAP (Toumaac) ^{TAMMACK AREA}	218-768-3313	ecyrus@frontiernet.net
Jim Berg	Workman Twp	218-426-3634	jimberty@frontiernet.net
Marvin Hohsten	Workman Twp	218-545-2297	
John Grimsbo	Verdon Twp	218-845-2913	
Robert Dressedel	Mt. Park Fire Dept.	218-232-5136	
Brian Pisarek	Aitkin Fire Chief / ONA	218-927-4040	brian.pisarek@state.mn.us
Paul Grans	Melrose School	(218) 768-2111	params@melroser
Matti Gurney	HSEM	612-201-9443	Matti.Gurney@state.mn.us
Scott Turner	Aitkin County	218-927-7420	scott.turner@co.aitkin.mn.us
SCOTT TURNER	...	218-426-3271	...
Jammy PPAFF	City of Aitkin	218-927-2627	
Margaret Sherman	ARIDB Bd Member	218-845-2816	
Laurel Smith	Aitkin County	218-927-7436	lsmith@co.aitkin.mn.us

Aitkin County Multi Hazard Mitigation Plan
Public Meeting

Aitkin

June 17, 2014

Name	Agency/Department	Phone	Email
Bob HARRIS	SPENCER Twp	927-4582	
Bill Pratt	Morrison Twp	218-845-2600	bill@billpratt.us
Matti Guiney	HSEM	612-708-7443	Matti.Guiney@state.mn.us
Jean West	H&HS	218-327-7256	jean.west@aitkin.mn.us
James Nelson	Aitkin Age	218-927-3761	
Bernie Nord	Aitkin Schols	218-927-2143	bernied@aitkin.k12.mn.us
Jeff Turner	Aitkin Co.	218-927-7120	Jeff.Turner@co.aitkin.mn.us
Andrea White	Aitkin Co	218-927-7426	kierke@co.aitkin.mn.us



Severe Summer Storms

- According to the 40-year NCDC record, there is a 135% chance of a significant hailstorm any year in Aitkin County and a 43% chance in each year that there will be a hailstorm that produces hail greater than one inch in size.
- The NCDC has recorded 2 lightning strikes in Aitkin County since 2000, but no deaths or injuries were reported.
- The county has experienced tornadoes in 14 of the 51 years on record. According to these statistics, there is a 27% chance of a tornado affecting Aitkin County each year.

Mitigation Strategies

- **Prevention** - Government, administrative, or regulatory actions
- **Property Protection** - Removal or modification of existing buildings or structures to protect them from a hazard.
- **Public Education and Awareness** - Actions to inform and educate citizens, elected officials, and property owners about the hazards and potential ways to mitigate them.
- **Natural Resource Protection** - Actions that minimize hazard losses and preserve or restore the functions of natural systems.
- **Emergency Services** - Actions that protect people and property during and immediately after a disaster or hazard event. Services include warning systems, emergency response services, and protection of critical facilities.
- **Structural Projects** - Actions that involve the construction of structures to reduce the impact of a hazard, for example, floodwalls, safe rooms.

Implementation of Mitigation Actions

- Happens at every jurisdictional level.
- Happens in partnership with other local, State, Federal agencies and non-profit organizations.
- Can be inexpensive ("low-hanging fruit")
- Can be high-cost (some are HMA eligible)
- Some may be implemented quickly, others may be on-going, and some may occur over several years.

The impact of hazards on people and property can only be reduced when efforts are made to mitigate against them before they occur.

Violent Storms (Winter & Summer)

- Promote the National Weather Service's "Severe Weather Awareness Week" and "Winter Hazard Awareness Week" each year.
- Participate in annual "SKYWARN training" from the National Weather Service to train new storm spotters in Aitkin County and ensure existing storm spotters maintain their storm-spotting skill.
- Promote and educate Aitkin County residents, agencies, and communities about the use of NOAA weather radios for relaying weather related emergency information.



Extreme Temperatures (Heat & Cold)

- Expand the in-school extreme weather awareness program to include students in all grades, and provide educational outreach to key vulnerable populations (young and elderly).
- Ensure there are personnel trained in shelter management within the County and each of its jurisdictions, engaging those who would play a role in emergency response leadership in the event of needing to activate a shelter for mass care.



Wildfire

- Educate area residents through the Firewise program on what they can do to reduce the risk of wildfires damage to their property (defensible space assessments, fuel reduction).
- Work with fire departments to inventory areas where firefighting capacity is limited through availability of water and install dry fire hydrants or water holding tanks in strategic locations.
- Develop a Community Wildfire Protection Plan to identify high-risk wildfire areas and actions to mitigate against wildfire.



Flash Flood and Riverine Flood

- Maintain bridge, road, and culvert infrastructure at a level that it is capable of sustaining a major storm event and will not be vulnerable to washouts.
- Steer development away from areas that may be difficult to serve with reliable road access.
- Address ice dams that may impact the road system in a timely manner in order to prevent damage to infrastructure, in particular during spring thaw.



Drought

- Continue to implement the monitoring of water table levels.
- Educate the public on water conservation measures in times of approaching drought conditions and develop plans to limit water use for nonessential purposes, such as lawn watering, car washing, etc., during drought periods as necessary.
- Strategically place livestock watering ponds on farms in the county to help offset the impact of drought on local farmers.



Mitigation Actions Eligible for HMA in the Aitkin County MHMP

- **Retrofit or construction of safe room facilities to protect public during extreme wind events.** (Locations may include schools, mobile home parks, campgrounds or other areas where there are populations vulnerable to high winds and tornado events.)
- **Purchase of generators for backup power to support the operation of essential functions in critical facilities in the event of severe storms.** (Critical facilities may include police and fire stations, hospitals, and water and sewer treatment facilities, and other facilities that the county deems critical.)

- **Burying or strengthening of power lines to reduce the risk of power outages from downed lines during a severe storm.** (Where it is feasible and cost effective as part of new construction or retrofit.)
- **Install new warning systems in identified vulnerable locations.** (Used to alert people in high risk, vulnerable areas such as campgrounds, parks and rural residents out of reach of other existing warning systems to approaching severe weather.)
- **Mitigation measures to reduce the threat of wildfire.** (Activities such as creation of defensible space, application of ignition-resistant construction, hazardous fuels reduction, and installation of external wildfire sprinkler systems.)

- **Infrastructure retrofit for flood prone areas.** (To make mitigation improvements for structures such as culverts, road, bridges and government buildings.)
- **Minor localized flood reduction projects to lessen the frequency or severity of flooding and decrease predicted flood damages.** (Such as installation or modification of culverts, stormwater management activities, such as creating retention and detention basins, protection of sanitary sewer lift stations in flood-prone areas, installation of flow-rate meters (stream gauges) on rivers and streams that are prone to flooding high-risk, vulnerable properties.)
- **Relocate flood prone properties or acquire and demolish flood prone properties.** (Located in the special flood hazard area and outside of the special flood hazard area.)

- **Dry proof or wet proof facilities that are flood prone.** (Reduce potential infrastructure flood damage on utilities such as wastewater treatment, pipelines, and power facilities by dry proofing or wet proofing facilities that are flood prone.)



**Aitkin County Multi-Hazard Mitigation Plan (MHMP) 2014 Update
PUBLIC MEETING EVALUATION AND COMMENT FORM
Tuesday, June 17th 2014**

Please fill out the following form and return it prior to your departure from this meeting.

Name (Optional): _____

Email or Phone (Optional): _____

Representation:

- Local resident: (Please write in your City or Township: _____)
- Local Government (Please write in your position: _____)
- Other Agency or Organization (_____)

Did the meeting provide you with adequate information about the Aitkin County MHMP Update (its purpose, process and content?)

- Yes
- No (If no, please provide any comments why): _____

COMMENTS, QUESTIONS and IDEAS SECTION:

Please use the area below (and the back of this page if needed) to provide any of your questions, comments or ideas you may have for mitigation actions for Aitkin County or your community.

Thank You for your attendance and participation. Please contact Bonnie Hundrieser, ARDC with any additional comments or questions: Email: bhundrieser@ardc.org / Phone: 218-529-7527.

Appendix G

Mitigation Actions by Jurisdiction

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Table G - 1. Mitigation Actions Identified for Jurisdictional Implementation in the City of Aitkin

Action Number (from the master MIMP mitigation chart)	Hazard	City of Aitkin Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
1	Violent Storms	Work with campground operators to post information regarding storm shelters and safety during strong summer storms.	2	Public Education	Ongoing	Ongoing	County and City emergency managers, MN DNR and concessionaires	The City will promote the dissemination of information in regards to sheltering options within the City. <i>Funding to deliver task via staff time of EM and others participating.</i>
2	Violent Storms	Work with the appropriate jurisdictions or agencies to place safety information at boat landings throughout Aitkin County regarding what to do in case of severe weather.	1	Public Education	Ongoing	Ongoing	Aitkin County Sheriff's Dept. and MN DNR	The City will work with the Aitkin County Emergency Manager and the MN DNR on posting safety information at the river access points in the City. <i>Funding to deliver task via staff time of EM and others participating.</i>
3	Violent Storms	Work with mobile home park owners to ensure they are meeting the standards set by the Minnesota Department of Health for approved storm shelters or evacuation plans for times of high winds or tornadoes.	1	Prevention	Ongoing	Ongoing	Aitkin County Environmental Services, mobile home park operators	The City of Aitkin will work with Aitkin County Environmental Services to provide information and direct outreach to mobile home park operators not in compliance. <i>Funding to deliver task via staff time of EM and others participating.</i>

Action Number (from the master MHMP mitigation chart)	Hazard	City of Aitkin Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
4	Violent Storms	Promote the National Weather Service's "Severe Weather Awareness Week" held in April of each year. The event seeks to educate residents on the dangers of severe summer storm events and highlights the importance of preparing for severe weather before it strikes.	2	Public Education	Ongoing	Ongoing	National Weather Service, County and City emergency managers, School District Superintendents and school staffs, Aitkin County Public Health	The City will work directly with the National Weather Service and the Aitkin County EM to promote severe weather awareness week in April. City will post information to City website. <i>Funding to deliver task via staff time of EM and others participating.</i>
5	Violent Storms	Promote the National Weather Service's "Winter Hazard Awareness Week" held in November of each year. The event seeks to educate residents on the dangers of winter weather and how to properly deal with it.	2	Public Education	Ongoing	Ongoing	Same as above	The City will work directly with the National Weather Service and the Aitkin County EM to promote severe winter awareness week in November. City will post information to City website. <i>Funding to deliver task via staff time of EM and others participating.</i>

Action Number (from the master MHMP mitigation chart)	Hazard	City of Aitkin Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
6	Violent Storms	Review current information and delivery systems in place for public awareness and education of preparedness for severe winter and summer storms and improve upon them as needed.	1	Public Education	New	Ongoing	County EM and local city emergency management, MN DNR, School District Superintendents and school staffs, Aitkin County Public Health	City will work with Aitkin County EM to evaluate current delivery systems, such as use of the City website and news releases. <i>Funding to deliver task via staff time of EM and others participating.</i>
7	Violent Storms	Participate in annual "Skywarn Training" from the National Weather Service to train new storm spotters in Aitkin County and ensure existing storm spotters maintain their storm-spotting skill.	1	Emergency Services	Ongoing	Ongoing	County EM and local city emergency management, MN DNR, and emergency response staff including EMS and Police	The City will promote the annual SkyWarn training to its residents. City of Aitkin fire department personnel participate annually. <i>Funding to deliver task via staff time of EM and others participating.</i>
8	Violent Storms	Continue to ensure that procedures are in place so that emergency management personnel, county sheriffs, and other emergency response teams are notified as soon as possible in the event of an approaching storm.	2	Emergency Services	Ongoing	Short-term	County EM and local city emergency management, MN DNR, emergency response staff including EMS and Police	The City has established protocols are in place to page out weather information to fire departments and emergency personnel. <i>Funded by NOAA. Other funding to deliver task via staff time of EM and others participating.</i>

Action Number (from the master MHMP mitigation chart)	Hazard	City of Aitkin Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
9	Violent Storms	Ensure that communication procedures are in place to effectively provide warning to residents and visitors in advance of approaching severe weather.	1	Emergency Services	New	Short-term	County EM and local city emergency management, and emergency response staff including EMS and Police	The City will promote that residents register for CodeRed and understand when and what to do when sirens are activated in the City. <i>Funding to deliver task via staff time of EM and others participating.</i>
10	Violent Storms	Provide information to Aitkin County visitors and residents regarding how they can obtain information on severe weather and how to respond to dangerous weather conditions. Increase strategically located signage along roadways informing people about emergency information radio frequencies.	1	Emergency Services	Ongoing	Mid-Term	County EM and local city emergency management, Aitkin County Public Health, Aitkin County Highway Department	The City will use its website to provide outreach to the public on severe weather awareness. <i>County will fund road signage along County roads for emergency radio information.</i>
11	Violent Storms	Promote and educate Aitkin County residents, agencies, and communities about the use of NOAA weather radios for relaying weather-related emergency information.	1	Public Education	Ongoing	Ongoing	County EM and local city emergency management, Aitkin County Public Health	During the spring and winter severe weather awareness weeks, the City of Aitkin will use its City website and work with local media to inform residents about the value of having a NOAA weather radio. <i>Funding to deliver task via staff time of EM and others participating.</i>

