

McLeod County

Hazard Mitigation Plan

~ 2015-2020 ~

Prepared by
McLeod County
Emergency Management, the
McLeod County Hazard
Mitigation Plan Task Force
& the Mid-Minnesota
Development Commission

Public Hearing:
April 7, 2015
10:45 a.m. County Board



*Flood Mitigation Dam
in Hutchinson, Minnesota*

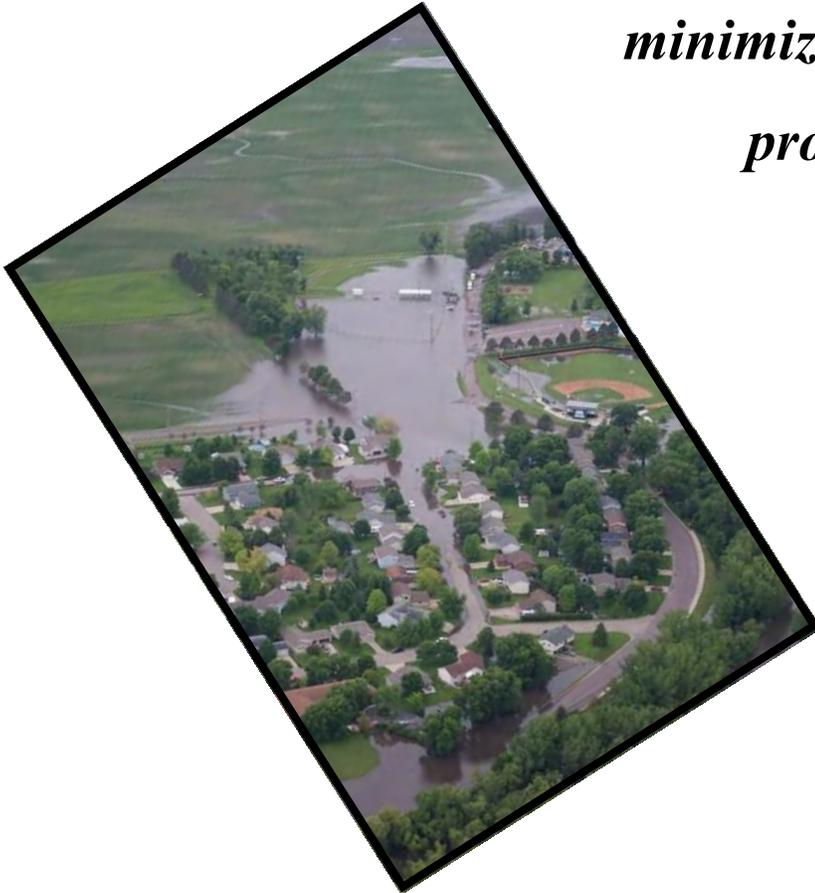


*June 2014 Flooding
In Glencoe, Minnesota*

The McLeod County Hazard Mitigation

Plan Mission Statement:

*“To recognize what McLeod County
can do before disasters strike to
minimize the loss of life &
property damage.”*



*June 2014 Flooding
In Glencoe, Minnesota*

**Flooding Photos provided
by the Minnesota
Civilian Air Patrol**

*“Mother Nature may be forgiving this year,
or next year, but eventually she's going
to come around and whack you.
You've got to be prepared.”*

Source: Geraldo Rivera

McLeod County Hazard Mitigation Plan
~ Table of Contents ~

Executive Summary1

 Section A: Introduction to the McLeod County Hazard Mitigation Plan1

 Section B: Planning Process.....3

 Section C: Plan Integration with Existing Documents4

 Section D: County Profile Highlights4

 Section E: Countywide Hazards Profile and Risk Assessment.....5

 Section F: Mitigation Strategy5

 Section G: Implementation & Administration6

Chapter One: Introduction 1-1

 Section A: Background and Purpose of the Plan 1-2

 Section B: The Disaster Mitigation Act 1-3

 Section C: Local Mitigation Planning Handbook and Plan Review Guide 1-7

 Local Mitigation Planning Handbook..... 1-7

 Local Mitigation Plan Review Guide 1-9

 Section D: Minnesota All Hazard Mitigation Plan (2014)..... 1-10

 Section E: ‘Task 1’ Determine the Planning Area 1-11

 Section F: ‘Task 2’ Build a Planning Team 1-12

 Section G: ‘Task 3’ Create and Outreach Strategy 1-14

 Section H: Plan Duration and Additional Information..... 1-16

Chapter Two: McLeod County Profile.....	2-1
Section A: Introduction to McLeod County	2-1
Historical Setting	2-2
Section B: Demographics	2-4
Historic Population	2-4
McLeod County’s Comparable Growth.....	2-5
Population by Age Groups.....	2-6
Households.....	2-6
Population and Household Projections	2-7
Section C: Physical Characteristics	2-8
Climate.....	2-8
Watersheds.....	2-10
Public Drainage Ditches	2-11
Water Control Structures	2-11
Floodplains.....	2-12
Aquifers.....	2-13
Topography	2-13
Presettlement Vegetation	2-14
Land Use	2-14
Public Land Ownership.....	2-16
Section D: Critical Facilities and Infrastructure	2-17
Transportation	2-17
Schools.....	2-20

Medical Facilities.....	2-20
Landfills and Demolition Landfills.....	2-21
Household Hazardous Waste Facility.....	2-21
Historic Sites.....	2-22
Section E: Existing Plans, Ordinances, and Official Documents.....	2-23
Chapter Three: Hazards Profile.....	3-1
Section A: Flooding.....	3-4
Section B: Tornadoes.....	3-22
Section C: Thunderstorms (Severe Wind, Hail, Lightning).....	3-28
Section D: Fire.....	3-44
Section E: Drought.....	3-52
Section F: Winter Storms.....	3-58
Section G: Extreme Temperatures.....	3-68
Section H: Severe Erosion & Land Subsidence.....	3-75
Section I: Dam or Levee Failure.....	3-78
Section J: Earthquakes.....	3-82
Section K: Infectious Disease.....	3-83
Section L: Groundwater Contamination.....	3-93
Section M: Hazardous Materials Incidents.....	3-96
Chapter Four: Community Profiles & Risk Assessment.....	4-1
Risk Assessment Methodology.....	4-2
Flooding (Riverine and Stormwater).....	4-2

Tornadoes.....	4-2
Winter Storms	4-3
Thunderstorms (Severe Wind, Lightning, and Hail)	4-3
Fire (Structural and Wildfires).....	4-3
Drought	4-4
Extreme Temperatures (Extreme Heat and Cold).....	4-4
Severe Erosion & Landslides.....	4-4
Earthquakes.....	4-4
Dam or Levee Failure	4-5
Infectious Disease	4-5
Water Contamination	4-5
Hazardous Materials	4-5
City of Biscay Community Profile & Hazard Risk Assessment	4-6
City of Brownton Community Profile & Hazard Risk Assessment	4-10
City of Glencoe Community Profile & Hazard Risk Assessment.....	4-14
City of Hutchinson Community Profile & Hazard Risk Assessment.....	4-20
City of Lester Prairie Community Profile & Hazard Risk Assessment	4-25
City of Plato Community Profile & Hazard Risk Assessment.....	4-29
City of Silver Lake Community Profile & Hazard Risk Assessment.....	4-33
City of Stewart Community Profile & Hazard Risk Assessment.....	4-37
City of Winsted Community Profile & Hazard Risk Assessment.....	4-41

Chapter Five: Mitigation Strategy ~ Goals, Objectives & Action Steps 5-1

Section A: Definition of Goals, Objectives & Action Steps 5-1

Section B: Action Step Information 5-1

 Stakeholders 5-2

 Participating Jurisdictions 5-3

 Overall Priority 5-3

 Estimated 5-year Costs 5-4

 Cost Benefit Score 5-4

Section C: Goals, Objectives & Action Steps (2015-2020) 5-5

Goal 1: Enhance McLeod County’s local capacity to be more resilient to the effects of all hazards 5-5

Goal 2: Implement fiscally sound projects which mitigate The impacts of natural disasters 5-10

Goal 3: Effectively implement and administer the McLeod County Hazard Mitigation Plan 5-16

 Summary of Estimated 5-Year Costs 5-17

Section D: Assessment of the 2008 Action Steps 5-18

Section E: New Action Step Priorities 5-29

Section F: Old vs. New Goals 5-31

Chapter Six: Plan Implementation & Administration 6-1

Section A: High Priority Mitigation Projects 6-1

Section B: Summary of 5-Year Implementation Costs 6-3

Section C: Implementation Steps by Participating Jurisdictions 6-5

Section D: Needed Revisions to Existing Plans, Ordinances, and Official Documents 6-14

Section E: Plan Evaluation, Monitoring, and Citizen Participation	6-15
Section G: General Plan Administration	6-15
Plan Coordination	6-15
Implementation Procedure	6-16
Plan Duration	6-16
Role of the County in Implementation.....	6-16
Other Agencies Roles in Implementation	6-16
Recommendations for State Programs	6-17
Intergovernmental Conflicts/Resolution Process.....	6-17
Plan Evaluation	6-17
Major Plan Amendment Procedure.....	6-17
Minor Plan Amendment Procedure.....	6-19
General Information.....	6-19

List of Tables

Table 1A: Tasks for Developing Local Hazard Mitigation Plans.....	1-6
Table 1B: McLeod County Hazard Mitigation Plan Participating Jurisdictions Checklist	1-10
Table 1C: McLeod County Hazard Mitigation Plan Task Force	1-12
Table 2A: Population of McLeod County’s Cities and Townships since 1970.....	2-5
Table 2B: Five County Area Population Change since 1970	2-5
Table 2C: Population by Age Group of McLeod County since 1970.....	2-6
Table 2D: Population, Households, and Average Household Size.....	2-7
Table 2E: Population, Households, and Average Household Size Projections	2-7
Table 2F: Temperature Extremes for NWS near Hutchinson (1899-2001).....	2-9
Table 2G: Precipitation Extremes for NWS Station near Hutchinson (1893-2001).....	2-10
Table 2H: Dams in McLeod County.....	2-12
Table 2I: Land Use Analysis of McLeod County	2-16

Table 2J: Public Lands for McLeod County.....	2-16
Table 2K: Rural Functional Classification System Summary for McLeod County	2-18
Table 2L: FRA Railroad Track Classification	2-19
Table 2M: Schools in McLeod County.....	2-20
Table 2N: Medical Facilities in McLeod County	2-21
Table 3A: McLeod County Hazard Categories Ranked by Probability of Occurring, Potential Damage, Mitigation Potential, and Overall Priority.....	3-2
Table 3B: McLeod County Flooding History.....	3-6
Table 3C: National Flood Insurance Program Participation.....	3-11
Table 3D: Countywide Flooding Risk Assessment	3-14
Table 3E: Fujita Scale, Derived EF Scale, and Operational EF Scale.....	3-16
Table 3F: McLeod County Tornadoes since 1950.....	3-18
Table 3G: Tornado Risk Assessment.....	3-21
Table 3H: Effect of Various Wind Speeds	3-23
Table 3I: McLeod County Severe Wind Events (2004-2013).....	3-24
Table 3J: Severe Wind Risk Assessment.....	3-27
Table 3K: McLeod County Hail Events (2003-2013)	3-29
Table 3L: Hail Risk Assessment.....	3-33
Table 3M: Lightning Casualties and Damages in Minnesota (1959-1994).....	3-35
Table 3N: Lightning Risk Assessment	3-35
Table 3P: Minnesota Structural Fires by Property (2008-2012).....	3-43
Table 4A: City of Biscay Population & Household Projections.....	4-7
Table 4B: City of Biscay Hazard Risk Assessment.....	4-9
Table 4C: City of Brownton Population & Household Projections.....	4-11
Table 4D: City of Brownton Hazard Risk Assessment	4-13
Table 4E: City of Glencoe Population & Household Projections.....	4-15
Table 4F: City of Glencoe Hazard Risk Assessment.....	4-19
Table 4G: City of Hutchinson Population & Household Projections	4-21
Table 4H: City of Hutchinson Hazard Risk Assessment	4-24
Table 4I: City of Lester Prairie Population & Household Projections	4-26
Table 4J: City of Lester Prairie Hazard Risk Assessment	4-28

Table 4K: City of Plato Population & Household Projections	4-30
Table 4L: City of Plato Hazard Risk Assessment.....	4-32
Table 4M: City of Silver Lake Population & Household Projections	4-34
Table 4N: City of Silver Lake Hazard Risk Assessment.....	4-36
Table 4O: City of Stewart Population & Household Projections	4-38
Table 4P: City of Stewart Hazard Risk Assessment.....	4-40
Table 4Q: City of Winsted Population & Household Projections	4-42
Table 4R: City of Winsted Hazard Risk Assessment	4-44

List of Figures

Figure 2A: McLeod County.....	2-1
Figure 2B: Population of McLeod County since 1930.....	2-4
Figure 2C: Average Annual Temperature.....	2-8
Figure 2D: Normal Annual Precipitation.....	2-9
Figure 3A: How Hail Forms	3-28
Figure 3B: Wildfires in Minnesota since 2009.....	3-39
Figure 3C: Average Wildfires per Month in Minnesota (1985-2012).....	3-40
Figure 3D: Causes of Wildfires in Minnesota (2013).....	3-40
Figure 3E: Size and Cause of Wildfires in 2012.....	3-41

List of Maps

Map 1A: McLeod County’s Location, Cities and Townships.....	2-3
Map 4C: FEMA 100-Year Floodplain.....	3-13
Map 3A: Average Annual Tornado Frequency (1950-2012)	3-17
Map 3B: McLeod County Siren Coverage	3-20
Map 4A: City of Biscay Aerial Photo (2012).....	4-6
Map 4B: City of Biscay’s Floodplain.....	4-7
Map 4C: City of Brownton Aerial Photo (2012).....	4-10

Map 4D: City of Brownton’s Floodplain.....	4-11
Map 4E: City of Glencoe Aerial Photo (2012).....	4-14
Map 4F: NW Glencoe’s Floodplain.....	4-15
Map 4G: SW Glencoe’s Floodplain.....	4-16
Map 4H: East Central Glencoe’s Floodplain.....	4-16
Map 4I: SW Glencoe’s Floodplain.....	4-17
Map 4J: City of Hutchinson Aerial Photo (2012).....	4-20
Map 4K: NW Hutchinson’s Floodplain.....	4-21
Map 4L: West Central Hutchinson’s Floodplain.....	4-22
Map 4M: SE Hutchinson’s Floodplain.....	4-22
Map 4N: City of Lester Prairie’s Aerial Photo (2012).....	4-25
Map 4O: City of Lester Prairie’s Floodplain.....	4-26
Map 4P: City of Plato’s Aerial Photo (2012).....	4-29
Map 4Q: City of Plato’s Floodplain.....	4-30
Map 4R: City of Silver Lake’s Aerial Photo (2012).....	4-33
Map 4S: City of Silver Lake’s Floodplain.....	4-34
Map 4T: City of Stewart’s Aerial Photo (2012).....	4-37
Map 4U: City of Stewart’s Floodplain.....	4-38
Map 4V: City of Winsted’s Aerial Photo (2012).....	4-41
Map 4W: City of Winsted’s Floodplain.....	4-42

Appendices

McLeod County Hazard Mitigation Plan Maps.....	Appendix A
McLeod County Hazard Mitigation Plan Resolutions & Planning Documents.....	Appendix B
Flood Analysis for McLeod County.....	Appendix C

McLeod County
Hazard Mitigation Plan
Executive Summary

A. Introduction to the McLeod County Hazard Mitigation Plan

This document provides an update to the McLeod County All Hazard Mitigation Plan, which was previously adopted by the McLeod County Board of Commissioners in November 2008. The updated Plan shall serve McLeod County for the five-year period of when it is adopted in 2015 until the same date in 2020, unless the Plan is revised earlier.

Hazard mitigation is defined as: “sustained action taken to reduce or eliminate the long-term risks to human life and property from hazards” (*Local Mitigation Planning Handbook, March 2013*). Examples include mitigating flood-prone areas, raising the public’s awareness on the risk of local hazards, and implementing projects to protect critical facilities, such as hospitals, emergency operation centers and public utilities.

Hazard Mitigations Plans are designed to accomplish the following:

- ✓ Protect public safety and prevent the loss of life and injury;
- ✓ Prevent or reduce damage to development;
- ✓ Protect a community’s economic, cultural, and environmental assets;
- ✓ Minimize operational downtime and accelerate the recovery time of government, business, and people after disasters;
- ✓ Reduce the costs associated with disasters; and
- ✓ Help create sustainable communities by leveraging capital investments, improving infrastructure, and enhancing the resiliency of natural resources and the local economy.

What is a Hazard Mitigation Plan?

A Hazard Mitigation Plan is a comprehensive resource document that serves many purposes, including raising public awareness on the risk of local hazards; creating a decision tool for local jurisdictions that enhances local capacity to reduce or eliminate the long-term risk to human life and property from hazards; and facilitating intergovernmental cooperation on hazard concerns. In addition, the Federal Disaster Mitigation Act of 2000 requires all local governments to create Hazard Mitigation Plans in order to qualify for funding to mitigate the hazards.

There are a number of state and federal documents which provide the planning foundation for the McLeod County All Hazard Mitigation Plan. These include the Disaster Mitigation Act of 2000, the Local Mitigation Planning Handbook (FEMA; March 2013), and the Minnesota All Hazard Mitigation Plan Update (2014). Based upon the requirements outlined in these documents, the McLeod County All Hazard Mitigation Plan contains the following six Chapters and four Appendices:

- **Chapter One: Introduction to the McLeod County Hazard Mitigation Plan** – This Chapter provides information on the purpose of the plan, key planning requirements and a description of the planning process. Key information includes a list of the participating jurisdictions (i.e., all the cities in McLeod County) and a description of the County’s Hazard Mitigation Plan Task Force.
- **Chapter Two: McLeod County Profile** – Chapter Two profiles McLeod County, including sections on the County’s demographics, climate, natural resources and critical facilities. In addition, a review of existing plans and official documents is provided, along with an assessment of local capabilities to mitigate hazards.
- **Chapter Three: County Hazards Profile and Risk Assessment** – This Chapter identifies and profiles the various hazards that have historically or could potentially impact the County. A countywide risk assessment is then provided for each hazard.
- **Chapter Four: Community Profiles and Hazard Risk Assessments** – This Chapter provides a community profile and risk assessment for each of the cities located in McLeod County. Information is provided on each city’s demographics, housing and anticipated growth. A table is also included that summarizes each City’s risk to the various hazards identified in this plan.
- **Chapter Five: Mitigation Strategy** – This Chapter identifies the specific mitigation strategy the County will use to prevent or minimize the loss of life and damage to property as the result of hazards. Goals, objectives and action steps are provided.
- **Chapter Six: Plan Implementation & Administration** – This Chapter describes how the plan will be implemented and administered, including a summary of estimated costs.
- **Appendices** – Appendix A contains a series of county and local maps. Appendix B provides a copy of the key hazard mitigation planning documents, including the various sign-in sheets from the Task Force meetings. Appendix C contains a copy of the McLeod County Flood Analysis. Finally, Appendix D provides a copy of the plan review checklist as completed by the State and FEMA in their review of this plan.

B. The Planning Process

The planning process used to develop the 2015-2020 McLeod County Hazard Mitigation Plan including the following:

1. Creation of a McLeod County Hazard Mitigation Plan Task Force from a comprehensive list of key stakeholders.
2. A public kickoff meeting was held on November 13, 2013. All key stakeholders were invited to participate. In addition, a press release was sent to all local media sources inviting the public to attend.
3. Frequent Task Force meetings were held. In addition, correspondence was emailed throughout the planning process.
4. An extended public review period was provided throughout the planning process.

Plan Review Checklist...

(A1) Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? *Requirement §201.6(c)(1)*

(A2) Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? *Requirement §201.6(b)(2)*

(A3) Does the Plan document how the public was involved in the planning process during the drafting stage? *Requirement §201.6(b)(1)*

For more information on the entire planning process, please refer to Sections E, F and G in Chapter One.

Note: Throughout the Plan, sections that contain required information as specified in ***FEMA's Local Mitigation Plan Review Guide*** (2011) are identified with the 'Required Information' dart icon shown to the right...



C. Plan Integration with Existing Official Documents

Chapter Two highlights how a number of official County and key stakeholder documents were reviewed and incorporated into the Hazard Mitigation Plan.

1. McLeod County Land Use Plan (1995)
2. McLeod County Zoning Ordinance (2014)
3. McLeod County Water Plan (2013)
4. McLeod County Emergency Operations Plan (2014)
5. McLeod County Flood Insurance Study (2014)
6. Buffalo Creek Watershed District Overall Plan (2014)
7. Minnesota State Hazard Mitigation Plan (2014)

For more information on how the County’s official documents were integrated into this Plan, please refer to Chapter Two.

D. County Profile Highlights

Chapter Two profiles McLeod County, including sections on the County’s demographics, natural resources, and critical facilities. In addition, a review of local capabilities to mitigate and reduce long-term vulnerability to hazards is provided.

McLeod County is located in central Minnesota, approximately 40 miles west of the Minneapolis-St. Paul Metropolitan Area. The Minnesota State Demographer’s Office estimates that McLeod County has approximately 36,104 residents (2012). There are 9 cities and 14 townships in the County. The County Seat is the City of Glencoe, which is located in the south central portion of the County. McLeod County is characterized by numerous lakes, rolling hills and vast agricultural land. The County shares borders with Meeker and Wright counties to the north, Carver County to the east, Sibley County to the south and Renville County to the west.

For more information on the County’s profile and capability assessment, please refer to Chapter Two.

Plan Review Checklist...

(C1) Does the plan document each jurisdiction’s existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs?
Requirement §201.6(c)(3)

(C2) Does the Plan address each jurisdiction’s participation in the NFIP and continued compliance with NFIP requirements, as appropriate?
Requirement §201.6(c)(3)(ii)

E. Countywide Hazards Profile and Risk Assessment

Chapter Three profiles the potential natural and manmade hazards that could occur in McLeod County. Chapter Four provides a risk assessment for each of the hazards profiled in Chapter Three, including a separate assessment for each city and township. Information is provided on population (2012), households (2012), average household size (2012), and total taxable market values (2014) for each jurisdiction.

Refer to Chapters Three and Four for more information on the County's Risk Assessment.

Plan Review Checklist...

(B1) Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? *Requirement §201.6(c)(2)(i)*

(B2) Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? *Requirement §201.6(c)(2)(i)*

(B3) Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? *Requirement §201.6(c)(2)(ii)*

(B4) Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? *Requirement §201.6(c)(2)(ii)*

F. Mitigation Strategy

Chapter Five identifies the County's Mitigation Strategy, which consists of Goals, Objectives, and Action Steps collectively designed to mitigate the negative impacts of McLeod County's Hazards. The Mitigation Plan will cover a span of five years (2015-2020). Overall, this Chapter will guide the County and key stakeholders in prioritizing emergency management activities, pursuing funding opportunities, and implementing projects. Specific information has been included with each Action Step, including which stakeholders are involved, an implementation target year (unless ongoing), and an estimated cost to implement the activity.

Refer to Chapter Five for more information on the County's Mitigation Strategy.

Plan Review Checklist...

(C3) Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? *Requirement §201.6(c)(3)(i)*

(C4) Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? *Requirement §201.6(c)(3)(ii)*

G. Implementation & Administration

Chapter Six contains information on implementing and administer the Plan, including a list of summary of estimated project costs and information on plan coordination, implementation, plan duration, the County's role in implementation, other agencies roles in implementation, recommendations for State programs, intergovernmental conflicts/resolution process, plan evaluation, major and minor plan amendment procedures.

For more information on Plan Implementation and Administration, please refer to Chapter Six.

Plan Review Checklist...

(A5) Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? *Requirement §201.6(c)(4)(iii)*

(A6) Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? *Requirement §201.6(c)(4)(i)*

(E1) Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? *Requirement §201.6(c)(5)*

(E2) For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? *Requirement §201.6(c)(5)*

(C5) Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? *Requirement §201.6(c)(3)(iv); Requirement §201.6(c)(3)(iii)*

(C6) Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? *Requirement §201.6(c)(4)(ii)*

Chapter One:

Introduction to the McLeod County Hazard Mitigation Plan

Chapter One contains eight sections designed to provide a good understanding of the importance of the McLeod County All Hazard Mitigation Plan, herein after referred to as “the Plan.” Section A describes the background and purpose of the Plan. Section B describes the Plan’s enabling legislation, the Disaster Mitigation Act (DMA) of 2000. Section C summarizes the key components of two documents published by the Federal Emergency Management Agency (FEMA), the *Local Mitigation Planning Handbook (2013)* and *Local Mitigation Plan Review Guide (2011)*. Section D introduces the *Minnesota All Hazard Mitigation Plan*, which was published by Minnesota’s Homeland Security and Emergency Management (HSEM) office in 2014. Section E completes the first essential planning task outlined in the Local Mitigation Planning Handbook, which is simply to communicate which jurisdictions are participating in the planning process. Section F identifies the members of the McLeod County Hazard Mitigation Plan Task Force, which is Task 2 of the planning process. Section G describes Task 3, which is a description of the planning process and outreach strategy used to develop the Plan. Finally, Section H communicates that this Plan shall serve a five-year period (2015-2020) and describes how to obtain more information regarding this Plan.

Plan Review Checklist...

The following required Hazard Mitigation Plan information, as specified in FEMA’s *Local Mitigation Plan Review Guide (2011)*, is found in Chapter One:

- (A1) Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? *Requirement §201.6(c)(1)*
- (A2) Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? *Requirement §201.6(b)(2)*
- (A3) Does the Plan document how the public was involved in the planning process during the drafting stage? *Requirement §201.6(b)(1)*

Note: Throughout the Plan, sections that contain required information as specified in *FEMA’s Local Mitigation Plan Review Guide (2011)* are identified with the dart icon shown to the right... →



**Section A:
Background and Purpose of the Plan**

This document provides an update to the McLeod County All Hazard Mitigation Plan, which was previously adopted by the McLeod County Board of Commissioners in November 2008. The updated Plan shall serve McLeod County for the five-year period of when it is adopted in 2015 until the same date in 2020, unless the Plan is revised earlier.

Hazard mitigation is defined as: “sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards” (*Local Mitigation Planning Handbook, March 2013*).

Examples include mitigating flood-prone areas, raising the public’s awareness on their risk of local hazards, and implementing projects to protect critical facilities, such as hospitals, emergency operation centers, drinking water supplies, and public utilities. Hazard Mitigation Plans are designed to accomplish the following:

- ✓ Protect public safety and prevent the loss of life and injury;
- ✓ Prevent or reduce damage to development;
- ✓ Protect a community’s economic, cultural, and environmental assets;
- ✓ Minimize operational downtime and accelerate recovery of government, business, and people after disasters;
- ✓ Reduce the costs associated with disasters; and
- ✓ Help create sustainable communities by leveraging capital investments, improving infrastructure, and enhancing economic and natural resource resiliency.

What is a Hazard Mitigation Plan?

A Hazard Mitigation Plan is a comprehensive resource document that serves many purposes, including raising public awareness on their risk to numerous hazards; creating a decision tool for local jurisdictions that enhances local capacity to reduce or eliminate the long-term risk to human life and property from hazards; and facilitating intergovernmental cooperation on hazard concerns. In addition, the Federal Disaster Mitigation Act of 2000 requires all local governments to create Hazard Mitigation Plans in order to qualify for future funding.

There are a number of State and Federal documents which provide the Planning foundation for the McLeod County All Hazard Mitigation Plan. These include the Disaster Mitigation Act of 2000, the Local Mitigation Planning Handbook (FEMA; March 2013), and the Minnesota All Hazard Mitigation Plan Update (March 25, 2011). Each of these documents are summarized in the following sections.

Section B: The Disaster Mitigation Act

The Disaster Mitigation Act (DMA) of 2000, commonly known as the 2000 Stafford Act amendments, was approved by Congress on October 10, 2000. On October 30, 2000, the President signed the bill into law, creating Public Law 106-390. The purpose of the DMA is to amend the Stafford Act, establish a national program for pre-disaster mitigation, and streamline administration of disaster relief.

Section 322 of the act specifically addresses state and local mitigation planning. It establishes pre-disaster hazard mitigation funding and new requirements for the national post disaster Hazard Mitigation Grant Program (HMGP). It identifies new requirements that allow HMGP funds to be used for planning activities, and increases the amount of HMGP funds available to states that have developed a comprehensive, enhanced mitigation plan prior to a disaster. States and communities must have an approved mitigation plan in place prior to receiving HMGP funds. Local mitigation plans must demonstrate that their proposed mitigation measures are based on a sound planning process that accounts for the risk to and the capabilities of the individual communities.

DMA encourages cooperation between state and local authorities, prompting them to work together. It rewards local and state pre-disaster planning and promotes disaster resistance as a key component of sustainable development. The intended result is better articulation of local and state government mitigation needs, resulting in faster allocation of funding and more effective risk reduction projects.

According to subsection 201.6, the local mitigation plan is the representation of the jurisdiction's commitment to reduce risks from natural hazards, serving as a guide for decision makers as they commit resources to reducing the effects of natural hazards. Local plans also will serve as the basis for the State to provide technical assistance and to prioritize project funding.

DMA requirements include the following (note: some of the highlights are provided. To view the entire DMA legislation, visit the U.S. Electronic Code of Federal Regulations at www.dcf.gov. Some of the important requirements are summarized below:

1. A local government must have a mitigation plan approved pursuant to this section in order to receive HMGP project grants. The Administrator may, at his discretion, require a local mitigation plan for the Repetitive Flood Claims Program. A local government must have a mitigation plan approved in order to apply for and receive mitigation project grants under all other mitigation grant programs.

Chapter One: Introduction

2. Multi-jurisdictional plans may be accepted as long as each jurisdiction has participated in the planning process and has officially adopted the Plan.
3. An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the Planning process shall include:
 - A. An opportunity for the public to comment on the Plan during the drafting stage and prior to plan approval;
 - B. An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia, and other private and non-profit interests to be involved in the Planning process; and
 - C. Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.
4. The Plan shall include the following contents:
 - A. Documentation of the Planning process used to develop the Plan, including how it was prepared, who was involved in the process, and how the public was involved.
 - B. A risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards. The risk assessment shall include:
 - i. A description of the type, location, and extent of all natural hazards that can affect the jurisdiction. The Plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.
 - ii. A description of the jurisdiction's vulnerability to the hazards. This description shall include an overall summary of each hazard and its impact on the community. All plans approved after October 1, 2008 must also address National Flood Insurance Program insured structures that have been repetitively damaged by floods. The Plan should describe vulnerability in terms of:
 - ✓ The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas;

Chapter One: Introduction

- ✓ An estimate of the potential dollar losses to vulnerable structures and a description of the methodology used to prepare the estimate;
 - ✓ A general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.
 - ✓ For multi-jurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.
- C. A mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs, resources, and its ability to expand on and improve these areas. This section shall include:
- i. A description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.
 - ii. A section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction's participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate.
 - iii. An action plan describing how the actions will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.
 - iv. For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the Plan.
- D. A plan maintenance process that includes:
- i. A section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.
 - ii. A process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.

Chapter One: Introduction

- iii. Discussion on how the community will continue public participation in the Plan maintenance process.
 - E. Documentation that the Plan has been formally adopted by the governing body of the jurisdiction requesting approval of the Plan. For multi-jurisdictional plans, each jurisdiction requesting approval of the Plan must document that it has been formally adopted.
5. Plans must be submitted to the State Hazard Mitigation Officer (SHMO) for initial review and coordination. The State will then send the Plan to the appropriate FEMA Regional Office for formal review and approval.
 6. A local jurisdiction must review and revise its Plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval within 5 years in order to continue to be eligible for mitigation project grant funding.

Section C:
Local Mitigation Planning Handbook and Plan Review Guide

The Federal Emergency Management Agency (FEMA) published the *Local Mitigation Planning Handbook* in March 2013, as a guide for local governments to use in developing or updating local hazard mitigation plans. The Handbook was written as a companion to the *Local Mitigation Plan Review Guide*, released by FEMA in 2011.

Difference between the Planning Handbook & the Plan Review Guide...

The Planning Handbook is intended to help local officials develop hazard mitigation plans, while the Plan Review Guide is intended to help State and Federal officials review and approve the local plans.

Local Mitigation Planning Handbook

The Local Mitigation Planning Handbook, herein after ‘the Handbook,’ was written to provide guidance to local governments on developing or updating hazard mitigation plans to meet the requirements of Title 44 (Emergency Management and Assistance) Code of Federal Regulations (CFR). The Handbook highlights examples which are intended to show how communities can effectively plan to reduce their long-term risk from natural disasters. Table 1A shows the nine recommended tasks outlined in the Handbook. Each task is briefly described following the Table.

Table 1A:
Tasks for Developing Local Hazard Mitigation Plans

<i>Task 1</i>	Determine the Planning Area & Resources
<i>Task 2</i>	Build the Planning Team
<i>Task 3</i>	Create an Outreach Strategy
<i>Task 4</i>	Review Community Capabilities
<i>Task 5</i>	Conduct a Risk Assessment
<i>Task 6</i>	Develop a Mitigation Strategy
<i>Task 7</i>	Keep the Plan Current
<i>Task 8</i>	Review and Adopt the Plan
<i>Task 9</i>	Create a Safe and Resilient Community

Chapter One: Introduction

Task 1 – Determine the Planning Area & Resources

The first step simply refers to identifying the planning area and participating jurisdictions. Section E of this Chapter provides more information on the process used to complete this task. In addition, Appendix B contains copies of the participating and adoption resolutions.

Task 2 – Build the Planning Team

The second task refers to compiling a planning team of representatives from each jurisdiction and key stakeholders. Section F of this Chapter provides a profile of McLeod County’s key hazard mitigation planning stakeholders and lists the members of the County’s Planning Team.

Task 3 – Create an Outreach Strategy

Federal regulations for mitigation plan approval require that stakeholders and the general public are given opportunities to be involved during the planning process and in the Plan’s maintenance and implementation. Section G of this Chapter describes the outreach strategy that McLeod County used to develop this Plan.

Task 4 – Review Community Capabilities

The fourth task reviews local capacity to accomplish mitigation and reduce long-term vulnerability to hazards. This includes a review of policies, programs, staffing responsibilities, and other local resources. This information is contained in Chapter Two.

Task 5 – Conduct a Risk Assessment

The fifth task involves conducting a risk assessment to determine the potential impacts of each hazard, including how they could potentially impact people, the built and natural environment, and the local economy. Chapter Three compiles information state and countywide, while Chapter Four breaks down the information further for each of the participating jurisdictions.

Task 6– Develop a Mitigation Strategy

The sixth task, considered the heart of the Plan, is to develop a mitigation strategy which will reduce or eliminate the long-term risk to human life and property from hazards. The mitigation strategy, found in Chapters Five and Six, includes goals, action steps, and an implementation plan.

Tasks 7 – Keep the Plan Current

Task 8 – Review and Adopt the Plan

Task 9 – Create a Safe and Resilient Community



The final three tasks are grouped into the final Chapter Six of this Plan. The seventh task includes measures to monitor, evaluate, and update the mitigation plan. The eighth task involves taking the Plan through the formal local review and adoption process. Lastly, task nine refers to following through to properly implement the mitigation strategy, which will include being organized with the various stakeholders to apply for grants.

Local Mitigation Plan Review Guide

The Federal Emergency Management Agency (FEMA) published the *Local Mitigation Plan Review Guide* (October 2011) to help Federal and State officials review local mitigation plans in a fair and consistent manner, and to ensure the plans meet all of the requirements of the Stafford Act and Title 44 of the Code of Federal Regulations (CFR) §201.6. FEMA supports, coordinates, and review local plans as a means to:

- Foster federal, state, and local partnerships for hazard mitigation;
- Promote more resilient and sustainable communities; and
- Reduce the costs associated with disaster response and recovery by promoting hazard mitigation activities.

The Plan Review Guide lists the following guiding principles for all plan reviews:

1. ***Focus on Mitigation Strategy*** – Plan reviews will emphasize actions and implementation of the hazard mitigation strategy.
2. ***Review for Intent*** – Plan reviews will focus on whether the mitigation plan meets the intent of the law and regulation.
3. ***Process is as important as the Plan itself*** – The actual process of planning is as important to the plan as the plan itself.
4. ***This is the Community's Plan*** – Plan reviews will recognize the effort and interest of each community that develops a mitigation plan.
5. ***Foster Relationships*** – FEMA's relationship with the State and community is as important as the words in the plan.

The Review Guide provides three distinct tools to be used in the review process. The first is a Regulation Checklist, which provides a summary of FEMA's evaluation of whether the plan meets all Federal requirements. The second is a Plan Assessment, which identifies the Plan's strengths and areas that could use some improvement. The final component is an optional worksheet that can be used to document how each jurisdiction met the requirements of the plan (i.e., Risk Assessment, Mitigation Strategy, Adoption, etc.).

The state-level agency responsible for providing hazard mitigation planning assistance and review in Minnesota is the Homeland Security and Emergency Management (HSEM) office, a Division of the Minnesota Department of Public Safety. Their overall mission is to help Minnesotans prevent, prepare for, respond to, and recover from natural and human caused disaster. HSEM is also responsible for creating the Minnesota All Hazard Mitigation Plan, which is briefly described in Section D of this Chapter and in more detail in Chapter Three.

**Section D:
2014 Minnesota All Hazard Mitigation Plan**

The State of Minnesota officially adopted the Minnesota All Hazard Mitigation Plan Update on March 14, 2014. The Plan covers a three-year period and meets all of the Disaster Mitigation Act of 2000 requirements for an updated Standard State Mitigation Plan. The overall goal of the Plan is to eliminate or reduce the impact of natural and human-caused incidents on the people and property in Minnesota. The Plan outlines the following six types of mitigation strategies:

- **Prevention** - Develop and promote comprehensive cost-effective recommendations for adoption and enforcement of land use, ordinances and regulations, promote legislation, zoning, and building codes that regulate construction, and decrease risk in areas susceptible to hazards.
- **Property Protection** - Install and maintain protective measures for the safety and security of critical facilities.
- **Public Education** - Develop educational materials for the general public and decision makers, educational projects and information regarding public and private volunteer initiatives as well as information regarding health safety and alternatives to improve the public's awareness of hazard risks and ways to prevent or reduce their impact with a sustainment mechanism to distribute educational materials.
- **Natural Resources** - Develop and implement watershed studies and implement watershed plans and conduct hydrology studies and studies of groundwater problems, support of siltation removal projects, and creation of retention/detention basins.
- **Emergency Services** - Train, exercise, and equip key state and local leaders for emergency/disaster/and response efforts; and install safety and warning signage in appropriate vulnerable locations.
- **Structural Improvements** - Electrical utility retrofit/hardening; construct, retrofit or maintain drainage systems (pipes, culverts, and channels) to provide adequate and proper functioning systems to include sewage systems and retention and detention systems; install soil stabilization, drainage and erosion protection measures; and construct, retrofit or maintain levees, dams, floodwalls, culverts, and floodgates to ensure adequate capacity and protection levels for property and critical facilities.

The full Minnesota All Hazard Mitigation Plan Update can be viewed online at:

<https://dps.mn.gov/divisions/hsem/Pages/default.aspx>

**Section E:
‘Task 1’ Determine the Planning Area**

Task 1 of developing the McLeod County Hazard Mitigation Plan was to *Determine the Planning Area*. All nine of the communities located in McLeod County were invited to participate. This was first communicated by asking each community to sign a Supporting Resolution, which was collected prior to the County applying for grant funding. The second major step was to invite the communities to the countywide kickoff meeting for updating the Hazard Mitigation Plan. This is where the communities first learned about signing a Participation Resolution and Memorandum of Agreement (MOA).

Once the Participation Resolution and the MOA were returned to the County, the participating jurisdiction had a representative assigned to the County’s Hazard Mitigation Plan Task Force (refer to Section F for more information). Each community was then asked to help identify mitigation steps that could be implemented by the participating jurisdiction. The last step was for each community to locally adopt the McLeod County All Hazard Mitigation Plan. Table 1B shows the dates each step was completed.

**Table 1B:
McLeod County Hazard Mitigation Plan
Participating Jurisdictions Checklist**



Jurisdiction	Supporting Resolution	Participation Resolution and MOA	Local Mitigation Steps in Plan?	Final Adoption Resolution
<i>Biscay</i>	2-13-2013	12-13-13	Yes	
<i>Brownton</i>	3-21-2013	12-3-13	Yes	
<i>Glencoe</i>	2-12-2013	12-2-13	Yes	
<i>Hutchinson</i>	3-21-2013	12-10-13	Yes	
<i>Lester Prairie</i>	2-6-2013	12-10-13	Yes	
<i>Plato</i>	2-11-2013	12-19-13	Yes	
<i>Silver Lake</i>	2-12-2013	12-16-13	Yes	
<i>Stewart</i>	2-11-2013	12-9-13	Yes	
<i>Winsted</i>	2-25-2013	12-17-13	Yes	
<i>McLeod County</i>	2-19-2013	6-26-13	Yes	

**Section F:
'Task 2' Build a Planning Team**

The McLeod County Board of Commissioners unanimously passed Resolution 13-CB-04 on February 19, 2013, which formally initiated the process to update the County's existing All Hazard Mitigation Plan (November 2008). The Resolution also authorized the County to execute a sub-grant agreement with the Division of Homeland Security and Emergency Management in the Minnesota Department of Public Safety for the program entitled Hazard Mitigation Assistance (HMA) for the development or update of the McLeod County All Hazard Mitigation Plan. The sub-grant agreement was signed by the State on June 26, 2013.

The County then entered into a contract agreement with the Mid-Minnesota Development Commission (MMDC) to help develop and facilitate the Plan update. MMDC assisted with developing and facilitating the County's existing All Hazard Mitigation Plan in 2008. In addition to MMDC, the County organized a McLeod County Hazard Mitigation Plan list of Stakeholders (Table 1C) and Task Force Member (Table 1D). The stakeholders were invited to participate on the Task Force and were involved throughout the planning process with emails.

Table 1C: McLeod County Hazard Mitigation Plan Stakeholders

- ✓ Emergency Management (McLeod County and all cities)
- ✓ McLeod County Public Health
- ✓ Ridgewater College (located in Hutchinson)
- ✓ All School Districts (located in McLeod County)
- ✓ All Fire Departments (located in McLeod County)
- ✓ McLeod County Highway Department
- ✓ City Administration (all cities in McLeod County)
- ✓ City Clerks (all cities in McLeod County)
- ✓ Police Departments (all cities in McLeod County)
- ✓ Public Works (City of Hutchinson and City of Glencoe)
- ✓ Buffalo Creek Watershed District
- ✓ Mid-Minnesota Development Commission
- ✓ The cities of Biscay, Brownton, Glencoe, Hutchinson, Lester Prairie, Plato, Silver Lake, Stewart, and Winsted
- ✓ Members of the public (newspaper and website announcements)
- ✓ Neighboring Communities: Meeker, Wright, Carver, Sibley and Renville Counties



**Table 1D: McLeod County
Hazard Mitigation Plan Task Force**



<i>Task Force Members</i>	<i>Representing</i>
Amy Eustis	McLeod County Public Health
Beth Hepola	Ridgewater College
Bob Carlson	City of Lester Prairie Police/Emergency Management
Bob Scheidt	City of Glencoe Assistant Emergency Manager
Chris Wawrzyniak	City of Silver Lake Emergency Management
Christy Christensen	McLeod County GIS
Dan Hatten	City of Hutchinson Police/ Emergency Management
Donald Albrecht	McLeod County Township Assoc. Secretary
Gary Schreifels	City of Glencoe Public Works
Geri Scott	City of Plato City Clerk
Jake Binnebose	City of Brownton Emergency Management
Jana Kunkel	City of Biscay City Clerk
Jay Wood	McLeod County Fire & EMS Assoc. President
Jim Raiter	City of Glencoe Police/ Emergency Management
Kermit Terlinden	McLeod County Commissioner
Larry Gasow	McLeod County Zoning Administrator
Mike Henrich	Winsted Police/ Emergency Management
Roger Berggren	McLeod County Environmental Services
Ronda Huls	City of Stewart City Clerk
Brad Sellner	Howard Lake Waverly Winsted Public Schools
Mike McNulty	Lester Prairie Public Schools
Chris Sonju	Glencoe Silver Lake Public Schools
Corey Henke	Citizen & Buffalo Creek Watershed District
Kevin Mathews	McLeod County Emergency Management
Matt Johnson	Mid-Minnesota Development Commission

**Section G:
'Task 3' Create an Outreach Strategy**

A multiple step planning process was followed in the development of this Plan, with a special emphasis on involving citizens and local/regional stakeholders. *Appendix B contains copies of the key correspondence and task force meeting sign-in sheets collected throughout the planning process.*



The first step in the planning process was to hold a countywide kickoff meeting. This took place at the McLeod County Courthouse on November 13, 2013. Invitation letters were sent to major local and regional stakeholders, including cities, townships, agencies, and the surrounding counties. *In addition, a press release was sent to all local media sources inviting the public to attend the meeting.* The second key component of the planning process involved the various meetings with the Hazard Mitigation Task Force. Table 1E provides a summary of the key meetings and important dates from the planning process.

**Table 1E:
Summary of the Planning Process**

June 26, 2013	Contract Signed. McLeod County signs the contract with the State to update with McLeod County Hazard Mitigation Plan.
October 15, 2013	Letters to Participating Jurisdictions. Although all participating jurisdictions previously signed resolutions supporting the Plan update, each participating jurisdiction was emailed a customized copy of the McLeod County Hazard Mitigation Plan Memorandum of Agreement (MOA). In addition, each jurisdiction was emailed a Participation Resolution.
November 13, 2013	Countywide Public Kickoff Meeting. All citizens and local and regional stakeholders were invited to the McLeod County Hazard Mitigation Plan kickoff meeting. The meeting took place in the Commissioner's Room/OEC Room of the McLeod County Courthouse. Task Force Members and local/regional stakeholders were sent direct emails inviting them to attend. <i>A press release was sent to all local and regional media sources inviting the public to attend the meeting.</i>

Continued on Page 1-15...

Chapter One: Introduction

- January 23, 2014** **Hazard Mitigation Plan Task Force Meeting.** Discussed the planning process, outreach strategy, stakeholder involvement, and reviewed the draft Chapter One. Previous mitigation strategies were also reviewed.
- February 7, 2014** **Hazard Mitigation Plan Task Force Meeting.** Reviewed the draft Chapter Two County Profile and Capabilities. Reviewed a preliminary draft of the County’s Risk Assessment and identified a number of new mitigation strategies.
- February 25, 2014** **Hazard Mitigation Plan Task Force Meeting.** Reviewed the draft risk assessment and continued brainstorming for new mitigation strategies. Discussed with the McLeod County Public Health how they could best fit into the Mitigation Plan.
- April 3, 2014** **Hazard Mitigation Plan Task Force Meeting.** Reviewed draft chapters and continued work identifying needed mitigation steps.
- June 26, 2014** **Hazard Mitigation Plan Task Force Meeting.** Reviewed the draft Chapter Five: Goals, Objectives and Action Steps.
- August 8, 2014** **Hazard Mitigation Plan Task Force Meeting.** Continued editing the County draft Goals, Objectives and Action Steps.
- September 2014** **Preliminary Draft Comment Period.** Copies of the Plan were emailed to the McLeod County Hazard Mitigation Plan Task Force and the various local and regional Mitigation Plan stakeholders, including surrounding counties, governmental agencies, and all local governmental units. E-mails were sent indicating the most current version of the Plan was online at www.mmrdc.org for review and comment.
- September 2014** **State Review Period.** The Draft Plan was emailed to the Homeland Security and Emergency Management office, a Division of the Minnesota Department of Public Safety for the official State review.
- December 2014** **Second State Review Period.** State review comments were incorporated into the draft plan.
- TBD...** **County Public Hearing and Adoption.**

**Section H:
Plan Duration and Additional Information**

The McLeod County Hazard Mitigation Plan will be periodically reviewed and updated as needed, although *the entire plan will be formally reviewed and updated once every five years*. As a result, the Plan will need to be formally updated again before it expires in 2020. The County's Emergency Manager will be responsible for initiating the update process by engaging the County Board, assembling a Task Force, and contacting the Minnesota Homeland Security and Emergency Management (HSEM) office.

Hazard Mitigation Plans are normally the responsibility of the County's Sheriff's Office and/or the County's Emergency Manager. McLeod County has an Emergency Manager that can be reached through the County's Sheriff's Office. For more information on the contents of this Plan or any other hazard or emergency-related issue, please contact the Sheriff's Office at 888-440-3134 or the McLeod County Emergency Manager at 320-864-1339. Additional information may be also found on the County's official website:

www.co.mcleod.mn.us

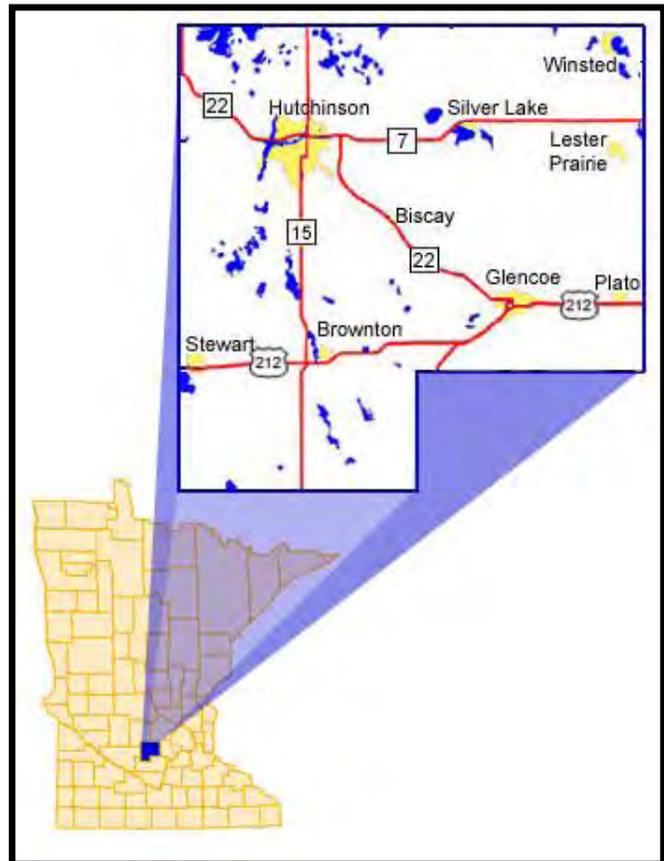
Chapter Two: McLeod County Profile

Chapter Two provides a general profile of McLeod County. It inventories the historical, demographic, physical, and infrastructure-related characteristics that are important to understanding the unique nature of the County. The Chapter is divided into six sections: Section A: Introduction to McLeod County; Section B: Demographics; Section C: Physical Characteristics; Section D: Critical Facilities and Infrastructure; Section E: Existing Plans, Ordinances, and Official Documents; and Section F: Capabilities Assessment.

Section A: Introduction to McLeod County

McLeod County is situated in south-central Minnesota, approximately 40 miles west of the Minneapolis-St. Paul Metropolitan Area. The County shares borders with Meeker and Wright Counties to the north, Carver County to the east, Sibley County to the south, and Renville County to the west. The County has 9 cities and 14 townships. The City of Glencoe serves as the County Seat. Other cities include Biscay, Brownton, Hutchinson, Lester Prairie, Plato, Silver Lake, Stewart, and Winsted. Figure 2A shows the location of McLeod County within Minnesota, while Map 1A shows the County's cities and townships.

**Figure 2A:
McLeod County**



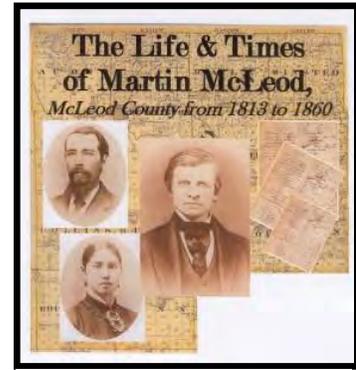
McLeod County's Hazard Mitigation Plan Maps

In order to create a comprehensive mapping section, many of the maps have been placed into Appendix A. Some of the key maps, however, have been incorporated next to the appropriate text.

Chapter Two: County Profile

Historical Setting ~ adapted from www.co.mcleod.mn.us

McLeod County was created by the territorial legislature on March 1, 1856, and was officially organized on March 11, 1856. It was named for Martin McLeod, a Scotsman, who was one of the first settlers to locate in this area. He was described as "a man of Noble Form", commanding presence, culture, intellect, dignity, and eloquence. J.H. Stevens, and perhaps a dozen others, founded a settlement thirty miles from the nearest white neighbors and called it Glencoe. The City of Glencoe was chosen as the County Seat.



*Source: McLeod County
Historical Society*

The first session of the County Board of Commissioners, then called "Commissioner's Court", was held in the Office of Bell and Chapman (attorneys at law) in Glencoe. John McLeod, James Phillips and W.B. Wilson were the first board members of the Commissioner's Court. Other officers included: Honorable Lewis Branson; Judge A.J. Snyder, as the first clerk of Court; Sheriff L.G. Simon, as Probate Judge; A.J. Bell, District Attorney; and J.B. McKean, Coroner.

The first action of the County Board was to lay out a school district to be called the Glencoe School District No. 1. The next order of business was the establishment of three election precincts. One was the Glencoe Precinct; the second was the Hutchinson Precinct; and the third was called the Lake Addie Precinct. The first court was held February 27, 1860. The first preacher was Rev. Henry Elliott, a Methodist. The first marriage was between John H. Chubb and Eva M. Maittey on July 23, 1856. The first child born was Ella W. Hoover on January 1, 1856. The first saw mill was a steam saw mill built by Glencoe Townsite Company. Finally, the first road was the Hutchinson road.

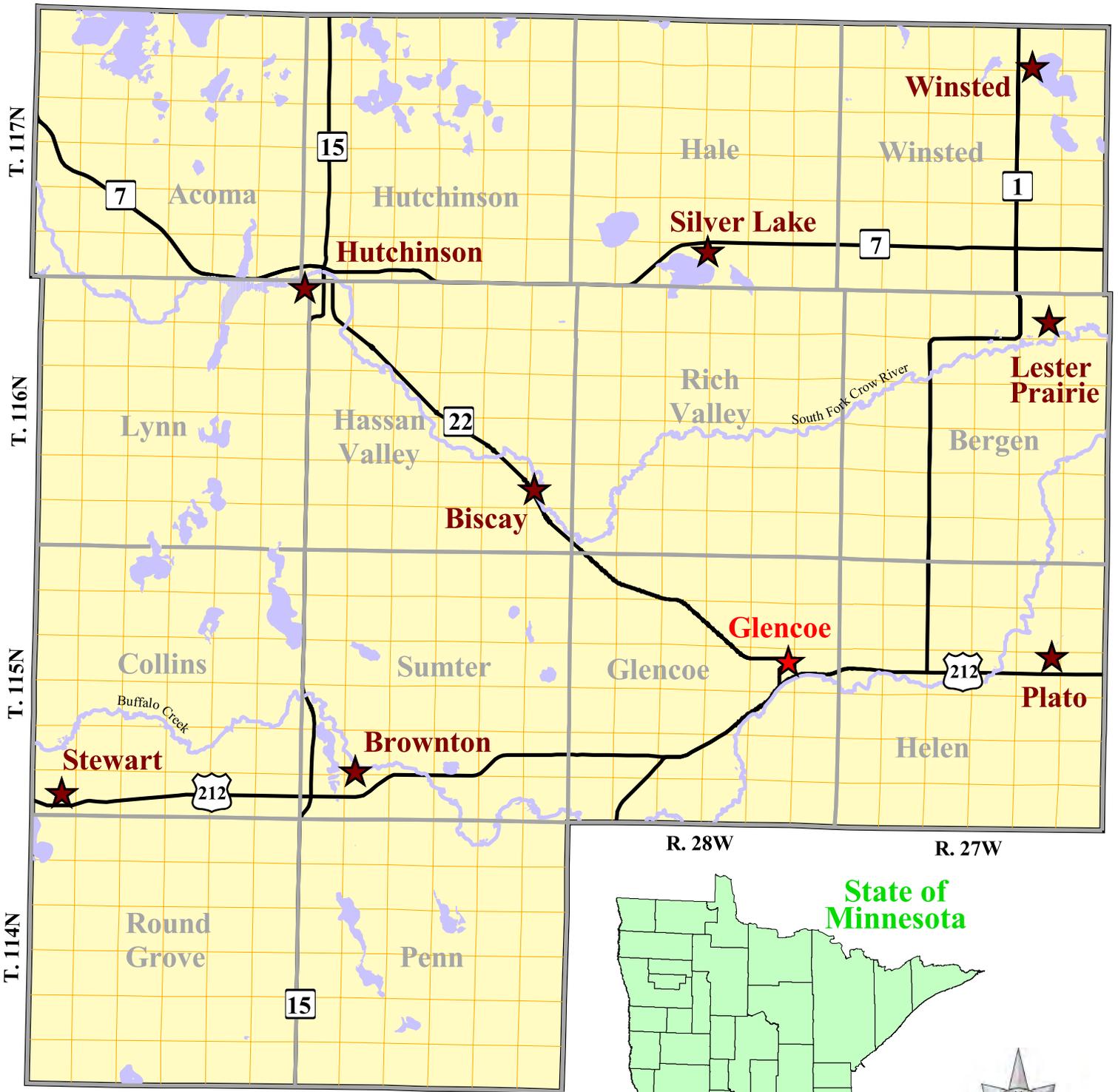


*Photo Compliments of the McLeod County
Historical Society and Museum*

McLeod County today has an area of 311,388 acres (503 square miles), having 460 miles of township roads, 405 miles of county roads, and 95 miles of state trunk highways. The first Courthouse was erected in 1896 at a cost of \$9,967.18. In 1900, the first addition was made at a cost of \$39,778.00, with a remodeling cost of \$13,255.00 in 1910. The third addition was made in 1936 at a cost of \$447,484.35. The original building site was acquired by a gift from the City of Glencoe.

For more information on McLeod County's history, please visit the McLeod County Historical Society and Museum online at: www.mcleodhistory.org

Map 1A: McLeod County Cities & Townships



- County Seat**
- Municipality**
- Township**
- Section Line**
- U.S. Highway
- State Highway
- Lake
- River

Section B: Demographics

Historic Population

McLeod County's population data since 1930 is presented in Figure 2B. Notice the County has steadily gained residents every decade, with the 2010 population reported at 36,651. The single largest increase in population gain occurred between 1960 and 1970, when the County grew by 3,261 people.



Figure 2B:
Population of McLeod County since 1930 (U.S. Census)

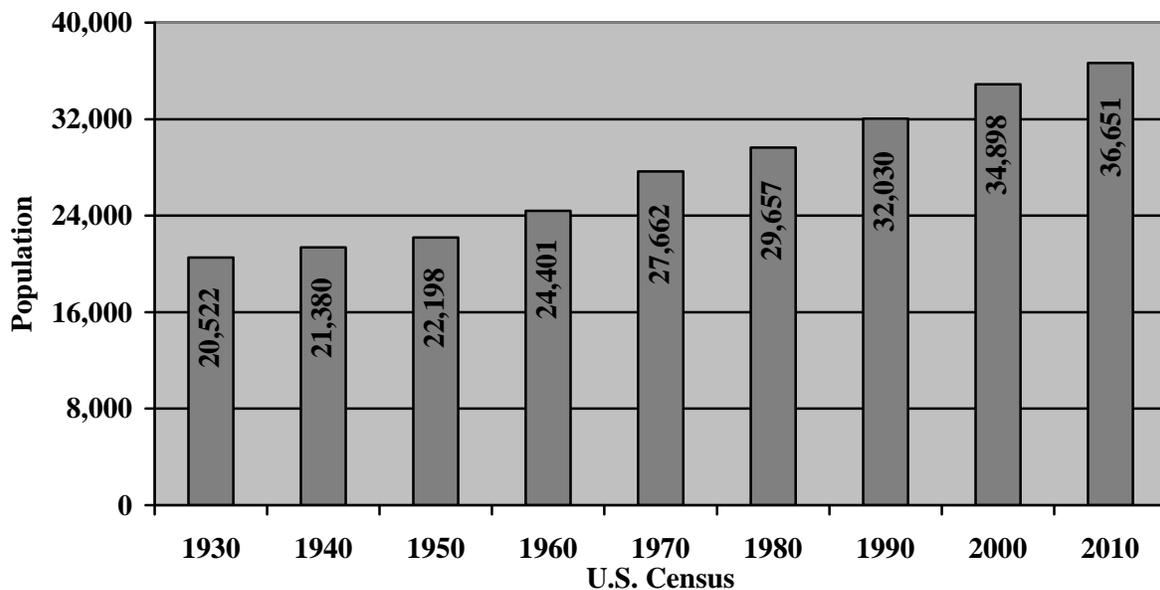


Table 2A presents population data for McLeod County's cities and townships (grouped together) since 1970. Hutchinson is the County's largest city, with a reported 2010 population of 14,178. In addition to Hutchinson, the cities of Glencoe (5,631), Lester Prairie (1,730), and Winsted (2,355) have a population of over 1,000 residents. Eight of the cities have experienced varying levels of growth since 1970, with only Stewart losing population (-14.3%). Overall, the total population of the County's cities has increased by 9,365 people (54.7%) since 1970, while the population of its townships has decreased slightly by 376 people (-3.6%) over the same time period.

Additional Demographic Information

Additional demographic information from the 2000 U.S. Census on the County, including data on gender, race, and household type can be obtained from the following official Census website:

<http://quickfacts.census.gov/qfd/states/27000.html>

**Table 2A:
Population of McLeod County's
Cities and Townships since 1970***

Political Subdivision		Year					40 Year Change	Percent Change
		1970	1980	1990	2000	2010		
Cities	<i>Biscay</i>	105	114	113	114	113	8	7.6%
	<i>Brownton</i>	688	697	781	807	762	74	10.8%
	<i>Glencoe</i>	4,217	4,396	4,648	5,453	5,631	1,414	33.5%
	<i>Hutchinson</i>	8,031	9,244	11,523	13,080	14,178	6,147	76.5%
	<i>Lester Prairie</i>	1,162	1,229	1,180	1,377	1,730	568	48.8%
	<i>Plato</i>	303	390	355	336	320	17	5.6%
	<i>Silver Lake</i>	694	698	764	761	837	143	20.6%
	<i>Stewart</i>	666	616	566	564	571	-95	-14.3%
	<i>Winsted</i>	1,266	1,522	1,581	2,094	2,355	1,089	86%
Total Cities		17,132	18,906	21,511	24,586	26,497	9,365	54.7%
Total Townships		10,530	10,751	10,519	10,312	10,154	-376	-3.6%
McLeod County		27,662	29,657	32,030	34,898	36,651	8,989	32.5%

* Source: U.S. Census

McLeod County's Comparable Growth

One of the best ways to compare the County's rate of population growth is to examine the growth rates of neighboring counties. Table 2B provides population data for Carver, McLeod, Meeker, Renville, and Wright counties.

**Table 2B:
Five County Area Population Change since 1970***

County (Major City)	Year					40 Year Change	Percent Change
	1970	1980	1990	2000	2010		
Carver (Chaska)	28,331	37,046	47,915	70,205	93,707	65,376	231%
McLeod (Hutchinson)	27,662	29,657	32,030	34,898	36,651	8,989	33%
Meeker (Litchfield)	18,387	20,594	20,846	22,644	23,061	4,674	25%
Renville (Olivia)	21,139	20,401	19,673	17,154	15,369	-5,770	-27%
Wright (Buffalo)	38,933	58,681	68,710	89,986	127,336	88,403	227%

* Source: U.S. Census

Chapter Two: County Profile

The statistics that appear in Table 2B indicate that McLeod County has experienced moderate growth (33%) relative to Carver (231%) and Wright (227%) counties. These counties, however, are located closer to the Minneapolis-St. Paul Metropolitan Area (note: Carver County is considered to be part of the seven-county Metropolitan Area). Meeker County's growth rate (25%) was similar to McLeod County's (33%). Among the five counties shown, only Renville County has lost residents (27%) since 1970.

Population by Age Groups

Table 2C provides a breakdown of McLeod County's population by age categories since 1970 using U.S. Census data (1970-2010). First, notice that while the County has experienced steady population gain since 1970, it has slightly lost population in the Under 18 age group. Second, the County's oldest age category, 65 & Over, has grown steadily every decade. Overall, this trend is indicative of an aging population. The Minnesota State Demographic Center projects the State's elderly population will grow at a larger rate than that of the total population over the next 30 years. This is a strong indicator of the increasing need for many senior-related services, including senior housing and public transit.

Table 2C:
Population by Age Group of McLeod County since 1970*

Age Group	Year				
	1970	1980	1990	2000	2010
<i>Under 18</i>	10,592	9,982	9,282	9,684	9,265
<i>Ages 18-24</i>	1,766	2,298	2,683	2,708	2,708
<i>Ages 25-44</i>	6,087	7,732	9,690	10,218	9,275
<i>Ages 45-64</i>	5,689	5,490	5,633	7,447	9,800
<i>65 & Over</i>	3,528	4,155	4,742	4,841	5,603
Totals	27,662	29,657	32,030	34,898	36,651

* Source: U.S. Census

Households

Table 2D shows how the number of households have increased as the County has gained population since 1970. In 2010, McLeod County had approximately 14,639 households (note: households are defined as an occupied housing unit). Notice that since 1970, the average household size (the average number of people living in each household) in McLeod County has



decreased from 3.24 people per household to an average size of 2.5 people per household in 2010. This smaller household size trend has been common throughout Minnesota, especially in the rural areas of the State.

**Table 2D:
Population, Households, and Average Household Size**

Characteristic	Year				
	1970	1980	1990	2000	2010
<i>Population</i>	27,622	29,657	32,030	34,898	36,651
<i>Households</i>	8,530	10,376	11,815	13,449	14,639
<i>Average Household Size</i>	3.24	2.86	2.67	2.56	2.50

Population and Household Projections

The Minnesota State Demographic Center maintains population projections for the State and each of the 87 counties. The projections are based on educated estimates for each county’s births, deaths, and net migration in/out of the county. The makeup of existing age categories (i.e., number of youth, number of seniors, etc.) provides the foundation for the population projections. Table 2E shows the State Demographer’s Office population projections for McLeod County out to 2035. The estimated number of households was determined by dividing the average household size for the County in 2010 (2.5 persons per household) and then decreasing slightly every five years to match the County’s trend since 1970. Table 2E shows the County’s estimated 2035 population is 42,716 residents living in approximately 17,651 households. This would be an increase of 6,065 people and 3,012 households. **Due to the close proximity of McLeod County to the Minneapolis-St. Paul Metropolitan Area, population and household growth over the next 20 years could greatly exceed the projections displayed in Table 2E.**

**Table 2E:
Population, Households, and Average Household Size Projections**

Characteristic	Year				
	2015	2020	2025	2030	2035
<i>Population</i>	38,240	39,556	40,755	41,842	42,716
<i>Households</i>	15,296	15,950	16,567	17,148	17,651
<i>Average Household Size</i>	2.50	2.48	2.46	2.44	2.42

Section C: Physical Characteristics

Climate

The climate of McLeod County varies drastically by season. During the winter months, cold, dry polar air dominates the region. Hot, dry air masses from the desert southwest, along with warm, moist maritime tropical air masses that originate over the Gulf of Mexico, are common during the summer months. The spring and fall months serve as transition periods between the summer and winter, with alternating intrusions of air from various sources.

According to Figure 2C, the average daily temperature for the County is between 43 and 45 degrees F. The National Weather Service (NWS) operates a climate monitoring station near Hutchinson. The 30-year (1971-2000) average annual temperature for the station was 43.7 degrees F. The temperature extremes for this station are provided in Table 2F. The maximum one-day temperature ever recorded was 104 degrees F; this occurred on August 1, 1988. The lowest one-day temperature ever recorded was -39 degrees F; this extreme was reached on January 18, 1994.

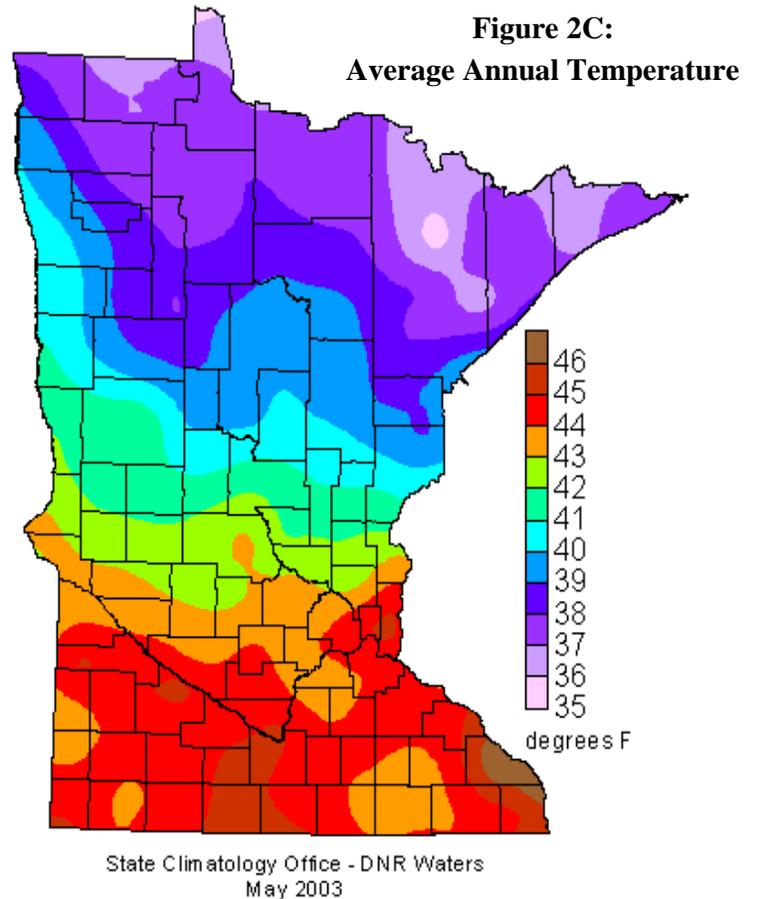
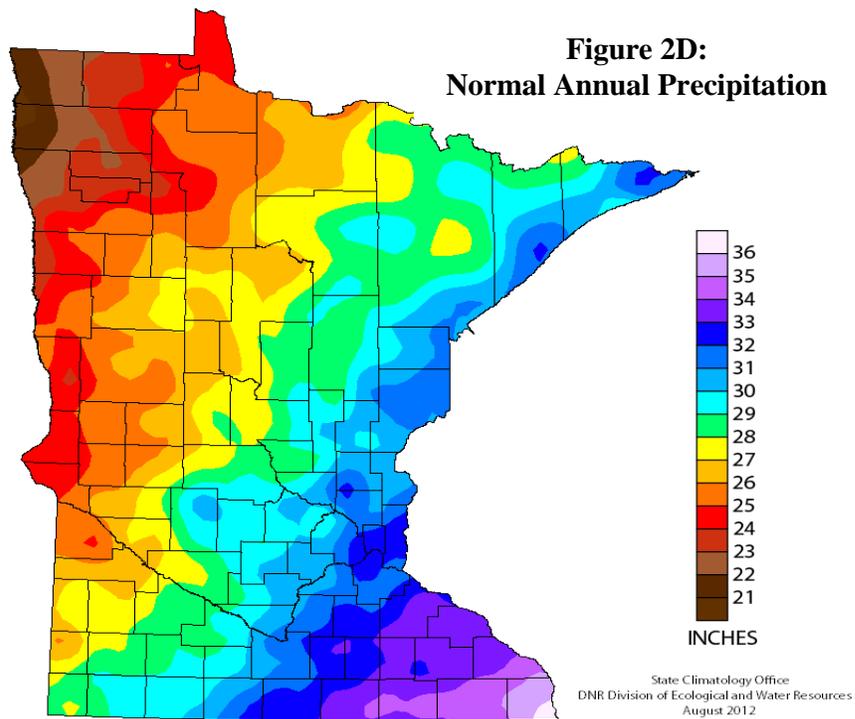


Figure 2D displays the State’s average annual precipitation (1981-2010), as determined by the Minnesota Climatology Working Group. Notice that the County received between 27 and 30 inches of precipitation annually over this period. Seasonal precipitation, the total precipitation between the months of May and September, for the County was approximately 20 inches annually. The precipitation extremes for the NWS station near Hutchinson are presented in Table 2G. The maximum one-day precipitation was 6.00 inches; this occurred on June 29, 1997.

**Table 2F:
Temperature Extremes for NWS Station near Hutchinson (1899-2001)**

Month	Temperature (°F)							
	High Mean	Year	Low Mean	Year	1-Day Max	Date	1-Day Min	Date
<i>January</i>	46.5	1900	-0.8	1977	74	01-28-1900	-39	01-18-1994
<i>February</i>	31.1	1987	6.2	1989	60	02-25-1976	-36	02-02-1996
<i>March</i>	41.0	1968	17.6	1965	83	03-30-1968	-32	03-01-1962
<i>April</i>	53.7	1977	38.4	1975	95	04-21-1980	3	04-03-1975
<i>May</i>	66.7	1977	52.4	1997	99	05-15-2001	20	05-03-1967
<i>June</i>	74.0	1988	61.1	1969	102	06-25-1988	37	06-02-1964
<i>July</i>	76.8	1983	64.6	1992	102	07-14-1980	44	07-04-1967
<i>August</i>	76.1	1983	64.8	1992	104	08-01-1988	38	08-14-1964
<i>September</i>	65.7	1978	52.6	1965	98	09-07-1978	22	09-22-1974
<i>October</i>	58.4	1963	42.4	1988	89	10-01-1963	12	10-27-1976
<i>November</i>	44.7	2001	22.9	1996	81	11-09-1999	-18	11-26-1977
<i>December</i>	28.1	1965	-0.1	1983	65	12-02-1998	-34	12-19-1983



Chapter Two: County Profile

Annual snowfall for the County is approximately 40 inches; however, this represents only a small portion of the annual precipitation due to the low moisture content of snow. Minor flooding can occur in the spring as a result of a number of factors including a deep, late winter snow pack, frozen soil prohibiting the infiltration of water, and rapid snow melt due to an intrusion of warm air and precipitation.

**Table 2G:
Precipitation Extremes for NWS Station near Hutchinson (1893-2001)**

Month	Precipitation (in)					
	High	Year	Low	Year	1-Day Max	Date
<i>January</i>	3.47	1999	0.01	1974	2.50	01-07-1999
<i>February</i>	2.51	1919	0.00	1894	1.05	02-14-1919
<i>March</i>	5.26	1965	0.07	1959	3.42	03-04-1985
<i>April</i>	6.55	2001	0.15	1987	2.77	04-23-2001
<i>May</i>	7.37	1991	0.57	1958	2.81	05-05-1959
<i>June</i>	9.06	1990	0.09	1988	6.00	06-29-1997
<i>July</i>	9.33	1997	0.54	1975	3.48	07-23-1977
<i>August</i>	6.93	1981	0.23	1950	4.50	08-26-1967
<i>September</i>	5.99	1991	0.19	2000	3.70	09-08-1991
<i>October</i>	5.80	1968	0.00	1895	2.38	10-10-1973
<i>November</i>	4.96	1991	0.00	1967	2.57	11-01-1991
<i>December</i>	2.99	1918	0.00	1895	1.33	12-28-1959

Watersheds

McLeod County is located within three major watersheds. The first two are part of the Upper Mississippi River Drainage Basin: the North Fork of the Crow River and South Fork of the Crow River Watersheds. The other, the High Island Creek Watershed, is part of the Lower Minnesota River Watershed. A brief description of each watershed is provided below:

- **The North Fork of the Crow River Watershed** covers approximately 16.2 square miles of northern McLeod County. Major waterbodies include Byron, Echo, Hook, and Todd

Chapter Two: County Profile

Lakes. The Watershed is divided into 3 minor watersheds, with a general flow direction to the north. Cultivated agricultural land is the predominant land use. There are no cities located within the North Fork of the Crow River Watershed.

- **The South Fork of the Crow River Watershed** is the largest watershed in McLeod County, covering approximately 425.8 square miles. Major waterways flowing through the Watershed include Buffalo Creek and the South Fork of the Crow River. In addition, numerous lakes are found in the Watershed, including Belle, Cedar, Eagle, Marion, and Silver. The Watershed is divided into 39 minor watersheds, with a general flow direction to the east. Cultivated agricultural land is the predominant land use. The cities of Biscay, Brownton, Hutchinson, Glencoe, Lester Prairie, Plato, Silver Lake, and Winsted are located in the South Fork of the Crow River Watershed.
- **The High Island Creek Watershed**, which is part of the Lower Minnesota River Watershed, covers approximately 63.3 square miles of southwestern McLeod County. The most notable waterway in the Watershed is High Island Creek. Baker's Lake and King's Lake are the Watershed's major waterbodies. The Watershed is divided into 13 minor watersheds, with a general flow direction to the south. Cultivated agricultural land is the predominant land use. A portion of the City of Stewart is located within the High Island Creek Watershed.