Action Number (from the master MHMP mitigation chart)	Hazard	City of Aitkin Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
12	Violent Storms	Work with local utility companies that serve Aitkin County to locate power lines underground or strengthen where it is feasible and cost effective to reduce the risk of power outages from downed lines during a severe storm. This could be done as part of new construction or as retrofit in areas deemed as high-priority.	2	Structural Improvement	Ongoing	Ongoing	Utility companies that serve Aitkin County: (Mille Lacs Electric, MN Power, Aitkin Public Utilities Commission); Partners include MN DNR, Aitkin County Land Department, City Public Works and Highway Departments.	The City of Aitkin will communicate with its energy providers, Mille Lacs Electric and the Aitkin Public Utilities Commission, to address the possibility of burying power lines to reduce the loss of power to the community during extreme weather events. <i>Projects may be eligible under FEMA HMA funding.</i>
13	Violent Storms	Maintain an aggressive right-of-way clearing program in order to reduce risks of downed trees interrupting the power supply.	2	Prevention	Ongoing	Ongoing	Utility companies have the lead responsibility. Partners include the MN DNR, Aitkin County Land Department, City Public Works, and Highway Department	The City of Aitkin's energy providers (Mille Lacs Electric and the Aitkin Public Utilities Commission) do this on an as-needed basis for the City and will continue to do so. <i>County funding will address ROW clearing on County-owned roads.</i>

Action Number (from the master M&MMP mitigation chart)	Hazard	City of Aitkin Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
14	Violent Storms	Maintain an aggressive brushing program in order to reduce the amount debris that could block a road after a severe windstorm or winter storm.	2	Prevention	Ongoing	Ongoing	Highway Departments are responsible for right of ways. DNR is a partner where applicable.	Same as above.
15	Violent Storms	Maintain an updated database of facilities in the county that have shelter agreements with the American Red Cross and the capabilities of each shelter to provide mass care in the event of violent storms.	1	Emergency Services	New / In Progress	Short-term	County emergency managers, American Red Cross, Aitkin County Public Health	The City of Aitkin will work with Aitkin County Public Health to be aware of what facilities are designated shelters for mass care, and will help to convey this to the public in times when shelters are activated. <i>Funding to deliver task via staff time of EM and others participating.</i>

Action Number (from the master MAMP mitigation chart)	Hazard	City of Aitkin Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
16	Violent Storms	Ensure there are personnel trained in shelter management within the County and each of its jurisdictions, engaging those who would play a role in emergency response leadership in the event of needing to activate a shelter for mass care.	1	Emergency Services	New / In Progress	Short-term	Aitkin County Emergency Manager, Aitkin County Public Health, and American Red Cross	<p>The City of Aitkin will work with Aitkin County Public Health to seek shelter management training as appropriate. Aitkin County EM and Public Health will coordinate with Red Cross in training personnel in 2014 – 2015.</p> <p><i>Funding provided to HSEM Region 2 for training under Mass Care grant in 2014. Other funding to deliver task via staff time of EM and others participating.</i></p>
17	Violent Storms	Research possible storm shelter and safe room locations within the County and each of its government jurisdictions including schools, mobile home parks, campgrounds or other areas where there are populations (residents or visitors) vulnerable to high winds and tornado events.	1	Prevention	New	Long-term	County EM and local city emergency management, School District Superintendents and school staffs, Red Cross, MN DNR, owners of private campgrounds, and owners of mobile home parks.	<p>The City of Aitkin will work with Aitkin County EM to identify and evaluate the potential location for safe room in appropriate area(s) of the City to protect vulnerable residents during times of severe wind events.</p> <p><i>Safe Room construction or retrofit projects may be eligible under FEMA HMA funding (see Action Item #16).</i></p>

Action Number (from the master MHMP mitigation chart)	Hazard	City of Aitkin Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
18	Violent Storms	<p>Retrofit or construct new storm shelter and safe room facilities in the identified vulnerable locations with specific information on location and building type to construct or retrofit.</p> <p>The term "safe room" applies to extreme wind (tornado), residential, non-residential and community safe rooms and tornado community safe rooms.</p> <p>(Locations may include schools, mobile home parks, campgrounds or other areas where there are populations (residents or visitors) vulnerable to high winds and tornado events).</p>	1	Structural Improvement	New	Long-term	County EM and local city emergency management, School District Superintendents and school staffs, Red Cross, MN DNR, owners of private campgrounds, and owners of mobile home parks.	<p>The City of Aitkin will work with the Aitkin County EM if we decide to pursue construction of a safe room for an identified location in our community. The City will submit an NOI to HSEM if deciding to proceed with inquiry into mitigation funds to advance the project.</p> <p><i>Safe Room construction or retrofit projects of both single and dual-use facilities may be eligible under FEMA HMA funding.</i></p>
26	Violent Storms	<p>Work with local jurisdictions, MN DNR and other key stakeholders to develop an Evacuation Plan for Aitkin County in the event of severe weather. The plan should make sure to address the evacuation of vulnerable populations, such as those in nursing homes or remote locations (such as Savanna Portage State Park or rural residential areas).</p>	1	Emergency Services	New	Short-term	County EM and local city emergency management	<p>The City of Aitkin will work with the Aitkin County Emergency Manager to be aware of the location of its nursing homes and facilities that house other vulnerable populations for inclusion in the development of evacuation plans for the City.</p> <p><i>Funding to deliver task via staff time of EM and others participating.</i></p>

Action Number (from the master MAMP mitigation chart)	Hazard	City of Aitkin Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
27	Violent Storms	Work to install shatter-resistant glass and other identified retrofitting measures to protect against the impact of severe summer storms at Riverwood Healthcare Center.		Structural Improvement	New		Riverwood Healthcare Center	Riverwood Healthcare will work to incorporate this mitigation action into their strategic plan. <i>Funding for implementation not currently identified.</i>
29	Violent Storms	Investigate "Storm Ready" designation by the National Weather Service and submit an application if deemed appropriate.	2	Prevention	New	Mid-term	County EM and local city emergency management	The City of Aitkin will work with Aitkin County EM to investigate becoming a Storm Ready Community and accomplishing any requirements necessary to be granted designation. <i>Funding to deliver task via staff time of EM and others participating.</i>

Action Number (from the master MHMP mitigation chart)	Hazard	City of Aitkin Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
30	Extreme Temperatures	Expand information on risks of heat-related illnesses. Key audiences are the elderly and the younger population engaging in physically strenuous activities.	1	Public Education	Ongoing	Ongoing	County EM and local city emergency management, School District Superintendents and school staffs, Aitkin County Public Health	The City of Aitkin will work with the Aitkin County Department of Public Health and school districts to provide outreach to vulnerable populations such as the elderly and our students. The City also will utilize its city website and public channel 8 to post public information. <i>Funding to deliver task via staff time of EM and others participating. Other potential funding unknown at this time.</i>
31	Extreme Temperatures	Continue the winter storm awareness program. Key audiences are the elderly and the younger populations who may be more susceptible to the effects of freezing temperatures when outside.	1	Public Education	Ongoing	Ongoing	County EM and local city emergency management, School District Superintendents and school staffs, Aitkin County Public Health	Same as above. <i>Funding to deliver task via staff time of EM and others participating. Other potential funding unknown at this time.</i>

Action Number (from the master MHMP mitigation chart)	Hazard	City of Aitkin Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
33	Extreme Temperatures	Maintain an updated database of facilities in the county that have shelter agreements with the American Red Cross and the capabilities of each shelter to provide mass care in the event of extreme temperatures.	1	Emergency Services	New / In Progress	Short-term	County EM and local city emergency management, Aitkin County Public Health and Red Cross	<p>The Red Cross provided the Aitkin County EM with a shelter database for Aitkin County in 2012. The City of Aitkin will work with Aitkin County EM to keep the database updated as related to our community.</p> <p><i>Funding to deliver task via staff time of EM and others participating.</i></p>
34	Extreme Temperatures	Ensure there are personnel trained in shelter management within the County and each of its jurisdictions, engaging those who would play a role in emergency response leadership in the event of needing to activate a shelter for mass care.	1	Emergency Services	New / In Progress	Short-term	County EM and local city emergency management, Aitkin County Public Health, Red Cross	<p>An HSEM grant for Mass Care to Region 2 is providing training to emergency managers during 2014. The City of Aitkin will work with the EM to acquire local shelter management training so we are prepared to assist should a shelter in our community need to be opened.</p> <p><i>Funding to deliver task via staff time of EM and others participating.</i></p>

Action Number (from the master MEMMP mitigation chart)	Hazard	City of Aitkin Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
35	Wildfire	Educate area residents through the Firewise program on what they can do to reduce the risk of wildfires doing damage to their property through vegetation management and the use of fire resistant building materials.	1	Public Education	Ongoing	Ongoing	County EM and local city emergency management, Fire Departments, DNR Firewise Program	The City of Aitkin will work with its local fire personnel and MN DNR Firewise Coordinator to provide education to its local residents on fire mitigation measures for creating defensible space. <i>Potential funding can be sought through the MN Firewise program.</i>
39	Wildfire	Maintain an ongoing effort to educate people how to respond in case of a large wildfire event so both residents and area visitors will know how to respond to warnings and are aware of evacuation routes.	1	Public Education	Ongoing	Ongoing	County EM and local city emergency management, Fire Departments	The City of Aitkin has worked with its local fire department to evaluate the risk to wildfire in each quadrant of the city and the potential impacts to transportation for evacuation and infrastructure that would be threatened. City will work with its local fire department and MN DNR to provide outreach and education to residents and visitors on wildfire safety. <i>Funding to deliver task via staff time of EM and others participating.</i>

Action Number (from the master MHMP mitigation chart)	Hazard	City of Aitkin Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
41	Wildfire	Planning staff on the city and county level, along with area fire chiefs, should coordinate to ensure new development will have adequate access and egress for emergency response vehicles.	1	Prevention / Emergency Services	Ongoing	Ongoing	All jurisdictional Fire Departments, City Planning & Zoning, County Board and Aitkin County Planning Commission	The City of Aitkin will work with Aitkin County Environmental Services / Planning and Zoning and local fire department to address access and egress requirements should any new development be slated for our community. <i>Funding to deliver task via staff time of EM and others participating.</i>
42	Wildfire	Continue inter-agency and multi-jurisdictional efforts to identify, contain, and extinguish wildfires.	1	Emergency Services	Ongoing	Ongoing	County EM and local city emergency management, Local Fire Departments, MN DNR	The City of Aitkin Fire Department will maintain its mutual aid agreements with other jurisdictions and the MN DNR for fire response. <i>Funding to deliver task via staff time of EM and others participating.</i>
44	Wildfire	Identify projects to mitigate at-risk structures and associated loss of life from the threat of wildfire through activities such as the creation of defensible space for wildfire, application of ignition-resistant construction, hazardous fuels reduction, and installation of external wildfire sprinkler systems and apply for appropriate funding for implementation.	1	Public Education / Natural Resources	New	Mid-term	County EM and local city emergency management, Aitkin County Soil and Water Conservation District, local fire departments	City of Aitkin will work with its local Fire Department to evaluate where potential wildfire mitigation projects may be most effective. <i>The mitigation actions noted may be eligible for Firewise or FEMA HMA funding.</i>

Action Number (from the master MEMD mitigation chart)	Hazard	City of Aitkin Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
45	Wildfire	In the event of a blow-down of trees from a severe storm, work with respective partners in natural resources to manage removal of trees to reduce wildland fire fuel.	2	Natural Resources	New	Ongoing	County EM and local city emergency management, MN DNR	The City of Aitkin will work with its energy providers and also MN DNR to address any removal of downed trees from severe weather. <i>Fuel reduction projects (removal of flammable vegetation) may be eligible for Firewise or FEMA HMA funding.</i>
46	Flash Flood and Riverine Flood	Maintain bridge, road, and culvert infrastructure at a level that it is capable of sustaining a major storm event and will not be vulnerable to washouts.	1	Structural Improvement	Ongoing	Ongoing	Aitkin County Highway Department, local jurisdictions' public works and transportation departments	On an annual basis, the City of Aitkin identifies and prioritizes any necessary culvert or road improvements as part of its Public Streets Improvement Plan. <i>Funding for improvement projects unknown at this time.</i>
47	Flash Flood and Riverine Flood	Steer development away from areas that may be difficult to serve with reliable road access.	1	Prevention	Ongoing	Ongoing	Local Planning and Zoning Authorities	The City of Aitkin has a zoning ordinance for development areas and it is enforced. <i>County Staff time to fund deliverables.</i>