Public Drainage Ditches

An extensive network of 320 miles of public drainage ditches have been established in the County. These systems serve as conveyance systems for surface water and as outlets for subsurface tile lines. Nonpoint source pollutants, including bacteria, nutrients, and sediment, commonly degrade drainage systems. These pollutants can impact the quality of other water resources in the County, due to the interconnectiveness of ditches, lakes, and streams. Drainage ditches can also pose a water quantity threat. Ditches are designed to remove large quantities of water in a relatively short duration. As a result, flooding can occur, especially following major storm events and during the spring snowmelt. To minimize potential flooding, upland storage, including wetland restoration, needs to be increased to reduce the overall volume of water transported by ditch systems. Drainage systems are regulated under Minnesota State Statutes, Chapter 103E (also known as The Drainage Law). All of the systems are operated under the authority of the County.

Water Control Structures

Table 2H lists the nine water control structures in the County that have been classified as dams by the DNR, most of which have been assigned a hazard potential. A dam’s hazard potential is rated 1 to 3; the lower the rating a dam receives, the higher the risk for structural, economic, and human life loss if it were to fail. According to the Table, all of the rated dams in the County have been classified as having a hazard potential rating of 3 (the safest rating).

**Table 2H:
Dams in McLeod County**

Name/ Location	DNR ID	Township	Section	Hazard Potential
Addie Lake	MN01173	Sumter	19	3
Bakers Lake	NA	Penn	20	NA
Buffalo Creek	MN01174	Collins	23	3
Hutchinson	MN00158	Hutchinson	31	2
Marion Lake	MN00156	Collins	13	3
Otter Creek	MN01175	Winsted	35	3
Round Grove Lake	MN00157	Round Grove	7	3
Swan Lake	MN01176	Hale	30	3
Winsted Lake	MN00159	Winsted	12	3

Floodplains

Historically, development has occurred adjacent to waterways and lakes, areas that are often subject to flooding. In order to protect existing property and structures within these areas, the Federal and State governments have enacted laws regulating floodplains. The DNR and the Federal Insurance Administration, under the Federal Emergency Management Agency (FEMA), are responsible for regulating and defining areas of flood hazard, known as the 100-year floodplain. The State of Minnesota, through the Floodplain Management Act, requires local governments to adopt a floodplain ordinance compliant with minimum State and Federal standards. This ordinance stresses the reduction of flood damages through nonstructural controls, such as wise land use, in addition to structural controls, and encourages a community floodplain management program with preventive actions to reduce flood risk. The DNR administers and enforces the Floodplain Management Act, serves as the coordinating agency for the National Flood Insurance

Chapter Two: County Profile

Program and oversees local enforcement of county or municipal floodplain ordinance. Local enforcement is generally through the county or municipal zoning official and the regional DNR hydrologist. Land use and building permits are strictly regulated within the floodplain, local governments have the authority to issue conditional use permits after a special administrative review. McLeod County has adopted a Floodplain Ordinance and participates in the National Flood Insurance Program offered through FEMA.

Aquifers

Aquifers are defined as water-bearing porous soil or rock strata that yield significant amounts of water to wells. The two principal aquifer types in the County are glacial drift and bedrock. Glacial drift aquifers, which are the most commonly used domestic and agricultural water sources, include surficial-drift aquifers and buried-drift aquifers. Surficial-drift aquifers are made up of sand or gravel deposits located at or near the surface. These aquifers are generally unconfined and have well depths ranging from 30-240 feet deep, with yields ranging from 25-500 gallons per minute. The water of these aquifers is generally of good quality, with high concentrations of iron and manganese present in some areas. Nitrate contamination is also a significant concern. Buried-drift aquifers are comprised of sand or gravel deposits, but because of repeated glaciation, are confined beneath layers of silt and clay. Well depths in these aquifers range from 80-380 feet deep, with yields of approximately 25-500 gallons per minute. Water from these aquifers generally contains high concentrations of iron, manganese, sulfate, and chloride.

Bedrock aquifers consist of two types in the County: Cretaceous and Precambrian. Cretaceous aquifers are made up of sandstone lenses near the base of a predominant shale section. The water associated with these aquifers is commonly hard and is generally confined. Large sulfate, chloride, and dissolved solids concentrations exist in many areas. Generally, depth to bedrock is greater than 200 feet. These aquifers typically yield 10-250 gallons per minute. Precambrian aquifers are undifferentiated and only exist in faults and fractures. Found at depths of 340 to 500 feet, these aquifers commonly yield 5 to 25 gallons per minute.

Topography

Generally, elevations within the County range from approximately 1,000 to 1,100 feet above sea level. The highest point is found in Section 4 of Acoma Township, at an elevation of 1,145 feet above sea level. The lowest point in the County is found in Section 12 of Bergen Township, at an elevation of 947 feet above sea level.

Presettlement Vegetation

The DNR has inventoried the original vegetation of the State through its Presettlement Vegetation Database. Presettlement vegetation was determined by analyzing the detailed maps and records of early surveyors (circa 1895). The purpose of this database was to enable analysis of presettlement vegetation patterns for determining natural community potential and patterns of disturbance.

Prior to settlement, McLeod County was predominately covered with upland prairie and prairie wetland vegetation; however, large stands of hardwood trees were commonly found throughout the northeastern portion of the County. The upland prairie occupied a wide variety of landforms, including beach ridges and swales, glacial lakebeds, morainic hills, steep bluffs, and rolling till plains. Big bluestem and Indian grass occupied the deep soils of the moist uplands, while little bluestem and side oats grama covered the thin soils of the dry uplands. In general, bluejoint, prairie cordgrass, rushes and sedges dominated the lowland areas and wetlands. Many of these wetlands are known today as “prairie potholes”.

The oak woodland and brushland was a common ecotonal type between the prairie and deciduous forest. Fire, more than topography or climate, was the primary factor influencing the location and extent of this type of vegetation. The oak woodland and brushland ranged from small groves of trees intermixed with open prairie, to communities of scrub forest and dense scrub thicket. The dominant tree species were bur and pin oak. Maple-basswood forests were dominated by elm, basswood, sugar maple, and red oak. These forests were highly sensitive to fire. As a result, their boundaries were in large part controlled by the frequency of fire. The forests were restricted to areas where natural firebreaks (such as rivers, lakes, and rough topography) prevented the spread of fire from the adjacent prairie lands.

Land Use (2000)

The University of Minnesota, Remote Sensing and Geospatial Analysis Laboratory developed the *Minnesota 2000 Level 1 Landsat Landcover Classification*, which offers the most recent land use data for the County. The landcover type was derived via multitemporal, multispectral supervised image classification of satellite imagery acquired by the Landsat TM and Landsat ETM+ satellites. A seven-category classification scheme was developed to categorize data. The following describes the types of land uses found in each category.

- ***Agriculture*** - An area where the primary cover type during the growing season is an agricultural cover type, including row crops, forage crops, and small grains. Examples: corn, soybeans, alfalfa, oats, wheat, and barley.

Chapter Two: County Profile

- **Forest** - An upland area of land covered with woody perennial plants, the tree reaching a mature height of at least 6 feet tall with a definite crown. Examples: white pine, red pine, oak, mixed conifer, and mixed deciduous.
- **Grassland** - An upland area covered by cultivated or non-cultivated herbaceous vegetation predominated by grasses, grass-like plants, and forbs. Includes non-agricultural upland vegetation dominated by short manicured grasses and forbs, as well as non-cultivated herbaceous upland vegetation dominated by native grasses and forbs. Examples: golf courses, lawns, athletic fields, dry prairies, and pastures.
- **Shrubland** - An upland or lowland area with vegetation that has a persistent woody stem, generally with several basal shoots, low growth of less than 20 feet in height. Examples: alder, willow, buckthorn, hazel, sumac, and scrub oak.
- **Urban/Developed** - An area containing any amount of impervious cover of man-made solid materials or compacted soils, including areas with interspersed vegetation. Examples: parking lots, shopping malls, warehouses, industrial parks, highways, sparse development, single family residential developments, single lane roads, and mines.
- **Water** - An area of open water with none or very little above surface vegetation. Examples: lakes, streams, rivers, and open wetlands.
- **Wetland** - A lowland area with a cover of persistent and non-persistent herbaceous plants standing above the surface of wet soil or water. Examples: cattails, marsh grass, sedges, and peat.

According to Table 2I, agricultural land is the predominant land use in the County, comprising 70.6 percent of its area. Relatively minor land uses include Urban/Developed (10.7%), Wetland (8.6%), Forest (5.0%), Water (2.4%), Grassland (2.0%), and Shrubland (0.8%).

**Table 2I:
Land Use Analysis of McLeod County (2000)**

Land Use	Area (ac)	County (%)
<i>Agriculture</i>	228,205	70.6
<i>Urban/Developed</i>	34,519	10.7
<i>Wetland</i>	27,840	8.6
<i>Forest</i>	16,121	5.0
<i>Water</i>	7,626	2.4
<i>Grassland</i>	6,578	2.0
<i>Shrubland</i>	2,454	0.8
Total	323,343	100.0

Public Land Ownership

The majority of land in the County is privately owned. Based on available data from local, State, and Federal agencies, public land accounts for only 1.2% of the area of the County. Table 2J presents an inventory of the major public lands. The DNR, Division of Fish and Wildlife (2,477 acres) manages the most public land. It is important to note that these figures do not account for land that is enrolled in conservation easement programs, such the Conservation Reserve Program and Reinvest in Minnesota.

**Table 2J:
Public Lands Inventory for McLeod County**

Public Agency	Number of Tracts	Area (acres)
<i>DNR, Division of Fish and Wildlife</i>	22	2,477
<i>Bureau of Land Management</i>	9	635
<i>U.S. Fish and Wildlife Service</i>	3	487
<i>Department of Transportation</i>	8	387
<i>Department of Military Affairs</i>	1	40
<i>DNR, Division of Trails and</i>	1	40
<i>DNR, Division of Forestry</i>	1	38
Total	45	4,104

Section D: Critical Facilities and Infrastructure

The County's infrastructure and facilities are important for its normal functioning and the health, safety, and general welfare of its residents. This section identifies McLeod County's important critical infrastructure and facilities, including subsections on transportation, schools, medical facilities, waste facilities, and historic sites.

Transportation

The primary purpose of any transportation system is to move goods and people both safely and efficiently. An efficient and balanced transportation system includes highways, railroads, mass transit, and aeronautics. While the most influential mode of transportation is the automobile, the other types of transportation play an important role in the overall network.

Highways

The current highway network in McLeod County has been built in response to an ever-increasing public demand for improved mobility. The local units of government and Mn/DOT are all responsible for assuring that the total highway system operates properly and the roads owned by the different levels of government are integrated into the overall highway system. McLeod County is well served by an extensive roadway network, which connects the County with the rest of the region and the State. McLeod County has a well-balanced mix of City, Township, County, and State roadways, nicely spaced throughout the County.

The Functional Classification System is a method used to describe the main function each road performs in the highway network. It is essentially a hierarchy of roads using criteria that describes the function that a particular road performs in a highway network (typically access and mobility). There is a general agreement among the public that the responsibility for the most important roads should be assigned to the highest level of government. In this fashion, the greatest resources for road maintenance and construction are devoted to the most heavily traveled roads. It follows that less traveled roads become the responsibility of local levels of government. Definitions for each of the road types in the Functional Classification System are provided below:

- **Principal Arterial** – These highways provide an integrated network of routes, which carry the highest traffic volumes, serve the longest trip movements, and provide for statewide or interstate travel. They serve all major urbanized areas and population centers. Principal arterial routes provide for through movement with minimum interference.

Chapter Two: County Profile

- **Minor Arterial** – These highways link cities, larger towns, and other major traffic generators, such as major resort areas, to each other and to principal arterial routes. They form an integrated network which provides for movement within the State and between counties.
- **Major Collectors** – These routes provide service to the county seat and to the larger cities not served by principal or minor arterials. They predominately serve trips within the County and link locally important traffic generators with their service areas and other nearby larger cities with higher order routes.
- **Minor Collectors** – These routes link smaller cities and locally important traffic generators and provide developed areas with reasonable access to a higher functioning roadway.
- **Local Roads** – The rural local roads primarily service relatively low traffic volumes and short distance trips.

A breakdown of the Rural Functional Classification System for McLeod County is given in Table 2K. Notice that the vast majority of roads are classified as Local Roads (66%), with lesser percentages in the Major and Minor Collectors (22%), Minor and Principal Arterial (12%), and Principal Arterial (7%) categories. Generally, these percentages are within the suggested guidelines established by the Mn/DOT for rural areas.

**Table 2K:
Rural Functional Classification System Summary for McLeod County**

Road Type	McLeod County (%)	Mn/DOT Suggested (%)
<i>Principal Arterial</i>	7	2-4
<i>Minor and Principal</i>	12	6-12
<i>Major and Minor Collectors</i>	22	20-25
<i>Local Roads</i>	66	65-75

In order to protect the integrity and prolong the lifespan of the roads, weight restrictions are imposed on the paved roads in McLeod County. Spring weight restrictions are intended to restrict weights on roads when they are most vulnerable to damage (spring is a critical period for roads because the soils and aggregate materials are weak while the frost leaves the road). By State law, all County and Township roads are automatically reduced to five-ton per-axle weight

Chapter Two: County Profile

limit (unless posted otherwise) at the same time as spring road restrictions are placed on state highways.

Railroads

There is one rail line in McLeod County. The Twin Cities and Western (TC&W) Railroad operates a class two rail line that runs parallel to U.S. Highway 212, through the communities of Brownnton, Glencoe, Plato, and Stewart.

The efficiency of a railroad is affected by the physical condition of the rail lines. The Federal Railroad Administration (FRA) track classification is based upon the physical characteristics of the roadbed, track geometry, and track structure. There are four different track classifications with maximum freight and passenger speeds (Table 2L). Characteristics related to the roadbed include drainage and vegetation. Track geometry includes gauge, alignment, elevation, and surface. Track structure involves ballast, ties, rail, spikes, joints, and switches. These characteristics determine the allowable operating speeds for each rail line.

**Table 2L:
FRA Railroad Track Classification**

Class	Freight Speed (mph)	Passenger Speed (mph)
<i>One</i>	10	15
<i>Two</i>	25	30
<i>Three</i>	40	60
<i>Four</i>	60	80

Mass Transit

Mass transit is considered to be an essential public service. Mass transit provides for increased capacity on heavily traveled roads, provides transportation access to persons with disabilities or those otherwise unable to drive, supports dense land use development, decreases dependence on car use, and helps to prevent the creation of additional air pollution from diminished individual car use. Trailblazer Transit provides public transit service within the County. Buses provide daily on-demand service Countywide, generally between 6:30 a.m. and 5:30 p.m., Monday through Friday.

Aeronautics

There are three public airports located within the County, serving the communities of Glencoe, Hutchinson, and Winsted. The Glencoe Municipal Airport (Vern Perschau Field) offers a 3,300-foot, paved runway. The Hutchinson Municipal Airport (Butler Field) has a 4,000-foot, paved runway. Finally, the Winsted Municipal Airport offers a 3,248-foot, turf runway.

Schools

McLeod County has four school districts that serve residents kindergarten through grade 12: Howard Lake-Waverly-Winsted, Hutchinson, Glencoe-Silver Lake, and Lester Prairie. Table 2M lists the types of schools in each of the cities. In addition to the public schools listed, there are parochial schools in Glencoe, Hutchinson, and Winsted. There is also a community and technical college in Hutchinson (Ridgewater College).

**Table 2M:
Schools in McLeod County**

Community	School			
	Elementary	Middle	High	Parochial
<i>Glencoe</i>	X	X	X	X
<i>Hutchinson</i>	X	X	X	X
<i>Lester Prairie</i>	X	X	X	
<i>Silver Lake</i>	X			
<i>Winsted</i>	X			X

Medical Facilities

A listing of medical facilities in McLeod County is provided in Table 2N. The County is served by two hospitals, Glencoe Regional Health Services and Hutchinson Health. Residents are also served by clinics that are located in Lester Prairie, Stewart, and Winsted.

**Table 2N:
Medical Facilities in McLeod County**

City	Facility Type	Facility Name
<i>Glencoe</i>	Hospital	Glencoe Regional Health Services
<i>Hutchinson</i>	Hospital	Hutchinson Health
<i>Lester Prairie</i>	Clinic	Lester Prairie Clinic-Glencoe Regional Health Services
<i>Stewart</i>	Clinic	Stewart Clinic-Glencoe Regional Health Services
<i>Winsted</i>	Clinic	Ridgeview Winsted Clinic

Landfills and Demolition Landfills

According to the MPCA, there are three existing landfills in McLeod County. The Spruce Ridge Resource Recovery Management Facility is a privately owned landfill located in Rich Valley Township; Waste Management, Inc. currently operates the site. There are also two demolition landfills, the Hansen Demolition Landfill and the Allview Demolition Landfill, that operate in Lynn Township.

Household Hazardous Waste Facility

The McLeod County Household Hazardous Waste (HHW) Facility is located at 1065 5th Avenue SE in Hutchinson. Products accepted at the facility include paint, stain, varnish, fuels, pesticides, aerosols, poisons, and acids. In addition to accepting the materials listed above, the facility houses the Product Exchange. The exchange consists of usable products such as latex paint, aerosols, cleaners, etc, brought to the facility. These products are available for reuse free of charge and change daily; however, their condition or availability cannot be guaranteed. The McLeod County HHW Facility is open year round, every Tuesday through Friday, from 8:00 AM to 4:00 PM.

Historic Sites

The Minnesota Historical Society maintains a list of all Minnesota properties included in the National Register of Historic Places. As of 2005, seven properties in McLeod County were included in the list. They include the following:

- American House Hotel, 12th and Ford Streets, Glencoe
- Merton S. Goodnow House, 446 South Main Street, Hutchinson
- Lewis Harrington Home, 225 West Washington Avenue, Hutchinson
- Hutchinson Carnegie Library, Main Street, Hutchinson
- Maplewood Academy, 700 North Main Street, Hutchinson
- McLeod County Courthouse, 830 11th Street East, Glencoe
- Winsted City Hall, 181 1st Street North, Winsted

The National Register of Historic Places is the nation’s official list of properties deemed worthy of preservation. The Register is maintained by the National Park Service in the U.S. Department of the Interior, and is administered by a Historic Preservation Office in each state. The National Register recognizes properties that have local, state, or national significance. Properties may be listed on the National Register because of their association with significant persons and events, because of their architectural or engineering significance, or because they contain important information about our history or prehistory.

Section E: Existing Plans, Ordinances, and Official Documents

Information was incorporated into the County’s Hazard Mitigation Plan from the following existing plans, ordinances, and official documents (also refer to Section F of this Chapter):



- **McLeod County Comprehensive Land Use Plan (1992)** – The Plan contains the goals, policies, and implementation steps that guide the County in land use management on a day-to-day basis. Goals cover the topics of growth management, fiscal responsibility, agricultural preservation, land development regulation, resource stewardship, and growth promotion.

Although the McLeod County Comprehensive Plan is slightly outdated being over 20 years old, much of the background information describing the County and development trends was incorporated into Chapter Two. In addition, the Comprehensive Plan’s Goals helped shaped the new Goals identified in the 2014 Mitigation Plan update, particularly the new goal of *implementing fiscally sound projects which mitigate the impacts of natural disasters*.

- **McLeod County Zoning Ordinance (2006)** – This document regulates land development by separating incompatible land uses outside of the incorporated areas into zoning districts, including a floodplain district. The vast majority of the County is zoned for agricultural purposes. The floodplain district information in the Ordinance was incorporated into the flooding hazard assessment found in Chapter Three.
- **McLeod County Comprehensive Water Plan (2013)** – This document contains the goals, objectives, and action steps related to the County’s vast water resources. The Plan is a requirement to receive an annual grant through the Board of Water and Soil Resources. The Marsh Water Project was profiled and listed as a priority water plan action step. The project was mainly designed to mitigate flooding in the City of Glencoe. In addition to the City, McLeod County and the Buffalo Creek Watershed District are also participating stakeholders.
- **McLeod County Emergency Operations Plan (2014)** – The purpose of the Plan is to ensure the effective, coordinated use of resources, so as to maximize the protection of life and property, ensure the continuity of government, and provide support to all political subdivisions in the County which require assistance in response to any major disaster. The Plan contains three primary parts: an all-hazard basic plan, a series of standard operating guidelines, and a resource manual. The basic plan focuses primarily on the

Chapter Two: County Profile

assignment of emergency responsibilities and on general operation guidelines. The operations guidelines are detailed procedural documents to be used by the personnel who are expected to carry out the responsibilities assigned in the basic plan. Finally, the resource manual is an inventory of materials, equipment, supplies, and organizations that could be needed in the event of a major emergency/disaster.

Many of the action steps identified in the County's 2008 Mitigation Plan were routine items addressed in the County's EOP. As a result, some of the redundant action steps were eliminated in the 2014 Plan update.

- **McLeod County Public Health Emergency Preparedness Plan (2014)** – This guidance document is designed to help local public health and emergency management officials respond more effectively and efficiently to an emergency involving a public health response.

Similar to the County's EOP, many of the action steps identified in the County's 2008 Mitigation Plan were routine items addressed in the County's Emergency Preparedness Plan. As a result, some of the redundant action steps were eliminated in the 2014 Plan update.

- **2014 Minnesota All Hazard Mitigation Plan** - The State of Minnesota officially adopted the Minnesota All Hazard Mitigation Plan Update on March 14, 2014. The Plan covers a three-year period and meets all of the Disaster Mitigation Act of 2000 requirements for an updated Standard State Mitigation Plan. The overall goal of the Plan is to eliminate or reduce the impact of natural and human-caused incidents on the people and property in Minnesota.

The State's Hazard Mitigation Plan helped form the foundation for the hazards profiled in Chapter Three and a few of the action steps identified in Chapter Five.

- **Buffalo Creek Watershed District Plan (2014)** – The Watershed District maintains an Overall Plan covering a five-year implementation period. The District recently updated the Plan in 2014, so a number of the flood mitigation projects identified in the Overall Plan were incorporated in the County's 2014 Mitigation Plan update. The Watershed District also had a Board Manager participate on the County's Hazard Mitigation Task Force.

The coordinated implementation of these documents forms a sound basis for all hazard mitigation projects, plans, and activities. Each of these documents should be consulted for further details on the information presented herein.

**Section F:
Capabilities Assessment**

This Section of Chapter Two provides a description of what types of plans and ordinances exist in the County along with which cities in McLeod County have the same type of official controls. The intent is to assess the County's overall capacity to address and implement hazard mitigation activities and to determine where improvements could be made.



Official Plans

Official plans refer to documents prepared and adopted by local jurisdictions to address a number of specific topics or issues. Examples of official plans include comprehensive plans, transportation plans, water plans, and economic development plans. Table 2O provides a summary of the following official plans adopted by the Hazard Mitigation Plan's participating jurisdictions.

Comprehensive Plans – are documents that outline goals and policies directing land use and community development over 5 to 20 years. Comprehensive plans vary in content but normally contain sections on transportation, land use, recreation, housing, and the environment. The County's Comprehensive Plan was updated in 1992 was intended to cover a 20-year timeframe. As a result, McLeod County will soon be updating its comprehensive plan. This will provide a great opportunity for hazard mitigation activities to be incorporated into the County's Plan.

Capital Improvements Plans – are short-range plans, usually four to ten years, which identifies capital projects and equipment purchases, provides a planning schedule and identifies options for financing. These plans provide a link between a jurisdiction's annual budget and the major anticipated expenditures for roads, bridges, facilities, and similar projects. McLeod County maintains an extensive five-year capital improvements plan (or list) which is discussed and updated annually.

Redevelopment Plans – facilitate development in specific geographic areas that have already previously been developed. An example of a redevelopment plan is converting an industrial area into commercial and mixed residential development. Another example is targeting an older residential neighborhood and offering low-interest loans to homeowners for rehabilitation.

The only such program in McLeod County is City of Hutchinson has an established Hutchinson Housing and Redevelopment Authority (HRA). The Hutchinson HRA offers a number of housing programs to promote decent, safe and affordable housing within the community of Hutchinson. The Fix-Up Home Improvement Loan Program is available outside of Hutchinson.

**Table 20:
McLeod County & City Official Plans**

Participating Jurisdictions	<i>McLeod County</i>	<i>City of Biscay</i>	<i>City of Brownton</i>	<i>City of Glencoe</i>	<i>City of Hutchinson</i>	<i>City of Lester Prairie</i>	<i>City of Plato</i>	<i>City of Silver Lake</i>	<i>City of Stewart</i>	<i>City of Winsted</i>
Official Jurisdictional Plans or Documents (Y=Yes; N=No; I=Included in another jurisdiction)										
Comprehensive Plan	Y	N	Y	Y	Y	Y	Y	Y	Y	Y
Capital Improvements Plan	Y	N	N	Y	Y	Y	N	N	N	Y
Redevelopment Plan	N	N	N	N	Y	N	N	N	Y	N
Land Use/Growth Management Plan	Y	N	Y	Y	Y	Y	Y	Y	Y	Y
Emergency Operations Plan	Y	N	N	N	N	N	N	N	N	N
County / Local Emergency Plan	Y	I	I	I	I	I	I	I	I	I
County / Local Recovery Plan	N	N	N	N	N	N	N	N	N	N
Local Mitigation Plan	Y	I	I	I	I	I	I	I	I	I
Economic Development Plan	Y	I	I	I	I	I	I	I	I	I
Pandemic/Public Health Incident Response Plan	Y	N	N	N	N	N	N	N	N	N
Transportation Plan	I	I	I	I	I	I	I	I	I	I
School Disaster Plan	N	N	N	N	N	N	N	N	N	N
Environment and Natural Resources Plan	Y	N	N	N	N	N	N	N	N	N
Strategy Implementation Plan (Strategic Plan)	N	N	N	N	N	N	N	N	N	N
County Parks Plan	I	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Water / Watershed Management Plan	Y	I	I	I	I	I	I	I	I	I
SWCD Local Water Management Plan	Y	I	I	I	I	I	I	I	I	I
Wildfire Plan	N	N	N	N	N	N	N	N	N	N
Critical Facilities Plan	N	N	N	N	N	N	N	N	N	N
Evacuation Route Map / Plan	Y	I	I	I	I	I	I	I	I	I
Critical Facilities Inventory	N	N	N	N	N	N	N	N	N	N
Vulnerable Population Inventory	N	N	N	N	N	N	N	N	N	N

**Table 20:
McLeod County & City Official Plans
Continued...**

Participating Jurisdictions	<i>McLeod County</i>	<i>City of Biscay</i>	<i>City of Brownton</i>	<i>City of Glencoe</i>	<i>City of Hutchinson</i>	<i>City of Lester Prairie</i>	<i>City of Plato</i>	<i>City of Silver Lake</i>	<i>City of Stewart</i>	<i>City of Winsted</i>
Official Jurisdictional Plans or Documents (Y=Yes; N=No; I=Included in another jurisdiction)										
Soil Conservations Plans	Y	I	I	I	I	I	I	I	I	I
Continuity Operations Plan	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Storm Water Plan	N	N	N	Y	Y	N	N	N	N	N
National Flood Insurance Program	Y	N	Y	Y	Y	Y	Y	Y	Y	Y
Emergency Response Plan	Y	I	I	I	I	I	I	I	I	I
Emergency Action Plan	Y	N	N	N	N	N	N	N	N	N
Groundwater Protection Plan	Y	I	I	I	I	I	I	I	I	I
Wellhead Protection Plan	N	N	N	N	Y	N	Y	N	N	N
Snow Removal Plan	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Communications Plan	Y	I	I	I	I	I	I	I	I	I
Regional Development Plans	N	N	N	N	N	N	N	N	N	N
NFIP Floodplain Management Plan	Y	N	Y	Y	Y	Y	Y	Y	Y	Y
Emergency Response Plan for Nuclear Plant	N	N	N	N	N	N	N	N	N	N
Local Planning Assistance Mock-Hazard Plan	N	N	N	N	N	N	N	N	N	N
Road Closure Plan	N	N	N	N	N	N	N	N	N	N
Human Quarantine Plan	Y	I	I	I	I	I	I	I	I	I
Wildfire Integrated Response Plan	N	N	N	N	N	N	N	N	N	N
National Fire Plan	N	N	N	N	N	N	N	N	N	N
Water Emergency and Conservation Plan	N	N	N	N	N	N	N	N	N	N
Community Needs Assessment	N	N	N	N	N	N	N	N	N	N

Land Use/Growth Management Plan – a set of techniques used by government to ensure that as the population grows that there are services available to meet their demands. These are not necessarily only government services. Other demands such as the protection of natural spaces, sufficient and affordable housing, delivery of utilities, preservation of buildings and places of historical value, and sufficient places for the conduct of business are also considered. Land use involves the management and modification of natural environment or wilderness into built environment such as settlements and semi-natural habitats such as arable fields, pastures, and managed woods. It also has been defined as "the arrangements, activities and inputs people undertake in a certain land cover type to produce, change or maintain it" (FAO, 1997a; FAO/UNEP, 1999). All of the land use/growth management language found for McLeod County and its cities is found in their corresponding comprehensive plans.

Emergency Operations Plan – describe who will do what, as well as when, with what resources, and by what authority before, during, and immediately after an emergency. They define the scope of preparedness and emergency management activities necessary for that jurisdiction. A jurisdiction's EOP is a document that:

- Assigns responsibility to organizations and individuals for carrying out specific actions that exceed routine responsibility at projected times and places during an emergency
- Sets forth lines of authority and organizational relationships and shows how all actions will be coordinated
- Describes how people (including unaccompanied minors, individuals with disabilities, others with access and functional needs, and individuals with limited English proficiency) and property are protected
- Identifies personnel, equipment, facilities, supplies, and other resources available within the jurisdiction or by agreement with other jurisdictions
- Reconciles requirements with other jurisdictions.

An EOP is flexible enough for use in all emergencies. McLeod County maintains a current EOP which is updated annually. The EOP covers McLeod County and of the cities located within.

County / Local Emergency Plan - The focus of local and tribal EOPs is on the emergency measures that are essential for protecting the public. At the minimum, these measures include warning, emergency public information, evacuation, and shelter information (*source: www.fema.gov*). This information is contained in the County's Emergency Operations Plan.

County / Local Recovery Plan - Recovery encompasses both short-term and long-term efforts for the rebuilding and revitalization of affected communities. Recovery planning builds stakeholder partnerships that lead to community restoration and future sustainability and resiliency (*source: www.fema.gov*). The County does not currently have this type of plan.

Chapter Two: County Profile

Local Mitigation Plan – outline a jurisdiction’s strategy for mitigating the hazards it faces. The Disaster Mitigation Act of 2000 requires jurisdictions seeking certain disaster assistance funding to have approved mitigation plans. Mitigation planning is often a long-term effort and may be part of or tied to the jurisdiction’s strategic development plan or similar documents. Mitigation planning committees may differ from operational planning teams in that they include zoning boards, floodplain managers, and individuals with long-term cultural or economic interests. Existing plans for mitigating hazards are relevant to an EOP since both originate from a hazard-based analysis and share similar component requirements.

Economic Development Plan - McLeod County is part of a four county Federally Certified Economic Development District, along with Kandiyohi, Meeker, and Renville counties. The District has been certified by the United States Department of Commerce – Economic Development Administration. The District authors a Comprehensive Economic Development Strategy (CEDS) every five years with a Performance Report authored once a year. The last CEDS was authored in 2011 with the next updated CEDS due the end of 2016. The CEDS includes economic development project priorities for the district, as well as, economic development goals and objectives.

Pandemic or Public Health Incident Response Plan – *The Pandemic and All-Hazards Preparedness Reauthorization Act of 2013* (Pub.L. 113–5, H.R. 307, enacted March 13, 2013) is a law enacted by the 113th United States Congress. The Act amends the Public Health Service Act in order to extend, fund, and improve several programs designed to prepare the United States and health professionals in the event of a pandemic, epidemic, or biological, chemical, radiological, or nuclear accident or attack. The Act clarifies the authority of different American officials, makes it easier to temporarily reassign personnel to respond to emergency situations, and alters the process for testing and producing medical countermeasures. The Act is focused on improving preparedness for any public health emergency. McLeod County Public Health actively maintains County and regional plans that contain pandemic and public health incident response components.

Transportation Plan - is a long-term blueprint of a jurisdiction’s transportation system. The plan identifies and analyzes transportation needs of the region and creates a framework for project priorities. McLeod County has an ongoing 5-year list of road and bridge projects that get updated annually. McLeod County is also in the Minnesota Department of Transportation’s District 8, which also has a long-range transportation plan. Some the flood mitigation components can be incorporated in the final road and bridge plans as they are developed. The key is to be aware of the need prior to the design process.

School Disaster Plan - Each school day, our nation’s schools are entrusted to provide a safe and healthy learning environment for approximately 55 million elementary and secondary school

Chapter Two: County Profile

students in public and nonpublic schools. Families and communities expect schools to keep their children and youths safe from threats (human-caused emergencies such as crime and violence) and hazards (natural disasters, disease outbreaks, and accidents). In collaboration with their local government and community partners, schools can take steps to plan for these potential emergencies through the creation of a school Emergency Operations Plan (school EOP). All of the School Districts in Minnesota are required to current school disaster plans.

Environment and Natural Resources Plan – Environmental planning is the process of facilitating decision making to carry out development with due consideration given to the natural environmental, social, political, economic and governance factors and provides a holistic frame work to achieve sustainable outcomes. The County addressed many of these concerns in both the County’s Comprehensive Plan and Water Plan. The cities’ comprehensive plans also contain extensive environmental policies.

Natural resource management refers to the management of natural resources such as land, water, soil, plants and animals, with a particular focus on how management affects the quality of life for both present and future generations (stewardship). The County’s main natural resource provisions are contained in the County’s Water Plan, which also covers the municipalities.

Strategy Implementation Plan (Strategic Plan) - is an organization's process of defining its strategy, or direction, and making decisions on allocating its resources to pursue this strategy. It may also extend to control mechanisms for guiding the implementation of the strategy. Strategic planning became prominent in corporations during the 1960s and remains an important aspect of strategic management. It is executed by strategic planners or strategists, who involve many parties and research sources in their analysis of the organization and its relationship to the environment in which it competes. No such plans currently exist for McLeod County.

County Parks Plan – as the name implies, county parks plan simply inventory existing park resources and identify future park needs. The County currently has an extensive inventory of park resources, however, future needs have not been identified.

Water / Watershed Management Plan - is the study of the water resources with the intent of identifying sustainable use. Counties in Minnesota are required to have an updated Water Plan with implementation activities identified on a five-year basis. McLeod County’s Water Plan was updated in 2013. Numerous flood mitigation and other sustainable activities were included.

SWCD Local Water Management Plan – the SWCD and the County’s Water Plan are identical documents. The McLeod County SWCD simply must adopt the County’s Water Plan in order to be eligible for operational funding. As a result, the SWCD is one of the lead stakeholders in developing and implementing the County’s Water Plan.

Wildfire Plan – wildfire plans outline action items that will improve a community’s wildfire readiness. No such plans exist in McLeod County, primarily due to low risk of both forest and wildfires.

Critical Facilities Plan (Mitigation/Response/Recovery) - Response embodies the actions taken in the immediate aftermath of an incident to save and sustain lives, meet basic human needs, and reduce the loss of property and the effect on critical infrastructure and the environment. **Recovery** encompasses both short-term and long-term efforts for the rebuilding and revitalization of affected communities. **Mitigation**, with its focus on the impact of a hazard, encompasses the structural and non-structural approaches taken to eliminate or limit a hazard’s presence; peoples’ exposure; or interactions with people, property, and the environment. The emphasis on sustained actions to reduce long-term risk differentiates mitigation from those tasks that are required to survive an emergency safely.

Evacuation Route Map / Plan - A disorganized evacuation can result in confusion, injury, and property damage. The County’s EOP contains information on how to proceed in the event an evacuation is needed. A number of different scenarios are included.

Critical Facilities Inventory – The County’s Emergency Operations Plan (EOP) maintains an updated list of the known critical facilities located throughout the county, including nursing homes, schools, hospitals, infrastructure, etc. The County Assessor can also produce a list of all public building located throughout McLeod County.

Vulnerable Population Inventory – documents the location, extent, and key contact information of where people of need are concentrated in the event a disaster occurs, such as in hospitals, rest homes, and in schools. McLeod County Public Health is currently working with McLeod County Emergency Management to complete this type of inventory.

Soil Conservations Plans - are a set of management strategies for the prevention of soil loss due to both wind and water erosion. These types of implementation activities are contained in the County’s Water Plan.

Continuity Operations Plan - Continuity of Operations (COOP) is a United States federal government initiative, required by U.S. Presidential directive, to ensure that agencies are able to continue performance of essential functions under a broad range of circumstances, including natural disasters. McLeod County and all of the cities have some form of Continuity Operations Plans in place as specified in the County’s Emergency Operations Plan.

Chapter Two: County Profile

Storm Water Plan – Stormwater is water that originates during precipitation events and snow/ice melt. Stormwater can soak into the soil (infiltrate), be held on the surface and evaporate, or runoff and end up in nearby streams, rivers, or other water bodies (surface water). McLeod County addresses this concern by requiring applicants to address storm water concerns in the land use permitting process. The cities of Hutchinson and Glencoe also have stormwater provisions in their city codes. In addition, the Buffalo Creek Watershed District requires stormwater review as part of the District’s land use permitting process.

National Flood Insurance Program - In 1968, Congress created the National Flood Insurance Program (NFIP) to help provide a means for property owners to financially protect themselves. The NFIP offers flood insurance to homeowners, renters, and business owners if their community participates in the NFIP. Participating communities agree to adopt and enforce ordinances that meet or exceed FEMA requirements to reduce the risk of flooding (*source*: www.floodsmart.gov).

Emergency Response Plan – Same as Emergency Operations Plan.

Emergency Action Plan - is a written document required by particular OSHA standards [29 CFR 1910.38(a)]. The purpose of an EAP is to facilitate and organize employer and employee actions during workplace emergencies. Well developed emergency plans and proper employee training (such that employees understand their roles and responsibilities within the plan) will result in fewer and less severe employee injuries and less structural damage to the facility during emergencies. A poorly prepared plan, likely will lead to a disorganized evacuation or emergency response, resulting in confusion, injury, and property damage.