Action Number (from the master MAMP mitigation chart)	Hazard	City of Aitkin Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
48	Flash Flood and Riverine Flood	Address ice dams that may impact the road system in a timely manner in order to prevent damage to infrastructure, in particular during spring thaw.	1	Prevention	Ongoing	Ongoing	Aitkin County Public Works and Highway Department, All local jurisdiction public works and transportation departments	The City of Aitkin's Street Department uses steamers each spring to thaw culverts that are frozen and may cause flooding to roads in early spring. <i>Funding from City department budgets.</i>
49	Flash Flood and Riverine Flood	Within the County and its jurisdictions, identify public infrastructure in areas that are prone to flooding (such as culverts, roads and bridges, and government buildings) and pursue funding for making specific mitigation improvements to those identified pieces of infrastructure.	1	Prevention	New	Ongoing	Aitkin County Public Works and Highway Department, All local jurisdiction public works and transportation departments	The City of Aitkin Public Works department will review any infrastructure that is threatened by flood risk on an annual basis. <i>Mitigation projects may be eligible for FEMA HMA funding for "Infrastructure Retrofit" (measures to reduce risk to existing utility systems, roads, and bridges).</i>

Action Number (from the master MBMP mitigation chart)	Hazard	City of Aitkin Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
50	Flash Flood and Riverine Flood	Maintain, and where necessary add, storm water retention ponds to protect wastewater treatment facilities throughout Aitkin County.	2	Structural Improvement	Ongoing	Mid-term	County and City Public Works Departments, Pipeline and Utility Companies, MnDOT	On an annual basis, the City's Public Works Department evaluates its INI (infiltration system) of water into its storm sewers and will continue to do so. <i>Funding from County or City department budgets.</i>
51	Flash Flood and Riverine Flood	Work to increase communication between the Aitkin County Planning and Zoning department and the United States Army Corps of Engineers regarding flooding and flowage easements.	1	Prevention	Ongoing	Short-term	Local Planning and Zoning Authorities, United States Army Corps of Engineers	The City of Aitkin will work in cooperation with the Aitkin County Emergency Manager and the Army Corps of Engineers in discussion of easements on the Mississippi River as it affects the City. <i>Funding from County or City department budgets.</i>
52	Flash Flood and Riverine Flood	Review storm water management guidelines currently in place to ensure that they are adequate to limit post development run-off and will not result in storm water run-off created flood damages.	2	Prevention	Ongoing	Mid-term	Local Planning and Zoning Authorities, MPCA	The City of Aitkin Streets Department maintains oversight of storm water management for the City and will review any guidelines as they relate to new development. <i>Funding from County or City department budgets.</i>

Action Number (from the master MHMP mitigation chart)	Hazard	City of Aitkin Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
57	Flash Flood and Riverine Flood	Install flow-rate meters (stream gauges) on rivers and streams that are prone to flooding high-risk, vulnerable properties.	1	Prevention / Structural Improvement	New	Ongoing	Same as #56	The City of Aitkin will work with the Aitkin County Emergency Manager to evaluate the value of flow rate meters along the Mississippi River and other creeks that flood in the City limits. <i>Minor Localized Flood Reduction Projects may be eligible for FEMA HMA funding. They may not duplicate the flood prevention activities of other Federal agencies and may not constitute a section of a larger flood control system.</i>

Action Number (from the master MRM? mitigation chart)	Hazard	City of Aitkin Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
58	Flash Flood and Riverine Flood	Acquire flood prone properties in the special flood hazard area and physically relocate existing structure(s) to outside of the special flood hazard area.	1	Prevention / Structural Improvement	New	Ongoing	Same as #56	The City of Aitkin will work with its assessor and the Aitkin County EM to evaluate any property that may be appropriate to relocate threatened structures to avoid repetitive loss during future flood events. <i>Eligible for FEMA HMA funding. The property must be deed-restricted in perpetuity to open space uses to restore and/or conserve natural floodplain functions.</i>
59	Flash Flood and Riverine Flood	Acquire at-risk structures and the underlying land in special flood hazard areas and demolish flood prone structures for the conversion of the land to open space.	1	Prevention / Structural Improvement	New	Ongoing	Same as #56	The City of Aitkin will work with its assessor and the Aitkin County EM to evaluate any structures that may be appropriate to demolish on flood prone property for the conversion to open space. <i>Eligible for FEMA HMA funding. The property must be deed-restricted in perpetuity to open space uses to restore and/or conserve natural floodplain functions.</i>

Action Number (from the master MHMP mitigation chart)	Hazard	City of Aitkin Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
60	Flash Flood and Riverine Flood	Reduce potential infrastructure flood damages on utilities such as wastewater treatment, pipelines, and power facilities by dry proofing or wet proofing facilities that are flood prone.	1	Prevention / Structural Improvement	New	Mid-term	Same as #56	The City of Aitkin will work with its Public Works Department to evaluate any facilities that may be threatened due to flooding and if they may benefit from a dry or wet proofing project. <i>Dry floodproofing activities are eligible for FEMA HMA funding.</i>

Table G - 2. Mitigation Actions Identified for Jurisdictional Implementation in Hill City

Action Number (from the master MHMP mitigation chart)	Hazard	City of Hill City Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
1	Violent Storms	Work with campground operators to post information regarding storm shelters and safety during strong summer storms.	2	Public Education	Ongoing	Ongoing	County and City emergency managers, MN DNR and concessionaires	The City Parks/Maintenance Department will work to ensure information is posted for summer storm safety at the Hill City Park Campground on an annual basis. <i>Funding to deliver task via staff time of EM and others participating.</i>
2	Violent Storms	Work with the appropriate jurisdictions or agencies to place safety information at boat landings throughout Aitkin County regarding what to do in case of severe weather.	1	Public Education	Ongoing	Ongoing	Aitkin County Sheriff's Dept., Hill City Police Department, and MN DNR	The City Parks/Maintenance Department will work to ensure information is posted for summer storm safety at boat launch sites on Hill Lake. <i>Funding to deliver task via staff time of EM and others participating.</i>

Action Number (from the master MHMP mitigation chart)	Hazard	City of Hill City Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
4	Violent Storms	Promote the National Weather Service's "Severe Weather Awareness Week" held in April of each year. The event seeks to educate residents on the dangers of severe summer storm events and highlights the importance of preparing for severe weather before it strikes.	2	Public Education	Ongoing	Ongoing	National Weather Service, County and City emergency managers, School District Superintendents and school staffs, Aitkin County Public Health	Hill City will work with the Aitkin County EM to promote severe weather awareness week in April. City will post information to City website and the Police Dept.'s Facebook page, insert information into the utility bills, and include in annual City newsletter. <i>Funding to deliver task via staff time of EM and others participating.</i>
7	Violent Storms	Participate in annual "Skywarn Training" from the National Weather Service to train new storm spotters in Aitkin County and ensure existing storm spotters maintain their storm-spotting skill.	1	Emergency Services	Ongoing	Ongoing	County EM and local city emergency management, MN DNR, and emergency response staff including EMS and Police	Hill City will promote the annual SkyWarn training to its residents. The City's fire department personnel participate annually. <i>Funding to deliver task via staff time of EM and others participating.</i>

Action Number (from the master MHMP mitigation chart)	Hazard	City of Hill City Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
8	Violent Storms	Continue to ensure that procedures are in place so that emergency management personnel, county sheriffs, and other emergency response teams are notified as soon as possible in the event of an approaching storm.	2	Emergency Services	Ongoing	Short-term	County EM and local city emergency management, MN DNR, emergency response staff including EMS and Police	In the event of severe weather, the City has established protocols in place to page out weather information to fire departments and emergency personnel. <i>Funded by NOAA. Other funding to deliver task via staff time of EM and others participating.</i>
9	Violent Storms	Ensure that communication procedures are in place to effectively provide warning to residents and visitors in advance of approaching severe weather.	1	Emergency Services	New	Short-term	County EM and local city emergency management, and emergency response staff including EMS and Police	Hill City will promote that residents register for CodeRed and understand when and what to do when sirens are activated in the City. <i>Funding to deliver task via staff time of EM and others participating.</i>

Action Number (from the master MIMMP mitigation chart)	Hazard	City of Hill City Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
16	Violent Storms	Ensure there are personnel trained in shelter management within the County and each of its jurisdictions, engaging those who would play a role in emergency response leadership in the event of needing to activate a shelter for mass care.	1	Emergency Services	New / In Progress	Short-term	Aitkin County Emergency Manager, Aitkin County Public Health, and American Red Cross	Hill City will work with the Aitkin County Public Health to seek shelter management training as appropriate. Aitkin County EM and Public Health will coordinate with Red Cross in training personnel in 2014–2015. <i>Funding provided to HSEM Region 2 for training under Mass Care grant in 2014. Other funding to deliver task via staff time of EM and others participating.</i>
19	Violent Storms	Identify critical facilities within the County and each of its jurisdictions that do not have a generator to supply backup power in the event of a severe storm taking out primary power for its facilities and essential functions. Critical facilities may include: police and fire stations, hospitals, water and sewer treatment facilities, and other facilities that the county deems critical.	1	Emergency Services	New	Mid-term	County EM and local city emergency management, Aitkin County and local City public works departments, MN DNR	The City will work with its Public Works Department to evaluate what critical facilities within the City do not have backup power and would be negatively affected in the event of a disaster, disrupting the continuation of city services or emergency response. <i>Generators and/or related equipment purchases may be eligible for FEMA HMA funding (see Action Item #18).</i>

Action Number (from the master MHMP mitigation chart)	Hazard	City of Hill City Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
20	Violent Storms	Purchase generators or related equipment (e.g., generator hook-ups) that will support the operation of essential functions in identified County- and jurisdiction-owned critical facilities in the event of severe storms. Critical facilities may include: police and fire stations, hospitals, water and sewer treatment facilities, and other facilities that the county deems critical (see Appendix B, Aitkin County Critical Facilities).	1	Emergency Services	New	Mid-term	County EM and local city emergency management, Aitkin County and local City public works departments, MN DNR	Hill City will communicate with the Aitkin County EM if it decides to pursue FEMA funding for the purchase of a permanent generator to support a critical facility. <i>Generators and/or related equipment purchases may be eligible for FEMA HMA funding.</i>
23	Violent Storms	Assure the functionality of warning systems for the areas with warning sirens in place. Warning sirens should be able to be remotely activated by the Aitkin County Sheriff's Office.	2	Emergency Services	Ongoing	Mid-term	County EM and local city emergency management	Hill City fire department tests its warning siren on a monthly basis to ensure it is in working order. In the event of an emergency, the siren is remotely activated by the Sheriff's office but we can also activate it manually if needed. <i>Funding unknown at this time for improvements.</i>

Action Number (from the master MBMP mitigation chart)	Hazard	City of Hill City Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
26	Violent Storms	Work with local jurisdictions, MN DNR and other key stakeholders to develop an Evacuation Plan for Aitkin County in the event of severe weather. The plan should make sure to address the evacuation of vulnerable populations, such as those in nursing homes or remote locations (such as Savanna Portage State Park or rural residential areas).	1	Emergency Services	New	Short-term	County EM and local city emergency management	The City of Hill City will work with Aitkin County EM to address local evacuation plans for its residents and especially for vulnerable/elderly people. Aitkin County will review other existing plans in HSEM Region 2. <i>Funding to deliver task via staff time of EM and others participating.</i>
28	Violent Storms	Work to provide increased first responder training for those that work in remote areas and serve the public in the County		Emergency Services	New		County EM in cooperation with local governments such as townships and the MN DNR	Hill City will work to ensure that it has trained first responders on-call. <i>Funding for implementation not currently identified.</i>

Action Number (from the master MHMP mitigation chart)	Hazard	City of Hill City Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
31	Extreme Temperatures	Continue the winter storm awareness program. Key audiences are the elderly and the younger populations who may be more susceptible to the effects of freezing temperatures when outside.	1	Public Education	Ongoing	Ongoing	County EM and local city emergency management, School District Superintendents and school staffs, Aitkin County Public Health	Hill City will work with the Aitkin County department of Public Health and school districts to provide outreach to vulnerable populations such as the elderly and our students. City will post information to City website and the Police Dept.'s Facebook page, insert information into the utility bills, and include in annual City newsletter. <i>Funding to deliver task via staff time of EM and others participating. Other potential funding unknown at this time.</i>