Groundwater Protection Plan – Protecting groundwater quality and quantity have increasingly become important issues throughout Minnesota. The Minnesota Department of Agriculture has produced a map of groundwater recharge areas in McLeod County. The shallow recharge areas are important to protect from contaminants. At the same time, recent droughts have made protecting aquifers a priority. Groundwater protection plans simply outline what jurisdictions are willing to do to regulate groundwater quality and quantity. Although McLeod County does not have a groundwater protection plan, they do have numerous groundwater protection initiatives contained in the County’s Water Plan.

Wellhead Protection Plan –This program, established under the Safe Drinking Water Act, is implemented through state governments. The Minnesota Department of Health has taken the lead on assisting communities with developing Wellhead Protection Plans. These plans delineate a public water supply’s wellhead area, or the land area contributing to the wellhead’s aquifer. The plans are intended to provide jurisdictions with advanced information on how to make land use decisions that can best protect the aquifer.

Snow Removal Plan – Snow removal for most cities and counties in Minnesota consumes a vast amount of financial and human resources. Although none of the local jurisdictions have adopted snow removal plans, all of the jurisdictions have established methodologies on how they go about conducting snow removal. The basic premise is to start with the major roadways and work down to the residential roads. In addition, nearly all of the cities in McLeod County have adopted parking ordinances preventing on-street parking during the winter months to ease the process of snow removal.

Communications Plan – outline the County’s procedures to be followed during a number of emergency scenarios. Specifically, communication plans identify which stakeholders are identified in order of significance depending upon the type of situation. This type of information is contained in the McLeod County Emergency Operations Plan.

Regional Development Plans – McLeod County is located in the Mid-Minnesota Development Commission (MMDC), referred to as MMDC, along with Kandiyohi, Meeker, and Renville Counties. MMDC does not have a regional development plan.

NFIP Floodplain Management Plan - The NFIP provides the maps and regulatory basis for local floodplain management. It is also the primary source of insurance protection for floodprone properties. Although McLeod County has a recently updated Flood Insurance Study (July 7, 2014), the County does not have developed Flood Management Plan.

Emergency Response Plan for Nuclear Generating Plant – The Monticello Nuclear Generating Plant is located approximately 60 north of McLeod County. The Plant has an extensive Emergency Planning Guide developed for the neighboring counties and communities, which details how communities should proceed in the event of a nuclear emergency. No part of McLeod County, however, falls into the Plant’s Emergency Planning Zones and/or Sub-Areas.

Local Planning Assistance Mock-Hazard Plan - The purpose of mock disaster plans is to provide sample response procedures in the event a catastrophic event occurs. These model policies and procedures provide continued operational capability to the greatest extent possible so that essential services may continue with as little interruption as possible. Most of the same type of information is contained in the County’s Emergency Response Plan. As a result, the County does not have a Mock-Hazard Plan.

Road Closure Plan – Road Closure Plans are common in areas that frequently experience closures due severe weather events, such as flooding or winter storms. They are developed for the Country’s Interstate network. Although McLeod County experiences both flooding and

Chapter Two: County Profile

severe winter weather, the Sheriff's Office simply has the ability to close local roads if they are determined to be unsafe.

Human Quarantine Plan – The McLeod County Public Health maintains human quarantine provisions for a number of infectious disease and emergency management scenarios.

Wildfire Integrated Response Plan – are developed by communities to mitigate the risks of forest or wildfires. Due to the low risk of wildfires in Meeker County, none of the participating jurisdictions have developed these types of plans.

National Fire Plan – The United States Forest Service, an agency of the U.S. Department of Agriculture, is responsible for developing fire plans for the Country's 155 national forests. None of these forests are located in Meeker County. As a result, none of the participating jurisdictions have adopted national fire plans.

Water Emergency and Conservation Plan – identifies measures to be taken if groundwater or drinking water supplies run low, normally associated with droughts. Although none of the participating jurisdictions have such a plan, Meeker County has identified developing a "Drought Contingency Plan" as an action step in the County's Water Plan (2013), if grant funds become available.

Community Needs Assessment - is a systematic process for determining and addressing needs, or "gaps" between current conditions and desired future conditions. The discrepancy between the current condition and wanted condition is usually measured to appropriately identify the need. The need can be a desire to improve current performance or to correct a deficiency. No participating jurisdiction in Meeker County has a community needs assessment.

Official Jurisdictional Policies or Ordinances

Official policies or ordinances refer to documents prepared and adopted by local jurisdictions to regulate a number of specific topics or issues. Examples of official policies or ordinances include zoning ordinances, building codes, stormwater ordinances. Table 2P provides a summary of the following official policies or ordinances adopted by the Hazard Mitigation Plan's participating jurisdictions

Zoning Ordinance – zoning describes the control by jurisdiction of the use of land, and of the buildings thereon. Areas of land are divided by appropriate authorities into zones within which various uses are permitted. Meeker County and all of the cities within have adopted zoning ordinances.

**Table 2P:
McLeod County and City Policies and Ordinances**

Participating Jurisdictions	<i>McLeod County</i>	<i>City of Biscay</i>	<i>City of Brownton</i>	<i>City of Glencoe</i>	<i>City of Hutchinson</i>	<i>City of Lester Prairie</i>	<i>City of Plato</i>	<i>City of Silver Lake</i>	<i>City of Stewart</i>	<i>City of Winsted</i>
Official Jurisdictional Policies / Ordinances (Y=Yes; N=No; I=Included in another jurisdiction)										
Zoning Ordinance	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Building Code	N	N	N	Y	Y	N	N	N	N	N
Planning Ordinance	N	N	N	N	N	N	N	N	N	N
Bluff Land Ordinance	N	N	N	N	N	N	N	N	N	N
Fire Code	N	N	N	N	N	N	N	N	N	N
Floodplain Ordinance	Y	N	N	Y	Y	Y	N	N	N	N
Subdivision Ordinance	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Nuisance Ordinance	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Storm Water Ordinance	Y	N	N	Y	Y	Y	N	N	N	Y
Drainage Ordinance	I	N	N	N	N	N	N	N	N	N
County Park Ordinance	Y	N	N	N	N	N	N	N	N	N
Site Plan Review Requirements	Y	N	N	Y	Y	Y	N	N	N	Y
Karst Ordinance	N	N	N	N	N	N	N	N	N	N
Shoreland Ordinance	Y	N	N	N	N	N	N	N	N	N
City Ordinance / Codes	N/A	Y	Y	Y	Y	Y	Y	Y	Y	Y
Steep Slope Ordinance	N	N	N	N	N	N	N	N	N	N
Soil Erosion Control Ordinance	N	N	N	N	N	N	N	N	N	N
SSTS Ordinance / Solid Waste Plan	Y	I	I	I	I	I	I	I	I	I
Historic Preservation Ordinance	N	N	N	N	N	N	N	N	N	N
Land Use Ordinance	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Methamphetamine Lab Ordinance	Y	I	I	I	I	I	I	I	I	I
Wild & Scenic River District	Y	N	N	N	N	N	N	Y	N	N

Chapter Two: County Profile

Building Code - is a set of rules that specify the minimum standards for how buildings are constructed. The main purpose of building codes are to protect public health, safety and general welfare as they relate to the construction and occupancy of buildings and structures. McLeod County has not adopted the Minnesota Building Code, however, they county has recently help public meetings to discuss its pros and cons. All of the cities in McLeod County has adopted the Minnesota Building Code, except the City of Biscay.

Planning Ordinance – a planning ordinance is essentially the same as or similar to adopting a Comprehensive Plan. These types of ordinances can prescribe which types of land use activities are permitted in certain areas. McLeod County does not have a planning ordinance.

Bluff Land Ordinance – establish setbacks and regulate the types of developments along bluff areas, primarily to preserve scenic integrity and also to ensure safety.

Fire Code - the fire code (also fire prevention code or fire safety code) is a model code adopted by the state or local jurisdiction and enforced by fire prevention. It is a set of rules prescribing minimum requirements to prevent fire and explosion hazards arising from storage, handling, or use of dangerous materials, or from other specific hazardous conditions. The fire code also addresses inspection and maintenance requirements of various fire protection equipment in order to maintain optimal active fire protection and passive fire protection measures. All of the fire districts located in McLeod County have adopted the State Fire Code.

Floodplain Ordinance – a **floodplain** or **flood plain** is an area of land adjacent to a stream or river that stretches from the banks of its channel to the base of the enclosing valley walls and experiences flooding during periods of high water levels. The County has an overlay Flood Plain District incorporated into its zoning ordinance. The cities of Glencoe, Hutchinson, and Lester Prairie also have flood districts identified in their zoning ordinances.

Subdivision Ordinance – prescribe the methods of diving a parcel into multiple parcels, in order to integrate new subdivisions with the development objectives of a jurisdiction and to contribute to an attractive, stable and wholesome environment (i.e., adequate public services, integrated safe roads, etc.). McLeod County and all its cities follow adopted subdivision ordinances.

Nuisance Ordinance - Most local units of government have the authority to define and abate nuisances by means of local ordinance. In the case of home rule charter cities, this authority may be derived from the city's charter. Statutory cities and towns have specific authority under state law to define and abate nuisances. Under Minnesota case law, jurisdictions may only regulate public nuisances and may only declare a condition to be a nuisance if the condition has been so recognized by the courts. Many conditions have been declared to be nuisances by the courts,

Chapter Two: County Profile

including the accumulation of filth, noise, dogs, and offensive odors. McLeod County and all of its cities have adopted nuisance provisions.

Stormwater Ordinance - Stormwater is water that originates during precipitation and snow/ice melt events. Stormwater can soak into the soil (infiltrate), be held on the surface and evaporate, or runoff and end up in nearby streams, rivers, or other water bodies (surface water). In natural landscapes such as prairies or forests, the soil absorbs much of the stormwater and plants help hold stormwater close to where it falls. In developed environments, unmanaged stormwater can create two major issues: one related to the volume and timing of runoff water (flooding) and the other related to potential contaminants that the water is carrying, i.e. water pollution. Stormwater ordinances require developers to incorporate stormwater management features into both the building process (i.e., silt fencing, erosion control matting, etc.) and how the site handles stormwater long-term (i.e., holding ponds, buffer strips, etc.).

Drainage Ordinance – drainage throughout Minnesota is primarily regulated by Minnesota State Statutes 103E, commonly referred to as the Minnesota Drainage Law. Although in need of revision since most of the laws were developed in 1940s, the language outlines how drainage systems and drainage authorities are established, how systems are maintained, and how drainage watersheds are determined by a set of viewers. Recently the relationship between drainage and flooding has become increasingly evident. McLeod County is the main drainage authority in the County, however, the Buffalo Creek Watershed District also has jurisdiction over two drainage systems. In addition, a few systems are jointed controlled by neighboring counties.

County Park Ordinance – These types of ordinances can be enacted pursuant to Minnesota State Statutes Chapter 383A. They authorize counties to enact ordinances to govern the conduct of members of the public during their use and enjoyment of county parks and recreational areas. The help protect the safety, health, enjoyment and welfare of all persons in the use thereof, and to protect public property and resources for posterity. McLeod County has six county parks, totaling 571 acres. Two of the parks are regional facilities which allow overnight camping. The other four parks are day parks. McLeod County has adopted a number of park provisions which prohibit the use of fireworks, limit the use of horseback riding, etc.

Site Plan Review Requirements – Jurisdictions have the option of requiring site plan review requirements for buildings and land use. Although McLeod County has recently considered adopting a build code, they have not done so at this time. All of the cities located in McLeod County except Biscay have adopted the State Building Code.

Karst Ordinance – Karst topography is a landscape formed from the dissolution of soluble rocks such as limestone, dolomite, and gypsum. It is characterized by underground drainage systems with sinkholes and caves. McLeod County does not have any Karst topography.

Chapter Two: County Profile

Shoreland Ordinance – McLeod County is required to adopt the State’s shoreland management regulations, administered by the Minnesota Department of Natural Resources. These establish development setback and size restrictions adjacent lakes and rivers.

City Ordinance / Codes – All of the cities located in McLeod County have adopted codes that establish local provisions on land use, nuisances, and day-to-day activities.

Steep Slope Ordinance - Zoning regulations for development on and disturbance of steep slopes can prevent erosion and reduce the risk of landslides that endanger lives, damage property and infrastructure, harm water quality, and degrade wildlife habitat. These regulations can also preserve the aesthetic character of visually prominent hillsides by discouraging vegetative clearing and excessive earthwork to accommodate development (*source*: Pennsylvania Land Trust Association). McLeod County currently does not have this type of ordinance, however, some of the steep slopes along Buffalo Creek and the Crow River would justify having setbacks.

Soil Erosion Control Ordinance - The sedimentation of streams, lakes, wetlands and other waters of this State constitute a major pollution problem. Control of erosion and sedimentation is deemed vital to the public interest and necessary to public health and welfare. Erosion control ordinances provide for the creation, administration, and enforcement of standards that aim to minimize the detrimental effects from pollution by sedimentation. Although McLeod County does not have a specific soil erosion control Ordinance, it does help administer the Minnesota Pollution Control Agency’s Stormwater Program for Construction Activity. This Program requires erosion control Best Management Practices (BMPs) during most construction activities.

SSTS Ordinance / Solid Waste Management Plan – Subsurface Sewage Treatment System (SSTS) ordinances regulate Counties are required by MN Stat. 115.55 to adopt a SSTS ordinance that complies with the MN Rules Chapter 7080-7083. Cities and townships with SSTS ordinances must effectively administer and enforce an ordinance that is administratively and technically as strict as the county ordinance. In addition to regulating the type, size, and location of septic systems, McLeod County’s SSTS also require inspections upon property transfers.

County Solid Waste Management Ordinances regulates facilities that accept, manage, and dispose of solid wastes of every type through licensing, inspections, and enforcement. The Minnesota Pollution Control Agency (MPCA) provides oversight on all solid waste facilities. McLeod County maintains a Solid Waste Management Department and a Household Hazardous Waste Facility located in Hutchinson.

Historic Preservation Ordinance – Although all communities can go through the process of listing historic properties with the National Register of Historic Places, some communities adopt

Chapter Two: County Profile

historic preservation ordinances. These types of ordinances create an overlay zoning district that identifies a specific area worth historic preservation. The key component is normally requiring properties to maintain buildings in a manner similar to how it was originally built. Although none of these types of districts exist in McLeod County, the County does have a very active McLeod County Historical Society (www.mcleodhistory.org). In addition, McLeod County currently has 7 places listed in the National Register.

Land Use Ordinance – Same as Zoning Ordinance in the State of Minnesota.

Methamphetamine Lab Ordinance - Minnesota Statutes, section 152.0275, subdivision 2(c), requires that any property found to be a clandestine drug site cannot be occupied until it has been remediated according to the Department of Health's clandestine drug lab cleanup guidelines by a qualified contractor. Counties and larger cities normally go beyond this by adopting local provisions that assess the costs of cleaning up the drug sites. McLeod County has an adopted Meth Lab Ordinance that also covers the municipalities.

Wild & Scenic River District - The National Wild and Scenic Rivers System was created by Congress in 1968 to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations. The Minnesota Wild & Scenic Rivers Act is similar in nature. It was enacted by the State Legislature in 1973 to create a statewide system to preserve and protect rivers in Minnesota with outstanding natural, scenic, scientific, historic, cultural, and recreational values. The Act is notable for safeguarding the special character of these rivers, while also recognizing the potential for their appropriate use and development. There are no scenic rivers located in McLeod County on the national or state system.

Sources: Federal Emergency Management Agency (www.fema.gov)
McLeod County (www.co.mcleod.mn.us)
Minnesota Department of Natural Resources (www.dnr.state.mn.us)
Minnesota Department of Public Safety (www.dps.mn.gov)
Minnesota Office of the Revisor of Statutes (www.revisor.mn.gov)
Wikipedia (www.wikipedia.org)

Chapter Three: McLeod County’s Hazards Profile

Chapter Three profiles the natural and technological hazards that have historically or could potentially affect the County. The information presented herein was derived from a variety of sources. First, Federal Emergency Management Agency’s (FEMA) guidelines for profiling hazards were followed. Second, statewide data sets were customized to the County’s geographic extent. Third, vast amounts of local information regarding the hazards were incorporated. Finally, numerous maps were created from available datasets to help characterize the unique nature of the County (also refer to Appendix A).

Plan Review Checklist...

(B1) Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)?
Requirement §201.6(c)(2)(i)

(B2) Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? *Requirement §201.6(c)(2)(i)*

(B3) Is there a description of each identified hazard’s impact on the community as well as an overall summary of the community’s vulnerability for each jurisdiction?
Requirement §201.6(c)(2)(ii)

(B4) Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods?
Requirement §201.6(c)(2)(ii)

Identification of Hazards

The hazards profiled in the 2008 McLeod County Hazard Mitigation Plan were identified through historical data and completion of FEMA’s “Identify the Hazards” worksheet (386-2 Series, Worksheet 1). This Plan also relies upon the hazards profiled in the 2008 McLeod County Plan and the 2014 Minnesota State Hazard Mitigation Plan. After comparing these documents, Table 3A lists the hazards that are not profiled in this Plan, primarily due to the County’s geographic location and lack of historical occurrence. Table 3B lists the hazards that are included, showing each hazard’s probability of occurring, average anticipated damage, mitigation potential, and overall priority compared to the other hazards listed.



Required Information

**Table 3A: Hazard Categories Not Profiled
in the McLeod County Hazard Mitigation Plan**

- | | | |
|--------------|---------------------|-------------------|
| ○ Avalanches | ○ Nuclear Incidents | ○ Transportation |
| ○ Volcanoes | ○ Tsunamis | ○ Coastal Storms |
| ○ Terrorism | ○ Hurricanes | ○ Coastal Erosion |

Table 3B: McLeod County Hazard Categories Ranked by Probability of Occurring, Potential Damage, Mitigation Potential, and Overall Priority

<i>Hazard</i> (Letters correspond to section headings)		<i>Probability of Occurring</i> ¹	<i>Average Damage</i> ²	<i>Mitigation Potential</i> ³	<i>Overall Priority</i> ⁴
Natural Disasters	A. Flooding:				
	- Riverine Flooding	High	High	High	1
	- Stormwater Flooding	High	Medium	High	2
	B. Tornadoes	High	Medium	Medium	3
	C. Thunderstorms:				
	- Severe Wind (Windstorms)	High	Medium	Medium	4
	- Hail	High	Medium	Low	14
	- Lightning	High	Low	Low	13
	D. Fire:				
	Wildfires	Low	Low	Medium	15
	Property (Structural) Fires	High	Medium	Medium	5
	E. Drought	High	Medium	Medium	11
	F. Winter Storms	High	Low	Low	10
	G. Extreme Temperatures	High	Low	Medium	8
H. Severe Erosion/Land Subsidence	High	Medium	High	7	
I. Dam / Levee Failure	Low	Low	Low	16	
J. Earthquake	Low	Low	Low	17	
Other	K. Infectious Disease Outbreak	Medium	Medium	Medium	9
	L. Groundwater Contamination	Medium	Medium	Medium	6
	M. Hazardous Material Incidents	Medium	Medium	Medium	12

¹**Probability of Occurring:**

Low = Rarely

Medium = Occasionally

High = Frequently

²**Average Damage:**

Low = Under \$25,000

Medium = \$25,000-\$100,000

High = Over \$100,000

³**Mitigation Potential:**

Low = Limited Options

Medium = Some Options

High = Many Options

⁴**Overall Priority:**

Numbered highest (1) to lowest (17) based upon local Task Force and stakeholder's input.

Federal Disaster Declarations

A governor may determine, after consulting with local government officials, that recovery from a specific disaster appears to be beyond the combined resources of both the state and local governments, and that federal assistance may be needed. In requesting supplemental Federal assistance under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. §§ 5121-5206 (Stafford Act), the Governor must certify that the severity and magnitude of the disaster exceed state and local capabilities; certify that Federal assistance is necessary to supplement the efforts and available resources of the state and local governments, disaster relief organizations, and compensation by insurance for disaster related losses; confirm execution of the state's emergency plan; and certify adherence to cost sharing requirements.

McLeod County has been included in nine Federal Disaster Declarations since 1993 (refer to Table 3C). Notice that eight of the declarations were issued to address flooding damage:

**Table 3C:
Federal Disaster Declarations in McLeod County**

DR – 4131: Minnesota Severe Storms, Straight-Line Winds, and Flooding (July 2013)

FEMA-4131-DR was declared on July 25, 2013, due to severe storms, straight-line winds, and flooding during the period of June 20-26, 2013. The disaster declaration designated 17.9 million of funds for relief.

DR – 4009: Minnesota Severe Storms, Flooding, and Tornadoes (July 2011)

Severe storms and tornadoes caused widespread damage and flooding throughout central Minnesota in July 2011. 12.1 million of disaster relief funds were made available through DR – 4009.

DR – 1982: Minnesota Severe Storms and Flooding (March-May 2011)

Severe storms caused damage and flooding throughout central and western Minnesota in spring 2011. 20.7 million of funds for relief were designated.

DR – 1900: Minnesota Flooding (March-April 2010)

McLeod County was included in this major disaster declaration for spring flooding throughout southern Minnesota. 12.8 million of funds for relief were designated through FEMA.

DR – 1419: Minnesota Severe Storms, Flooding and Tornadoes (June 2002)

Severe storms caused damage and flooding throughout Minnesota, including McLeod County, in June 2002. 26.4 million of funds for relief were designated through FEMA.

**Table 3C:
Federal Disaster Declarations in McLeod County
Continued...**

DR – 1370: Minnesota Flooding (July 2001)

Widespread flooding throughout Minnesota in July 2001 prompted DR-1370. McLeod County was included in the declaration, which designated 36.2 million of funds for flood-related relief.

DR – 1175: Minnesota Severe Storms/Flooding (March-May 1997)

Severe storms caused damage and flooding throughout Minnesota in the spring of 1997.

DR – 1158: Minnesota Severe Winter Storms/Blizzards (January-February 1997)

Severe winter storms throughout Minnesota caused damage and power outages in January and February 1997.

DR – 993: Minnesota Flooding, Severe Storms, and Tornadoes (June 1993)

Severe storms and tornadoes caused damage and flooding throughout Minnesota in June 1993.

**Section A:
Flooding**

Flooding is the overflowing of rivers, streams, and lakes due to excessive rainfall or rapid snowmelt. There are several forms of flooding including flash floods (quickly rising streams after heavy rain or rapid snowmelt); ice jam (ice that accumulates at a natural or human-made obstruction and slows the flow of water); riverine (periodic overflow of rivers and streams); and stormwater flooding (overflow of storm sewers systems following heavy rain or rapid snowmelt exceeding the system's capacity). The outcome of flooding includes threats to human and animal health and safety, as well as tremendous social and economic losses to individuals, communities, and taxpayers as a whole.

The information contained in this section comes from a variety of sources, including the 2008 McLeod County Hazard Mitigation Plan, the 2014 Minnesota State Hazard Mitigation Plan, and the McLeod County Vulnerability Report. The latter report was prepared by the Geographic Information Sciences Lab at the University of Minnesota-Duluth. The purpose of the report was to prepare a flood analysis for McLeod County. Although most of the information contained in report is reproduced in this section, a copy of the full report appears in Appendix C.

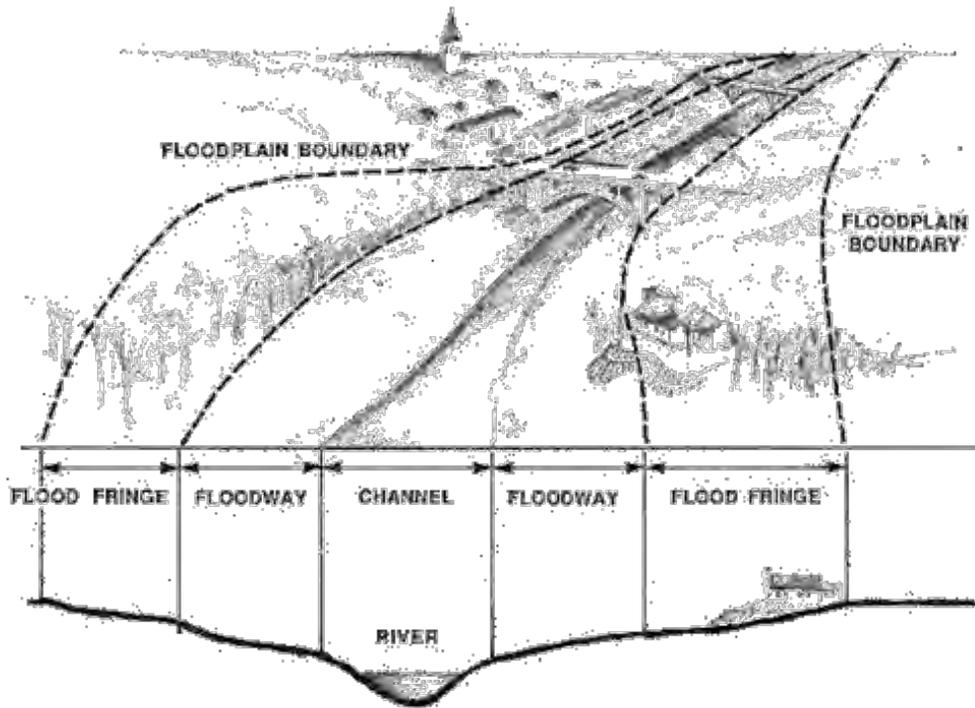


What is a Floodplain?

Under state law, the floodplain is considered to be the land adjoining lakes and rivers that is covered by the "100-year" or "regional" flood. This flood is considered to be a flood that has a 1 percent chance of occurring in any given year. Floods of this magnitude occurred throughout the state in 1965, 1969, 1997, and 2001, and in various parts of the state in 1972, 1975, 1978, 1979, 1987, and 1993. Using sophisticated engineering and meteorological techniques, it is possible to estimate to an acceptable degree of accuracy the magnitude of such a flood along those rivers where long-term flood records have been kept. Various government agencies conduct these studies, and as they become available, local communities are required by state law to adopt this technical data in their floodplain zoning ordinances.

The natural floodplain is an important part of our water system. It affects storm runoff, water quality, vegetative diversity, wildlife habitat, and aesthetic qualities of our rivers and lakes. Any alteration of the floodplain should be carefully evaluated. A person's intended use should be appropriate to the site selected. The following information about floodplains and local zoning codes deals with restrictions on developing in or near floodplains. However, remember that the least amount of alteration to the natural system is usually the most ecologically sound development decision. If a person is buying or already owns property on a river shoreline in a community that has adopted floodplain zoning, they should consider the following points: floodway location, flood fringe location, flood protection elevation, flood proofing, and flood insurance (refer to Figure 3A).

Figure 3A: Floodplain Diagram



Source: www.dnr.state.mn.us

General Overview of Flooding in McLeod County

Floods in McLeod County take one of two forms: large-scale floods and flash floods. Generally, large-scale floods occur adjacent to waterways and are a result from a combination of deep, late-winter snow-pack, frozen soil that prevents infiltration, rapid snowmelt, and widespread precipitation common during the spring and early summer. Flash floods result from powerful, concentrated, slow-moving thunderstorms and include stormwater flooding found in urban areas.

Riverine Flooding (Large-Scale Floods) – This type of flooding is the most common in McLeod County. It normally occurs during the spring months and early summer due to excessive snow melt and/or rain overflowing banks into the adjacent flood plain.

Flash Flooding – This type of flooding occurs when a rapid amount of water overburdens an area’s drainage capacity. In urban areas, this is referred to as stormwater flooding. The Minnesota Climatology Working Group defines flash flooding as “the occurrence of 6 inches or more of rain within a 24 hour period” (<http://climate.umn.edu/>).

County Historical Flooding Events

Recent flood data collected by the National Climatic Data Center NCDC shows that McLeod County has experienced 20 major flooding events *since 1993* (www.ncdc.noaa.gov). Table 3D summarizes these events, including the date it occurred, where it occurred (i.e., specific city or generally countywide), and a brief narrative on what happened. Table 3D also includes a chronological listing of the Federal Disaster Declarations.

The floods that occurred in June of 2002 were caused by four to six inches of rain. Much of northern and eastern McLeod County was flooded, leaving behind 800,000 in property damage. This amount is significant since most flood-related damages go unreported. Ten roads were covered with water, ditches and creeks overflowed near Winsted and Lester Prairie, and one home in Lester Prairie was flooded. A few homes required sandbagging, and nearly 300 houses had their basements flooded. Thousands of acres of farmland were flooded. Water damaged much of the school in Silver Lake.

In early March 2010, an ice jam along Buffalo Creek caused flooding on Division Street in Brownton. County officials also reported 16 partially blocked county roads adjacent to Buffalo Creek and one house with basement flooding. By March 18, the water also flooded 100th Street in Glencoe.

Although all of the information has not been collected, the recent countywide flooding in June 2014 is estimated to have caused major damage.

**Table 3D: McLeod County
Flooding History (1993-2014)**

Date	Location – Type	Narrative
June 1993		DR – 993: Minnesota Flooding, Severe Storms, and Tornadoes (June 1993) Severe storms and tornadoes caused damage and flooding throughout Minnesota in June 1993. McLeod County was included in the disaster declaration.
3/26/1997	Countywide Flood	Above normal temperatures during the last week of March began melting a deep snowcover across much of west central into central Minnesota. Snow depth rank was in the 80 to 90th percentile over much of the area measured on 3/20/97. The snowcover had a high moisture content. In addition, a Spring storm deposited a mixture of rain and fresh snow over the area on 3/24/97, immediately preceding the warm temperatures. The flooding resulted in severe losses to both public and private property. Damage was extensive to roads, bridges, culverts, agricultural drainage areas, homes and businesses. The south fork of the Crow River reached flood stage of 8 feet at Delano on 3/31/97 which is the river monitoring point. The river crested on 4/8/97 at 14.4 feet which was the third highest crest ever measured. 20 roads in McLeod county were closed at the peak of river flooding including highway 22 between Biscay and Glencoe. Major flooding along the river occurred in the towns of Hutchinson, Mayer, and New Germany. The flooding of Buffalo Creek in the Glencoe area aggravated the problem in McLeod County.
May 1997		DR – 1175: Minnesota Severe Storms/Flooding - Severe storms caused damage and flooding throughout Minnesota in the spring of 1997.
6/28/1997	Brownton Flash Flood	Flooded basement resulted in wall collapse. Water was reported flowing over State Highway 22.
7/1/1997	Glencoe Flash Flood	Heavy rainfall in brief period of time resulted in flash flooding causing the Crow River to overflow its banks and flood State Highway 22 north of Glencoe.
7/22/1997	Glencoe Flash Flood	Slow moving thunderstorms deposited heavy rainfall on already well saturated ground. Street flooding was reported in Glencoe after receiving 2.75 inches of rain.
7/25/1997	Stewart Flash Flood	Heavy rains resulted in street and basement flooding.
4/1/2001	Countywide Flood	Heavy snowfall during winter remained on the ground through the end of March and then rapidly melted, resulting in river stages close to record levels.
5/1/2001	Countywide Flood	Snowmelt flooding that began April 1 continued into early May on the major rivers: the Minnesota, St. Croix, Crow River, South Fork of the Crow River, and the Mississippi River below its confluence with the Minnesota River.

**Table 3D: McLeod County
Flooding History (1993-2014)
Continued...**

Date	Location – Type	Narrative
July 2001		DR – 1370: Minnesota Flooding - Widespread flooding throughout Minnesota in July 2001 prompted DR-1370. McLeod County was included in the declaration, which designated 36.2 million of funds for flood-related relief.
6/24/2002	Winsted Flash Flood	Basements were flooded and roads covered in the wake of a quick three to four inches of rain.
6/25/2002	Countywide Flash Flood	Four to six inches rain flooded much of northern and eastern McLeod County, mainly along and northeast of a line from Hutchinson to Glencoe. Ten roads were covered with water. Ditches and creeks overflowed near Winsted and Lester Prairie, with one home under water. A few homes required sandbagging, and nearly 300 houses had their basements flooded. Thousands of acres of farmland were flooded. Water damaged much of the school in Silver Lake. \$800,000 of damage was reported.
June 2002		DR – 1419: Minnesota Severe Storms, Flooding and Tornadoes - Severe storms caused damage and flooding throughout Minnesota, including McLeod County, in June 2002. 26.4 million of funds for relief were designated through FEMA.
8/3/2002	Eastern McLeod County Flash Flood	Four to six inches of rain fell within a few hours. One county road washed out. Numerous roads and intersections were impassable. 150 basements flooded with up to three feet of water. Portions of the Glencoe High School had one foot of water flowing through it. Sandbagging took place at Silver Lake and Glencoe.
6/24/2003	Hutchinson Flash Flood	County wide flooding. Five to ten inches of rain were reported, including one unofficial report of 10 inches about 6 miles northwest of Hutchinson. A number of township and secondary roads were flooded, crops were under water, and a bridge was closed near Biscay.
6/30/2004	Countywide Flash Flood	Water overflowed across County Road 13. Crops were damaged by flood waters near Brownton. Up to 3 inches of rain fell southwest of Glencoe.
9/3/2005	Countywide Flash Flood	Flash flooding was reported by the fire department in Stewart. Flash flooding was also reported near the intersection of Common Street and County Road 7 about 5 miles northeast of Hutchinson. A total of 2.62 inches of rain fell in Brownton. Radar rainfall estimates as high as 4 inches were indicated across the western portion of the county.
9/12/2005	Countywide Flash Flood	Water was 2 feet deep at the intersection of Pryor Avenue and 12th Street in Glencoe. Flooding was also reported on South Grade Road SW, Sunset Street SW, and on California Street NW in Hutchinson. A car was stalled in the deep water and had to be towed out at the intersection of South Grade Road and Sunset Street. A total of 3.25 inches of rain fell in Hutchinson.

**Table 3D: McLeod County
Flooding History (1993-2014)
Continued...**

Date	Location – Type	Narrative
3/15/2010	Brownton Flood	An ice jam along the Buffalo Creek caused flooding on Division Street in Brownton. In addition, county officials reported 16 partially blocked county roads throughout McLeod County due to flooding along Buffalo Creek. At least one home had basement flooding due to flood waters. By the 18th of March, the flood waters from the Buffalo Creek reached Glencoe which flooded 100th Street. \$190,000 of damage was reported.
April 2010	DR – 1900: Minnesota Flooding - McLeod County was included in this major disaster declaration for spring flooding throughout southern Minnesota. 12.8 million in relief funds were designated through FEMA.	
8/13/2010	Brownton Flash Flood	Several inches of rainfall occurred between 11 PM CST to 1 AM CST across a large area of McLeod County. Significant street flooding occurred in the town of Brownton, Minnesota where a few streets were closed during the height of the storm.
3/23/2011	Brownton Flood	Several state highways, and county roads became impassable due to Spring snow melt and the associated runoff through the end of March. Areas along the Buffalo and South Fork of the Crow River were hit the hardest.
May 2011	DR – 1982: Minnesota Severe Storms and Flooding - Severe storms caused damage and flooding throughout central and western Minnesota in spring 2011. 20.7 million in relief funds were designated, including McLeod County.	
July 2011	DR – 4009: Minnesota Severe Storms, Flooding, and Tornadoes - Severe storms and tornadoes caused widespread damage and flooding throughout central Minnesota in July 2011. 12.1 million in disaster relief funds were made available through DR – 4009, which included McLeod County.	
6/17/2012	Biscay Flash Flood	Highway 22, between County Road 11 and 67, northwest of Biscay was closed due to flooding. The public reported up to 5 feet of water over the roadway.
	Glencoe Flash Flood	The City of Glencoe had significant street flooding which caused some streets to close.
6/21/2013	Countywide Flash Flood	Flood waters were flowing over roads north of Winsted.
6/23/2013	Countywide Flash Flood	Overnight rainfall, with high rainfall rates, caused significant street flooding in Glencoe, with flood waters encroaching on homes and businesses during the early morning hours. During the height of the storm, 12 inches of flowing water was reported on area streets in Glencoe. Significant street flooding occurred in the town of Winsted as rainfall amounts were in excess of 1 to 2 inches in a short period of time. Some homes reported basement flooding. \$75,000 of damage was reported.

**Table 3D: McLeod County
Flooding History (1993-2014)
Continued...**

Date	Location – Type	Narrative
<i>July 2013</i>		<i>DR-4131: Minnesota Severe Storms, Straight-Line Winds, and Flooding</i> – FEMA DR-4131 was declared on July 25, 2013, due to severe storms, straight-line winds, and flooding during the period of June 20-26, 2013. McLeod County was included in this disaster declaration, which designated 17.9 million in relief funds.
6/19/2014	Countywide Flood	An extremely wet spring crested in mid-June with excessive flooding along Buffalo Creek and the South Fork Crow River. Numerous homes and streets were flooded.

Stream Gauge Locations

The Minnesota Department of Natural Resources maintains three stream gauge monitoring stations in McLeod County (refer to Table 3E). The National Oceanic and Atmospheric Administration’s (NOAA) Advanced Hydrologic Prediction Service relies upon these stations to help monitor flood stages. *Note:* the Flood Analysis for McLeod County shown in Appendix C only shows one stream gauge location (Buffalo Creek at Brownton).

**Table 3E:
McLeod County’s Stream Gauge Monitoring Stations**

Station Name	Name/Location	Historic Flood Levels
<i>BTMN5</i>	Buffalo Creek at Brownton	Information not available
<i>NCMN5</i>	South Fork Crow River at Hutchinson	(1) 39.68 ft on 06/20/2014
<i>GLMN5</i>	Buffalo Creek below Glencoe	(1) 24.10 ft on 04/04/1997 (2) 20.33 ft on 06/19/2014 (3) 19.45 ft on 03/25/2011 (4) 19.40 ft on 03/18/2010 (5) 19.27 ft on 04/11/2001

The National Flood Insurance Program

The National Flood Insurance Program (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.

The SFHA is a high-risk area defined as any land that would be inundated by a flood having a 1-percent chance of occurring in a given year (also referred to as the base flood). The high-risk-area standard constitutes a reasonable compromise between the need for building restrictions to minimize potential loss of life and property and the economic benefits to be derived from floodplain development. Development may take place within an SFHA, provided that development complies with local floodplain management ordinances, which must meet the minimum Federal requirements. Flood insurance is required for insurable structures within high-risk areas to protect Federal financial investments and assistance used for acquisition and/or construction purposes within communities participating in the NFIP. *A Flood Insurance Rate Map (FIRM)* is an official map of a community on which FEMA has delineated both the special hazard areas and the risk premium zones applicable to the community.

Through the NFIP, property owners in participating communities are able to insure against flood losses. By employing wise floodplain management, a participating community can reduce risk and protect its citizens and the community against much of the devastating financial losses resulting from flood disasters. Careful local management of development in the floodplains results in construction practices that can reduce flood losses and the high costs associated with flood disasters to all levels of government.

National Flood Insurance Program Participation

FEMA regularly updates and publishes a list of communities participating in the National Flood Insurance Program (NFIP). Table 3EF shows a summary of the NFIP for McLeod County and its cities (updated 7-21-2014). Two items stand out regarding Table 3F. The first is the City of Biscay has not joined the National Flood Insurance Program. The second is that no special flood

hazard areas have been identified for the City of Stewart. As a result, they too have not joined the NFIP.

**Table 3F:
National Flood Insurance Program Participation**

Community Id. # (CID)	Location	Initial FHBM ⁴	Initial FIRM ⁵	Current Map Date	Date Joined	NFIP Participation?
270261	Biscay	11/15/74	7/7/14	7/7/14	N/A	No
270262	Brownston	6/25/76	8/18/92	7/7/14	4/5/94	Yes
270263	Glencoe	6/7/74	7/2/80	7/7/14	7/2/80	Yes
270264	Hutchinson	3/29/74	11/05/80	7/7/14	11/5/80	Yes
270265	Lester Prairie	1/16/74	9/4/87	7/7/14	9/4/87	Yes
270266	Silver Lake	1/24/75	8/18/12	7/7/14	11/21/12	Yes
270267	Stewart*	*No special flood hazards identified				No
270596A	Plato	11/1/74	7/7/14	7/7/14	7/7/14	Yes
270614A	Winsted	11/8/74	6/19/89	7/7/14	6/19/89	Yes
270616	McLeod County ⁶	6/3/77	2/4/81	7/7/14	2/4/81	Yes

⁴**Flood Hazard Boundary Map (FHBM)** - Official map of a community issued by FEMA, where the boundaries of the flood, mudflow, and related erosion areas having special hazards have been designated.

⁵**Flood Insurance Rate Map (FIRM)** - Official map of a community on which FEMA has delineated the Special Flood Hazard Areas (SFHAs), the Base Flood Elevations (BFEs), and the risk premium zones applicable to the community.

⁶**Unincorporated areas in McLeod County**

Repetitive Loss Structures

Repetitive Loss Structures (RLS) refer to buildings that have received two or more payments of more than \$1,000 from the National Flood Insurance Program within a rolling 10-year period. **According to the Federal Emergency Management Agency, there are no RLS properties located in McLeod County.**



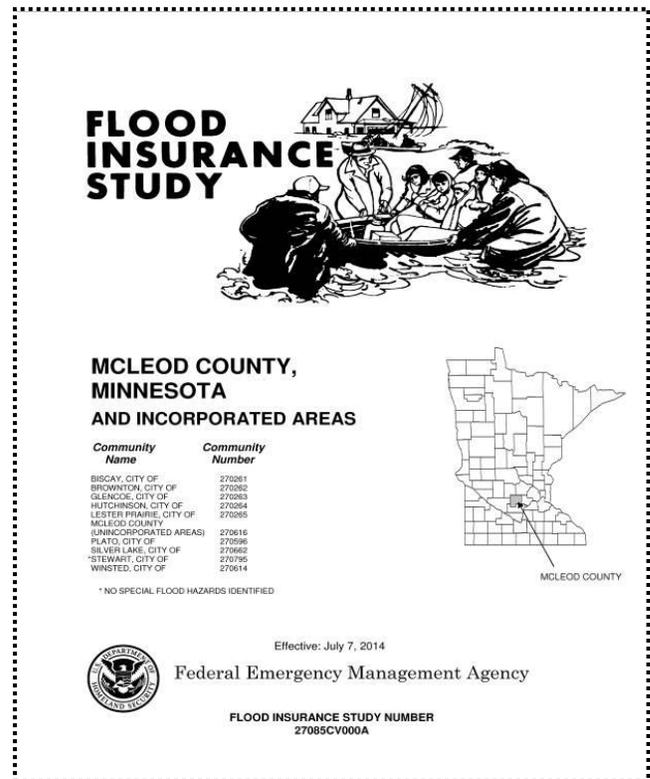
Required Information

McLeod County Flood Insurance Study

A Flood Insurance Study (FIS) is a compilation and presentation of flood risk data for specific watercourses, lakes, and coastal flood hazard areas within a community. When a flood study is completed for the National Flood Insurance Program (NFIP), the information and maps are assembled into an FIS. The FIS report contains detailed flood elevation data in flood profiles and data tables. The most current FIS for McLeod County went into effect on July 7, 2014. Visit www.fema.gov for more information.

The County's FIS revises and updates information on the existence and severity of flood hazards in the geographic area of McLeod County, including the Cities of Biscay, Brownnton, Glencoe, Hutchinson, Lester Prairie, Plato, Silver Lake, Stewart, and Winsted and the unincorporated areas of McLeod County (referred to collectively herein as McLeod County), and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood-risk data for various areas of the community that will be used to establish actuarial flood insurance rates and to assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

**Figure 3B: McLeod County
Flood Insurance Study (2014)**



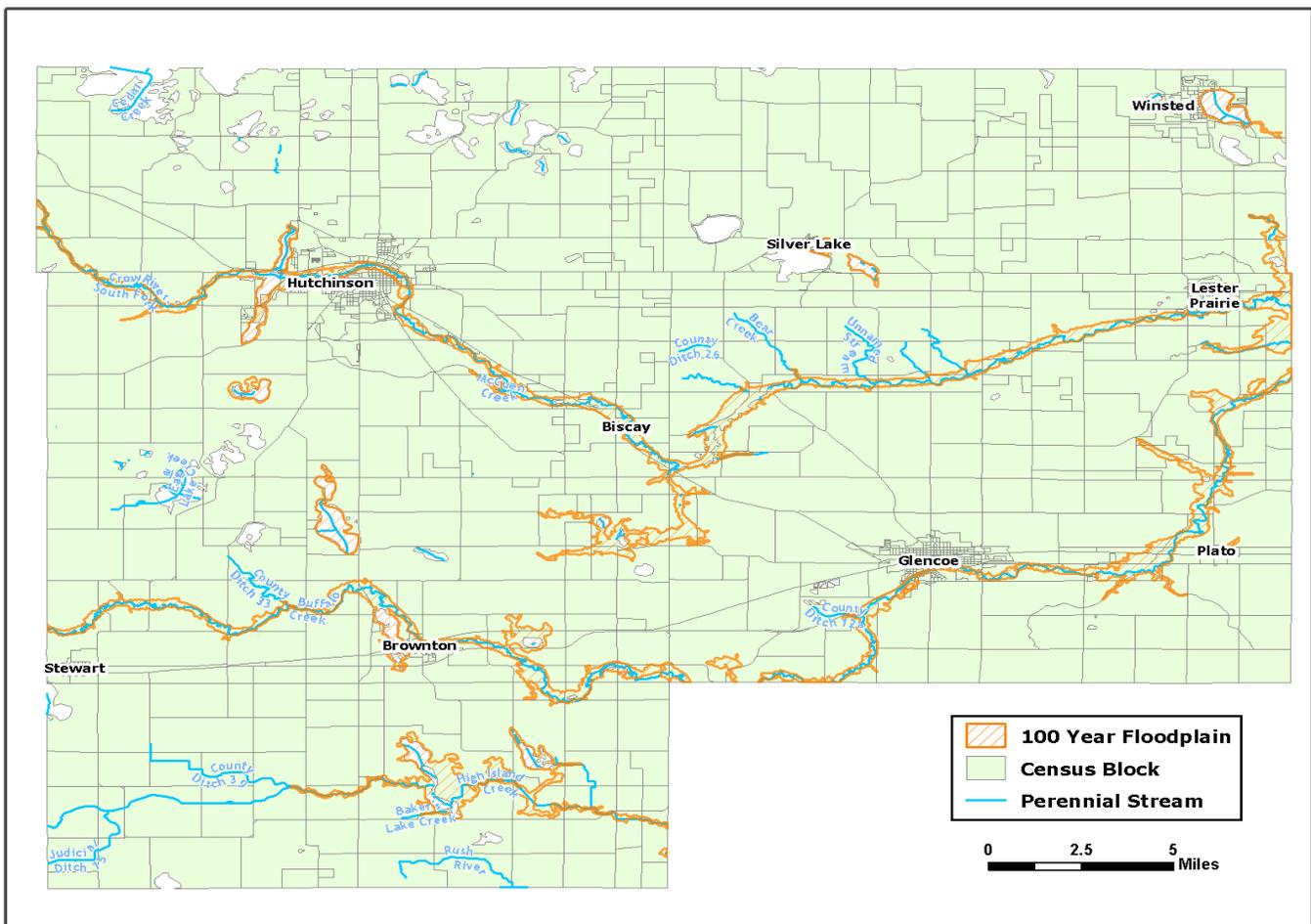
Additional key McLeod County FIS findings include:

- The majority of the land within the floodplain is agricultural.
- Planned development of the floodplain is primarily for recreational purposes.
- Many drainage systems, with cumulative water-movement, were placed in operation upstream from Buffalo Creek Watershed without the consideration of the necessary downstream channel capacity (MWRB, 1974).

HAZUS-MH Hazard Analysis

Flood analysis for McLeod County was performed using HAZUS-MH MR4 released in August 2009. The bundled aggregated general building stock was updated to Dun & Bradstreet 2006. Building valuations were updated to R.S. Means 2006. Building counts based on census housing unit counts are available for RES1 (single-family dwellings) and RES2 (manufactured housing) instead of calculated building counts. The site specific inventory (specifically Schools, Hospitals, Fire Stations and Police Stations) was updated using the best available statewide information. HAZUS-MH was used to generate the flood depth grid for a 100-year return period calculated by clipping the USGS 30m DEM to the DNR Q3 boundary. Map 3A depicts the flood boundary from the HAZUS-MH analysis.

**Map 3A: McLeod County
HAZUS Analysis (100-Year Flood)**



HAZUS MH Aggregate Loss Analysis

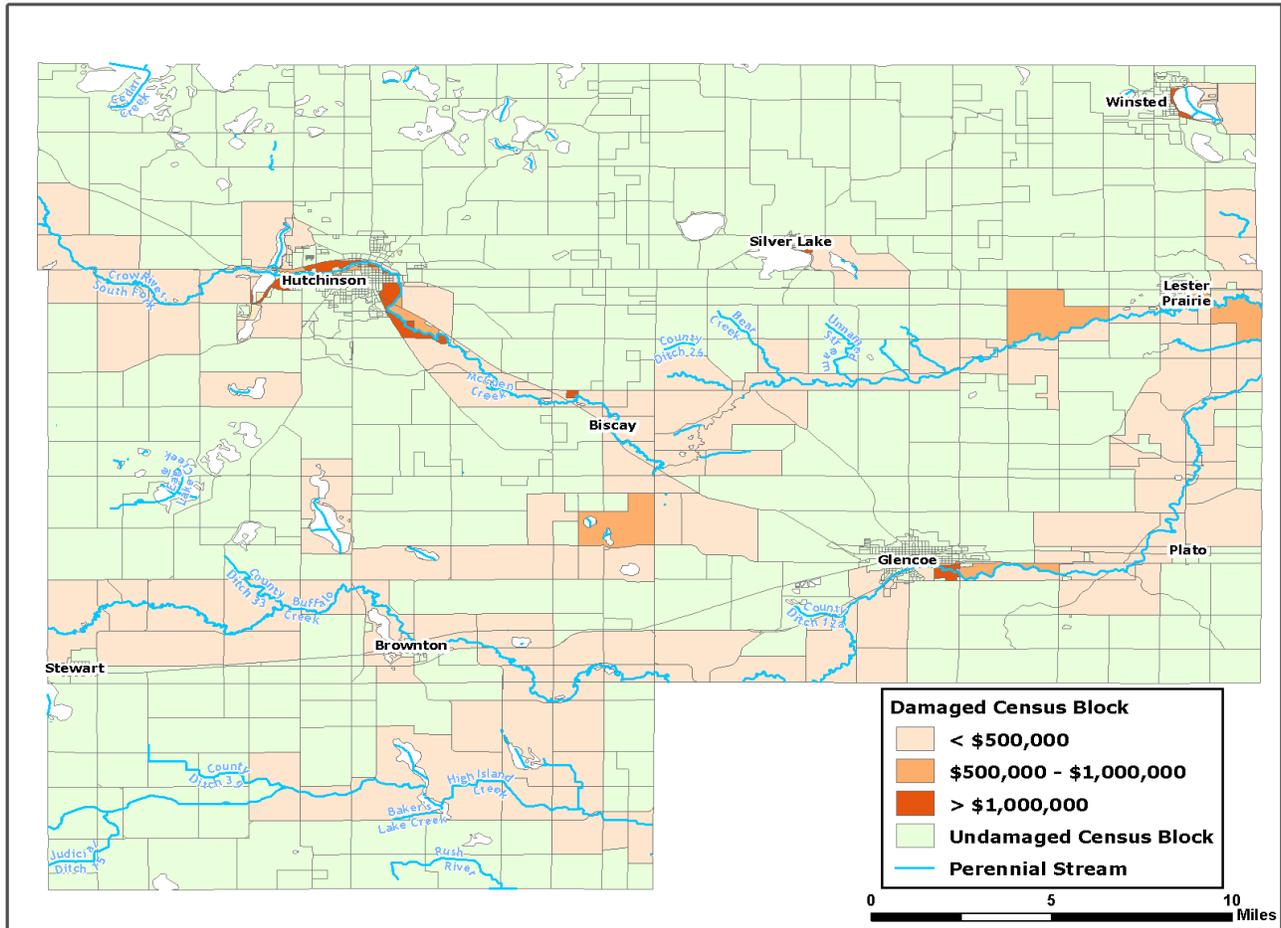
HAZUS-MH was used to estimate the damages incurred for a 100-year flood event in McLeod County. An estimated 45 buildings will be damaged totaling \$26.3 million in building losses and \$68.7 million in total economic losses. The total estimated number of damaged buildings, total building losses, and estimated total economic losses are shown in Table 3G.

**Table 3G: McLeod County
Total Economic Loss - 100-Year Flood**

General Occupancy	Estimated Total Buildings	Total Damaged Buildings	Total Building Exposure X 1000	Total Economic Loss X 1000	Building Loss X 1000
<i>Agricultural</i>	304	0	\$66,913	\$1,675	\$509
<i>Commercial</i>	955	8	\$491,545	\$25,069	\$5,822
<i>Education</i>	24	0	\$37,655	\$95	\$19
<i>Government</i>	36	0	\$26,580	\$447	\$42
<i>Industrial</i>	334	0	\$222,115	\$14,435	\$3,627
<i>Religious/Non-Profit</i>	74	0	\$62,376	\$2,169	\$353
<i>Residential</i>	14,991	37	\$2,237,576	\$24,841	\$15,946
Totals	16,718	45	\$3,144,760	\$68,731	\$26,318

HAZUS-MH estimates 14 census blocks with losses exceeding \$1 million. The distribution of losses is shown in Map 3B. The reported building counts should be interpreted as degrees of loss rather than as exact numbers of buildings exposed to flooding. These numbers were derived from aggregate building inventories which are assumed to be dispersed evenly across census blocks. HAZUS-MH requires that a predetermined amount of square footage of a typical building sustain damage in order to produce a damaged building count. If only a minimal amount of damage to buildings is predicted, it is possible to see zero damaged building counts while also seeing economic losses.

Map 3B: McLeod County Total Economic Loss - 100-Year Flood



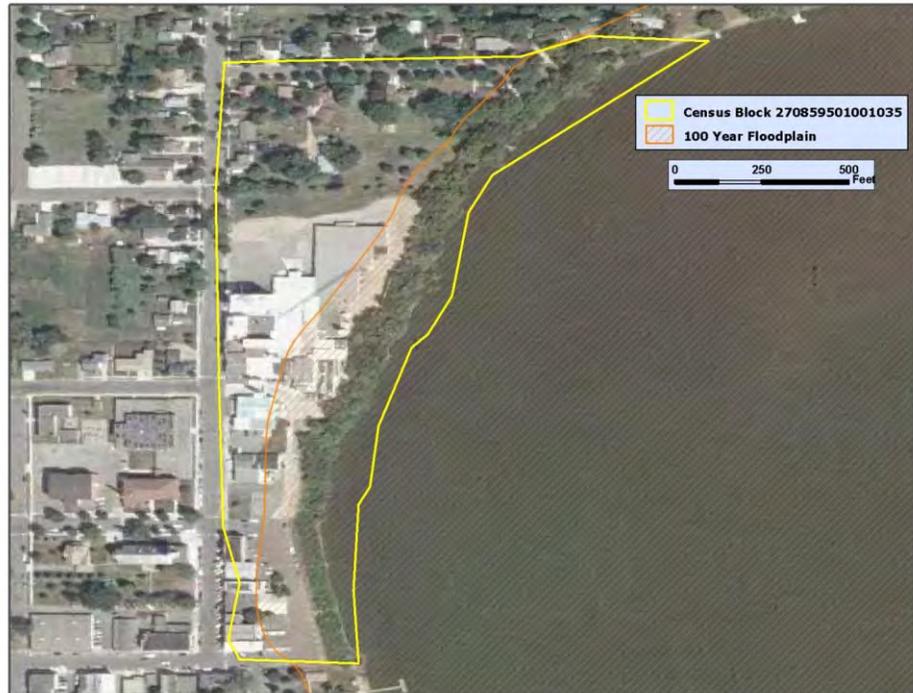
Census blocks of concern should be reviewed in more detail to determine the actual percentage of facilities that fall within the flood hazard areas. The aggregate losses reported in this study may be overstated. Maps 3C and 3D are examples of census blocks where the highest damages were reported.

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 406 households may be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these 562 people (out of a total population of 34,898) may seek temporary shelter in public shelters.

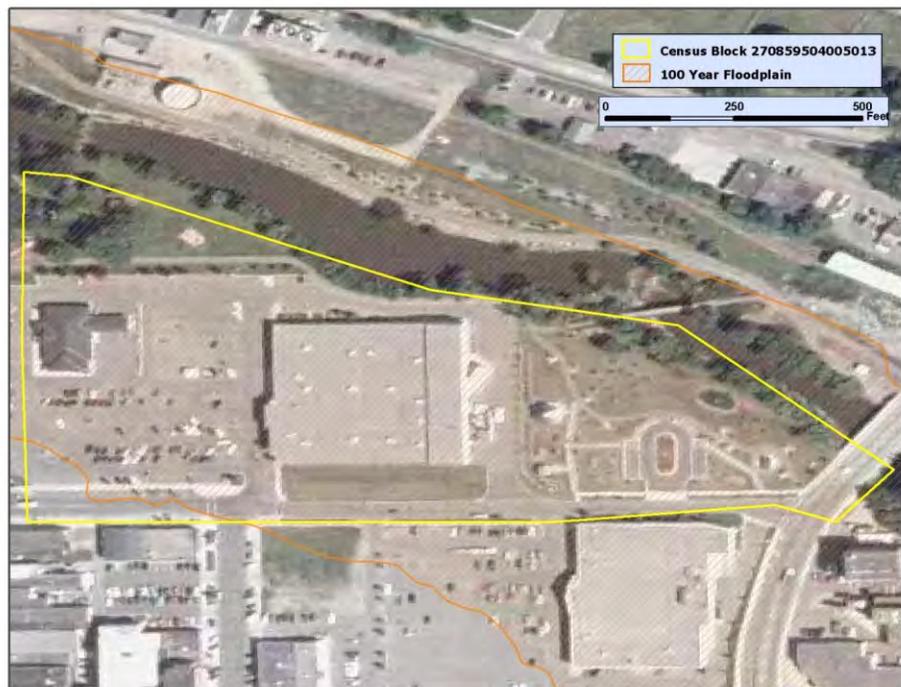
Map 3C: Flood Damage Exposure in Eastern Winsted

Map 3C shows census blocks overlaid with the flood boundary and orthophoto of Winsted. Census block 270859501001035 has an estimated building loss of \$2 million and a total economic loss of \$6 million. The overlay shows significant flooding in this census block, though only a portion of the buildings are at risk.



Map 3D: Flood Damage Exposure in Northern Hutchinson

Map 3D shows census blocks overlaid with the flood boundary and orthophoto of Hutchinson. Census block 270859504005013 has an estimated building loss of \$1 million with a total loss of \$5 million. The overlay shows significant flooding in this census block and all buildings are at risk.



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). None of the essential facilities included in the HAZUS-MH analysis fall within the flood boundary. An inventory of the essential facilities within McLeod County is included in Table 3H.

**Table 3H: McLeod County
Essential Facility Loss - 100-Year Flood**

Class	Building Count	At Least Moderate Damage	At Least Substantial Damage	Loss of Use
<i>Care Facilities</i>	4	0	0	0
<i>Fire Stations</i>	8	0	0	0
<i>Police Stations</i>	7	0	0	0
<i>Schools</i>	36	0	0	0
Total	55	0	0	0

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 4,246 tons of debris may be generated. Of the total amount, Finishes comprises 37% of the total, Structure comprises 36% of the total. If the debris tonnage is converted into an estimated number of truckloads, it would require 170 truckloads (at 25 tons/truck) to remove the debris generated by the flood.

HAZUS-MH State Property Loss Analysis

The HAZUS-MH generated flood boundaries were overlaid with the State of Minnesota owned buildings to determine if any structures are at risk to flooding. None of the state properties included in the HAZUS-MH analysis fall within the flood boundary area in McLeod County.

Existing Plans and Programs Related to Flooding

McLeod County has the following existing plans and programs related to flooding:

- **Zoning Ordinance** – The County has adopted a local Floodplain Ordinance that requires new construction to be out of the floodplain. Specifically, the Floodplain Ordinance states:

“This ordinance regulates development in the flood hazard areas of McLeod County, Minnesota. These flood hazard areas are subject to periodic inundation, which may result in loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base. It is welfare by minimizing these losses and disruptions.”
- **Emergency Operations Plan** – The County’s Emergency Operations Plan has identified the activities that need to be followed when flooding occurs.
- **Wetland Restorations** – The County’s wetlands have been inventoried through the National Wetlands Inventory and mapped. The County closely follows the provisions for protecting and/or mitigating wetlands during all construction projects.
- **McLeod County Water Plan** – McLeod County has adopted a Comprehensive Local Water Management Plan, with numerous items that both directly and indirectly address flooding. Appendix A contains the McLeod County Floodplain Map created for the Water Plan by the Mid-Minnesota Development Commission.
- **GIS Program** – McLeod County has an extensive Geographic Information System (GIS) program that has a vast amount of data regarding the flood plain, drainage systems, and potential wetlands restorations.
- **Buffalo Creek Watershed District** – The Watershed District has an Overall Plan that addresses flooding issues along Buffalo Creek. In addition, they administer a set of Rules and Regulations with permitting authority over a vast amount of flooding related issues. The most important role they have is ensuring drainage coefficients are properly sized in order to prevent drainage systems from being over their design capacity.

McLeod County Flood Hazard Risk Assessment

Table 3I provides a countywide flooding risk assessment for McLeod County. Notice the last row gives McLeod County an overall combined risk level of ‘high’ for riverine flooding and an overall combined risk level of ‘moderate’ for stormwater flooding. The last row also breaks down risk assessments for the following five categories: Citizens/People; Animals/Livestock; Housing; Critical Facilities (i.e., hospitals, fire stations, schools, etc.); and Infrastructure (i.e., roads, bridges, etc.). **The cities located in McLeod County each have separate risk assessments for flooding contained in Chapter Four.**

Assessment of McLeod County’s Key Flooding Information

- Of the 17 hazards profiled for McLeod County, riverine flooding ranks as McLeod County’s top priority, while addressing stormwater flooding concerns ranks 2nd.
- ***Riverine Flooding*** occurs regularly adjacent to Buffalo Creek and the South Fork of the Crow River, severely impacting the cities of Brownton and Glencoe.
- All communities have the potential for ***Stormwater Flooding*** but especially in Biscay, Brownton, Glencoe, Hutchinson, Stewart, and Winsted.
- The most recent Flood Insurance Study (FIS) for McLeod County went into effect on July 7, 2014.
- The County currently does not have an established buyout or relocation fund for repetitive loss structures.
- The County needs to prioritize the roads and bridges that flood on a regular basis for needed improvements, especially during any future roadway upgrades.
- The County would benefit from enhanced monitoring gauges on Buffalo Creek and the South Fork Crow River.
- Existing flood educational material needs to be properly disseminated.
- The Buffalo Creek Watershed District is a major stakeholder in mitigating flooding hazards due to their drainage permitting authority and ability to implement numerous flood-mitigation projects.

Table 3I:
Countywide Flooding Risk Assessment for McLeod County

Question	Response	
	Riverine Flooding	Flash Floods/Stormwater Flooding
<i>Priority Rank</i>	1 st out of 17 Hazards Countywide	2 nd out of 17 Hazards Countywide
<i>Location?</i>	Countywide	All cities in McLeod County have experienced either flash flooding and/or stormwater flooding problems.
<i>Historic Events?</i>	1997, 2001, 2014	1997, 2001, 2002, 2013
<i>How Often?</i>	Minor flooding annually with major events once every 5-10 years.	Twelve events since 1997
<i>Where Would It Strike?</i>	Along Buffalo Creek and the South Fork of the Crow River	Municipalities, especially in Biscay, Brownton, Glencoe, Hutchinson, and Winsted.
<i>How Bad Could Hazard Get?</i>	Major floods cost between \$500,000 and \$1,000,000 countywide.	Homes and infrastructure are displaced for two-three days.
<i>When Likely to Occur?</i>	Spring	Spring/Summer
<i>Other Related Hazards?</i>	Utility failure, landslide, erosion, debris flow, interrupt transportation routes (emergencies)	Utility failure, landslide, erosion, debris flow, interrupt transportation routes (emergencies)
<i>Economic Impacts?</i>	Displaced homeowners, damaged infrastructure, temporary loss of wages, extensive emergency management expenses.	Displaced homeowners, damaged infrastructure, temporary loss of wages, extensive emergency management expenses.
<i>Loss of Life Impacts?</i>	Yes – Education needed to stay clear of flood water.	Yes – Education needed to stay clear of stormwater.
<i>Warning Time?</i>	12 hours on average	1-3 hours on average
<i>Overall Risk Level?</i>	Citizens/People: Moderate Animals/Livestock: Minimal Housing: High Critical Facilities: Minimal Infrastructure: High Riverine: High Stormwater: Moderate	Citizens/People: Minimal Animals/Livestock: Moderate Housing: Moderate Critical Facilities: Minimal Infrastructure: Moderate

Section B: Tornadoes

A tornado is defined as a rapidly rotating vortex or funnel of air extending ground ward from a cumulonimbus cloud. Tornadoes are spawned by thunderstorms and are produced when cool air overrides a layer of warm air, forcing the warm air to rise rapidly. All thunderstorms are capable of producing tornadoes. The damage from a tornado is a result of the high wind velocity and wind-blown debris. Environmental clues of a developing tornado include a dark, often greenish sky, a wall cloud, large hail, and/or a loud roar similar to a freight train. Tornadoes vary greatly in appearance and intensity, ranging from violent to very weak.

Tornado intensity is commonly measured through the use of the Fujita Scale. The scale takes into consideration a number of factors, including patch length and width, and rates a tornado on a scale of 0 to 5. Since 2007, tornado strength in the United States is also 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 National Weather Service 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. The Fujita Scale, the derived EF Scale and the operational EF Scale are included. Though the Enhanced Fujita scale itself ranges up to EF28 for the damage indicators, the strongest tornadoes max out in the EF5 range (262 to 317 mph). A description of each of these scale increments is provided in Table 3J.

**Table 3J:
Fujita Scale, Derived EF Scale, and Operational EF Scale**

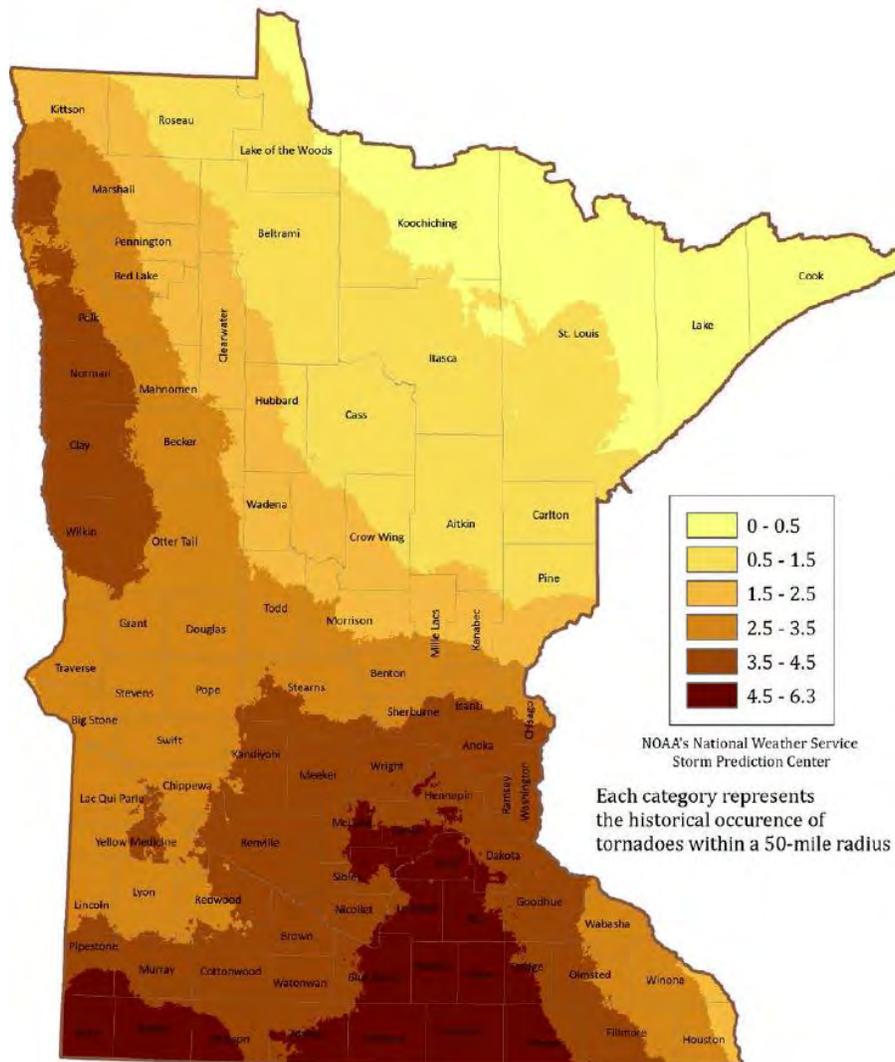
FUJITA SCALE			DERIVED EF SCALE		OPERATIONAL EF SCALE	
F Number	Fastest 1/4-mile (mph)	3 Second Gust (mph)	EF Number	3 Second Gust (mph)	EF Number	3 Second Gust (mph)
0	40-72	45-78	0	65-85	0	65-85
1	73-112	79-117	1	86-109	1	86-110
2	113-157	118-161	2	110-137	2	111-135
3	158-207	162-209	3	138-167	3	136-165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

Source: www.spc.noaa.gov/faq/tornado

Chapter Three: Hazards Profile

Across the United States there are regions that are more prone to tornados than others. States in the southern Midwest, also known as “tornado alley,” receive the most tornados annually. Though Minnesota is north of this region, tornados do occur on a regular basis. Tornado season in Minnesota is generally March through August, although tornados can occur at any time of year. They tend to occur in the afternoons and evenings: over 80 percent of all tornados strike between noon and midnight. The path of Minnesota tornados is typically quite narrow, most less than a quarter of a mile and not very long. Consequently, the total area affected is generally not large. Map 3E shows the State’s Historical Tornado Frequency per Year from 1950 to 2012. Notice that McLeod County falls within the two highest frequency categories.

**Map 3E:
Average Annual Tornado Frequency (1950-2012)**



Source: Minnesota State Hazard Mitigation Plan 2014

County Historical Tornado Events

According to the National Climatic Data Center (NCDC), the Storm Prediction Center, and the Tornado History Project, 17 tornadoes have occurred in McLeod County since 1950 (refer to Table 3K). Most of these tornadoes were classified as F1 or F0. The County’s worst tornado occurred on June 19, 1951, when a F4 tornado emerged near Hutchinson and traveled 53 miles (330 yards wide). This tornado caused 1 death, 20 injuries, and \$2.5 million in property damage.

**Table 3K:
McLeod County Tornadoes since 1950**

Date	Magnitude	Narrative
June 19, 1951	F4 - Hutchinson	53 miles in length. 330 yards wide. 1 fatality and 20 injuries reported. \$2,500,000 in property damage.
May 6, 1965	F3	167 yards wide and 15.5 miles in length, passing through Glencoe north towards Silver Lake.
June 26, 1967	F0	10 yards wide for 0.1 miles in length, a half mile northeast of Glencoe.
May 9, 1973	F0	30 yards wide for 1 mile, 5 miles west of Hutchinson.
June 4, 1975	F1	31 miles in length. 350 yards wide. \$2,500,000 in property damage.
May 23, 1977	F1	10 yards wide for 0.1 miles, 1 mile west of Hutchinson.
June 28, 1979	F1	200 yards wide. \$250,000 in property damage.
June 13, 1983	F1 F2	1 mile in length. 100 yards wide. \$25,000 in property damage. 1 miles in length. 200 yards wide. \$2,500,000 in property damage.
May 12, 1986	F0 F1	13 yards wide for 0.2 miles. 20 yards wide for 0.2 miles with \$25,000 in property damage.
July 25, 1997	F0	1 mile north west of Brownton. 50 yards wide. Tree damage.
Oct 6, 1997	F0	3 miles east of Stewart. 1 mile in length. 30 yards wide. Tree damage.

**Table 3K:
McLeod County Tornadoes since 1950
Continued...**

Date	Magnitude	Narrative
May 15, 1998	F1	5 miles north of Silver Lake. 50 yards wide. \$500,000 in property damage. Brief tornado touchdown destroying 6 farm buildings and damaged homestead. Debris hurled over nearby Butternut Lake. Posts driven 2 feet into the ground.
Sept 16, 2006	F0	2 miles west of Biscay. 1 mile in length. 30 yards wide. An NWS damage survey confirmed that a tornado tore through corn and bean fields. It dissipated about 100 feet west of a rural Biscay church.
June 17, 2010	EF0	The tornado touched down in a rural area. Some trees were broken, a gravity box was tipped over, and minor crop damage occurred.
April 15, 2012	EF0	A storm chaser observed a brief tornado touch down southwest of Brownton, Minnesota. No damage was observed as it tracked less than a few hundred feet in an open field.

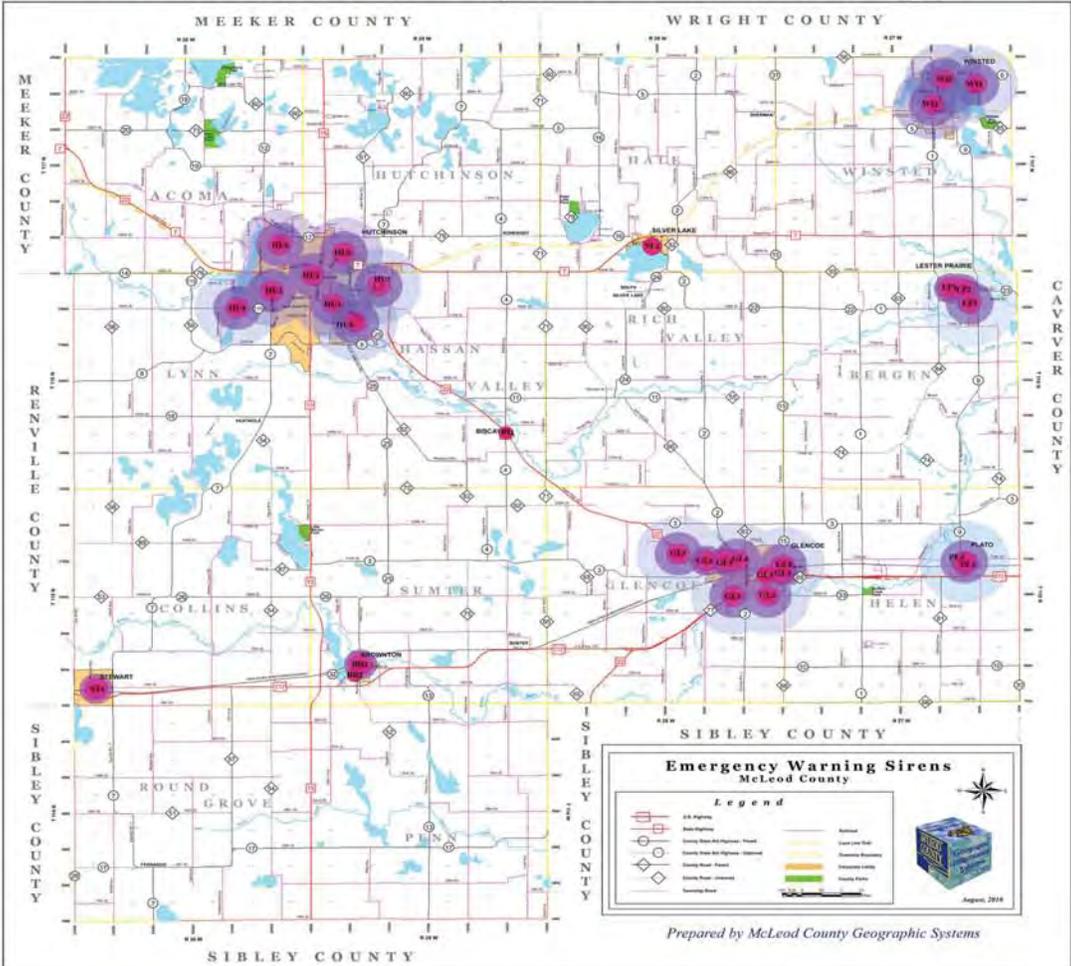
Early Warning Sirens

Tornadoes are likely to occur regularly in McLeod County. Unfortunately, it is difficult to predict to what extent or how much damage will occur. The best way to be prepared for tornadoes is to ensure that residents have enough early notification. Warning sirens are still the most effect method to warn people about increment weather in the shortest amount of time. Map 3F shows McLeod County’s early warning siren coverage. Overall, McLeod County has a total of 27 warning sirens. Notice the communities of Biscay, Plato, and Silver Lake only have one warning siren. All of the remaining six cities have at least two warning sirens, with the City of Glencoe having the most with 7 sirens.