Action Number (from the master NHMP mitigation chart)	Hazard	City of Hill City Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
39	Wildfire	Maintain an ongoing effort to educate people how to respond in case of a large wildfire event so both residents and area visitors will know how to respond to warnings and are aware of evacuation routes.	1	Public Education	Ongoing	Ongoing	County EM and local city emergency management, Fire Departments and DNR	Hill City will work with its local fire department to evaluate the risk to wildfire to the city and the potential impacts to transportation for evacuation and infrastructure that would be threatened. City will work with its local fire department and MN DNR to provide outreach and education to residents and visitors on wildfire safety. <i>Funding to deliver task via staff time of EM and others participating.</i>
62	Drought	Educate the public on water conservation measures in times of approaching drought conditions and develop plans to limit water use for nonessential purposes, such as lawn watering, car washing, etc., during drought periods as necessary.	2	PE/P	New	Ongoing	Aitkin County Soil and Water Conservation District, Aitkin County Public Health	Hill City will work with the Aitkin County EM to communicate to the public on water conservation measures. City will post information to City website and the Police Dept.'s Facebook page, insert information into the utility bills, and include in annual City newsletter. <i>County staff time to fund deliverables.</i>

Action Number (from the master MMMP mitigation chart)	Hazard	City of McGregor Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
26	Violent Storms	Work with local jurisdictions, MN DNR and other key stakeholders to develop an Evacuation Plan for Aitkin County in the event of severe weather. The plan should make sure to address the evacuation of vulnerable populations, such as those in nursing homes or remote locations (such as Savanna Portage State Park or rural residential areas).	1	Emergency Services	New	Short-term	County EM and local city emergency management	<p>The City of McGregor will work with Aitkin County EM to address local evacuation plans for its residents and especially for vulnerable/elderly people. Aitkin County will review other existing plans in HSEM Region 2.</p> <p><i>Funding to deliver task via staff time of EM and others participating.</i></p>
33	Extreme Temperatures	Maintain an updated database of facilities in the county that have shelter agreements with the American Red Cross and the capabilities of each shelter to provide mass care in the event of extreme temperatures.	1	Emergency Services	New / In Progress	Short-term	County EM and local city emergency management, Aitkin County Public Health and Red Cross	<p>The Red Cross provided the Aitkin County EM with a shelter database for Aitkin County in 2012. The City of McGregor will work with Aitkin County EM to keep the database updated as related to our community.</p> <p><i>Funding to deliver task via staff time of EM and others participating.</i></p>

Action Number (from the master MRM/P mitigation chart)	Hazard	City of McGregor Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
34	Extreme Temperatures	Ensure there are personnel trained in shelter management within the County and each of its jurisdictions, engaging those who would play a role in emergency response leadership in the event of needing to activate a shelter for mass care.	1	Emergency Services	New / In Progress	Short-term	County EM and local city emergency management, Aitkin County Public Health, Red Cross	An HSEM grant for Mass Care to Region 2 is providing training to emergency managers during 2014 and 2015. The City of McGregor will work with Aitkin County to participate in shelter training as it is available. <i>Funding to deliver task via staff time of EM and others participating.</i>
36	Wildfire	Promote the use of financial assistance for fuel reduction efforts through the Firewise program by area property owners.	1	Prevention	Ongoing	Ongoing	County EM and local city emergency management, Fire Departments, DNR Firewise Program	The City of McGregor Emergency Planning committee will work with fire dept., DNR Firewise Program and Aitkin County EM to promote the use of financial assistance for fuel reduction efforts through the Firewise program by area property owners.

Action Number (from the master MHMP mitigation chart)	Hazard	City of McGregor Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
49	Flash Flood and Riverine Flood	Within the County and its jurisdictions, identify public infrastructure in areas that are prone to flooding (such as culverts, roads and bridges, and government buildings) and pursue funding for making specific mitigation improvements to those identified pieces of infrastructure.	1	Prevention	New	Ongoing	Aitkin County Public Works and Highway Department, All local jurisdiction public works and transportation departments	The City of McGregor Emergency Planning committee will work with the city engineer to identify public infrastructure in areas prone to flooding and pursue funding improvements to identified Infrastructure. <i>Mitigation projects may be eligible for FEMA HMA funding for "Infrastructure Retrofit" (measures to reduce risk to existing utility systems, roads, and bridges).</i>
50	Flash Flood and Riverine Flood	Maintain, and where necessary add, storm water retention ponds to protect wastewater treatment facilities throughout Aitkin County.	2	Structural Improvement	Ongoing	Mid-term	County and City Public Works Departments, Pipeline and Utility Companies, MnDOT	The City of McGregor Emergency Planning Committee will investigate to see if there is need for the City of McGregor. <i>Funding from County or City department budgets.</i>
54	Flash Flood and Riverine Flood	Work to update the floodplain maps for Aitkin County. Current floodplain maps are over 20 years old.	1	Prevention	Ongoing	Mid-term	MN DNR, Local Planning and Zoning Authorities	The City of McGregor Emergency Planning Committee will work with the MN DNR, local planning and zoning authorities to upgrade floodplain maps. <i>Funding from County budget.</i>

Action Number (from the master MHP mitigation chart)	Hazard	City of McGregor Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
62	Drought	Educate the public on water conservation measures in times of approaching drought conditions and develop plans to limit water use for nonessential purposes, such as lawn watering, car washing, etc., during drought periods as necessary.	2	Public Education / Prevention	New	Ongoing	Aitkin County Soil and Water Conservation District, Aitkin County Public Health	The City of McGregor Emergency Planning Committee will work with Aitkin County and McGregor to develop plans to limit water use in times of drought. <i>County staff time to fund deliverables.</i>

Table G - 5. Mitigation Actions Identified for Jurisdictional Implementation in the City of Palsade

Action Number (from the master MHMP mitigation chart)	Hazard	City of Palsade Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
1	Violent Storms	Work with campground operators to post information regarding storm shelters and safety during strong summer storms.	2	PE	Ongoing	Ongoing	County and City emergency managers, Aitkin County Land Department, MN DNR and concessionaires	The Aitkin County Land Department will work to ensure information is posted for summer storm safety at the county-operated Berglund Park. <i>Funding to deliver task via staff time of EM and others participating.</i>
2	Violent Storms	Work with the appropriate jurisdictions or agencies to place safety information at boat landings throughout Aitkin County regarding what to do in case of severe weather.	1	PE	Ongoing	Ongoing	Aitkin County Sheriff's Dept., Aitkin County Land Department, and MN DNR	The Aitkin County Land Department will work to ensure information is posted for summer storm safety at the county-operated Berglund Park. <i>Funding to deliver task via staff time of EM and others participating.</i>
4	Violent Storms	Promote the National Weather Service's "Severe Weather Awareness Week" held in April of each year. The event seeks to educate residents on the dangers of severe summer storm events and highlights the importance of preparing for severe weather before it strikes.	2	PE	Ongoing	Ongoing	National Weather Service, County and City emergency managers, School District Superintendents and school staffs, Aitkin County Public Health	The City of Palsade will work with the Aitkin County EM to promote severe weather awareness week in April. City will insert information into the utility bills and include in annual City newsletter. <i>Funding to deliver task via staff time of EM and others participating.</i>

Action Number (from the master MSMP mitigation chart)	Hazard	City of Palisade Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
5	Violent Storms	Promote the National Weather Service's "Winter Hazard Awareness Week" held in November of each year. The event seeks to educate residents on the dangers of winter weather and how to properly deal with it.	2	PE	Ongoing	Ongoing	Same as above	The City of Palisade will work with the Aitkin County EM to promote severe weather awareness week in April. City will insert information into the utility bills and include in annual City newsletter. <i>Funding to deliver task via staff time of EM and others participating.</i>
6	Violent Storms	Review current information and delivery systems in place for public awareness and education of preparedness for severe winter and summer storms and improve upon them as needed.	1	PE	New	Ongoing	County EM and local city emergency management, MN DNR, School District Superintendents and school staffs, Aitkin County Public Health	The City of Palisade will work to evaluate current delivery systems, such as use of the City utility bill notices and posting of community informational flyers. <i>Funding to deliver task via staff time of EM and others participating.</i>
7	Violent Storms	Participate in annual "Skywarn Training" from the National Weather Service to train new storm spotters in Aitkin County and ensure existing storm spotters maintain their storm-spotting skill.	1	ES	Ongoing	Ongoing	County EM and local city emergency management, MN DNR, and emergency response staff including EMS and Police	The City of Palisade will promote the annual SkyWarn training to its residents. The City's fire department personnel participate annually. <i>Funding to deliver task via staff time of EM and others participating.</i>

Action Number (from the master MHMP mitigation chart)	Hazard	City of Palisade Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
8	Violent Storms	Continue to ensure that procedures are in place so that emergency management personnel, county sheriffs, and other emergency response teams are notified as soon as possible in the event of an approaching storm.	2	ES	Ongoing	Short-term	County EM and local city emergency management, MN DNR, emergency response staff including EMS and Police	The City of Palisade has established protocols in place to page out weather information to fire departments and emergency personnel. <i>Funded by NOAA. Other funding to deliver task via staff time of EM and others participating.</i>
9	Violent Storms	Ensure that communication procedures are in place to effectively provide warning to residents and visitors in advance of approaching severe weather.	1	ES	New	Short-term	County EM and local city emergency management, and emergency response staff including EMS and Police	The City of Palisade will promote that residents register for CodeRed and understand when and what to do when the emergency siren is activated in the City. <i>Funding to deliver task via staff time of EM and others participating.</i>
11	Violent Storms	Promote and educate Aitkin County residents, agencies, and communities about the use of NOAA weather radios for relaying weather-related emergency information.	1	PE	Ongoing	Ongoing	County EM and local city emergency management, Aitkin County Public Health	During the spring and winter severe weather awareness weeks, the City of Palisade will work to inform residents about the value of having a NOAA weather radio. <i>Funding to deliver task via staff time of EM and others participating.</i>

Action Number (from the master MHP mitigation chart)	Hazard	City of Palsade Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
15	Violent Storms	Maintain an updated database of facilities in the county that have shelter agreements with the American Red Cross and the capabilities of each shelter to provide mass care in the event of violent storms.	1	ES	New / In Progress	Short-term	County emergency managers, American Red Cross, Aitkin County Public Health	City of Palisade will work with Aitkin County Public Health to be aware of what facilities are designated shelters for mass care in our community, and will help to convey this to the public times when shelters are activated. <i>Funding to deliver task via staff time of EM and others participating.</i>
16	Violent Storms	Ensure there are personnel trained in shelter management within the County and each of its jurisdictions, engaging those who would play a role in emergency response leadership in the event of needing to activate a shelter for mass care.	1	ES	New / In Progress	Short-term	Aitkin County Emergency Manager, Aitkin County Public Health, and American Red Cross	The City of Palisade will work with the Aitkin County Public Health to seek shelter management training as appropriate. Aitkin County EM and Public Health will coordinate with Red Cross in training personnel in 2014 – 2015. <i>Funding provided to HSEM Region 2 for training under Mass Care grant in 2014. Other funding to deliver task via staff time of EM and others participating.</i>

Action Number (from the master MHMP mitigation chart)	Hazard	City of Palsade Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
17	Violent Storms	Research possible storm shelter and safe room locations within the County and each of its government jurisdictions including schools, mobile home parks, campgrounds or other areas where there are populations (residents or visitors) vulnerable to high winds and tornado events.	1	P	New	Long-term	County EM and local city emergency management, School District Superintendents and school staffs, Red Cross, MN DNR, owners of private campgrounds, and owners of mobile home parks.	The City of Palisade will work with Aitkin County EM to identify and evaluate the potential location for a safe room in our city to protect vulnerable residents during times of severe wind events. <i>Safe Room construction or retrofit projects may be eligible under FEMA HMA funding (see Action Item #16).</i>

Action Number (from the master MHMP mitigation chart)	Hazard	City of Palsade Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
18	Violent Storms	<p>Retrofit or construct new storm shelter and safe room facilities in the identified vulnerable locations with specific information on location and building type to construct or retrofit.</p> <p>The term "safe room" applies to extreme wind (tornado), residential, non-residential and community safe rooms and tornado community safe rooms.</p> <p>(Locations may include schools, mobile home parks, campgrounds or other areas where there are populations - residents or visitors - vulnerable to high winds and tornado events).</p>	1	SI	New	Long-term	<p>County EM and local city emergency management, School District Superintendents and school staffs, Red Cross, MN DNR, owners of private campgrounds, and owners of mobile home parks.</p>	<p>The City of Palisade will work with the Aitkin County EM if we decide to pursue construction of a safe room for an identified location in our community.</p> <p><i>Safe Room construction or retrofit projects of both single and dual-use facilities may be eligible under FEMA HMA funding.</i></p>

Action Number (from the master MPMMP mitigation chart)	Hazard	City of Palisade Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
19	Violent Storms	Identify critical facilities within the County and each of its jurisdictions that do not have a generator to supply backup power in the event of a severe storm taking out primary power for its facilities and essential functions. Critical facilities may include: police and fire stations, hospitals, water and sewer treatment facilities, and other facilities that the county deems critical.	1	ES	New	Mid-term	County EM and local city emergency management, Aitkin County and local City public works departments, MN DNR	The City of Palisade will identify and discuss the need for backup power in any of our identified critical facilities. <i>Generators and/or related equipment purchases may be eligible for FEMA HMA funding (see Action Item #18).</i>
20	Violent Storms	Purchase generators or related equipment (e.g., generator hook-ups) that will support the operation of essential functions in identified County- and jurisdiction-owned critical facilities in the event of severe storms. Critical facilities may include: police and fire stations, hospitals, water and sewer treatment facilities, and other facilities that the county deems critical (see Appendix B, Aitkin County Critical Facilities).	1	ES	New	Mid-term	County EM and local city emergency management, Aitkin County and local City public works departments, MN DNR	The City of Palisade will communicate with the Aitkin County EM if it decides to pursue FEMA funding for the purchase of a permanent generator to support a critical facility. <i>Generators and/or related equipment purchases may be eligible for FEMA HMA funding.</i>

Action Number (from the master MHMP mitigation chart)	Hazard	City of Palisade Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
21	Violent Storms	Work with respective road authorities to plant "living snow fences" or tree lines along identified problem areas of identified roads that can reduce snow drifts on the roads.	2	P	New	Mid-term	County, City and MnDOT public works and transportation departments	The City of Palisade will work with the Aitkin County Transportation Department to identify any areas of concern that warrant action. <i>Funding via County or local jurisdiction transportation budgets.</i>
24	Violent Storms	Identify jurisdictions that do not have warning siren systems in place and have an expressed need for acquiring one to alert people in high risk, vulnerable areas (such as: campgrounds, parks and rural residents out of reach of other existing warning siren systems) to approaching severe weather.	1	ES	New	Short-term	County EM and local city emergency management, MN DNR	The City of Palisade does not have a warning siren and seeks to have one installed. The City will work with Aitkin County EM to address this need. <i>Funding for new warning siren systems may be eligible under FEMA's HMA 5% Initiative.</i>

Action Number (from the master MHMP mitigation chart)	Hazard	City of Palisade Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
25	Violent Storms	<p>Install new warning systems in identified vulnerable locations (jurisdictions that do not have warning siren systems in place and have an expressed need for acquiring one to alert people in high risk, vulnerable areas such as campgrounds, parks and rural residents out of reach of other existing warning siren systems) to approaching severe weather.</p> <p>Warning sirens should be able to be remotely activated by the Aitkin County Sheriff's Office.</p>	1	ES	New	Short-term	County EM and local city emergency management, MN DNR	<p>Same as above.</p> <p><i>Funding for new warning siren systems may be eligible under FEMA's HMA 5% Initiative.</i></p>
26	Violent Storms	<p>Work with local jurisdictions, MN DNR and other key stakeholders to develop an Evacuation Plan for Aitkin County in the event of severe weather. The plan should make sure to address the evacuation of vulnerable populations, such as those in nursing homes or remote locations (such as Savanna Portage State Park or rural residential areas).</p>	1	ES	New	Short-term	County EM and local city emergency management	<p>The City of Palisade will work with Aitkin County EM to address local evacuation plans for its residents and especially for vulnerable/elderly people. Aitkin County will review other existing plans in HSEM Region 2.</p> <p><i>Funding to deliver task via staff time of EM and others participating.</i></p>

Action Number (from the master MHMP mitigation chart)	Hazard	City of Palsade Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
28	Violent Storms	Work to provide increased first responder training for those that work in remote areas and serve the public in the County			New		County EM in cooperation with local governments such as townships and the MN DNR	The City of Palisade will work to ensure that it has trained first responders on-call. <i>Funding for implementation not currently identified.</i>
29	Violent Storms	Investigate "Storm Ready" designation by the National Weather Service and submit an application if deemed appropriate.	2	P	New	Mid-term	County EM and local city emergency management	The City of Palisade will work with Aitkin County EM to investigate becoming a Storm Ready Community and accomplishing any requirements necessary to be granted designation. <i>Funding to deliver task via staff time of EM and others participating.</i>
31	Extreme Temperatures	Continue the winter storm awareness program. Key audiences are the elderly and the younger populations who may be more susceptible to the effects of freezing temperatures when outside.	1	PE	Ongoing	Ongoing	County EM and local city emergency management, School District Superintendents and school staffs, Aitkin County Public Health	The City of Palisade will work with the Aitkin County department of Public Health and school districts to provide outreach to vulnerable populations such as the elderly and our students. The City also will utilize its local utility bills to get information out to its residents. <i>Funding to deliver task via staff time of EM and others participating. Other potential funding unknown at this time.</i>

Action Number (from the master MMMP mitigation chart)	Hazard	City of Palsade Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
32	Extreme Temperatures	Promote and educate Aitkin County residents, agencies, and communities about the use of NOAA weather radios for relaying weather-related emergency information.	1	PE	New	Ongoing	Emergency managers, Sheriff's Department and local Police Departments	The City of Palsade will seek to increase the amount of NOAA weather radios within our community (to residents, government buildings, and facilities that serve vulnerable populations, i.e., assisted living)
33	Extreme Temperatures	Maintain an updated database of facilities in the county that have shelter agreements with the American Red Cross and the capabilities of each shelter to provide mass care in the event of extreme temperatures.	1	ES	New / In Progress	Short-term	County EM and local city emergency management, Aitkin County Public Health and Red Cross	<i>Funding to deliver task via staff time of EM and others participating.</i> The Red Cross provided the Aitkin County EM with a shelter database for Aitkin County in 2012. The City of Palsade will work with Aitkin County EM to keep the database updated as related to our community.
34	Extreme Temperatures	Ensure there are personnel trained in shelter management within the County and each of its jurisdictions, engaging those who would play a role in emergency response leadership in the event of needing to activate a shelter for mass care.	1	ES	New / In Progress	Short-term	County EM and local city emergency management, Aitkin County Public Health, Red Cross	<i>Funding to deliver task via staff time of EM and others participating.</i> An HSEM grant for Mass Care to Region 2 is providing training to emergency managers during 2014. The City of Palsade will work with the EM to acquire local shelter management training so we are prepared to assist should a shelter in our community need to be opened.

Action Number (from the master MHMP mitigation chart)	Hazard	City of Palisade Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
39	Wildfire	Maintain an ongoing effort to educate people how to respond in case of a large wildfire event so both residents and area visitors will know how to respond to warnings and are aware of evacuation routes.	1	PE	Ongoing	Ongoing	County EM and local city emergency management, Fire Departments and MN DNR	The City of Palisade will work with its local fire department and MN DNR to provide outreach and education to residents and visitors on wildfire safety. <i>Funding to deliver task via staff time of EM and others participating.</i>
44	Wildfire	Identify projects to mitigate at-risk structures and associated loss of life from the threat of wildfire through activities such as the creation of defensible space for wildfire, application of ignition-resistant construction, hazardous fuels reduction, and installation of external wildfire sprinkler systems and apply for appropriate funding for implementation.	1	PE/NR	New	Mid-term	County EM and local city emergency management, Aitkin County Soil and Water Conservation District, local fire departments	City of Palisade will work with its local Fire Department to evaluate where potential wildfire mitigation projects may be most effective. <i>The mitigation actions noted may be eligible for Firewise or FEMA HMA funding.</i>
45	Wildfire	In the event of a blow-down of trees from a severe storm, work with respective partners in natural resources to manage removal of trees to reduce wildland fire fuel.	2	NR	New	Ongoing	County EM and local city emergency management, MN DNR	The City of Palisade will work with its energy providers and also MN DNR to address any removal of downed trees from severe weather. <i>Fuel reduction projects (removal of flammable vegetation) may be eligible or Firewise or FEMA HMA funding.</i>

Action Number (from the master MHMP mitigation chart)	Hazard	City of Palisade Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
46	Flash Flood and Riverine Flood	Maintain bridge, road, and culvert infrastructure at a level that it is capable of sustaining a major storm event and will not be vulnerable to washouts.	1	SI	Ongoing	Ongoing	Aitkin County Highway Department, local jurisdictions' public works and transportation departments	On an annual basis, the City of Palisade identifies and prioritizes any necessary culvert or road improvements as part of its Public Streets Improvement Plan. <i>Funding for improvement projects unknown at this time.</i>
47	Flash Flood and Riverine Flood	Steer development away from areas that may be difficult to serve with reliable road access.	1	P	Ongoing	Ongoing	Local Planning and Zoning Authorities	The City of Palisade has a zoning ordinance for development areas and it is enforced. <i>County Staff time to fund deliverables.</i>
48	Flash Flood and Riverine Flood	Address ice dams that may impact the road system in a timely manner in order to prevent damage to infrastructure, in particular during spring thaw.	1	P	Ongoing	Ongoing	Aitkin County Public Works and Highway Department, All local jurisdiction public works and transportation departments	The City of Palisade Streets Department uses steamers each spring to thaw culverts that are frozen and may cause flooding to roads in early spring. <i>Funding from County or City department budgets.</i>
49	Flash Flood and Riverine Flood	Within the County and its jurisdictions, identify public infrastructure in areas that are prone to flooding (such as culverts, road and bridges, and government buildings) and pursue funding for making specific mitigation improvements to those identified pieces of infrastructure.	1	P	New	Ongoing	Aitkin County Public Works and Highway Department, All local jurisdiction public works and transportation departments	The City of Palisade Public Works department will review any infrastructure that is threatened by flood risk on an annual basis. <i>Mitigation projects may be eligible for FEMA HMA funding for "Infrastructure Retrofit" (measures to reduce risk to existing utility systems, roads, and bridges).</i>

Action Number (from the master MHMP mitigation chart)	Hazard	City of Palsade Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
50	Flash Flood and Riverine Flood	Maintain, and where necessary add, storm water retention ponds to protect wastewater treatment facilities throughout Aitkin County.	2	SI	Ongoing	Mid-term	County and City Public Works Departments, Pipeline and Utility Companies, MnDOT	On an annual basis, the City's Public Works Department evaluates its INI (infiltration system) of water into its storm sewers and will continue to do so. <i>Funding from County or City department budgets.</i>
51	Flash Flood and Riverine Flood	Work to increase communication between the Aitkin County Planning and Zoning department and the United States Army Corps of Engineers regarding flooding and flowage easements	1	P	Ongoing	Short-term	Local Planning and Zoning Authorities, United States Army Corps of Engineers	The City of Palisade will work in cooperation with the Aitkin County Emergency Manager and the Army Corps of Engineers in discussion of easements on the Mississippi River as it affects the City. <i>Funding from County or City department budgets.</i>
52	Flash Flood and Riverine Flood	Review storm water management guidelines currently in place to ensure that they are adequate to limit post development run-off and will not result in storm water run-off created flood damages.	2	P	Ongoing	Mid-term	Local Planning and Zoning Authorities, MPCA	The City of Palisade Streets Department maintains oversight of storm water management for the City and will review any guidelines as they relate to new development. <i>Funding from County or City department budgets.</i>

Action Number (from the master MUMP mitigation chart)	Hazard	City of Palsade Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
56	Flash Flood and Riverine Flood	Identify minor localized flood reduction projects identified to lessen the frequency or severity of flooding and decrease predicted flood damages, such as the installation or modification of culverts, and stormwater management activities, such as creating retention and detention basins, and protection of sanitary sewer lift stations in flood-prone areas.	1	P/SI	New	Ongoing	Aitkin County Public Works and Highway Department, All local jurisdiction public works and transportation departments	On an annual basis, the City's Public Works Department will evaluate any flood-related issues as related to our community infrastructure and prioritize improvement projects. <i>Minor Localized Flood Reduction Projects may be eligible for FEMA HMA funding. They may not duplicate the flood prevention activities of other federal agencies and may not constitute a section of a larger flood control system.</i>
57	Flash Flood and Riverine Flood	Install flow-rate meters (stream gauges) on rivers and streams that are prone to flooding high-risk, vulnerable properties.	1	P/SI	New	Ongoing	Same as #56	The City of Palsade will work with the Aitkin County Emergency Manager to evaluate the value of flow rate meters along the Mississippi River. <i>Minor Localized Flood Reduction Projects may be eligible for FEMA HMA funding. They may not duplicate the flood prevention activities of other federal agencies and may not constitute a section of a larger flood control system.</i>

Action Number (from the master MKMP mitigation chart)	Hazard	City of Palsade Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Aitkin County Comments on Planning Mechanisms and Funding for Implementation
58	Flash Flood and Riverine Flood	Acquire flood prone properties in the special flood hazard area and physically relocate existing structure(s) to outside of the special flood hazard area.	1	P/SI	New	Ongoing	Same as #56	The City of Palisade will work with its assessor and the Aitkin County EM to evaluate any property that may be appropriate to re-locate threatened structures to avoid repetitive loss during future flood events. <i>Eligible for FEMA HMA funding. The property must be deed-restricted in perpetuity to open space uses to restore and/or conserve natural floodplain functions.</i>
62	Drought	Educate the public on water conservation measures in times of approaching drought conditions and develop plans to limit water use for nonessential purposes, such as lawn watering, car washing, etc., during drought periods as necessary.	2	PE/P	New	Ongoing	Aitkin County Soil and Water Conservation District, Aitkin County Public Health	The City of Palisade will work with the Aitkin County EM to communicate to the public on water conservation measures. City will insert information into the utility bills, and include in City newsletter. <i>County staff time to fund deliverables.</i>