McLeod County Tornadoes Hazard Risk Assessment

Table 3I provides a countywide flooding risk assessment for McLeod County. Notice the last row gives McLeod County an overall combined risk level of ‘moderate’ for tornadoes. The last row also breaks down risk assessments for the following five categories: Citizens/People; Animals/Livestock; Housing; Critical Facilities (i.e., hospitals, fire stations, schools, etc.); and

Map 3F: McLeod County Siren Coverage



McLeod County Emergency Warning Sirens

<p>Biscay</p> <p>BI1 Federal Model 2 125 dB 1,500 Ft Radius (PERM) Installed: 1984</p> 	<p>Hutchinson</p> <p>HU1 Federal 2001DC 127 dB 3,000 Ft Radius (PERM) Installed: 1994, 95 or 96</p> 	<p>HU4 Federal 2001DC 128 dB 3,000 Ft Radius (PERM) Installed: 1994, 95 or 96</p> 	<p>HU7 Federal 2001AC/DC 128 dB 3,000 Ft Radius (PERM) Installed: 2009</p> 	<p>Plato</p> <p>PL1 Erick First Siren 128 dB 3,000 Ft Radius (PERM) Installed: 1992</p> 
<p>Brownton</p> <p>BR1 Federal STH24 125 dB 2,000 Ft Radius (PERM) Installed: 1995</p> 	<p>HU2 Federal 2001DC 127.0 Ft Radius (PERM) Installed: 1994, 95 or 96</p> 	<p>HU5 Federal 2001DC 127 dB 3,000 Ft Radius (PERM) Installed: 1994, 95 or 96</p> 	<p>HU8 Federal 2001AC/DC 128 dB 3,000 Ft Radius (PERM) Installed: 2009</p> 	<p>PL2 Whelan Vortex 84 128 dB 3,000 Ft Radius (PERM) Installed: 2008</p> 
<p>BR2 Federal Model 2 125 dB 1,500 Ft Radius (PERM) Installed: 1984</p> 	<p>HU3 Federal 2001DC 127 dB 3,000 Ft Radius (PERM) Installed: 1994, 95 or 96</p> 	<p>HU6 Federal 2001DC 127 dB 3,000 Ft Radius (PERM) Installed: 1994, 95 or 96</p> 	<p>Stewart</p> <p>ST1 Federal STH24 125 dB 2,000 Ft Radius (PERM) Installed: Year in file</p> 	<p>Silver lake</p> <p>SL1 Federal Model 5 128 dB 3,000 Ft Radius (PERM) Installed: 1979</p> 
<p>Glencoe</p> <p>GL1 Federal 2001AC/DC 128 dB 3,000 Ft Radius (PERM) Installed: 2004</p> 	<p>GL4 Federal 2001AC/DC 128 dB 3,000 Ft Radius (PERM) Installed: 2004</p> 	<p>GL7 Federal 2001AC/DC 128 dB 3,000 Ft Radius (PERM) Installed: 2004</p> 	<p>Lester Prairie</p> <p>LP1 Federal STH24 125 dB 2,000 Ft Radius (PERM) Installed: 1981</p> 	<p>Winsted</p> <p>WI1 Federal 2001AC/DC 128 dB 3,000 Ft Radius (PERM) Installed: 2008</p> 
<p>GL2 Federal 2001AC/DC 128 dB 3,000 Ft Radius (PERM) Installed: 2004</p> 	<p>GL5 Federal 2T22 121 dB 2,000 Ft Radius (PERM) Installed: Used in 1994 From Hutchinson</p> 	<p>GL8 Federal 2001AC/DC 128 dB 3,000 Ft Radius (PERM) Installed: 2004</p> 	<p>LP2 Federal STH24 125 dB 2,000 Ft Radius (PERM) Installed: 1981</p> 	<p>WI2 Federal 2001AC 127 dB 3,000 Ft Radius (PERM) Installed: 1994</p> 
<p>GL3 Federal 2T22 121 dB 2,000 Ft Radius (PERM) Installed: Used in 1994 From Hutchinson</p> 	<p>GL6 Federal STH10 127 dB 2,000 Ft Radius (PERM) Installed: Used in 1994 From Hutchinson</p> 	<p>GL9 Federal Model 5 127 dB 3,000 Ft Radius (PERM) Installed: 1979</p> 	<p>LP3 Federal 2001AC 128 dB 3,000 Ft Radius (PERM) Installed: 2007</p> 	<p>WI3 Federal 2001AC 128 dB 3,000 Ft Radius (PERM) Installed: 1994</p> 



**Table 3G:
Tornado Risk Assessment for McLeod County**

Question	Response
<i>Priority Rank?</i>	3rd out of 17 Hazards Countywide
<i>Location?</i>	Countywide
<i>Historic Events?</i>	1951, 1975, & 1983
<i>How Often?</i>	17 tornado occurrences in past 50 years
<i>Where Would It Strike?</i>	Countywide
<i>How Bad Could Hazard Get?</i>	F4 reported near Hutchinson in 1951
<i>When Would Hazard Likely Occur?</i>	Spring – Fall
<i>What Other Hazards Could Occur Simultaneously?</i>	Hazardous materials, utility failure, fire, hail, thunderstorms
<i>Economic Impacts?</i>	Structure loss and community shut down
<i>Loss of Life Impacts?</i>	Extremely dangerous
<i>Warning Time?</i>	None to less than 30 minutes
<i>Overall Risk Level?</i>	Citizens/People: Minimal Animals/Livestock: Moderate Housing: Moderate Critical Facilities: Minimal Infrastructure: Moderate
Moderate	

Infrastructure (i.e., roads, bridges, etc.). **The cities located in McLeod County each have separate risk assessments for tornadoes contained in Chapter Four.**

Assessment of McLeod County’s Key Tornadoes Information

- Of the 17 hazards profiled for McLeod County, mitigating tornadoes ranks as McLeod County’s 3rd priority.
- The County has an extensive network of 27 warning sirens.

Section C: Thunderstorms (Severe Wind, Hail, and Lightning)

A thunderstorm is formed from a combination of moisture, rapidly rising warm air, and a force capable of lifting air, such as a warm and cold front, a sea breeze or a mountain. Thunderstorms may occur singly, in clusters or in lines. Thus, it is possible for several thunderstorms to affect one location in the course of a few hours. Some of the most severe weather occurs when a single thunderstorm affects one location for an extended time. Thunderstorms often cause damage resulting from flooding, lightning, hail, and straight line winds. In addition, thunderstorms have the potential to spawn tornadoes. According to the National Weather Service (NWS), a thunderstorm is classified as severe when it contains one or more of the following phenomena:

- Winds gusting in excess of 50 knots (57.5 mph)
- Hail ¾" or greater
- A tornado

Severe thunderstorms are not confined to any particular geographic area in McLeod County and may occur and inflict damage anywhere they occur. Although the County is mostly rural, severe thunderstorms can pose a greater threat to people and property in urbanized areas due to the higher density of people and buildings.

As a result of Thunderstorms having multiple hazard features, each of the hazards are profiled in three separate hazard categories: Severe Wind, Hail, and Lightning.

Severe Wind

According to the Federal Emergency Management Agency, winds in excess of 58 miles per hour (mph) are classified as windstorms (excluding tornadoes). According to Minnesota's State Hazard Mitigation Plan (2014), windstorms are among the nation's most severe natural hazards in terms of both lives lost and property damage. Severe winds can damage and destroy roofs, toss mobile homes off their pier foundations, and tear light-framed homes apart. The effects of various wind speeds, as determined by the National Weather Service are presented in Table 3H.

There are several different types of windstorms. A "downburst" is a rather underrated thunderstorm threat defined as a strong downdraft with an out rush of damaging winds on or near the earth's surface. When people experience property damage from a downburst, they often do not believe that "just wind" could have caused the damage, and they assume that they were struck by a tornado. Downbursts may have wind gusts to nearly 130 mph and are capable of the same damage as a medium-sized tornado.

**Table 3H:
Effect of Various Wind Speeds**

Wind Speed		Typical Effects
Miles Per Hour	Knots	
25-31	22-27	Large branches in motion, whistling in telephone wires
32-38	28-33	Whole trees in motion
39-54	34-47	Twigs break off of trees, wind impedes walking
55-72	48-62	Damage to chimneys and TV antennas, pushes over shallow rooted trees
73-112	63-97	Peels surface off roofs, windows broken, trailer houses overturned
113+	98+	Roofs torn off houses, weak buildings and trailer houses destroyed, large trees uprooted

A "gust front" is the leading edge of the thunderstorm downdraft air. It is most prominent near the rain-free cloud base and on the leading edge of an approaching thunderstorm and is usually marked by gusty, cool winds, and sometimes by blowing dust. The gust front often precedes the thunderstorm precipitation by several minutes.

"Straight-line winds," when associated with a thunderstorm, are most frequently found with the gust front. These winds originate as downdraft air reaches the ground and rapidly spreads out, becoming a strong horizontal flow.

County Historical Severe Wind Events

The NCDC lists over 150 thunderstorm wind events that have affected McLeod County since 1955. Over this period, the reported thunderstorms caused 2 injuries, and over \$280,000 in property damage. Many thunderstorms also go unreported, however, due to their high frequency throughout the Midwest. Due to the numerous severe wind events, each with similar types of damages, Table 3I only reports on the 40 major wind events that took place between 2004 and 2013. Table 3J provides a severe wind risk assessment for McLeod County.

**Table 3I:
McLeod County Severe Wind Events (2004-2013)**

Date	Location	Narrative
April 18, 2004	Countywide	Several trees and power poles were downed. A few sheds and garages were downed. Corn bins were blown over. The roof of a granary was blown off and a garage door of a home was damaged. A machine shed and a corn bin were destroyed.
May 9, 2004	Hutchinson	An automated weather sensor recorded a wind gust of 68 mph. A tree was downed onto Jefferson Street SE. Three were also reported down in Silver Lake.
May 30, 2004	Glencoe	A few large trees were downed onto a road. Heavy rain that fell between 10 p.m. CDT on the 29 th and 3 a.m. on the 30 th caused widespread flooding of roads, fields, and waterways across Redwood and southern Renville counties.
June 11, 2004	Brownton	Trees were downed. Magnitude of 50 knots.
June 23, 2004	Hutchinson	A few power lines were downed. Magnitude of 52 knots.
June 30, 2004	Hutchinson & Brownton	One machine shed was destroyed and another was heavily damaged on a farm along Highway 15. Six power poles along Highway 15 near the farm were downed. Magnitude of 65.
May 8, 2005	Glencoe	The roof of a pole barn (228'x70') was blown off and tossed southeast of the structure. Magnitude of 70. \$70,000 in property damage.
June 8, 2005	Countywide	A 10-inch diameter tree snapped off and blocked the intersection of County Road 7 and 225 th Street in Hutchinson. A power line was downed in Silver Lake. A storage shed was demolished in Glencoe. Numerous trees and power lines were downed countywide.
June 20, 2005	Glencoe	Large branches were downed.
June 29, 2005	Stewart & Glencoe	An 18-inch diameter tree and a few 8-inch diameter tree branches were downed at the intersection of County Road 7 and 110 th Street. A tree branch took down power lines on Unit Avenue. A portion of the roof of a trailer home was blown off on Essex Court in Glencoe.
August 8, 2005	Hutchinson	A 6-inch diameter tree branch was downed.
Sept. 3, 2005	Countywide	Power lines were downed onto Highway 15 near the Meeker County border. In addition, trees were downed at the intersection of 240 th Street and Pilot Court in addition to County Road 7 just south of the Meeker County line.

Table 3I:
McLeod County Severe Wind Events (2004-2013)
Continued...

Date	Location	Narrative
August 8, 2005	Countywide	Numerous trees and power lines were downed impeding traffic.
Sept. 12, 2005	Countywide	Fifty trees were uprooted at Lake Marion County Park and Campground. Power lines were downed at various locations throughout the county.
July 13, 2006	Countywide	Numerous trees were downed and a light pole was knocked down in Hutchinson.
July 24, 2006	Hutchinson	A large barn was blown down, with additional damage to a nearby home and garage. Chimney on home was destroyed, with some damage to shingles. The wall of the garage was damaged.
Sept. 16, 2006	Glencoe & Lester Prairie	Trees downed and a boat storage collapsed. Magnitude 52 knots.
June 6, 2007	Brownton & Hutchinson	Two trees twelve to fifteen inches in diameter snapped off at the base. In addition, several 8 to 9 inch diameter branches severed.
August 11, 2007	Hutchinson & Glencoe	Numerous trees downed.
August 28, 2007	Stewart	A few one foot diameter trees toppled.
Sept. 20, 2007	Hutchinson	A roof was blown off a home.
Sept. 20, 2007	Lester Prairie	Wind gusts of 50 knots.
June 14, 2008	Lester Prairie	Wind gusts of 57 knots.
July 10, 2008	Lester Prairie	Power lines and trees toppled.
July 11, 2008	Hutchinson & Brownton	Shed blown over and grain bin blown off foundation on 100th St. two miles West of Highway 15.
June 17, 2010	Countywide	Several power lines were blown down northeast of Lester Prairie, Minnesota.
August 12, 2010	Hutchinson	Several large tree branches were blown down around Hutchison.
July 1, 2011	Countywide	An animal hospital roof was blown off in Hutchinson, along with several power poles on the northeast side of town. In addition, trees were blown down in the south and eastern portions of Hutchinson. A Minnesota Department of Transportation weather sensor measured a wind gust of 63 mph.

**Table 3I:
McLeod County Severe Wind Events (2004-2013)
Continued...**

Date	Location	Narrative
July 10, 2011	Stewart & Brownton	A trained spotter measured a peak wind speed with his anemometer north of Stewart, Minnesota. In addition, local law enforcement officials reported numerous power outages and power lines were blown down from Stewart, eastward to Brownton.
August 1, 2011	Glencoe	Several trees were blown down in Glencoe that blocked city roads.
August 23, 2011	Hutchinson	Large trees downed.
May 1, 2012	Winsted	Several large tree branches caused damage to power lines around the city.
May 19, 2012	Winsted	Large trees downed. Wind gusts measures at 52 knots.
June 10, 2012	Countywide	Large trees and power lines were blown down.
June 17, 2012	Countywide	Power outages due to strong winds and tree damage.
June 19, 2012	Lester Prairie	A 40-inch diameter tree was blown down, and landed on a home.
August 3, 2012	Hutchinson	A few large tree branches were blown down and blocking a road near Kay Street and Lea Avenue.
August 23, 2012	Countywide	There was numerous large tree branches that were blown down. A house roof was partially blown off, with a part of a silo damaged.
June 21, 2013	Countywide	A large tree fell on a vehicle on Jefferson Street, in Hutchinson, Minnesota. The person in the car was injured. There was a measured wind gust of 46 mph at the Hutchinson Airport at 829 LST. Power lines down.
Sept 19, 2013	Silver Lake	Several large tree limbs, and one large tree were blown down northwest of Silver Lake, including an area of flattened corn in the same area of the downed tree limbs.

**Table 3J:
Severe Wind Risk Assessment for McLeod County**

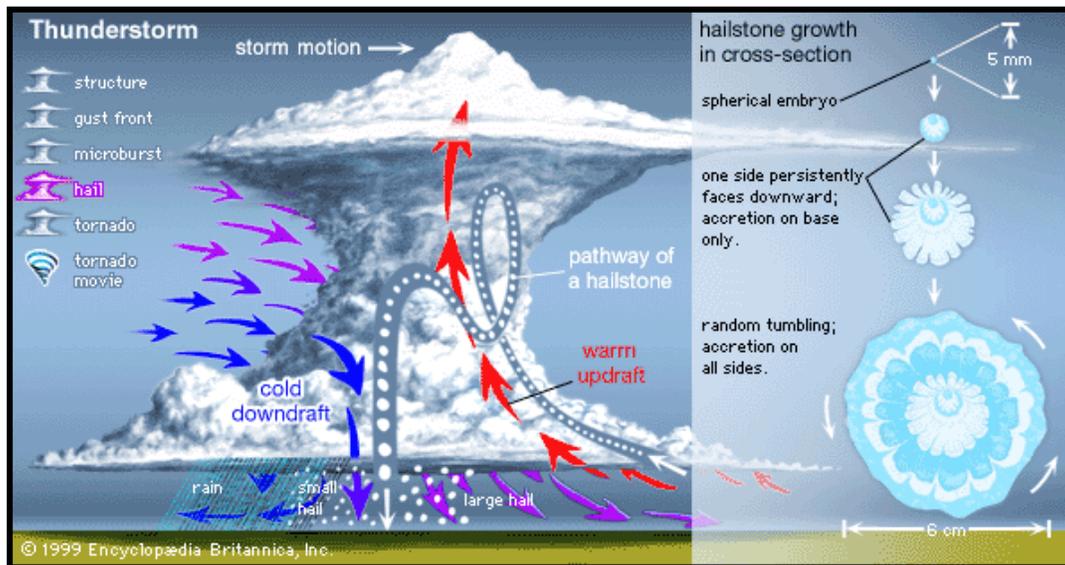
Question	Response
<i>Priority Rank?</i>	4 th out of 17 Hazards Countywide
<i>Location?</i>	Countywide
<i>Historic Events?</i>	2-3 storms per year
<i>How Often?</i>	2-3 storms per year
<i>Where Would It Strike?</i>	Countywide
<i>How Bad Could Hazard Get?</i>	Moderate damage countywide
<i>When Would Hazard Likely Occur?</i>	Spring – Fall
<i>What Other Hazards Could Occur Simultaneously?</i>	Flooding, lightning, hail, transportation accidents, fires, wildfire, tornado
<i>Economic Impacts?</i>	Loss of livestock, fire potential, agriculture and property damage
<i>Loss of Life Impacts?</i>	Rare
<i>Warning Time?</i>	0-6 Hours
Overall Risk Level? <i>Minimal</i>	Citizens/People: Minimal Animals/Livestock: Minimal Housing: Moderate Critical Facilities: Minimal Infrastructure: Minimal

Hail

Hail is precipitation in the form of a chunk of ice that can fall from a cumulonimbus cloud. Usually associated with multi-cell, super-cell and cold front induced squall line thunderstorms, most hail falls from the central region of a cloud in a severe storm. It 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.

The size of hailstones is a direct function of the severity and size of the storm. Large hailstones are an indication of powerful updraft and downdraft winds within a thunderstorm. Large hailstones fall at speeds faster than 100 mph. Hailstorms can occur throughout the year; however, most hailstorms occur during the months of April through October. July is the prime month of crop loss caused by hail.

**Figure 3A:
How Hail Forms**



Historical Events

Since 1993, there have been 190 documented instances of hail in McLeod County, as recorded by the NCDC. The size of hail ranged from $\frac{3}{4}$ " (dime-size) to $2\frac{3}{4}$ " (baseball-size). No deaths, injuries, crop damage, or property damage was recorded with these storms. Table 3K shows the County's major hail events from 2003 to 2013. Table 3L provides a risk assessment for hail in McLeod County. Individual risk assessments for each city are provided in Chapter Four.

**Table 3K:
McLeod County Hail Events (2003-2013)**

Date	Location & Size
April 15, 2003	1 mile south of Glencoe. Magnitude of 0.75 inches. 1 mile south of Hutchinson. Magnitude of 0.75 inches.
June 23, 2003	Hutchinson 0.88 inches.
June 24, 2003	Stewart 1.00 inches. Hutchinson 1.00 inches.
July 14, 2003	Biscay 0.88 inches.
July 19, 2003	4 miles north west of Silver Lake. Magnitude of 0.75 inches. 1 mile north of Silver Lake. Magnitude of 0.75 inches. 2 miles north west of Hutchinson. Magnitude of 1.00 inches. 5 miles north west of Hutchinson. Magnitude of 1.75 inches. 2 miles west of Hutchinson. Magnitude of 1.00 inches. Hutchinson. Hail fell at the golf course in the northwest portion of Hutchinson. Magnitude of 2.00 inches. 6 miles south southwest of Hutchinson. Magnitude of 1.00 inches. Stewart. Magnitude of 1.75 inches.
April 18, 2004	Hutchinson. Dime to quarter sized hail fell. Magnitude of 1.00 inches. Stewart. Magnitude of 0.75 inches. Biscay. Magnitude of 0.75 inches.
May 9, 2004	8 miles west of Glencoe. Penny sized hail fell in Sumter Township and at Lake Marion. Magnitude of 0.75 inches. Brownton. Magnitude of 0.75 inches.
June 30, 2004	4 miles north east of Stewart. Numerous corn and bean crops were shredded by hail. Some of the worst damage was found in a two to three mile area east of Lake Marion. Magnitude of 1.00 inches. Biscay. Magnitude of 0.75 inches. 1 mile north of Brownton. Magnitude of 1.00 inches. 7 miles east of Brownton. Magnitude of 0.88 inches. Sumter. Magnitude of 0.88 inches. Glencoe. Magnitude of 1.00 inches.
March 30, 2005	Hutchinson. Reported on the west side of town. Magnitude of 0.75 inches.
June 8, 2005	Hutchinson. Magnitude of 1.00 inches 5 miles south east of Hutchinson. Magnitude of 0.88 inches. Lester Prairie. Dime sized hail fell on the west side of town. Magnitude of 0.75 inches

Table 3K:
McLeod County Hail Events (2003-2013)
Continued...

Date	Location & Size
Aug 8, 2005	Stewart. Magnitude of 0.75 inches. 1 mile east of Brownton. Dime sized hail was reported by law enforcement at the intersection of Highway 212 and Orange Avenue. Magnitude of 0.75 inches.
Sept 3, 2005	5 miles south of Hutchinson. Dime to nickel sized hail was reported in southeast Lynn Township. Magnitude of 0.88 inches. 3 miles north west of Hutchinson. Dime sized hail was reported at the intersection of Highway 7 and Walden Avenue. Magnitude of 0.75 inches. 1 mile north of Hutchinson. Dime sized hail fell at the intersection of Tagus Avenue and 210 th Street. Magnitude of 0.75 inches. Stewart. Magnitude of 1.00 inches. 9:32 p.m. CST. Brownton. Dime sized hail fell in town and a few miles north of town at the intersection of 110 th Street and Highway 15. Magnitude of 0.75 inches. Stewart. Magnitude of 1.00 inches. 10:15 p.m. CST. 7 miles north northeast of Hutchinson. Three quarter to two inch diameter hail was reported by a trained spotter. Magnitude of 2.00 inches.
Sept 4, 2005	Winsted. Magnitude of 0.75 inches. 5 miles north of Hutchinson. The public reported baseball sized hail. Magnitude of 2.75 inches. 4 miles east of Hutchinson. Quarter sized hail was reported between Silver Lake and Hutchinson and along 236 th Circle northeast of Hutchinson. Magnitude of 1.00 inches.
Sept 21, 2005	Hutchinson. Magnitude of 0.75 inches. Glencoe. Hail damaged cars. Magnitude of 0.88 inches.
April 6, 2006	Hutchinson 1.00 inches.
April 18, 2006	Stewart 0.88 inches.
June 24, 2006	Hutchinson 0.88 inches.
August 24, 2006	Hutchinson 1.00 inches. Glencoe 0.88 inches. Plato 1.50 inches. Winsted 0.75 inches.
Sept. 16, 2006	Silver Lake 0.75 inches.

Table 3K:
McLeod County Hail Events (2003-2013)
Continued...

Date	Location & Size
April 21, 2007	Hutchinson 0.88 inches. Glencoe 0.75 inches.
April 30, 2007	Hutchinson 0.88 inches.
June 7, 2007	Glencoe 0.75 inches. Lester Prairie 0.75 inches.
June 20, 2007	Winsted 1.75 inches.
June 21, 2007	Hutchinson 0.75 inches.
July 8, 2007	Lester Prairie 1.75 inches.
August 11, 2007	Winsted 0.88 inches.
August 28, 2007	Stewart 0.88 inches. Biscay 0.75 inches.
May 30, 2008	Hutchinson 0.88 inches. Glencoe 1.00 inches. Plato 1.00 inches. Silver Lake 0.75 inches. Lester Prairie 0.75 inches.
July 10, 2008	Winsted 1.25 inches. Lester Prairie 0.88 inches.
July 11, 2008	Hutchinson 0.75 inches.
May 6, 2009	Lester Prairie 0.75 inches.
August 2, 2009	Stewart 1.00 inches. Brownton 1.75 inches.
June 17, 2010	Silver Lake 1.50 inches. Brownton 0.88 inches.

Table 3K:
McLeod County Hail Events (2003-2013)
Continued...

Date	Location & Size
August 13, 2010	Lester Prairie 1.50 inches.
May 21, 2011	Hutchinson 0.88 inches. Silver Lake 1.00 inches. Lester Prairie 0.75 inches. Winsted 1.00 inches. Lester Prairie 1.00 inches.
July 1, 2011	Hutchinson 1.25 inches. Glencoe 1.25 inches.
August 6, 2011	Silver Lake 1.50 inches.
April 15, 2012	Biscay 0.75 inches. Glencoe 1.00 inches. Winsted 0.75 inches.
June 14, 2012	Hutchinson 0.75 inches. Glencoe 0.88 inches. Stewart 0.75 inches.
July 13, 2012	Silver Lake 1.50 inches.
August 22, 2012	Stewart 1.00 inches.
August 23, 2012	Brownton 0.88 inches. Lester Prairie 1.00 inches.
June 21, 2013	Countywide 1.75 inches.

**Table 3L:
Hail Risk Assessment for McLeod County**

Question	Response
<i>Priority Rank?</i>	14 th out of 17 Hazards Countywide
<i>Location?</i>	Countywide
<i>Historic Events?</i>	--
<i>How Often?</i>	3-4 storms per year
<i>Where Would It Strike?</i>	Countywide
<i>How Bad Could Hazard Get?</i>	
<i>When Would Hazard Likely Occur?</i>	Spring – Fall
<i>What Other Hazards Could Occur Simultaneously?</i>	Flooding, lightning, tornado, wind, transportation accidents, fires, wildfire
<i>Economic Impacts?</i>	Loss of livestock, fire potential, agriculture, property, and vehicle damage
<i>Loss of Life Impacts?</i>	Rare
<i>Warning Time?</i>	0-1 Hours
<i>Overall Risk Level?</i> Minimal	Citizens/People: Minimal Animals/Livestock: Minimal Housing: Minimal Critical Facilities: Minimal Infrastructure: Minimal

Lightning

Although commonly associated with summer storms, lightning in McLeod County actually occurs throughout the year. Lightning is an electrical discharge resulting from the buildup of positive and negative charges within a thunderstorm. When the buildup becomes strong enough, lightning appears as a "bolt". This flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning reaches a temperature approaching 50,000 degrees Fahrenheit (hotter than the surface of the sun) in a split second. The rapid heating and cooling of air near the lightning cause thunder. Thunderstorms affect relatively small areas when compared with hurricanes and winter storms, however, despite their small size; all thunderstorms are dangerous, as all thunderstorms produce lightning. Severe thunderstorms usually have very frequent and sometimes nearly continuous lightning. However, some non-severe thunderstorms also contain frequent and vivid electrical displays, while some severe storms are accompanied by little lightning. Lightning often strikes outside of heavy rain and may occur as far as 10 miles away from any rainfall. The power of lightning's electrical charge and intense heat can electrocute on contact, split trees, ignite fires, and cause electrical failures.

Historical Events

According to the National Climatic Data Center (NCDC), from January 1996 to August 2013, there were 210 lightning strikes in Minnesota. These strikes were responsible for 9 fatalities, 60 injuries, \$16.5 million in property damages, and \$65,000 in crop damages. According to the NCDC, there are three recorded incidents in McLeod County's lightning history. Lightning occurs frequently, however, and numerous lightning strikes go unreported.

1. On June 23, 1994, lightning struck a barn located one mile north of Hutchinson causing \$15,000 in fire damage.
2. On July 10, 2010, lightning struck a home in Winsted. A fire started causing \$5,000 in property damage.
3. On May 21, 2011, lightning struck a home one mile west northwest of Silver Lake. \$25,000 of property damage was reported.

Most lightning related casualties and damages occur in the summer months, during the afternoon and early evening. In the Midwest, lightning related deaths peak within one hour of 3 p.m. standard local time. Property damage reports peak within two hours of 3 p.m. There are a significant number of casualties and damage reported from lightning during the night, however, particularly between midnight and 6 a.m. Although the information is 20 years old, Table 3M displays the casualties and damages associated with lightning that were reported in Minnesota from 1959 to 1994. Table 3N provides a risk assessment for lightning in McLeod County.

**Table 3M:
Lightning Casualties and Damages in Minnesota (1959-1994)**

Season	Casualties	Damage Reports
Spring	21	95
Summer	123	256
Fall	25	54
Winter	0	1

Source: www.nasa.gov

**Table 3N:
Lightning Risk Assessment for McLeod County**

Question	Response
<i>Priority Rank?</i>	13 th out of 17 Hazards Countywide
<i>Location?</i>	Countywide
<i>Historic Events?</i>	0-2 storms per year
<i>How Often?</i>	0-2 storms per year
<i>Where Would It Strike?</i>	Countywide
<i>How Bad Could Hazard Get?</i>	Fire, strong wind, and hail. Humidity is factor
<i>When Would Hazard Likely Occur?</i>	Spring – Fall
<i>What Other Hazards Could Occur Simultaneously?</i>	Flooding, hail, wind, transportation accidents, fires, wildfire
<i>Economic Impacts?</i>	Loss of livestock, fire potential, agriculture and property damage
<i>Loss of Life Impacts?</i>	Rare
<i>Warning Time?</i>	None to less than 30 minutes
<i>Overall Risk Level?</i>	Citizens/People: Minimal Animals/Livestock: Minimal Housing: Moderate Critical Facilities: Minimal Infrastructure: Minimal
Minimal	

***McLeod County Thunderstorm (Severe Wind, Hail, and Lightning)
Hazard Summary and Assessment***

Thunderstorms, Lightning, Wind, and Hail are likely to occur regularly in McLeod County. Unfortunately, it is difficult to predict to what extent or how much damage will occur. Individual Thunderstorm risk assessments for each city are provided in Chapter Four.

- Of the 17 hazards profiled for McLeod County, Severe Wind ranks as McLeod County's 4th priority, while lightning ranks 13th and hail ranks 14th.
- The County's current warning system needs to be evaluated, specifically who and how people and organizations within the county are notified. Make changes as necessary. Funding should be secured from the Department of Homeland Security or other agencies to maintain and upgrade the systems.
- The County needs to continuously ensure that severe storm spotter volunteers and emergency service personnel are adequately trained.
- The readiness of all public buildings for preventing damage from lightning should be evaluated. Funding to install equipment as necessary should be pursued. Local residents need to be informed of options to protect their own homes and property from lightning damage as well.
- The County needs to continue to cooperate with local radio and TV stations to provide local weather alert program services.
- Emergency response plans should be continuously reviewed for proper staff and equipment needs.
- All public buildings, schools, and other critical facilities should have proper backup electric generators.
- The County needs to continue to implement State and local plans for coordination with surrounding counties during violent storms or extreme temperatures.
- Educational information and "best practices" for protecting life and property during violent storms or extreme temperatures should be provided.
- The County needs to continuously review and assess evacuation and shelter plans.

Chapter Three: Hazards Profile

- The County should assist in developing information on where to find shelter from violent storms for the public and private outdoor recreation sites (i.e., parks, public landings, etc.).
- The County should continue to work with large events, such as outdoor festivals and sporting events, on having a plan to protect and/or evacuate people during violent storms or provide relief from extreme temperatures.
- The County's current warning system needs to be evaluated, specifically who and how people and organizations within the County are notified. Make changes as necessary. Funding should be secured from the Department of Homeland Security or other agencies to maintain and upgrade the systems.

Section D: Fire

Types of fires come in many forms. For purposes of this Plan, fire is divided into two types of categories: wildfires and property fires. It is often assumed that wildfires are natural disasters; however, some wildfires are caused by negligence, such as by not properly extinguishing campfires. Likewise, some property fires are caused naturally, such as by lightning strikes. Being prepared for both types of fires is an essential part of McLeod County's Hazard Mitigation Plan.

Wildfires

As defined in the Minnesota State Hazard Mitigation Plan, a wildfire is any fire on wildland (including forest, brush, range, grass, etc.) that is not a prescribed natural fire and thus, requires a suppression response. These fires are not controlled as they spread through vegetative fuels, exposing and possibly consuming structures. While some wildfires start as a result of natural causes like lightning, humans cause four out of every five wildfires. The risk of wildfire depends on the interactions of several factors during the year, including fuel, topography, and weather. Both fuel and topography will not change dramatically from year to year; however, weather can fluctuate on a daily basis.

Due to increasing urbanization of wild or open lands, there is a distinction made between types of wildfires. A wildland fire is a wildfire in an area in which development is essentially nonexistent, except for roads, railroads, power lines, and similar infrastructure. An urban-wildland interface fire is a wildfire in a geographical area where structures and other human development meet or intermingle with wildland or vegetative fuels. Fires in Minnesota are usually classified by their fuel source and setting: Forest wildfires, prairie fires, and peat fires occur in distinct regions throughout the State (Minnesota State Hazard Mitigation Plan 2014).

The long-term impacts of wildfires are numerous. Wildfires can leave large amounts of scorched and barren land, which may not return to its pre-fire condition for many years. Major fires can completely destroy ground cover, which can, in turn, cause erosion. If heavy rains follow a major fire, flash floods, landslides, and mudflows can occur.

According to the Minnesota State Hazard Mitigation Plan 2014, the following factors contribute significantly to wildfire behavior:

Topography: As slope increases, that is, the divergence of the terrain from horizontal, the rate of wildfire spread increases. South facing slopes are also subject to greater solar radiation, making them drier and thereby intensifying wildfire behavior. However, ridge tops

Chapter Three: Hazards Profile

may mark the end of wildfire spread, since fire spreads more slowly or may even be unable to spread downhill. McLeod County's topography is relatively flat to slightly rolling agricultural land.

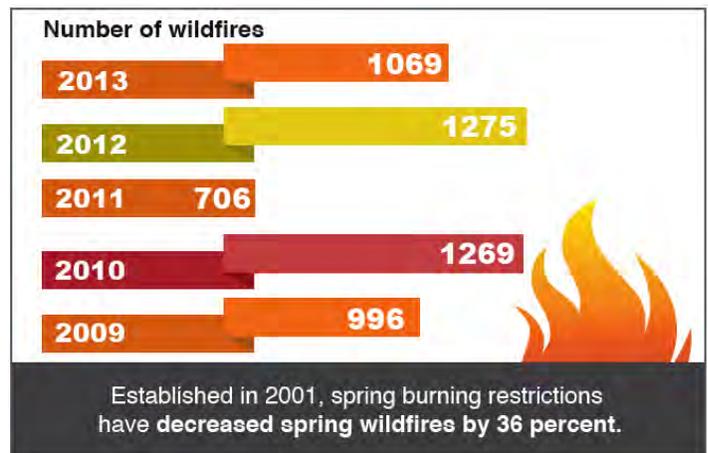
Fuel: Size class, moisture content and volume are the methods of classifying fuel, with volume also referred to as fuel loading (measured in tons of vegetative material per acre). As fuel loading increases, fire intensity (energy released) and flame length increase, making fire suppression more difficult. Fuels with low moisture content ignite easier than wet fuels. The fuel's continuity is also an important factor, both horizontally and vertically. Eighty percent of McLeod County's land cover is classified as agricultural, with the vast majority used for commodity crops (primarily corn and soybeans).

Weather: The most variable factor affecting wildfire behavior is weather. Important weather variables are temperature, humidity, wind, and lightning. Weather events ranging in scale from localized thunderstorms to large fronts can have major effects on wildfire occurrence and behavior. Extreme weather, such as high temperatures and low humidity, can lead to extreme wildfire activity. By contrast, cooling and higher humidity often signals reduced wildfire occurrence and easier containment.

Wildfire History and Causes

Wildfires occur throughout Minnesota. According to the Minnesota Department of Natural Resources, the State spent over \$30 million fighting 1,069 wildfires in 2013 (refer to Figure 3B). The DNR is the primary agency responsible for maintaining a statewide wildfire database. According to this information, no wildfires have been reported in McLeod County since 1985. This does not reduce the risk from them occurring, however, especially since numerous houses and subdivisions are located in the rural wooded areas of the County.

Figure 3B: Wildfires in Minnesota since 2009

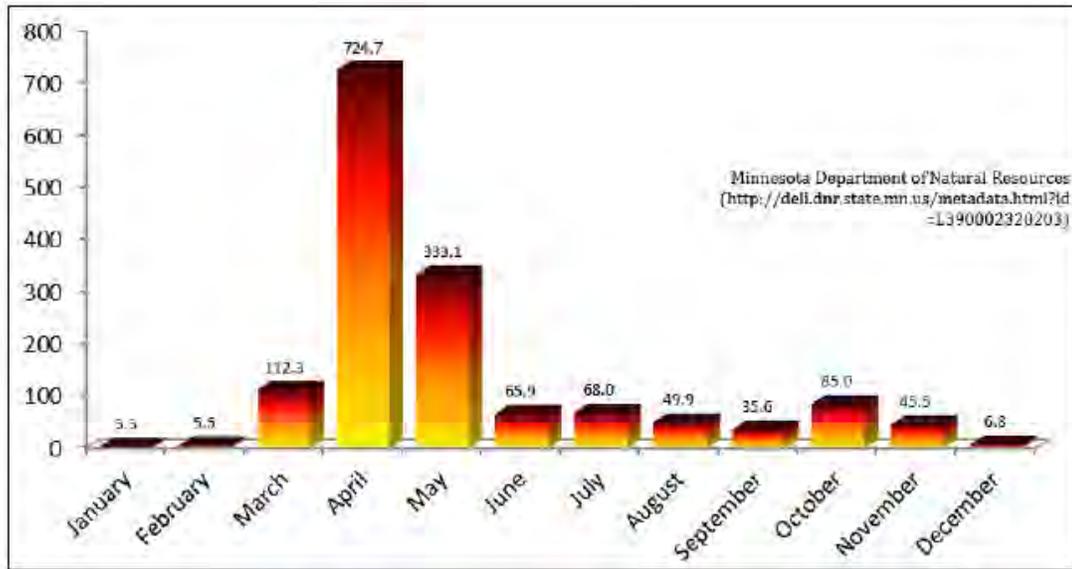


Source: <http://www.dnr.state.mn.us/wildfire/>

According to the information presented in Figure 3C, the month of April accounts for nearly as many average wildfires reported (725) in Minnesota as all of the other months combined

throughout Minnesota (1,536) since 1985. Furthermore, the average number of wildfires reported in March, April, and May account for 76% of the average amount of wildfires annually.