Table G - 6. Mitigation Actions Identified for Jurisdictional Implementation in the City of Tamarack

Action Number (from the Tamarack MAMP mitigation chart)	Hazard	City of Tamarack Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
9	Violent Storms	Ensure that communication procedures are in place to effectively provide warning to residents and visitors in advance of approaching severe weather.	1	Emergency Services	New	Short-term	County EM and local city emergency management, and emergency response staff including EMS and Police	The Tamarack Area Emergency Planning Committee (TAEP) will promote residents of Tamarack to register for Code Red and to understand when and what to do when sirens are activated. <i>Funding to deliver task via staff time of EM and others participating.</i>
15	Violent Storms	Maintain an updated database of facilities in the county that have shelter agreements with the American Red Cross and the capabilities of each shelter to provide mass care in the event of violent storms.	1	Emergency Services	New / In Progress	Short-term	County emergency managers, American Red Cross, Aitkin County Public Health	TAEP will work with Aitkin County Public Health to be aware of what facilities are designated shelters for mass care, and will help to convey this to the public in times when shelters are activated. <i>Funding to deliver task via staff time of EM and others participating.</i>
16	Violent Storms	Ensure there are personnel trained in shelter management within the County and each of its jurisdictions, engaging those who would play a role in emergency response leadership in the event of needing to activate a shelter for mass care.	1	Emergency Services	New / In Progress	Short-term	Aitkin County Emergency Manager, Aitkin County Public Health, and American Red Cross	TAEP will work with Aitkin County Public Health to seek shelter management training as appropriate. Aitkin County EM and Public Health will coordinate with Red Cross in training personnel in 2014 – 2015. <i>Funding provided to HSEM Region 2 for training under Mass Care grant in 2014. Other funding to deliver task via staff time of EM and others participating.</i>

Action Number (from the master MAMP mitigation chart)	Hazard	City of Tamarack Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
17	Violent Storms	Research possible storm shelter and safe room locations within the County and each of its government jurisdictions including schools, mobile home parks, campgrounds or other areas where there are populations (residents or visitors) vulnerable to high winds and tornado events.	1	Prevention	New	Long-term	County EM and local city emergency management, School District Superintendents and school staffs, Red Cross, MN DNR, owners of private campgrounds, and owners of mobile home parks.	<p>TAEP will work with Aitkin County EM to identify and evaluate the potential location for a safe room in Tamarack to protect vulnerable residents during times of severe wind events.</p> <p><i>Safe Room construction or retrofit projects may be eligible under FEMA HMA funding (see Action Item #16).</i></p>

Action Number (from the master MHMP mitigation chart)	Hazard	City of Tamarack Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
18	Violent Storms	<p>Retrofit or construct new storm shelter and safe room facilities in the Identified vulnerable locations with specific information on location and building type to construct or retrofit.</p> <p>The term "safe room" applies to extreme wind (tornado), residential, non-residential and community safe rooms and tornado community safe rooms.</p> <p>(Locations may include schools, mobile home parks, campgrounds or other areas where there are populations -residents or visitors- vulnerable to high winds and tornado events).</p>	1	Structural Improvement	New	Long-term	<p>County EM and local city emergency management, School District Superintendents and school staffs, Red Cross, MN DNR, owners of private campgrounds, and owners of mobile home parks.</p>	<p>TAEP will work with the Aitkin County EM if we decide to pursue construction of a safe room for an identified location in our community. TAEP will submit an NOI to HSEM if deciding to proceed with inquiry into mitigation funds to advance the project.</p> <p><i>Safe Room construction or retrofit projects of both single and dual-use facilities may be eligible under FEMA HMA funding.</i></p>

Action Number (from the master MHMP mitigation chart)	Hazard	City of Tamarack Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
19	Violent Storms	Identify critical facilities within the County and each of its jurisdictions that do not have a generator to supply backup power in the event of a severe storm taking out primary power for its facilities and essential functions. Critical facilities may include: police and fire stations, hospitals, water and sewer treatment facilities, and other facilities that the county deems critical.	1	Emergency Services	New	Mid-term	County EM and local city emergency management, Aitkin County and local City public works departments, MN DNR	TAEP will identify and discuss the need for backup power in any of our identified critical facilities in Tamarack. <i>Generators and/or related equipment purchases may be eligible for FEMA HMA funding (see Action Item #18).</i>
20	Violent Storms	Purchase generators or related equipment (e.g., generator hook-ups) that will support the operation of essential functions in identified County- and jurisdiction-owned critical facilities in the event of severe storms. Critical facilities may include: police and fire stations, hospitals, water and sewer treatment facilities, and other facilities that the county deems critical (see Appendix B, Aitkin County Critical Facilities).	1	Emergency Services	New	Mid-term	County EM and local city emergency management, Aitkin County and local City public works departments, MN DNR	TAEP will communicate with Aitkin County EM if we decide to pursue a purchase of a generator for backup power with FEMA grant funds. <i>Generators and/or related equipment purchases may be eligible for FEMA HMA funding.</i>

Action Number (from the master MHMP mitigation chart)	Hazard	City of Tamarack Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
21	Violent Storms	Work with respective road authorities to plant "living snow fences" or tree lines along identified problem areas of identified roads that can reduce snow drifts on the roads.	2	Prevention	New	Mid-term	County, City and MnDOT public works and transportation departments	TAEP will work with the Aitkin County Transportation Department to identify any areas of concern that warrant action. <i>Funding via County or local jurisdiction transportation budgets.</i>
26	Violent Storms	Work with local jurisdictions, MN DNR and other key stakeholders to develop an Evacuation Plan for Aitkin County in the event of severe weather. The plan should make sure to address the evacuation of vulnerable populations, such as those in nursing homes or remote locations (such as Savanna Portage State Park or rural residential areas).	1	Emergency Services	New	Short-term	County EM and local city emergency management	TAEP will work with Aitkin County EM to address local evacuation plans for its residents and especially for vulnerable/elderly people. Aitkin County will review other existing plans in HSEM Region 2. <i>Funding to deliver task via staff time of EM and others participating.</i>
28	Violent Storms	Work to provide increased first responder training for those that work in remote areas and serve the public in the County.		Emergency Services	New		County EM in cooperation with local governments such as townships and the MN DNR	TAEP will work with area first responders on training the public relative to disasters. <i>Funding for implementation not currently identified.</i>

Action Number (from the master MMMP mitigation chart)	Hazard	City of Tamarack Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
29	Violent Storms	Investigate "Storm Ready" designation by the National Weather Service and submit an application if deemed appropriate.	2	Prevention	New	Mid-term	County EM and local city emergency management	<p>TAEP will work with Aitkin County EM to investigate becoming a Storm Ready Community and accomplishing any requirements necessary to be granted designation.</p> <p><i>Funding to deliver task via staff time of EM and others participating.</i></p>
32	Extreme Temperatures	Promote and educate Aitkin County residents, agencies, and communities about the use of NOAA weather radios for relaying weather-related emergency information.	1	Public Education	New	Ongoing	Emergency managers, Sheriff's Department and local Police Departments	<p>TAEP will seek to increase the amount of NOAA weather radios within our community (to residents, government buildings, and facilities that serve vulnerable populations, i.e., assisted living)</p> <p><i>Funding to deliver task via staff time of EM and others participating.</i></p>
33	Extreme Temperatures	Maintain an updated database of facilities in the county that have shelter agreements with the American Red Cross and the capabilities of each shelter to provide mass care in the event of extreme temperatures.	1	Emergency Services	New / In Progress	Short-term	County EM and local city emergency management, Aitkin County Public Health and Red Cross	<p>The Red Cross provided the Aitkin County EM with a shelter database for Aitkin County in 2012. TAEP will work with Aitkin County EM to keep the database updated as related to our community.</p> <p><i>Funding to deliver task via staff time of EM and others participating.</i></p>

Action Number (from the master MEMP mitigation chart)	Hazard	City of Tamarack Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
34	Extreme Temperatures	Ensure there are personnel trained in shelter management within the County and each of its jurisdictions, engaging those who would play a role in emergency response leadership in the event of needing to activate a shelter for mass care.	1	Emergency Services	New / In Progress	Short-term	County EM and local city emergency management, Aitkin County Public Health, Red Cross	An HSEM grant for Mass Care to Region 2 is providing training to emergency managers during 2014 and 2015. TAEP will work with Aitkin County to participate in shelter training as it is available. <i>Funding to deliver task via staff time of EM and others participating.</i>
38	Wildfire	Pursue additional funding sources, if available, to supplement programs such as Firewise.	1	Prevention	New	Ongoing	County EM and local city emergency management, Fire Departments	TAEP will discuss with MN DNR Firewise Coordinator, Aitkin County EM and fire departments to review FEMA HMA funding available for wildfire mitigation projects. <i>Funding to deliver task via staff time of EM and others participating.</i>
41	Wildfire	Planning staff on the city and county level, along with area fire chiefs, should coordinate to ensure new development will have adequate access and egress for emergency response vehicles.	1	Prevention / Emergency Services	Ongoing	Ongoing	All jurisdictional Fire Departments, City Planning & Zoning, County Board and Aitkin County Planning Commission	TAEP will work with Aitkin County Environmental Services / Planning and Zoning and local fire departments to address access and egress requirements should any new development be slated for our community. <i>Funding to deliver task via staff time of EM and others participating.</i>

Action Number (from the master MHMP mitigation chart)	Hazard	City of Tamarack Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
43	Wildfire	Explore development of a Community Wildfire Protection Plan for Aitkin County with guidance from the MN DNR Firewise Community Specialist for Northeast Minnesota. Create plan as advised by MN DNR.	3	Natural Resources	New	Mid-term	County EM, MN DNR	<p>TAEP will participate in the development of a CWPP for Aitkin County should one be developed. TAEP will discuss with Aitkin County EM, MN DNR Firewise Coordinator and local fire departments.</p> <p><i>Funding for a CWPP may be eligible through the Firewise program.</i></p>
44	Wildfire	Identify projects to mitigate at-risk structures and associated loss of life from the threat of wildfire through activities such as the creation of defensible space for wildfire, application of ignition-resistant construction, hazardous fuels reduction, and installation of external wildfire sprinkler systems and apply for appropriate funding for implementation.	1	Public Education / Natural Resources	New	Mid-term	County EM and local city emergency management, Aitkin County Soil and Water Conservation District, local fire departments	<p>TAEP will discuss with Aitkin County EM, MN DNR Firewise Coordinator and local fire departments.</p> <p><i>The mitigation actions noted may be eligible for Firewise or FEMA HMA funding.</i></p>
45	Wildfire	In the event of a blow-down of trees from a severe storm, work with respective partners in natural resources to manage removal of trees to reduce wildland fire fuel.	2	Natural Resources	New	Ongoing	County EM and local city emergency management, MN DNR	<p>In the event of a blow down, TAEP will discuss with Aitkin County EM, MN DNR Firewise Coordinator and local fire departments.</p> <p><i>Fuel reduction projects (removal of flammable vegetation) may be eligible for Firewise or FEMA HMA funding.</i></p>

Action Number (from the master MHMP mitigation chart)	Hazard	City of Tamarack Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
49	Flash Flood and Riverine Flood	Within the County and its jurisdictions, identify public infrastructure in areas that are prone to flooding (such as culverts, road and bridges, and government buildings) and pursue funding for making specific mitigation improvements to those identified pieces of infrastructure.	1	Prevention	New	Ongoing	Aitkin County Public Works and Highway Department, All local jurisdiction public works and transportation departments	<p>TAEP will work with the Tamarack City Council to review any infrastructure that is threatened by flood risk on an annual basis.</p> <p><i>Mitigation projects may be eligible for FEMA HMA funding for "Infrastructure Retrofit" (measures to reduce risk to existing utility systems, roads, and bridges).</i></p>
56	Flash Flood and Riverine Flood	Identify minor localized flood reduction projects identified to lessen the frequency or severity of flooding and decrease predicted flood damages, such as the installation or modification of culverts, stormwater management activities, such as creating retention and detention basins, protection of sanitary sewer lift stations in flood-prone areas.	1	Prevention / Structural Improvement	New	Ongoing	Aitkin County Public Works and Highway Department, All local jurisdiction public works and transportation departments	<p>TAEP and the Tamarack City Council will communicate with Aitkin County EM and Transportation Department to address any necessary review and planning.</p> <p><i>Minor Localized Flood Reduction Projects may be eligible for FEMA HMA funding. They may not duplicate the flood prevention activities of other federal agencies and may not constitute a section of a larger flood control system.</i></p>

Action Number (from the master MHMP mitigation chart)	Hazard	City of Tamarack Mitigation Action	Priority	Mitigation Type	Status	Time frame	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
62	Drought	Educate the public on water conservation measures in times of approaching drought conditions and develop plans to limit water use for nonessential purposes, such as lawn watering, car washing, etc., during drought periods as necessary.	2	Public Education / Prevention	New	Ongoing	Aitkin County Soil and Water Conservation District, Aitkin County Public Health	<p>TAEP will work with its City Council to keep its residents informed on water use during times of drought and the heightened danger for fires as a result of drought conditions.</p> <p><i>Funding to deliver task via staff time of EM and others participating.</i></p>

Table G - 7. Mitigation Actions Identified for Jurisdictional Implementation in Aitkin County School Districts

Action Number (from the master MHP mitigation chart)	Hazard	Aitkin County School Districts Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions (School Districts)	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
4	Violent Storms	Promote the National Weather Service's "Severe Weather Awareness Week" held in April of each year. The event seeks to educate residents on the dangers of severe summer storm events and highlights the importance of preparing for severe weather before it strikes.	2	Public Education	Ongoing	Ongoing	Aitkin Public Schools ISD #1 Hill City School District ISD #2 McGregor Area School District ISD #4	School District Superintendents and school staffs, National Weather Service, and Aitkin County EM	School Superintendents and staff will work with the Aitkin County Emergency Manager and National Weather Service on an annual basis to integrate this action into the school's education program during the designated week in April. <i>Funding to deliver task via school staff time and others participating.</i>
5	Violent Storms	Promote the National Weather Service's "Winter Hazard Awareness Week" held in November of each year. The event seeks to educate residents on the dangers of winter weather and how to properly deal with it.	2	Public Education	Ongoing	Ongoing	Aitkin Public Schools ISD #1 Hill City School District ISD #2 McGregor Area School District ISD #4	School District Superintendents and school staffs, National Weather Service, and Aitkin County EM	Same as above.

Action Number (from the master MHMP mitigation chart)	Hazard	Aitkin County School Districts Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions (School Districts)	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
6	Violent Storms	Review current information and delivery systems in place for public awareness and education of preparedness for severe winter and summer storms and improve upon them as needed.	1	Public Education	Ongoing	Ongoing	Aitkin Public Schools ISD #1 Hill City School District ISD #2 McGregor Area School District ISD #4	School District Superintendents and school staffs	School Superintendents and staff will work together across school districts to review and improve the information and means of delivery to educate students on severe weather preparedness. We will continue annual exercise drills for tornadoes. <i>Funding to deliver task via staff time.</i>
7	Violent Storms	Participate in annual "Skywarn Training" from the National Weather Service to train new storm spotters in Aitkin County and ensure existing storm spotters maintain their storm-spotting skill.	1	Emergency Services	Ongoing	Ongoing	Aitkin Public Schools ISD #1 Hill City School District ISD #2 McGregor Area School District ISD #4	School Superintendent and school staff, National Weather Service	Schools will coordinate with the National Weather Service for this training. <i>Funding to deliver task via staff time.</i>

Action Number (from the master MMMP mitigation chart)	Hazard	Aitkin County School Districts Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions (School Districts)	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
17	Violent Storms	Research possible storm shelter and safe room locations within the County and each of its government jurisdictions including schools, mobile home parks, campgrounds or other areas where there are populations (residents or visitors) vulnerable to high winds and tornado events.	1	Prevention	New	Long-term	Aitkin Public Schools ISD #1 Hill City School District ISD #2 McGregor Area School District ISD #4	School District Superintendents and school staffs, County and City emergency managers.	School Superintendents will work with the Aitkin County Emergency Manager and our respective city jurisdictions to evaluate our schools for safe room construction or retrofit. <i>Safe Room construction or retrofit projects may be eligible under FEMA HMA funding (see Action Item #16).</i>

Action Number (from the master MAMP mitigation chart)	Hazard	Aitkin County School Districts Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions (School Districts)	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
18	Violent Storms	<p>Retrofit or construct new storm shelter and safe room facilities in the identified vulnerable locations with specific information on location and building type to construct or retrofit.</p> <p>The term "safe room" applies to extreme wind (tornado), residential, non-residential and community safe rooms and tornado community safe rooms.</p> <p>(Locations may include schools, mobile home parks, campgrounds or other areas where there are populations -residents or visitors- vulnerable to high winds and tornado events).</p>	1	Structural Improvement	New	Long-term	<p>Aitkin Public Schools ISD #1</p> <p>Hill City School District ISD #2</p> <p>McGregor Area School District ISD #4</p>	<p>School District Superintendents and school staffs, County and City emergency managers.</p>	<p>School Superintendents will work with the Aitkin County Emergency Manager and our respective City jurisdictions if advancing plans for construction or retrofit of a safe room.</p> <p><i>Safe Room construction or retrofit projects of both single and dual-use facilities may be eligible under FEMA HMA funding.</i></p>

Action Number (from the master MHMP mitigation chart)	Hazard	Aitkin County School Districts Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions (School Districts)	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
19	Violent Storms	Identify critical facilities within the County and each of its jurisdictions that do not have a generator to supply backup power in the event of a severe storm taking out primary power for its facilities and essential functions. Critical facilities may include: police and fire stations, hospitals, water and sewer treatment facilities, and other facilities that the county deems critical.	1	Emergency Services	New	Mid-term	Aitkin Public Schools ISD #1 Hill City School District ISD #2 McGregor Area School District ISD #4	School District Superintendents and school staffs, County and City emergency managers.	School Superintendents will work with school staff and the Aitkin County Emergency Manager to evaluate the need of backup power in our school facilities. <i>Generators and/or related equipment purchases may be eligible for FEMA HMA funding.</i>

Action Number (from the master MHMP mitigation chart)	Hazard	Aitkin County School Districts Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions (School Districts)	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
20	Violent Storms	Purchase generators or related equipment (e.g., generator hook-ups) that will support the operation of essential functions in identified County- and jurisdiction- owned critical facilities in the event of severe storms. Critical facilities may include: police and fire stations, hospitals, water and sewer treatment facilities, and other facilities that the county deems critical (see Appendix B, Aitkin County Critical Facilities).	1	Emergency Services	New	Mid-term	Aitkin Public Schools ISD #1 Hill City School District ISD #2 McGregor Area School District ISD #4	School District Superintendents and school staffs, County and City emergency managers.	School Superintendents will work with the Aitkin County Emergency Manager and our respective City jurisdictions if advancing plans for obtaining back-up generators for a school. <i>Generators and/or related equipment purchases may be eligible for FEMA HMA funding.</i>

Action Number (from the master MHMP mitigation chart)	Hazard	Aitkin County School Districts Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions (School Districts)	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
30	Extreme Temperatures	Expand information on risks of heat-related illnesses. Key audiences are the elderly and the younger population engaging in physically strenuous activities.	1	Public Education	Ongoing	Ongoing	Aitkin Public Schools ISD #1 Hill City School District ISD #2 McGregor Area School District ISD #4	School District Superintendents and school staffs	School Superintendents and staff will work together across school districts to review and improve upon how students are educated on the risks of exercise and extreme heat through our Physical Education classes, sports programs and general education. <i>Funding to deliver task via staff time.</i>
31	Extreme Temperatures	Continue the winter storm awareness program. Key audiences are the elderly and the younger populations who may be more susceptible to the effects of freezing temperatures when outside.	1	Public Education	Ongoing	Ongoing	Aitkin Public Schools ISD #1 Hill City School District ISD #2 McGregor Area School District ISD #4	School District Superintendents and school staffs	School Superintendents and staff will work together across school districts to review and improve upon how students are educated on extreme weather awareness in all grades. <i>Funding to deliver task via staff time.</i>

Action Number (from the master MAMP mitigation chart)	Hazard	Aitkin County School Districts Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions (School Districts)	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
49	Flash Flood and Riverine Flood	Within the County and its jurisdictions, identify public infrastructure in areas that are prone to flooding (such as culverts, road and bridges, and government buildings) and pursue funding for making specific mitigation improvements to those identified pieces of infrastructure.	1	Prevention	Ongoing	Ongoing	Aitkin Public Schools ISD #1 Hill City School District ISD #2 McGregor Area School District ISD #4	School District Superintendents and school staffs, County and City emergency managers, City staff.	School Superintendents will work with the Aitkin County Emergency Manager and our respective city jurisdictions to identify and evaluate any specific flood mitigation needs for infrastructure as related to our school. <i>Mitigation projects may be eligible for FEMA HMA funding for "Infrastructure Retrofit" (measures to reduce risk to existing utility systems, roads, and bridges).</i>

Action Number (from the master MHP mitigation chart)	Hazard	Aitkin County School Districts Mitigation Action	Priority	Mitigation Type	Status	Time frame	Jurisdictions (School Districts)	Responsibility	Comments on Planning Mechanisms and Funding for Implementation
56	Flash Flood and Riverine Flood	Identify minor localized flood reduction projects identified to lessen the frequency or severity of flooding and decrease predicted flood damages, such as the installation or modification of culverts, stormwater management activities, such as creating retention and detention basins, protection of sanitary sewer lift stations in flood-prone areas.	1	Prevention / Structural Improvement	New	Ongoing	Aitkin Public Schools ISD #1 Hill City School District ISD #2 McGregor Area School District ISD #4	School District Superintendents and school staffs, County and City emergency managers, City staff.	School Superintendents will work with the Aitkin County Emergency Manager and our respective city jurisdictions to identify and evaluate localized flood reduction projects as related to our school. <i>Minor Localized Flood Reduction Projects may be eligible for FEMA HMA funding. They may not duplicate the flood prevention activities of other federal agencies and may not constitute a section of a larger flood control system.</i>

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Appendix I
Documentation of Aitkin County 2005
Mitigation Actions for 2014 MHMP Update

Violent Storms

2005 Language	2005 timeframe	2014 Revised Language	2014 Status (of 2005 action)
Identify responsible entities and promote the provision of safety information at campgrounds in Aitkin County. Information should provide the location of the nearest safe building or location. In addition, it should be stressed that under certain circumstances it is best to stay put, as travel during a severe storm may create greater risk.	Short-term	Work with campground operators to post information regarding storm shelters and safety during strong summer storms.	Ongoing
Educate Aitkin County citizens and visitors on ways to stay safe if adequate shelter is not available during a storm.	Ongoing	Promote the National Weather Service's "Severe Weather Awareness Week" held in April of each year. The event seeks to educate residents on the dangers of severe summer storm events and highlights the importance of preparing for severe weather before it strikes.	Ongoing
Work with and encourage mobile home operators in developing storm related shelter plans.	Short-term	Work with mobile home park owners to ensure they are meeting the standards set by the Minnesota Department of Health for approved storm shelters or evacuation plans for times of high winds or tornadoes.	Ongoing
Work with the appropriate jurisdictions to place safety information at boat landings throughout Aitkin County regarding what to do in case of severe weather.	Short-term	Work with the appropriate jurisdictions or agencies to place safety information at boat landings throughout Aitkin County regarding what to do in case of severe weather.	Ongoing
Continue the winter storm awareness program. Since recent winter weather has been relatively mild, residents may not be as prepared to deal with extreme temperatures and snowfall.	Ongoing	Promote the National Weather Service's "Winter Hazard Awareness Week" held in November of each year. The event seeks to educate residents on the dangers of winter weather and how to properly deal with it.	Ongoing
Make certain storm spotters in Aitkin County receive training on a regular basis through the National Weather Service (NWS) in order to maintain their storm spotting skill level.	Ongoing	Participate in annual "Skywarn Training" from the National Weather Service to train new storm spotters in Aitkin County and ensure existing storm spotters maintain their storm-spotting skill.	Ongoing
Ensure emergency management personnel, the County Sheriff's Office, and other emergency response teams are notified as soon as possible in the event of an approaching severe storm.	Ongoing	Continue to ensure that procedures are in place so that emergency management personnel, county sheriffs, and other emergency response teams are notified as soon as possible in the event of an approaching storm.	Ongoing
Provide information to Aitkin County visitors and residents regarding how they can obtain information on severe weather and how to respond to dangerous weather conditions.	Short-term	Provide information to Aitkin County visitors and residents regarding how they can obtain information on severe weather and how to respond to dangerous weather	Ongoing

2005 Language	2005 timeframe	2014 Revised Language	2014 Status (of 2005 action)
Increase strategically located signage along roadways informing people about emergency information radio frequency.		conditions. Increase strategically located signage along roadways informing people about emergency information radio frequencies.	
Promote and educate Aitkin County residents and agencies about the use of NOAA weather radios for relaying weather related emergency information	Ongoing	Promote and educate Aitkin County residents, agencies, and communities about the use of NOAA weather radios for relaying weather-related emergency information.	Ongoing
Inventory the functionality of warning systems for the incorporated areas in Aitkin County and support local jurisdictions with the maintenance of outdoor warning systems.	Mid-term	Assure the functionality of warning systems for the areas with warning sirens in place. Warning sirens should be able to be remotely activated by the Aitkin County Sheriff's Office.	Ongoing / New
Inform Aitkin County public on snow removal policies in place so there is an understanding of the timeframe it may take to remove snow from certain routes.	Mid-term	Raise public awareness on driving conditions and snow removal policies for certain routes during times of dangerous snow or ice conditions.	Ongoing
Locate power lines underground where it is feasible and cost effective. This could be done as part of new construction or as part of reconstruction projects.	Ongoing	Work with local utility companies that serve Aitkin County to locate power lines underground or strengthen where it is feasible and cost effective to reduce the risk of power outages from downed lines during a severe storm. This could be done as part of new construction or as retrofit in areas deemed as high-priority.	Ongoing
Maintain an aggressive brushing program in order to reduce the risk of downed trees interrupting the power supply.	Ongoing	Maintain an aggressive right-of-way clearing program in order to reduce risks of downed trees interrupting the power supply. Development of a hazard-tree program may be appropriate in areas identified as a concern.	Ongoing
Maintain an aggressive brushing program in order to reduce the amount of debris that could block a road after a severe windstorm or winter storm.	Ongoing	Maintain an aggressive brushing program in order to reduce the amount debris that could block a road after a severe windstorm or winter storm.	Ongoing
<u>New Mitigation Actions to be Added to the above actions for the 2014 Plan:</u>			
Review current information and delivery systems in place for public awareness and education of preparedness for severe winter and summer storms and improve upon them as needed.			
Ensure that communication procedures are in place to effectively provide warning to residents and visitors in advance of approaching severe weather.			