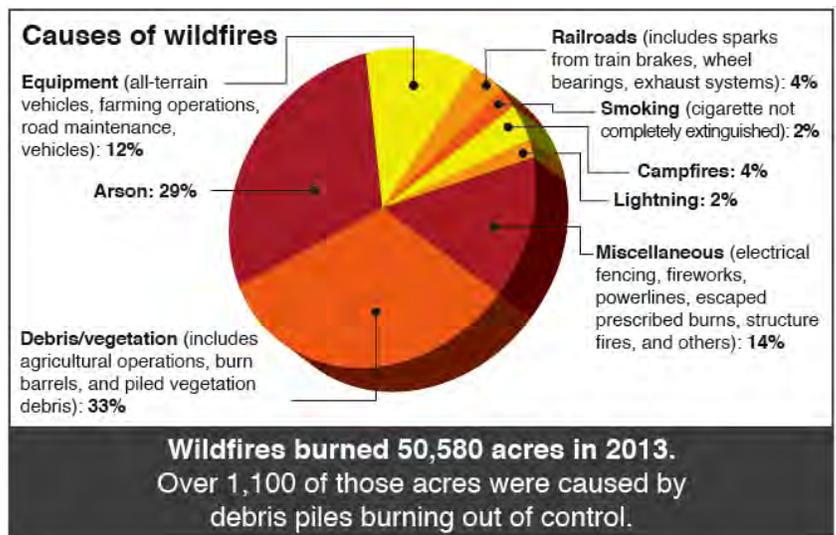
Figure 3C: Average Wildfires Per Month in Minnesota (1985-2012)



Source: Minnesota State Hazard Mitigation Plan 2014

Figure 3D: Causes of Wildfires in Minnesota (2013)

Figure 3D shows a shocking statistic that approximately 29% of the wildfires in the State were started by arson in 2013. The largest category of wildfires were started by debris piles burning out of control (33%). Adding the 4% for campfires and the 2% for cigarettes means that over two-thirds (68%) of wildfires in 2013 could've been prevented. Notice too that only 2% of wildfires were attributed to lightning strikes. Throughout Minnesota, 50,580 acres of wildfires burned in 2013.

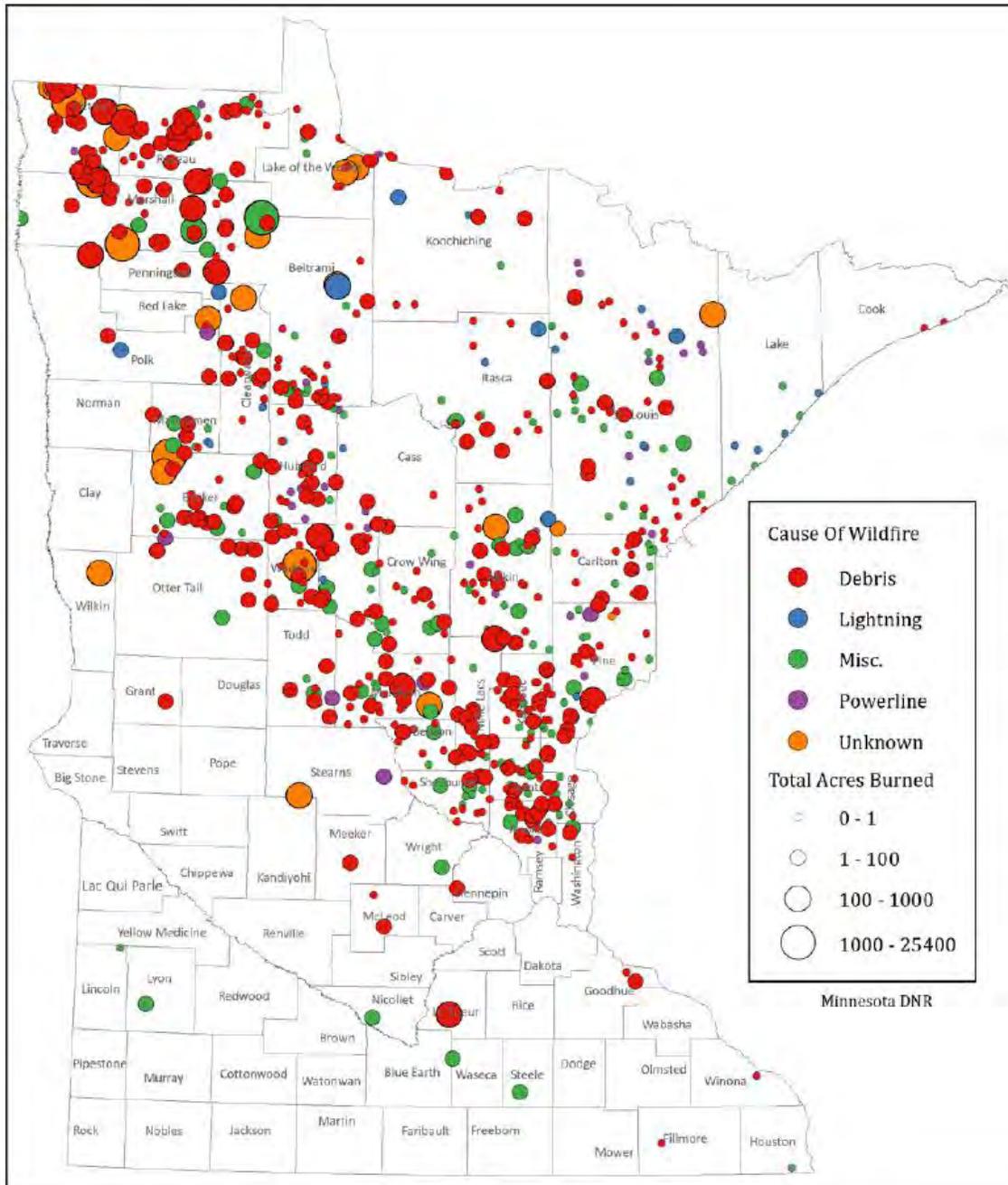


Source: <http://www.dnr.state.mn.us/wildfire/>

Chapter Three: Hazards Profile

Figure 3E displays the size and cause of wildfires in 2012 throughout the State. Notice that in 2012 McLeod County has two debris wildfires. Notice also that wildfires are more common throughout northern Minnesota.

**Figure 3E:
Size and Cause of Wildfires in 2012**



Source: Minnesota State Hazard Mitigation Plan 2014

Wildfire Risk Assessment and Vulnerability Summary

Table 3R provides a risk assessment for wildfires and property fires in McLeod County. Individual wildfire risk assessments for each city are provided in Chapter Four. Wildfires are fairly common occurrences. Due to the vegetation, they have a higher likelihood of occurring in the rural areas of McLeod County rather than in the cities. Wildfires can quickly become an overall larger risk when they approach a heavily populated area.

Property Fires

A fire is categorized as both a natural hazard and a technological hazard. The types of technological fires include structural fires and vehicles fires. For purposes of this Plan, both types of technological fires are referred to as property fires. Property fires include the following:

Structure Fires:

Residential – single-family dwellings, apartments, mobile homes, hotels, motels, and similar.

Public and Mercantile – stores, restaurants, grocery stores, institutions, churches, public facilities, educational, and similar.

Industrial, Manufacturing, Other Buildings - basic industry, manufacturing, storage, residential garages, vacant buildings, and unknown.

Vehicle Fires:

Mobile Property – aircraft, automobiles, trucks, trains, buses, boats, etc.

Historical Events

The Minnesota State Fire Marshall creates an annual *Fire in Minnesota* report that summarizes fire data from each of the fire districts (although not all report in each year). Based upon this information, residential fires are the overwhelming majority of reported fires each year. This information is presented in Table 3P: Minnesota Structural Fires by Property Type.

**Table 3P:
Minnesota Structural Fires by Property Type (2008 – 2012)**

Property Type	2008	2009	2010	2011	2012	Percent of Total
Residential	5,330	4,994	4,825	5,039	4,857	76%
Educational/Institutional	193	175	167	185	147	3%
Public /Commercial	418	387	336	301	349	5%
Industrial/Manufacturing	288	217	234	220	231	4%
Storage	670	572	554	553	556	9%
Special/Other	168	195	162	173	228	3%
Unclassified	39	40	54	59	61	1%
TOTAL	7,106	6,580	6,332	6,530	6,429	100%

As shown in Table 3Q, in 2012, McLeod County’s 8 fire districts reported 140 fire runs with a total loss of \$1,056,821 and no deaths. From 1983 to 2012, 16 people died from fires in McLeod County.

**Table 3Q:
Fire Department Runs and Dollar Losses per City/County (2012)**

Area	Total Fire Runs	Total Other Runs	Total County Dollar Loss		
Brownton	6	55	\$2,000		
Glencoe	0	6	\$0		
Hutchinson	61	376	\$458,071		
Lester Prairie	15	126	\$50,500		
Plato	13	31	\$0		
Silver Lake	18	120	\$400,000	Average Dollar Loss/Fire	Fire Deaths
Stewart	9	0	\$136,750		
Winsted	18	234	\$9,500		
McLeod County	140	948	\$1,056,821	\$10,162	0
Minnesota	19,728	224,994	\$292,159,086	\$17,600	50

Source: 2012 Fire in Minnesota Annual Report

Fire Risk Assessment Vulnerability Summary

Table 3R provides a risk assessment for McLeod County for wildfires and property fires in McLeod County. Individual Fire risk assessments for each city are provided in Chapter Four.

**Table 3R:
Fire Risk Assessment for McLeod County**

Question	Response	
	Wildfires	Property Fires
<i>Priority Rank</i>	15 th out of 17 Hazards Countywide	5 th out of 17 Hazards Countywide
<i>Location?</i>	Countywide	Buildings/Countywide
<i>Historic Events?</i>	2003	
<i>How Often?</i>	1-2 wildfires countywide per year	4-6 property fires countywide per month
<i>Where Would It Strike?</i>	County	Structures throughout county
<i>How Bad Could Hazard Get?</i>	Potential for hundreds of acres to burn	Multiple structures are destroyed
<i>When Likely to Occur?</i>	Spring Months – April is the most likely	Anytime
<i>Other Related Hazards?</i>	Erosion/landslide, severe wind, scrap tire fires, structure fires, hazardous materials, utility failure	Wildfire, hazardous materials
<i>Economic Impacts?</i>	Extremely expensive for local fire departments	Could harm business if fire is bad enough
<i>Loss of Life Impacts?</i>	Extremely dangerous for firefighters	Potential if hazardous materials present Elderly and very young at risk
<i>Warning Time?</i>	3-6 Hours	None
<i>Overall Risk Level?</i>	Citizens/People: Minimal Wildfires: Animals/Livestock: Minimal Low Housing: Minimal Property: Critical Facilities: Minimal Moderate Infrastructure: Minimal	Citizens/People: Minimal Animals/Livestock: Minimal Housing: Moderate Critical Facilities: Moderate Infrastructure: Minimal

Plans and Programs

- McLeod County is served by 8 local fire departments. While each department is responsible for fires within their territorial boundary, they often assist each other on larger fires, including wildfires.
- Firefighters participate in annual wildfire training classes offered by the Minnesota Department of Natural Resources, Forestry Department.
- The McLeod County Zoning Ordinance regulates the development of new housing. The department also is in charge of enforcing safety restrictions including setbacks, lot coverage, depth, and structure height.
- The County's Emergency Operations Plan has designated emergency evacuation routes.
- The State of Minnesota has adopted the National Firewise Program, a multi-agency program designed to protect people, property, and natural resources from wildfires.

***McLeod County Fire
Hazard Summary and Assessment***

- Of the 17 hazards profiled for McLeod County, structural fires ranks as McLeod County's 5th priority, while addressing wildfires ranks 15th.
- The best use of prescribed burnings on county or public lands needs to be assessed.
- The DNR's FIREWISE susceptibility model should be used countywide.
- The County currently does not have a Wildfire Protection Plan.
- Wildfire safety education needs to be promoted.

Section E: Drought

A drought is a period of abnormally dry weather that persists long enough to produce a serious hydrologic imbalance (for example crop damage, water supply shortage, etc.). The severity of the drought depends upon the degree of moisture deficiency, the duration, and the size of the affected area. There are four different ways that drought can be defined:

- ***Meteorological*** - a measure of departure of precipitation from normal. Due to climatic differences, what is considered a drought in one location may not be a drought in another location.
- ***Agricultural*** - refers to a situation when the amount of moisture in the soil no longer meets the needs of a particular crop.
- ***Hydrological*** - occurs when surface and subsurface water supplies are below normal.
- ***Socioeconomic***- refers to the situation that occurs when physical water shortage begins to affect people.

Although the effects of a drought are easily recognized, a drought eludes simple definition. As noted by the Water Resources Center at the University of Minnesota, drought is a difficult condition to define because the requirements for water vary so widely. For example, drought for a crop commences when the soil is deficient in supplying moisture for particular physiologic stages. Thus, drought is not uniform for different crops or even within areas as small as a farm or a single field. For people in urban areas, a drought commences when the reservoir or water source is low and restrictions in the use of water are required. A satisfactory definition requires that a demand for water exists and that the demand be greater than the amount supplied at a particular time.

A more specific definition of drought rests upon what condition, crop, profession, or citizen is affected. Thus, there can be crop or agricultural droughts, forest droughts, engineering droughts, urban droughts, and economic droughts. When a serious hydrologic imbalance occurs in Minnesota, soil moisture reserves, groundwater supplies, lake levels, and stream flows are negatively influenced. Water dependent industries, including agriculture, public utilities, forestry, and tourism, are profoundly affected.

The Minnesota Department of Natural Resources maintains the following webpage which has a vast amount of drought-related information:

<http://dnr.state.mn.us/climate/drought/index.html>

Historical Events

According to Table 3S, a drought has occurred in Minnesota in nearly every decade since the early 1900s. Many of the droughts listed impacted McLeod County. The droughts of the 1930s, 1970s, and 1980s were of the greatest severity. During these events crop loss was substantial and many low monthly precipitation records were set.

**Table 3S:
Historic Droughts**

Year	Location	Remarks
2012-2013	Statewide	96% of the State was moderate or severe drought.
2003	Statewide	Dry weather began in early September and persisted for several days. Above normal temperatures added to the dry conditions.
1999-2000	Southwest MN	Dry weather that began in August 1999 continued through spring 2000. Water levels continued to fall slowly in wetlands, streams, and lakes. Above normal temperatures contributed to further drying. One noticeable manifestation of the dry conditions was a number of grass fires.
1987-1989	Statewide	Established new “average low precipitation” and “average high temperature” records. Farmers lost most, if not all, of the year’s crop. Drought also affected power production, the forest products industry, public water supplies, and fish and wildlife dependent on adequate surface water. Mississippi River flow levels threatened to drop below the Minneapolis Water Works intake pipes.
1976-1977	Statewide	Began in 1974 in parts of south-central and western MN. Dry conditions caused lower water levels in wells and caused record low stream flows throughout the state. Late summer forest fires broke out and conflicts arose between domestic well owners and neighboring high capacity well owners.
1954-1961	Northeast MN	Intensity and duration differed locally.
1936	Northwest MN	Intensity and duration differed locally.
1934	Northwest MN	Intensity and duration differed locally.
1931-1942	Statewide	Intensity and duration differed locally.
1911-1914	Statewide	Intensity and duration differed locally.

Drought of 2012-2013

Precipitation deficits for the period May through August 2012 were the most severe since official measurements began in 1895, eclipsing the driest summers of 1934 and 1936 that occurred during the height of the Dust Bowl. This prolonged period of precipitation deficits, along with above normal temperatures, resulted in the largest area of the contiguous United States in drought since the U.S. Drought Monitor began in January 2000. By early September, over three-quarters of the contiguous U.S. was experiencing at least abnormally dry conditions with nearly half of the region (the Central Plains in particular) experiencing unprecedented severe drought (Source: <http://cpo.noaa.gov/ClimatePrograms/>).

Drought of 2003

For a three-month period from mid-July through mid-October, a stubbornly persistent weather pattern resulted in extremely dry weather across the State of Minnesota. Few widespread rain events moved through the State during the interval, and precipitation totals were less than six inches across much of Minnesota. Total rainfall for the mid-July through mid-October period fell short of historical averages by four or more inches in many areas. Rainfall deficits exceeded seven inches in portions of southeastern Minnesota. When compared with other July 15 through October 20 time periods in the historical database, mid-July through mid-October 2003 rainfall totals rank among the lowest on record for many areas of south central and southeastern Minnesota and a small portion of west central Minnesota.

Drought of 1987-89

The warm, dry winter of 1986-87 was the beginning of this drought period. Drought conditions became very serious in mid-June 1988 when Mississippi River flow levels threatened to drop below the Minneapolis Water Works intake pipes at Fridley. Below normal precipitation coupled with declining lake levels, ground water levels, and stream flow created statewide concern. To facilitate coordination of drought response actions a State Drought Task Force was convened by the Director of the Division of Waters. The State Drought Task Force brought together local, State, and Federal officials to share information and coordinate drought response strategies.

Several actions were taken following the summer of 1988 to better prepare the State for the next drought. The Governor appointed a "Twin Cities Water Supply Task Force" specifically to make recommendations on how to meet future water demands in the event of low flow conditions on the Mississippi River. The Corps of Engineers initiated a review of its operating plans for the

Chapter Three: Hazards Profile

Mississippi River headwaters reservoirs, and the 1989 legislature charged the Metropolitan Council with preparing water use and supply plans for the metropolitan area. In the summer of 1988, rains finally came in August, but not soon enough to save agriculture crops. Drought also gives way to insect infestation. Grasshoppers were prevalent during 1988.

Drought of 1974-77

Drought conditions began in the winter of 1974 and extended through the summer of 1977. The dry conditions of these years lowered water levels in wells and caused record low stream flows throughout the State. Late summer forest fires broke out and conflicts arose between domestic well owners and neighboring high capacity well owners. The DNR Division of Waters formulated new policies to resolve these resource management problems and user conflicts. Many of these new policies formed the basis of subsequent amendments to agency rules and State statutes.

Drought of 1920-30

Perhaps the most devastating weather-driven event in American history, the drought of the 1920's and 1930's significantly impacted Minnesota's economic, social, and natural landscapes. Abnormally dry and hot growing season weather throughout the better part of two decades turned Minnesota farm fields to dust and small lakes into muddy ponds. The parched soil was easily taken up by strong winds, often turning day into night. The drought peaked with the heat of the summer of 1936, setting many high temperature records that still stand today.

Drought Risk Assessment and Vulnerability Summary

Based upon the County's historical experiences, droughts are likely to occur again in the future. Table 3T provides a risk assessment for Droughts in McLeod County. Individual drought risk assessments for each city are provided in Chapter Four.

**Table 3T:
Drought Risk Assessment for McLeod County**

Question	Response
<i>Priority Rank?</i>	11th out of 17 Hazards Countywide
<i>Location?</i>	Countywide
<i>Historic Events?</i>	1976, 1988
<i>How Often?</i>	1 time per 20-30 years
<i>Where Would It Strike?</i>	County
<i>How Bad Could Hazard Get?</i>	Nearly total crop loss and aquifers go dry
<i>When Would Hazard Likely Occur?</i>	Anytime
<i>What Other Hazards Could Occur Simultaneously?</i>	Utility failure (water, wastewater)
<i>Economic Impacts?</i>	Crops/agriculture/food & water supply
<i>Loss of Life Impacts?</i>	Unlikely
<i>Warning Time?</i>	6-12 months
<i>Overall Risk Level?</i> Minimal	Citizens/People: Minimal Animals/Livestock: Moderate Housing: Minimal Critical Facilities: Minimal Infrastructure: Minimal

Plans and Programs

- The NWS provides weather, hydrologic, and climate forecasts and warnings, many of which pertain to droughts.
- The Farm Service Agency administers relief programs in the event of a drought causing a crop disaster. Funding for these programs are provided on a case-by-case basis, as Federal funds are allocated. There are no permanent programs in place for droughts. Agricultural producers are encouraged to purchase multi-hazard insurance.

Chapter Three: Hazards Profile

- McLeod County has adopted a Comprehensive Local Water Management Plan. Overall, the Plan indirectly addresses measures to help prevent or minimize the damage caused through droughts.
- The County's major and minor watersheds have been mapped (found in the Appendix).

McLeod County Drought Hazard Summary and Assessment

- Of the 17 hazards profiled for McLeod County, mitigating drought ranks as McLeod County's 11th overall priority.
- Plans need to be developed to limit water use of nonessential purposes during periods of drought (sometimes referred to as a Drought Contingency Plan).
- The County's Emergency Operations Plan may need to be reviewed and assessed for the distribution of clean water and other drought relief provisions.
- Education materials for water use best management practices needs to be disseminated to the public.
- Current water monitoring data needs to be reviewed to determine if additional efforts are needed or if the existing data is being used adequately.

Section F: Winter Storms

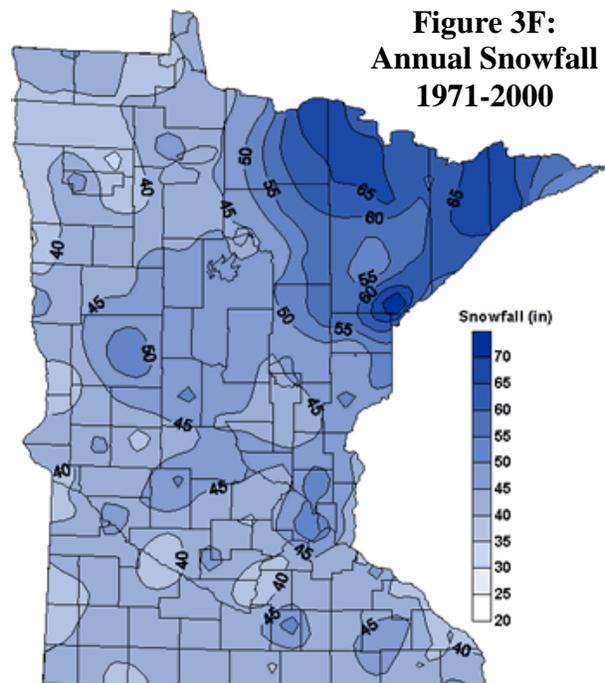
The negative effects of Minnesota winters come in many forms, from blizzards and heavy snow accumulations, to blowing/drifting snow and ice build up on roads and infrastructure. Due to the extended period of most winters, Minnesotans simply adapt to these environmental factors on a nearly-regular basis. There are a few things, however, that counties can do to minimize the negative impacts of winter storms...or at least be better prepared for them before they arrive.

Blizzards and Heavy Snowfall

Blizzards are the most dramatic and destructive of all winter storms. They are characterized by strong winds bearing large amounts of snow. They have the ability to completely immobilize large areas and to isolate and kill humans (and animals) in their path.

A blizzard occurs when the following conditions last for three hours or longer: 1) wind speeds of 35 mph or more; 2) considerable falling and/or blowing snow (reducing visibility frequently to less than 1/4 mile); and 3) generally temperatures of 20 degrees Fahrenheit (F) or lower. A severe blizzard has: 1) wind speeds of 45 mph or more; 2) a great density of falling and/or blowing snow (reducing visibility frequently to near zero); and 3) temperatures of 10 degrees F or lower. Blizzards can occur from the first of October to the end of April, but most frequently occur from early November to the end of March.

The average annual snowfall in Minnesota varies from 36 inches in the southwest to more than 70 inches along the Lake Superior "snow belt." Although snow is an important component of Minnesota's hydrology, the water found in the snow comprises less than 20 percent of the total precipitation received annually. Figure 3F shows Minnesota's annual snowfall from 1971 to 2000 (<http://www.lpa.state.mn.us/>).



Ice and Sleet

An ice or sleet storm is a storm that generates sufficient quantities of ice or sleet to result in hazardous conditions and/or property damage. 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. Ice forming on exposed objects generally ranges from a thin glaze to coatings approximately one inch thick. Significant accumulations of ice are defined as one-quarter inch or greater. 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 repair the extensive damage. When electric lines are downed, households may be without power for several days, resulting in significant economic loss and disruption of essential services in affected communities. Even small accumulations of ice on sidewalks, streets, and highways may cause extreme hazards to motorists and pedestrians.

Ice storms are sometimes incorrectly referred to as sleet storms. Sleet is similar to hail, only smaller and can be easily identified as frozen raindrops (ice pellets), which bounce when hitting the ground or other objects. Sleet is less prevalent and is more difficult to forecast than freezing rain because it develops under more specialized atmospheric conditions. Sleet is very similar to freezing rain in that it causes surfaces to become very slick, but is different because it is easily visible. While sleet does not stick to trees and wires, it can cause hazardous driving conditions. Heavy sleet is a relatively rare event, defined as an accumulation of ice pellets covering the ground to a depth of ½ inch or more.

Historical Events

According to the National Climatic Data Center, McLeod County has experienced 49 severe winter storms since 1993 (many winter storms go unreported and the database only dates back to 1993). These storms affected the central region of Minnesota, caused several accidents, and two reported deaths. While no property loss was reported to the NCDC, significant financial losses undoubtedly did occur in a variety of forms during each winter storm event.

All of the winter storm categories profiled for McLeod County are likely to occur on a regular basis again in the future. Unfortunately, it is difficult to predict to what extent or how much damage will occur. Previously, the NCDC website combines all winter storms for the State of Minnesota under the heading ‘Ice & Snow’ rather than listing by county. As a result, Table 3U provides information on the 49 reported “Blizzard; Ice and Sleet; Heavy Snow, and Winter Storm” reports for McLeod County from 1993 – 2014.

**Table 3U:
Winter Storm Events for McLeod County (1993-2013)**

Date	Description
Jan. 10, 1996	The town of Stewart received 7 inches while 6 inches of snow was measured at Chanhassen, Savage, Mankato, Litchfield, and Stillwater.
Nov. 20, 1996	Four to eight inch snowfall over much of the area. Some of the heavier amounts included 8 inches at Montevideo and Gaylord, 7 inches at St. James, Mankato, Madison, and Stewart. 6 inches reported in the Twin Cities and Glenwood. The weight of the snow in addition to previous ice accumulation resulted in a roof collapse in Canby on Friday, November 22 nd .
Nov. 22, 1996	Four to seven inch snowfall. Heavier snowfall occurred during the daylight hours of the 23 rd . A few of the heavier amounts included almost six inches in the Twin Cities, six inches in Chanhassen, Stewart, St. James, and Redwood Falls.
Dec. 14, 1996	Snowfall exceeding one foot was reported from south central Minnesota through portions of the Twin Cities metropolitan area. Some of the higher snowfalls included 15 inches at Rockford, 14 inches at Cedar and North Branch, 13 inches at Stewart and 7 to 10 inches across the central and southern parts of the Twin Cities metropolitan area.
Dec 23, 1996	General 4 to 10 inch snowfall across much of the area. Heaviest snowfalls of 6 to 10 inches in central and eastern sections of area while snow amounts were in the 4 to 6 inch range in the north. A few snowfalls included 6 to 8 inches across the Twin Cities metro area, 10 inches in Jordan, 8 inches at Cambridge, Forest Lake, Hutchinson, and Montevideo.
March 8, 1999	Strong surface low pressure system moved out of the Rockies and into the central Great Plains. The center of this Winter Storm tracked across central Iowa with snow seen as far north as central Minnesota. Several counties, including McLeod County, were subjected to more than 6 inches of snowfall in less than 38 hours...with most of south central and east central MN receiving between 9 inches and 12 inches of snow.
Jan. 12, 2000	A swath of heavy snow fell across a good chunk of southern MN, and generally ranged between 6 and 12 inches. Some snow totals of note include: Eight inches at Litchfield, Red Wing, Glencoe, and St. Paul. Ten inches were observed at Hutchinson, Willmar, and Benson.

**Table 3U:
Winter Storm Events for McLeod County (1993-2013)
Continued...**

Date	Description
Dec. 28, 2000	A strong low pressure system over central North Dakota early on the 28 th , trekked into southwestern MN during the afternoon, and then moved into northern Iowa during the evening hours. This system deposited heavy snow in the 6 to 10 inch range across much of central and southeast MN. Some notable snow amounts include: Hutchison 7.0 inches.
March 11, 2001	A low pressure system located near Kansas City, MO, just after midnight on the 12 th , trekked northeast across far southern MN during the morning hours, and then traveled into west central Wisconsin by the afternoon. A large area of generally 6 to 8 inches of snow fell across central and portions of south central MN. Some snowfall observations of note include: 8 inches at Granite Falls, Hutchinson, Brownton, Hamburg, Delano, and Owatonna. A garage at the Greencastle Condominiums in Hutchinson was damaged due to heavy snow on the 15 th .
Feb. 9, 2002	Low pressure strengthened over eastern Nebraska, then moved to Illinois. It produced two swaths of significant snow, then strong wind caused blowing snow and near zero visibility in the wide open prairies from west central into south central MN. Some heavier snow totals include 7 inches at Springfield, 6.4 inches at Cokato, 6 inches at Long Prairie and Brownton. Winds of 25 to 35 mph were common.
March 14, 2002	An area of surface low pressure moved from the Oklahoma Panhandle during the early morning hours on Thursday the 14 th , to northeastern Kansas by noon, and then proceeded to the Milwaukee, Wisconsin area by the early morning hours on Friday the 15 th . Some snowfall totals of note include: Hutchinson, New London, Buffalo, Benson, and Litchfield all with 15.0 inches.
Feb. 2, 2003	The first significant snowfall of the season arrived very late in the season, waiting until Groundhog Day. An 80-mile-wide swath of heavy snow fell from west central MN into west central and northwest Wisconsin. Six to eleven inches were common. Top snowfall total that was reported was 11 inches at Montevideo and New London. Ten inches were measured at Eden Valley, Forest Lake, Ham Lake, Hutchinson, and Litchfield. Winds were typically 20 to 25 mph, and though there was some blowing snow, it was not a major problem.

**Table 3U:
Winter Storm Events for McLeod County (1993-2013)
Continued...**

Date	Description
Jan. 21, 2005	<p>Low pressure moved from South Dakota into southern MN on the 21st. Periods of snow resulted between the morning of the 21st and the early morning hours of the 22nd. Snowfall totals ranged from around an inch southwest of a line from Madison to Hanley Falls to Springfield to Fairmont where freezing rain and sleet mixed in with the snow to a swath of 6 to 8 inches stretching from Alexandria to St. Cloud to the Twin Cities metropolitan area. After the snow began to taper off during the predawn hours of the 22nd the winds increased dramatically. Sustained winds increased to 30 to 40 mph across west central and south central MN with gusts as high as 64 mph. The gusty winds caused widespread blowing and drifting of snow southwest of a line from Alexandria to Willmar to Glencoe to Faribault, which dropped visibilities to near zero at times. Snowplow operators were pulled off the road because of the blizzard conditions.</p>
Dec. 13, 2005	<p>A storm system located over eastern North Dakota and northwestern MN during the late evening hours on the 13th, moved over central MN by the afternoon on the 14th, and exited into west central Wisconsin by the early morning hours on the 15th. The largest storm total was 9.2 inches reported at Winsted in McLeod County.</p>
Dec. 29, 2005	<p>A surface low pressure system across southeast South Dakota late on the evening of the 29th, moved to southern MN by late on the morning of the 30th. A large swath of snowfall in the 6 to 8 inch range, fell approximately north of a line from Madison to Redwood Falls, to Glencoe, to Chanhassen to Andover, to Woodbury.</p>
March 12, 2006	<p>A major winter storm traversed much of central Iowa and southern Wisconsin from the afternoon hours on the 12th, to the early evening on the 13th. Snow began to fall around 1200 CST across south central MN, and overspread the entire area by 2000 CST. The storm dumped as much as 19 inches of heavy, wet snow, including a wide swath of 6 to 12 inches. Sustained winds in the 15 to 25 mph range, with gusts between 30 and 38 mph, contributed to moderate to substantial blowing snow and very poor visibility, even in those areas where there was only three to four inches snow. Hutchinson reported 8 inches.</p>

Table 3U:
Winter Storm Events for McLeod County (1993-2013)
Continued...

Date	Description
12/31/2006	A large storm system developed in the Southern Plains on the 29th, and then moved to extreme western Minnesota on the 30 th leaving behind heavy snowfall amounts. Twenty to thirty mile per hour winds produced some blowing and drifting snow during much of the afternoon hours on the 31st.
2/6/2007	Snowfall amounts of note include 6 inches at: Faribault, Glencoe, two miles S Gilchrist, and Hutchinson.
2/24/2007	15.5 inches at Hutchinson.
3/1/2007	Many roads were closed or impassable, and hundreds of schools closed.
12/1/2007	Sustained winds of between 20 and 35 mph were also observed during the storm, causing considerable blowing and drifting.
3/20/2008	9.0 inches at Hutchinson.
3/31/2008	7.5 inches in Glencoe.
4/1/2008	Northwesterly winds in the 10 to 15 mph range also produced moderate blowing and drifting snow.
12/20/2008	Snow began in McLeod County after midnight. After 9 am, snow became heavier, with periods of heavy snow in the late morning and early afternoon. The winter storm continued through the afternoon, but snowfall became lighter and surface visibilities improved.
2/26/2009	Bands of heavy snow fell across McLeod County during the afternoon, before tapering off toward sunset. Total snowfall amounts of five to seven inches occurred across the county.
10/12/2009	This snowstorm was so unusual due to the early nature and how much fell.
12/8/2009	Local cooperative observers reported between 4 and 6 inches of snow across McLeod County with winds estimated between 20 and 30 mph during the height of the storm with a few gusts over 35 mph.
12/23/2009	Three storm systems affected McLeod County over a period of 48 to 60 hours. Once the storm systems tapered off the morning of December 26th, snowfall totals ranged from 12 to 16 inches, with a local report of 19 inches east of Glencoe.

Table 3U:
Winter Storm Events for McLeod County (1993-2013)
Continued...

Date	Description
1/25/2010	Hutchison AWOS had strong winds of 20 to 40 mph, with gusts of 45 mph across the county for several hours, however, visibilities did not drop below one half mile. Near blizzard conditions were observed in open country where driving was not advised. Snowfall amounts were light and under one inch.
2/7/2010	Several reports from the public, COOP observers, and storm data had storm totals of seven to nine inches across McLeod County, with the heaviest in the east.
11/13/2010	Light snow began in the county shortly after midnight, and became heavy toward sunrise. Heavy snow fell mainly in the extreme eastern part of the county during the morning hours, before tapering off in the early afternoon. Total snowfall amounts ranged from 6 to 10 inches.
12/3/2010	Snowfall amounts averaged around 8 to 12 inches across the county.
12/10/2010	Snowfall amounts averaged around 11 inches across the county, along with whiteout conditions which caused plows to be pulled off the road for several hours.
12/15/2010	A band of moderate snow formed prior to midnight, December 15th, and continued through the mid morning hours of December 16th. A quick 6 to 9 inches occurred across the county by 9 am.
12/20/2010	Several reports of 5 to 8 inches of snow fell across the county in less than 12 hours.
1/30/2011	A period of light snowfall continued for an 18 to 24 hour time span and produced locally 6 to 8 inches.
2/20/2011	Snowfall amounts averaged between eight and ten inches.
3/22/2011	A period of sleet and snow fell on the onset of the precipitation, with some heavy snowfall rates around sunrise. Several reports of snowfall were observed by cooperative and supplemental observers across the county. By the time the snow taper off to flurries, locally 10 inches fell.
12/8/2012	Snow developed across the county during the evening of Saturday, December 8th. The snow became heavier toward morning, with totals ranging from 10 to 14 inches across the county.

**Table 3U:
Winter Storm Events for McLeod County (1993-2013)
Continued...**

Date	Description
2/10/2013	Periods of freezing rain and sleet occurred early Sunday morning, but switched over to all snow during the mid to late morning of Sunday, February, 10th. The heaviest snow fell between 8 am and 12 noon where locally 4 to 6 inches fell in the northern part of the county.
3/3/2013	Several weather observers across the county reported between 6 to 9 inches of snowfall that started late Sunday night, and lasted through Tuesday morning, March 5th.
4/9/2013	Snowfall amounts ranged from 8 to 11 inches across the county.
4/18/2013	Snowfall amounts ranged from 9 to 11 inches across the county.
12/4/2013	This storm produced locally 5 to 8 inches of snow across the county.
1/26/2014	Local surface observations from trained spotters, combined with web cams, Minnesota Department of Transportation road conditions, and the added spin outs and crashes, blizzard conditions were noted from the afternoon, through the evening of Sunday, January 26th. A 55 year old man perished when he left his stranded car Sunday evening to walk in the storm, probably trying to get home. He was found dead the next morning south of Stewart. Another occupant of the vehicle made it to a neighbor's house. The temperature at Hutchinson at 11 pm was -7 and the wind was 28 mph gusting to 33 mph, yielding a wind chill around -35.
2/20/2014	Several resources from trained spotters, local public, and county officials measured over 6 inches of snowfall in a 12 hour period. Locally, 6 to 7 inches fell near Hutchinson.
4/3/2014	Several observations, and trained spotters reported 8 to 12 inches of snowfall across McLeod County, with a local report of 12.2 inches in Brownton.
4/16/2014	Numerous reports from local observers, and county officials indicated a large area of snowfall across the county. The heavier snowfall amounts were between 8 to 10 inches from Hutchinson, northward to the Meeker County border.

Table 3V provides a risk assessment for winter storms in McLeod County. Individual risk assessments for each city are provided in Chapter Four.

**Table 3V:
Winter Storms Risk Assessment for McLeod County**

Question	Response
<i>Priority Rank?</i>	10th out of 17 Hazards Countywide
<i>Location?</i>	Countywide
<i>Historic Events?</i>	3-6 storms per year 0-3 blizzards per year
<i>How Often?</i>	3-6 storms per year 0-3 blizzards per year
<i>Where Would It Strike?</i>	County
<i>How Bad Could Hazard Get?</i>	2-3 days per storm, multiple storms in one season, limited visibility, record snow is 17 in. of snow in one day and 76 in. of snow in one season.
<i>When Would Hazard Likely Occur?</i>	November – March
<i>What Other Hazards Could Occur Simultaneously?</i>	Wind, transportation accidents, extreme temp, spring flooding
<i>Economic Impacts?</i>	Cost of snow removal, loss of livestock, school closing, store closing
<i>Loss of Life Impacts?</i>	Yes. Mostly related to transportation accidents and people leaving their vehicle in severe weather.
<i>Warning Time?</i>	24 hours
<i>Overall Risk Level?</i> Minimal	Citizens/People: Minimal Animals/Livestock: Minimal Housing: Minimal Critical Facilities: Minimal Infrastructure: Moderate

*McLeod County Winter Storms
Hazard Summary and Assessment*

- Of the 17 hazards profiled for McLeod County, mitigating the effects of winter storms ranks as McLeod County's 10th overall priority.
- The County's current warning system needs to be evaluated, specifically who and how people and organizations within the county are notified. Make changes as necessary. Funding should be secured from the Department of Homeland Security or other agencies to maintain and upgrade the systems.
- The County needs to continuously ensure that severe storm spotter volunteers and emergency service personnel are adequately trained.
- The County needs to continue to cooperate with local radio and TV stations to provide local weather alert program services.
- Emergency response plans should be continuously reviewed for proper staff and equipment needs.
- All public buildings, schools, and other critical facilities should have proper backup electric generators.
- The County needs to continue to implement State and local plans for coordination with surrounding counties during violent storms or extreme temperatures.
- Educational information and "best practices" for protecting life and property during violent storms or extreme temperatures should be provided.
- The County needs to continuously review and assess evacuation and shelter plans.
- The County should assist in developing information on where to find shelter from violent storms for the public and private outdoor recreation sites (i.e., parks, public landings, etc.).
- The County should continue to work with large events, such as outdoor festivals and sporting events, on having a plan to protect and/or evacuate people during violent storms or provide relief from extreme temperatures.
- The County's current warning system needs to be evaluated, specifically who and how people and organizations within the County are notified.
- Funding should be secured from the Department of Homeland Security or other agencies to maintain and upgrade the systems.