2005 Language	2005 timeframe	2014 Revised Language	2014 Status (of 2005 action)
<p>Maintain an updated database of facilities in the county that have shelter agreements with the American Red Cross and the capabilities of each shelter to provide mass care in the event of violent storms.</p> <p>Ensure there are personnel trained in shelter management within the County and each of its jurisdictions, engaging those who would play a role in emergency response leadership in the event of needing to activate a shelter for mass care.</p> <p>Research possible storm shelter and safe room locations within the County and each of its government jurisdictions including schools, mobile home parks, campgrounds or other areas where there are populations (residents or visitors) vulnerable to high winds and tornado events.</p> <p>Retrofit or construct new storm shelter and safe room facilities in the identified vulnerable locations with specific information on location and building type to construct or retrofit. The term "safe room" applies to extreme wind (tornado), residential, non-residential and community safe rooms and tornado community safe rooms. (Locations may include schools, mobile home parks, campgrounds or other areas where there are populations -residents or visitors- vulnerable to high winds and tornado events). Savana Portage State Park was concerned about this.</p> <p>Work with local jurisdictions, MN DNR and other key stakeholders to develop an Evacuation Plan for Aitkin County in the event of severe weather. The plan should make sure to address the evacuation of vulnerable populations, such as those in nursing homes or remote locations (such as Savanna Portage State Park or rural residential areas). (New as a result of Mtg #2)</p> <p>Identify critical facilities within the County and each of its jurisdictions that do not have a generator to supply backup power in the event of a severe storm taking out primary power for its facilities and essential functions. Critical facilities may include: police and fire stations, hospitals, water and sewer treatment facilities, and other facilities that the county deems critical.</p> <p>Purchase generators or related equipment (e.g., generator hook-ups) that will support the operation of essential functions in identified County- and jurisdiction-owned critical facilities in the event of severe storms. Critical facilities may include: police and fire stations, hospitals, water and sewer treatment facilities, and other facilities that the county deems critical (see Appendix B, Aitkin County Critical Facilities). Savana Portage State Park expressed concern that they do not have any back up power for wells and lift stations.</p> <p>Work with respective road authorities to plant "living snow fences" or tree lines along identified problem areas of identified roads that can reduce snow drifts on the roads.</p> <p>Identify jurisdictions or other areas that do not have warning siren systems in place and have an expressed need for acquiring one to alert people in high risk, vulnerable areas (such as: campgrounds, parks and rural residents out of reach of other existing warning siren systems) to approaching severe weather. (Note – McGregor only has a manual warning siren; Palisade does not have one. Savana Portage State Park expressed concern that they do not have a warning siren.</p>			

2005 Language	2005 timeframe	2014 Revised Language	2014 Status (of 2005 action)
<p>Install new warning systems in identified vulnerable locations (jurisdictions that do not have warning siren systems in place and have an expressed need for acquiring one to alert people in high risk, vulnerable areas such as campgrounds, parks and rural residents out of reach of other existing warning siren systems) to approaching severe weather. (3/20/14 Meeting Note – McGregor, McGrath and Palsade do not have one).</p> <p>Work to install shatter-resistant glass and other identified retrofitting measures to protect against the impact of severe summer storms at Riverwood Healthcare Center. 3/20/14 Meeting Note – under the category of Property Protection, Tony Sundholm</p> <p>Work to provide increased first responder training for those that work in remote areas and serve the public in the County. (Savana Portage State Park was concerned about this).</p> <p>Investigate “Storm Ready” designation by the National Weather Service and submit an application if deemed appropriate.</p>			

Extreme Temperatures

2005 Language	2005 timeframe	2014 Revised Language	2014 Status (of 2005 action)
Expand information on the risks of heat related illnesses. Key audiences are the elderly and the younger populations engaging in physically strenuous activities.	Ongoing	No changes to wording.	Ongoing
Continue the winter storm awareness program. Since recent winter weather has been relatively mild, residents may not be as prepared to deal with extreme temperatures and snowfall.	Ongoing	Promote the National Weather Service’s “Winter Hazard Awareness Week” held in November of each year. The event seeks to educate residents on the dangers of winter weather and how to properly deal with it.	Ongoing
<p><u>New Mitigation Actions to be Added to the above actions for the 2014 Plan:</u></p> <p>Expand the in-school extreme weather awareness program to include students in all grades.</p> <p>Promote and educate Aitkin County residents, agencies, and communities about the use of NOAA weather radios for relaying weather-related emergency information.</p>			

Maintain an updated database of facilities in the county that have shelter agreements with the American Red Cross and the capabilities of each shelter to provide mass care in the event of extreme temperatures.

Ensure there are personnel trained in shelter management within the County and each of its jurisdictions, engaging those who would play a role in emergency response leadership in the event of needing to activate a shelter for mass care.

Wildfire

2005 Language	2005 timeframe	2014 Revised Language	2014 Status (of 2005 action)
Continue and where necessary expand efforts to educate area residents through the FireWise Program on how they can reduce the risk of wildfire doing damage to their property through vegetation management and use of fire resistant building materials.	Ongoing	Educate area residents through the Firewise program on what they can do to reduce the risk of wildfires doing damage to their property through vegetation management and the use of fire resistant building materials.	Ongoing
Promote the use of financial assistance for fuel reduction efforts through the FireWise program by area property owners.	Ongoing	<i>No changes to wording.</i>	Ongoing
Promote through new building codes that building materials are used that can reduce the chance of property damage related to structural fires.	Ongoing	Promote, through new building codes, the use of building materials that can reduce the chance of property damage related to structural fires.	Ongoing
Maintain an ongoing effort to educate people how to respond in case of a large wildfire event so both residents and area visitors will know how to respond to warnings and area aware of evacuation routes.	Mid-term	Maintain an ongoing effort to educate people how to respond in case of a large wildfire event so both residents and area visitors will know how to respond to warnings and are aware of evacuation routes.	Ongoing
Work with fire departments to inventory areas where firefighting capacity is limited through the availability of water and consider strategic installation of dry fire hydrants or water holding tanks. Northeast Aitkin County does not have a dry hydrant in place.	Mid-term	Work with fire departments to inventory areas where firefighting capacity is limited through availability of water and consider strategic installation of dry fire hydrants or water holding tanks.	Ongoing
Planning staff on the city and county levels, along with area fire chiefs, should coordinate to ensure new development will have adequate access and egress for emergency response vehicles.	Ongoing	<i>No changes to wording.</i>	Ongoing

Continue inter-agency and multi-jurisdictional efforts to identify, contain, and extinguish wildfires.	Ongoing	No changes to wording.	Ongoing
<u>New Mitigation Actions to be Added to the above actions for the 2014 Plan:</u>			
Pursue additional funding sources, if available, to supplement programs such as Firewise.			
Explore development of a Community Wildfire Protection Plan for Aitkin County with guidance from the MN DNR Firewise Community Specialist for Northeast Minnesota. Create plan as advised by MN DNR.			
Identify projects to mitigate at-risk structures and associated loss of life from the threat of wildfire through activities such as the creation of defensible space for wildfire, application of ignition-resistant construction, hazardous fuels reduction, and installation of external wildfire sprinkler systems and apply for appropriate funding for implementation.			
In the event of a blow-down of trees from a severe storm, work with respective partners in natural resources to manage removal of trees to reduce wildland fire fuel.			

Flash Flood and Riverine Flood

2005 Language	2005 timeframe	2014 Revised Language	2014 Status (of 2005 action)
Maintain bridge, road, and culvert infrastructure at a level that is capable of sustaining a major storm event and will not be vulnerable to washouts.	Ongoing	No changes to wording.	Ongoing
Encourage that development occurs away from areas that may be difficult to serve with reliable road access. For example, development that will require access through an area that would be prone to washouts or flooding, such as wetland areas.	Ongoing	Steer development away from areas that may be difficult to serve with reliable road access.	Ongoing
Address ice dams that may impact the road system in a timely manner in order to prevent damage to infrastructure, in particular during the spring thaw.	Ongoing	No changes to wording.	Ongoing
Maintain, and where necessary add, storm water retention ponds to protect wastewater treatment facilities throughout Aitkin County.	Long-term	No changes to wording.	Ongoing

Continue to enforce city and county ordinances governing development and setbacks in shoreland areas.	Ongoing	No changes to wording.	Ongoing
Work to update the floodplain maps for Aitkin County. Current floodplain maps are over 20 years old.	Short-term	Develop high-resolution digital elevation modeling.	Ongoing
Work to increase communication between the Aitkin County Planning and Zoning department and the United States Army Corps of Engineers regarding flooding and flowage easements	Short-term	No changes to wording.	Ongoing
Review storm water management guidelines currently in place to ensure that they are adequate to limit post development run-off and will not result in storm water run-off created flood damages.	Mid-term	No changes to wording.	Ongoing

New Mitigation Actions to be Added to the above actions for the 2014 Plan:

Within the County and its jurisdictions, identify public infrastructure in areas that are prone to flooding (such as culverts, road and bridges, and government buildings) and pursue funding for making specific mitigation improvements to those identified pieces of infrastructure.

Communities without floodplain or shore land ordinances should develop such ordinances. The State Floodplain Management Act requires flood prone communities to adopt floodplain management regulations when adequate technical information is available to identify floodplain areas and enroll and maintain eligibility in the National Flood Insurance Program (NFIP).

Identify minor localized flood reduction projects identified to lessen the frequency or severity of flooding and decrease predicted flood damages, such as the installation or modification of culverts, stormwater management activities, such as creating retention and detention basins, protection of sanitary sewer lift stations in flood-prone areas. **Savana Portage State Park concerned that bridges, roads and culverts are subject to washout and flooding in the park.**

Install flow-rate meters (stream gauges) on rivers and streams that are prone to flooding high-risk, vulnerable properties.

Acquire flood prone properties in the special flood hazard area and physically relocate existing structure(s) to outside of the special flood hazard area.

Acquire at-risk structure and the underlying land in special flood hazard area and demolish flood prone structure for the conversion of the land to open space.

Reduce potential infrastructure flood damages on utilities such as wastewater treatment, pipelines, and power facilities by dry proofing or wet proofing facilities that are flood prone.

Dam Failure

2005 Language	2014 Revised Language
<i>Dam Failure not included in the 2005 plan.</i>	N/A
NOTES FROM 4/20 MEETING REFLECT THE STEERING COMMITTEE SAID TO LEAVE THIS OUT, FELT IT IS COVERED BY DAM OPERATOR EOPs.	

Drought

2005 Language	2014 Revised Language
<i>Drought not included in the 2005 plan.</i>	N/A
<p><u>New Mitigation Actions to be Added to the above actions for the 2014 Plan:</u></p> <p>Continue to implement the monitoring of water table levels.</p> <p>Educate the public on water conservation measures in times of approaching drought conditions and develop plans to limit water use for nonessential purposes, such as lawn watering, car washing, etc., during drought periods as necessary.</p> <p>Strategically place livestock watering ponds on farms in the county to help offset the impact of drought on local farmers.</p>	

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