Section G: Extreme Temperatures

Extreme Heat

Extreme summer temperatures pose a threat to McLeod County’s residents in the form of heat exhaustion. All areas of the County have an equal chance of experiencing extreme temperatures. According to the NWS, extreme temperatures are characterized by the issuance of Excessive Heat Advisories or Warnings in the summer months. Heat Advisories are issued by the NWS when, during a 24-hour period, the Heat Index ranges from 105 to 114 degrees during the day, and remains at or above 80 degrees at night. An Excessive Heat Warning is issued when, during a 24-hour period, the Heat Index reaches 115 degrees or more during the day, and remains at or above 80 degrees at night. An Excessive Heat Watch may precede a warning.

The risk for exposure to extreme temperatures is greatest for people who must work outside or must be outside for other reasons. Elderly and youth are the most susceptible age groups to the effects of extreme temperatures. In addition to human related impacts, extreme temperatures may also affect animals that are boarded outside.

Historical Events

The historical events of extreme temperatures that included McLeod County are listed in Table 3W as reported by the National Climatic Data Center. Ten deaths and two million dollars worth of property damage were reported as a result of these events statewide. Excessive heat also causes crop damage that often goes unreported.

One of the historic heat events was documented in the report, “July 1995 Heat Wave,” published by the National Oceanic and Atmospheric Administration Disaster Survey Team. They write,

“Heat kills by taxing the human body beyond its abilities. In a normal year, about 175 Americans succumb to the demands of summer heat. Among the large continental family of natural hazards, only the cold of winter—not lightning, hurricanes, tornadoes, floods, or earthquakes – takes a greater toll. In the disastrous heat wave of 1995, more than 1,000 people died” (*Source: July 1995 Heat Wave, NOAA, December 1995*).

**Table 3W:
Historic Extreme Heat**

Date	Description
7/10/1995	During the 3-day period from July 13-15, 1995, approximately 70 daily maximum temperature records were set at locations from the central and northern Great Plains to the Atlantic Coast. Despite timely NWS warnings, forecasts, advisories, and statements and effective media coverage of the event, this information either failed to reach or was not used effectively by the people who could have prevented heat-related deaths. More than 1,000 people died due to complications related to excessive heat.
7/23/1999	A massive upper ridge over the central and eastern U.S. enabled heat to build into Minnesota. Heat indices ranged from 95 to 110 the afternoon of the 23rd, 90 to 105 on the 24th, and climaxed at 95 to 116 on the 25th before a cold front moved in. Indices only dropped into the 70s the mornings of the 24th and 25th. Dewpoints in the middle and upper 70s were common, along with temperatures topping out in the lower and middle 90s. The highest indices noted, all on the 25th, were 116 in Lakeville, 113 in Appleton, and 110 in Faribault, Redwood Falls and Benson. A 43 year old man died in Willmar after falling asleep inside a closed vehicle on the 25th.
7/29/1999	Less than one week after the first heat wave, central and south central Minnesota were belted with even greater heat, especially on the 30th. The morning of the 29th started with lows in the 70s and dew points in the middle 60s to middle 70s, producing heat indices from 70 to 85. With afternoon highs well into the 90s, and dew points ranging from the middle 60s to upper 70s, heat indices climbed to the 95 to 114 range. Southern Minnesota bore the brunt of the heat this day with numerous triple digit indices. Faribault recorded the highest index at 114, with 113 at St. James, 111 at Redwood Falls, and 110 at Appleton and New Ulm. Though farther north, the central Minnesota cities of Mora and Little Falls still registered an index in the middle 90s.
7/30/2001	A heat wave began on the 30th and persisted until August 1 (see August Storm Data for information regarding August 1). Temperatures on July 30 soared into the upper 80s and lower 90s across a large portion of central and southern Minnesota, while dew points climbed into the middle 70s to lower 80s, resulting in triple digit heat indexes during the afternoon and evening. Korey Stringer, a professional football player for the Minnesota Vikings of the NFL, practiced during the late morning of the 31st in Mankato (Blue Earth County). He collapsed shortly after practice and was taken to the hospital. Mr. Stringer died on August 1 and his fatality will be listed in the August Storm Data.

**Table 3W:
Historic Extreme Heat
Continued...**

Date	Description
8/04/2001	August 5 - 114 at Alexandria (Douglas County) and Morris (Stevens County), 110 at Maple Lake (Wright County) and Montevideo (Chippewa County), and 107 at Mankato (Blue Earth County) and at MSP.
7/30/2006	Temperatures topped out near 100 degrees across much of central and southern Minnesota during the afternoon hours of the 30th and 31st, with maximum heat indices ranging from 105 on the 30th, to 110 on the 31st. No reports of fatalities or injuries were received, but heat advisory criteria were met.
7/18/2011	The second longest consecutive stretch of low temperatures at or above 70 degrees was set this week. Five days in a row, temperatures bottomed out at or above 70 degrees, ending July 20th (the longest streak in St. Cloud is 10 consecutive days, set between July 16th and July 25th 1981).
8/25/2013	Temperatures across the area rose above 90 degrees during the afternoon of Sunday, August 25th. As dew point rose into the 70s, the heat indices surpassed 100 degrees for several hours during the afternoon, topping out around 105 degrees. During the evening, heat indices held above 80 degrees. The heat and humidity continued through Tuesday afternoon before temperatures fell into the 70s.

Extreme Cold

Extreme cold temperatures pose a threat to McLeod County’s residents in many forms, including frostbite, power outages, and unreliable vehicles due to batteries going dead. All areas of the County have an equal chance of experiencing extreme temperatures. According to the NWS, extreme temperatures are characterized by the issuance of Wind Chill Advisories or Warnings in the winter months. Wind Chill Advisories are issued by the NWS when widespread wind chills of 40 degrees below zero or lower, with winds at least 10 mph are expected. A Wind Chill Warning is issued when widespread wind chills of 60 degrees below zero or lower with winds greater than 10 mph are expected.

The risk for exposure to extreme temperatures is greatest for people who must work outside or must be outside for other reasons. Elderly and youth are the most susceptible age groups to the effects of extreme temperatures. In addition to human related impacts, extreme temperatures may also affect animals that are boarded outside.

Historical Events

According to the National Climatic Data Center, the following extreme cold temperatures events occurred in McLeod County from 1996 to 2014:

**Table 3X:
Historic Extreme Cold Events (1996-2014)**

Date	Description
1/18/1996	More than 475 schools including those in the Minneapolis/St. Paul metro area were closed due to extreme cold and wind chill which lingered from the 18th when very cold air overspread the region. Wind chills were frequently 50 below zero or colder. The winds diminished on the 19th, however very cold conditions persisted into the 20th. Many locations neared record cold the morning of the 20th.
1/31/1996	Extremely cold air settled over the area on January 31st, and remained entrenched through February 4th. A new record low temperature for Minnesota was set in the town of Tower on 2/2. Numerous record low temperatures and record low high 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 record on 2/2. A mean temperature of 25 degrees below zero was measured that day with a high of 17 below and a low of 32 degrees below zero. 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.
12/24/1996	Combined with the record low temperature that morning of 22 below, the mean temperature for Christmas Day was 16 degrees below zero.
1/15/1997	Governor of Minnesota canceled school on 1/16 due to extreme wind chills. Wind chills in 40 to 60 below range much of period. Coldest wind chill noted was 63 below at Alexandria at 7 am on 1/16.
2/10/2008	Arctic air behind a cold frontal boundary, combined with northwest winds from 8 to 15 mph, and temperatures from 10 below to 19 below zero, to produce wind chills in the -35 to -48 category across much of the region.
1/14/2009	A deep snow pack and several minor snowfall events prior to this arctic outbreak allowed for little modification of this air mass as it dived southward. Temperatures dropped below zero and stayed below zero for the majority of the outbreak. In addition to the low temperatures, brisk winds of 10 to 20 mph caused wind chill values to drop into the 40 to 60 below range. Some of the coldest wind chill values are as follows; Glenwood at -56, Alexandria at -51, and Willmar at -49.

**Table 3X:
Historic Extreme Cold Events (1996-2014)
Continued...**

Date	Description
1/5/2014	Several sources from local observations indicated that a prolonged period of wind chill values below -35F occurred in the county, with locally -50F or lower during the height of the cold conditions.
1/23/2014	Wind chill values dropped to 35 below zero for several hours across the county. One of the lowest wind chill value was -41 degrees that occurred at the Hutchinson airport.
1/27/2014	Wind chill values dropped below -35 degrees across the county and last for numerous hours. Governor Mark Dayton issued Emergency Executive Order on January 27, declaring a Peacetime State of Emergency in Minnesota in response to a severe shortage of propane and other home heating fuel supplies statewide.
3/1/2014	The first two days of March remained extremely cold, with wind chill values dropping to -35F or colder for several hours during the evening of March 1st, to the morning hours of March 2nd.

Extreme Temperatures Risk Assessment and Vulnerability Summary

Due to the location of McLeod County, both extreme heat and cold temperatures are likely to impact the loss of life and property damage on a regular basis. Unfortunately, it is difficult to predict to what extent or how much damage will occur. Table 3Y provides a risk assessment for extreme temperatures in McLeod County. Individual risk assessments for each city are provided in Chapter Four.

**Table 3Y:
Extreme Temperatures Risk Assessment for McLeod County**

Question	Response	
	Extreme Heat	Extreme Cold
<i>Priority Rank</i>	8 th out of 17 Hazards Countywide	8 th out of 17 Hazards Countywide
<i>Location?</i>	Countywide	Countywide
<i>Historic Events?</i>	1-3 days of extreme heat per year	1996, 1997
<i>How Often?</i>	1-3 days of extreme heat per year	Often below freezing Extreme cold 1-2 days per year
<i>Where Would It Strike?</i>	Countywide	Countywide
<i>How Bad Could Hazard Get?</i>	Record heat is 110° Humidity is factor	Record cold is -36°, wind chill makes conditions worse
<i>When Likely to Occur?</i>	Spring – Fall	November – March
<i>Other Related Hazards?</i>	Flooding, lightning, hail, wind, transportation accidents, fires, wildfire	Wind, transportation accidents, extreme temp, spring flooding
<i>Economic Impacts?</i>	Loss of livestock, fire potential, agriculture and property damage	Loss of livestock, school closing, store closing
<i>Loss of Life Impacts?</i>	Heat stroke, rare	Heat turn-off issues,
<i>Warning Time?</i>	None to less than 30 minutes	3-6 Hours
<i>Overall Risk Level?</i> Riverine: High Stormwater: Moderate	Citizens/People: Minimal Animals/Livestock: Minimal Housing: Minimal Critical Facilities: Minimal Infrastructure: Minimal	Citizens/People: Moderate Animals/Livestock: Moderate Housing: Moderate Critical Facilities: Minimal Infrastructure: Minimal

Plans and Programs

- The NWS issues advisories and warnings for wind chill. These advisories and warnings are broadcast through the radio and television stations that are part of the Emergency Alert System covering McLeod County.

*McLeod County Extreme Temperatures
Hazard Summary and Assessment*

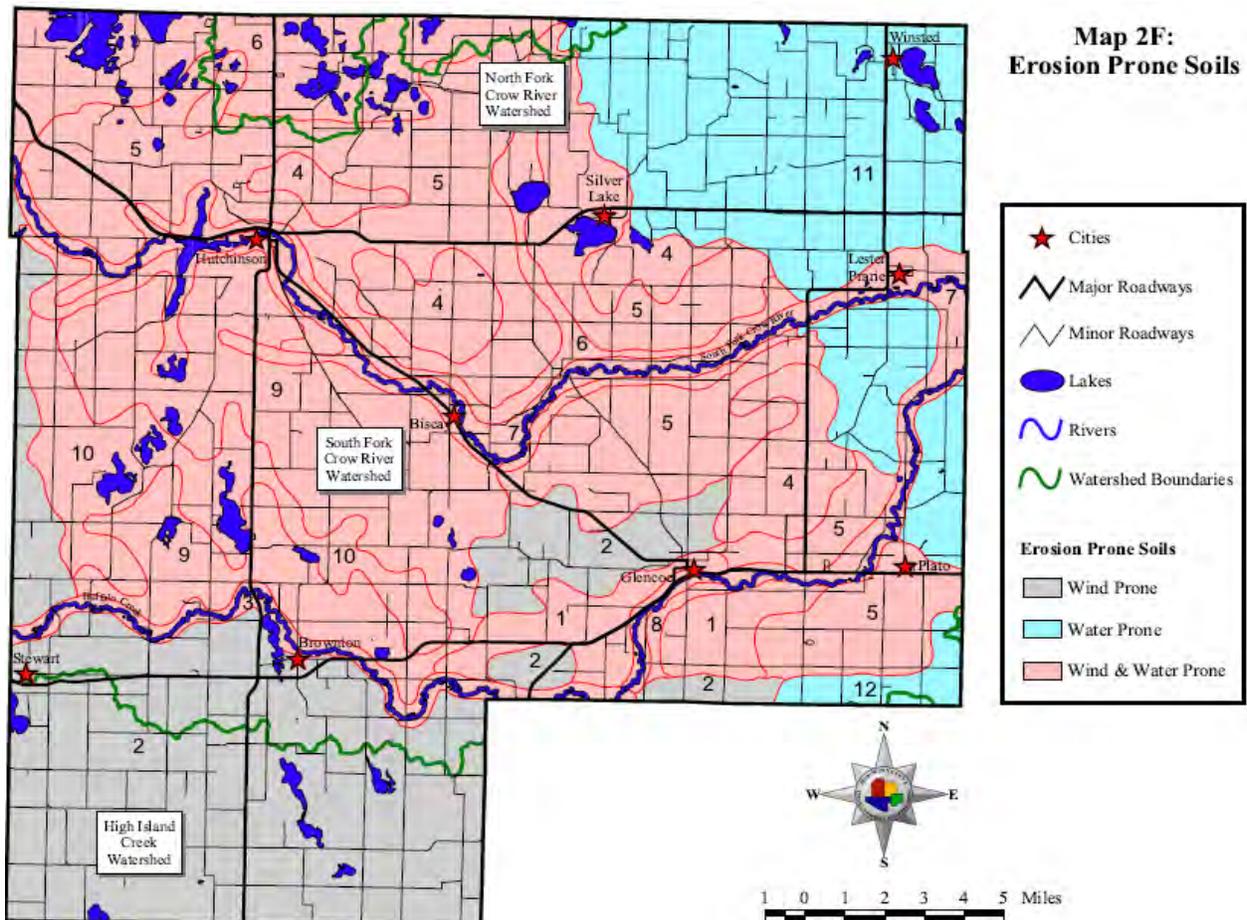
- Of the 17 hazards profiled for McLeod County, mitigating the effects of extreme temperatures ranks as McLeod County's 8th overall priority.
- The County needs to continue to cooperate with local radio and TV stations to provide local weather alert program services.
- Emergency response plans should be continuously reviewed for proper staff and equipment needs.
- All public buildings, schools, and other critical facilities should have proper backup electric generators.
- The County needs to continue to implement State and local plans for coordination with surrounding counties during violent storms or extreme temperatures.
- Educational information and "best practices" for protecting life and property during violent storms or extreme temperatures should be provided.
- The County needs to continuously review and assess evacuation and shelter plans.
- The County needs to work with local jurisdictions to establish shelters to offer temporary relief from extreme heat or cold (i.e., air-conditioned or heated shelters).

Section H: Severe Erosion & Land Subsidence

Erosion is a term that covers a wide range of problems, from soil and wind erosion on agricultural lands, to severe stream bank erosion along rivers. Although agricultural and stream bank erosion have similarities, this Plan addresses the later type as it pertains to the potential loss of life and/or property. According to the 2014 Minnesota State Hazard Mitigation Plan:

Erosion hazard as stated in the 1999 FEMA Riverine Erosion Hazard Mapping Feasibility Study, erosion hazard area is defined by Section 577 of [the] National Flood Insurance Reform Act (NIFRA): “Erosion hazard area means, based on erosion rate information and other historic data available, an area of erosion or avulsion is likely to result in damage or loss of property or infrastructure within a 60 year period.”

The following Map 2F was originally created for the McLeod County Water Plan. The Map shows the location of McLeod County’s wind and water erosion prone soils. Notice that Buffalo Creek and the South Fork Crow River are located in both wind and water prone soils.



Severe Erosion Risk Assessment and Vulnerability Summary

Due to the location of Buffalo Creek and the South Fork Crow River flowing through McLeod County, severe erosion hazards exist in various sites. Table 3Z provides a risk assessment for severe erosion in McLeod County. Individual risk assessments for each city are provided in Chapter Four.

**Table 3Z:
Severe Erosion Risk Assessment for McLeod County**

Question	Response
<i>Priority Rank?</i>	7 th out of 17 Hazards Countywide
<i>Location?</i>	Along Buffalo Creek and the South Fork of the Crow River
<i>Historic Events?</i>	None, however one is developing
<i>How Often?</i>	Once every 10 years
<i>Where Would It Strike?</i>	Along Buffalo Creek and the South Fork of the Crow River
<i>How Bad Could Hazard Get?</i>	The Brownton severe erosion site could affect four homes.
<i>When Would Hazard Likely Occur?</i>	Spring to early Summer (wet soils)
<i>What Other Hazards Could Occur Simultaneously?</i>	Flooding
<i>Economic Impacts?</i>	Loss of dwellings and property along major rivers
<i>Loss of Life Impacts?</i>	Yes, if a land breaks away while people are present.
<i>Warning Time?</i>	2-5 Years
<i>Overall Risk Level?</i> Minimal	Citizens/People: Minimal Animals/Livestock: Minimal Housing: Moderate Critical Facilities: Minimal Infrastructure: Moderate

*McLeod County Severe Erosion
Hazard Summary and Assessment*

- Of the 17 hazards profiled for McLeod County, mitigating the effects of severe erosion ranks as McLeod County's 7th overall priority.
- ***Riverine Flooding*** occurs regularly adjacent to Buffalo Creek and the South Fork of the Crow River, severely impacting the cities of Brownton and Glencoe.
- The McLeod County Soil and Water Conservation District (SWCD) is the primary water plan stakeholder dealing with preventing soil loss in McLeod County. Although mainly targeting agricultural erosion, many of the SWCD's Best Management Practices (BMPs) would also help to alleviate severe erosion hazards.

**Section I:
Dam or Levee Failure**

Dam or levee failure is defined as the collapse or failure of an impoundment resulting in downstream flooding. Dam failures can result in loss of life and extensive property damage. Dam failure can result from an array of situations, including flood events, poor operation, lack of maintenance and repair and terrorism.

One of the main benefits of dams is to hold back water. This is important during high water or floods, especially during spring runoff and immediately after heavy rains. Although dams act to prevent harm from flooding, they do pose potential threats if they fail. Dam failure can push a wall of water down the valley below the dam, destroying many things in its path.

There are 1,250 dams inventoried in the Minnesota’s Dam Safety Program, which is administered by the Minnesota Department of Natural Resources (http://www.dnr.state.mn.us/waters/surfacewater_section/damsafety/index.html). Most of the dams are more than 50 years old and require ongoing or emergency repairs. As a result, Minnesota spends approximately \$1 million annually on repairs and reconstruction. It is estimated that approximately \$114 million of funds are needed over the next 20 years for dam safety. Figure 3G shows pictures of the Hutchinson Dam replacement project which took place in 2007. Table 3AA lists all of the dams found in McLeod County.

Figures 3G: Hutchinson Dam Replacement, McLeod County



The previous Hutchinson Dam (above) was built in 1857. It was the first dam to span the Crow River. The dam was replaced with a “fish ladder” design (right) in 2007 at a cost of \$1.54 million.

**Table 3AA:
National Inventory of Dams (NID) for McLeod County**

Dam Name	NID ID	River	NID Height	NID Storage	Year Completed	Hazard	Owner
<i>Marion Lake</i>	MN00156	Tr-Buffalo Creek	10	404	1948	Low	Co Sportsmans Club
<i>Round Grove Lake</i>	MN00157	Judicial Ditch No. 24	9	2552	1921	Low	McLeod Co
<i>Hutchinson</i>	MN00158	South Fork Crow River	15	2800	1857	Low	City of Hutchinson
<i>Winsted Lake</i>	MN00159	Tr-South Fork Crow River	7	3672	1954	Low	City of Winsted

Dam Failure Risk Assessment and Vulnerability Summary

Table 3AB provides a risk assessment for dam failure in McLeod County. Individual risk assessments for each city are provided in Chapter Four.

Plans and Programs

- *Floodplain Ordinance.* The county floodplain ordinance prohibits further development on the properties in the floodplain.
- *Dam Inspection.* The DNR regulates nearly 900 of the numerous dams in the State. The DNR and U.S. Army Corps of Engineers regularly inspect the dam and reservoir capabilities for flooding and dam failure. Their report indicates that the size of the dam is adequate for any major floods or spring runoff.
- *Monitoring.* The county does some monitoring of tributaries emptying into the reservoir to help identify large volumes of water in times of flooding. This is done by the watershed projects.

- *Evacuation Plan.* The county has an identified evacuation plan for the cities.

**Table 3AB:
Dam Failure Risk Assessment for McLeod County**

Question	Response
<i>Priority Rank?</i>	16th out of 17 Hazards Countywide
<i>Location?</i>	Countywide
<i>Historic Events?</i>	None
<i>How Often?</i>	Unlikely
<i>Where Would It Strike?</i>	Current dam locations
<i>How Bad Could Hazard Get?</i>	Dam could break and flood surrounding area.
<i>When Would Hazard Likely Occur?</i>	Prior to scheduled repairs
<i>What Other Hazards Could Occur Simultaneously?</i>	Flooding
<i>Economic Impacts?</i>	Homes and Businesses flooded
<i>Loss of Life Impacts?</i>	Minimal
<i>Warning Time?</i>	None
<i>Overall Risk Level?</i> Minimal	Citizens/People: Minimal Animals/Livestock: Minimal Housing: Minimal Critical Facilities: Minimal Infrastructure: Minimal

***McLeod County Dam Failure
Hazard Summary and Assessment***

- Of the 17 hazards profiled for McLeod County, mitigating the effects of dam failure ranks as McLeod County’s 16th overall priority.

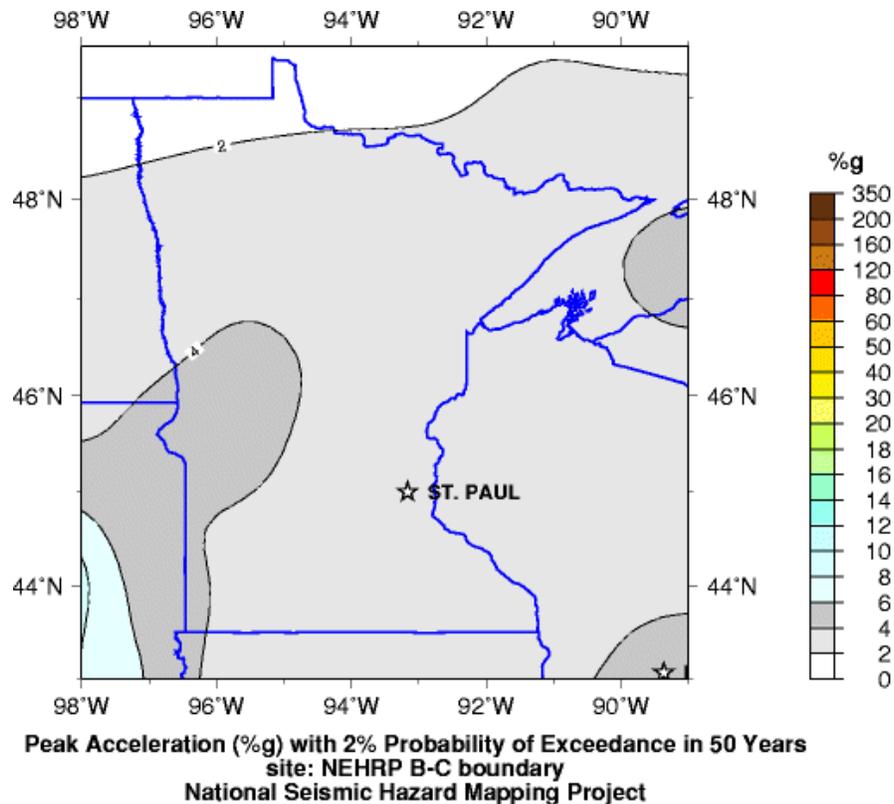
Section J: Earthquake

An earthquake is a shaking or trembling of the crust of the earth caused by underground volcanic forces or by breaking and shifting of rock beneath the surface. Earthquakes occur when geologic pressure causes two or more portions of the Earth's crust to slip against each other along a crack, referred to as a fault. Damage to buildings and infrastructure as a result of an earthquake can be substantial.

The Figure 3H below displays the earthquake potential for the United States. Notice that Minnesota is located in an area in which the earth's crust is relatively stable. The nearest major fault line is the New Madrid Fault, which is located in the central and mid-continental states. The United States Geological Survey and several universities are currently monitoring this fault.

Although the likelihood of an earthquake impacting Minnesota is low, the region still sits atop minor faults where slippage can occur and cause mini-quakes. Minnesota earthquakes, like those elsewhere in the Midwest, are attributed to minor reactivation of ancient faults in response to modern stresses. Table 3AC provides a risk assessment for earthquakes.

Figure 3H: Minnesota's Earthquake Risk



**Table 3AC:
Earthquake Risk Assessment for McLeod County**

Question	Response
<i>Priority Rank?</i>	17 th out of 17 Hazards Countywide
<i>Location?</i>	Countywide
<i>Historic Events?</i>	No major events
<i>How Often?</i>	Infrequent
<i>Where Would It Strike?</i>	Small population within county
<i>How Bad Could Hazard Get?</i>	Major outbreak of life-threatening disease
<i>When Would Hazard Likely Occur?</i>	Year round
<i>What Other Hazards Could Occur Simultaneously?</i>	Riots, terrorist attack, natural hazard event
<i>Economic Impacts?</i>	Tourism industry, local businesses
<i>Loss of Life Impacts?</i>	Major if life-threatening outbreak
<i>Warning Time?</i>	Varies (24 hours normally)
<i>Overall Risk Level?</i> Minimal	Citizens/People: Minimal Animals/Livestock: Moderate Housing: Minimal Critical Facilities: Minimal Infrastructure: Minimal

***McLeod County Earthquakes
Hazard Summary and Assessment***

- Of the 17 hazards profiled for McLeod County, mitigating the effects of earthquakes ranks as McLeod County’s 17th overall priority.

**Section K:
Infectious Disease**

Emerging infectious diseases are infections that have newly appeared in a population or have existed but are rapidly increasing in incidence or geographic range. The huge population growth in some underdeveloped countries and other conditions of modern life ensure that the factors responsible for disease emergence are more prevalent than ever before. Further, there is increasing concern that the overuse of antibiotics is helping germs become resistant to drugs, first to penicillin, then to newer antibiotics, raising the specter of more deaths and disabilities.

Many infectious diseases are preventable and are controllable. Prevention and control of infectious diseases involves collection of accurate assessment data (such as surveillance data for specific conditions), outbreak detection, and investigation, and development of appropriate control strategies (both short- and long-term) based on specific epidemiologic data. These activities require close collaboration between clinical providers (especially infection-control practitioners within hospitals), clinical laboratories, State and local health departments, and Federal agencies. Furthermore, a need exists for continued education of industry (particularly food producers and food-service industries), health-care students and providers, along with research to improve immunizations, diagnostic methods, and therapeutic modalities. Thus, the prevention of infectious diseases requires multidisciplinary interventions involving public health professionals, medical practitioners, researchers, community-based organizations, volunteer and private groups, industrial representatives, and educational systems.

Historical Events

Minnesota has not had an infectious disease outbreak that has reached epidemic proportions in several decades. McLeod County has experienced individual cases of infectious diseases over the last 50 years that have been considered isolated occurrences or minor exposures.

In contrast to typical natural disasters in which critical components of the physical infrastructure may be threatened or destroyed, an infectious disease outbreak may also pose significant threats to the human infrastructure responsible for critical community services due to widespread absenteeism in the workforce. Examples of such services and personnel in the non-health sector might include highly specialized workers in public safety, utility, transportation, and food service industries, and will likely vary from jurisdiction to jurisdiction. State and local officials should carefully consider which services and key personnel within relevant firms or organizations are essential. It is important to identify where absenteeism would pose a serious threat to public safety or would significantly interfere with the ongoing response to the outbreak.

Chapter Three: Hazards Profile

By and large, infectious diseases would have no effect on physical property. A negative impact on the economy would occur, however, if a widespread outbreak happened and businesses were forced to shut down for an extended period of time. McLeod County's entire population is susceptible to exposure from an infectious disease because of the random nature of diseases. Infection rates and exposure risk will vary based on the disease, sanitation habits of individuals, and personal choices. Large population concentrations and sites with large numbers of people are especially at risk in the event of an outbreak.

The following infectious diseases are possible in McLeod County and could be considered a health risk and disaster if a large outbreak occurred.

Respiratory Illnesses

Tuberculosis

Tuberculosis (TB) is a disease that is spread from person to person through the air. TB usually affects the lungs, but it can also affect other parts of the body, such as the brain, the kidneys, or spine. TB germs are put into the air when a person with TB of the lungs or throat, coughs or sneezes. When a person inhales air that contains TB germs, he or she may become infected. People with TB infection do not feel sick and do not have any symptoms, this is Latent TB. However, they may develop TB at some time in the future. For this reason Latent TB continues to be monitored through Local and State Public Health agencies and is treated to reduce the incidences of active disease outbreaks.

The general symptoms of TB include feeling sick or weak, weight loss, fever, and night sweats. The symptoms of TB of the lungs include coughing, chest pain, and coughing up blood. Other symptoms depend on the part of the body that is affected.

Influenza (Flu)

Influenza is a contagious disease that is caused by the influenza virus. It attacks the respiratory tract in humans (nose, throat, and lungs). The flu is different from a cold. The flu usually comes on suddenly and may include these symptoms: fever, headache, tiredness (can be extreme), dry cough, sore throat, nasal congestion, and body aches.

Influenza types A or B viruses cause epidemics of disease almost every winter. In the United States, these winter influenza epidemics can cause illness in 10 to 20 percent of people and are associated with an average of 20,000 deaths and 114,000 hospitalizations per year. Getting a flu shot can prevent illness from types A and B influenza.

Pertussis

Pertussis, or whooping cough, is a contagious respiratory disease caused by the B. Pertussis bacterium. The disease is spread by coughing or sneezing. Thick mucus builds up in the lungs and clogs air passages, triggering violent coughing spells. It can be quite serious, especially for young infants with tiny air passages. The fatality rate is highest in infants under six months of age. The effects of toxins in the B. Pertussis bacteria can produce high fever, convulsions, brain damage, and death. Permanent damage can include continuing seizure conditions, mental retardation, learning disabilities, and chronic illness.

Severe cases of whooping cough may require hospitalization, respiratory support, and nutritional and rehydration therapy. There is no medicine to cure whooping cough but antibiotics are often used to reduce the spread of the disease to others as well as treat secondary infections such as pneumonia, bronchitis, and otitis media (inner ear infections). In the past, these secondary infections often caused many of the deaths that occurred after a child had whooping cough. Pertussis causes about nine deaths per year in the United States. The children’s vaccine program includes a vaccine for Pertussis. Because the Pertussis vaccine loses effectiveness as children get older, children over the age of six may get Pertussis even if they were vaccinated. While most adults handle whooping cough as another cold, this can be a difficult disease for those who are at high risk such as those with asthma.

Table 3AD shows the cases of Pertussis Disease in McLeod County in relation to the State of Minnesota.

**Table 3AD:
Annual Pertussis Disease Statistics**

	2012	2013	2014
<i>McLeod County</i>	11	5	1
<i>Minnesota</i>	4,144	865	614 (As of August 14)

Pandemic Flu

A pandemic is a global disease outbreak. A flu pandemic occurs when a new influenza virus emerges for which people have little or no immunity, and for which there is no vaccine. The disease spreads easily person-to-person, causes serious illness, and can sweep across the country and around the world in a very short time.

Chapter Three: Hazards Profile

It is difficult to predict when the next influenza pandemic will occur or how severe it will be. Wherever and whenever a pandemic starts, everyone around the world is at risk. Countries might, through measures such as border closures and travel restrictions, delay arrival of the virus, but cannot stop it.

Food Borne Illnesses

Foodborne illness is caused by consuming contaminated foods or beverages. Many different disease-causing microbes or pathogens can contaminate foods, so there are many different types of foodborne illnesses.

Most foodborne diseases are infections caused by a variety of bacteria, viruses, and parasites. Other diseases are poisonings caused by harmful toxins or chemicals that have contaminated food. Many foodborne pathogens also can be acquired through recreational or drinking water, from contact with animals or their environment, or through person-to-person spread.

Commonly recognized foodborne infections are:

- Campylobacteriosis (*Campylobacter*)
- *Escherichia coli* O157:H7 Infection (*E. coli* O157) and Hemolytic Uremic Syndrome (HUS)
- Giardiasis (*Giardia*)
- Salmonellosis (*Salmonella*)

Common Symptoms

- Common symptoms of foodborne illness are diarrhea and/or vomiting, typically lasting 1 to 7 days. Other symptoms might include abdominal cramps, nausea, fever, joint/back aches, and fatigue.
- What some people call the “stomach flu” may actually be a foodborne illness caused by a pathogen (i.e., virus, bacteria, or parasite) in contaminated food or drink.
- The incubation period (the time between exposure to the pathogen and onset of symptoms) can range from several hours to 1 week.

Foods Associated with Foodborne Illness

- Raw foods of animal origin, that is, raw meat and poultry, raw eggs, unpasteurized milk, and raw shellfish are the most likely to be contaminated.
- Fruits and vegetables can also be contaminated with animal waste when manure is used to fertilize produce in the field, or unclean water is used for washing the produce.
- Raw sprouts are particularly concerning because the conditions under which they are sprouted are ideal for growing microbes.
- Unpasteurized fruit juices or cider can also be contaminated if there are pathogens on the fruit that is used to make it.
- Any food item that is touched by a person who is ill with vomiting or diarrhea, or who has recently had such an illness, can become contaminated. When these food items are not subsequently cooked (e.g., salads, cut fruit) they can pass the illness to other people.

Source: Minnesota Department of Health 2014

Hepatitis A

Hepatitis A is an enterically transmitted viral disease that causes fever, malaise, anorexia, nausea, and abdominal discomfort followed within a few days by jaundice. The disease ranges in clinical severity from no symptoms; to a mild illness lasting one or two weeks; to a severely disabling disease lasting several months. Transmission can occur by direct person-to-person contact, through exposure to contaminated water, ice, or food. Food and beverages become contaminated by a food-handler who is ill with Hepatitis A. There is no specific treatment for Hepatitis A and the only prevention is vaccination.

Vector Borne Diseases

Vector-Borne Diseases are caused by bacterial or viral infections transmitted by mosquitos, ticks or fleas. These include some of the world's most destructive diseases, many of which are increasing threats to human health as the environment changes and globalization increases. Some of these diseases have long been present in the United States and more specifically Minnesota, while others have recently emerged. Table 3AE lists the most recent viral illnesses that are transmitted to people through the bite of an infected mosquito or tick. Most people infected with

these viruses will have either no initial symptoms or a mild flu-like illness. A small percentage of people (especially children) may develop more severe illnesses that could potentially be fatal.

**Table 3AE:
Vector Borne Illnesses**

Mosquito Borne	Tick Borne
<ul style="list-style-type: none">• West Nile Virus• La Crosse Encephalitis	<ul style="list-style-type: none">• Lyme Disease• Anaplasmosis-Ehrlichiosis• Babesiosis• Rocky Mountain Spotted Fever

The number of mosquitoes that are actually capable of causing infection in humans is relatively small, but it is always advisable to take preventive measures to protect yourself. Preventing exposure to blacklegged ticks (also known as deer ticks or bear ticks) requires diligence. The preventions listed below reduce exposure to possible mosquito and/or tick borne illnesses:

- Wear mosquito/tick repellent containing up to 30% DEET (10% for children).
- Wear long sleeve shirts and pants or protective clothing and tuck pant legs into socks or boots to create a “tick barrier”
- Avoid outdoor activity at peak mosquito feeding times (dawn and dusk). Avoid blacklegged tick habitats (tall grass and leafy brush areas) during the peak time of year (generally mid-May through mid-July).
- Eliminate water-holding containers (buckets, tires, etc.) from your property. This will reduce the numbers of several mosquito species.
- Keep your lawn cut short. Remove leaves and clear the brush around your house and at the edges of the yard to reduce tick habitat.

Animal Health

Wildlife diseases are a major area of concern in colonial water birds or major concentrations of waterfowl. Diseases, such as Newcastle’s Disease or West Nile, exist in the wild and outbreaks will occur. However, the extent to which animals die or disease is spread can be minimized through early identification.

Foot-and-Mouth Disease

Foot-and-Mouth Disease (FMD) is a severe, highly contagious viral disease of wild and domestic animals. It primarily affects cattle and pigs, but infections can also occur in sheep, deer, and other cloven-hooved animals. A rule of thumb is sheep are carriers, pigs are amplifiers, and cows are indicators.

Infections in humans are extremely rare. The disease has not been reported in the United States since 1929. However, an outbreak of foot-and-mouth disease occurring in the United Kingdom has received considerable attention in the media.

FMD is considered the most costly of all animal diseases. It is often necessary to conduct wholesale slaughter of animals wherever there is an outbreak. Second, no animals from an area not declared free of the disease may be moved to other locations or used in trade except as processed food subjected to high temperatures. It is also one of the most contagious animal diseases. The virus is spread not only animal to animal through the air, it can attach to truck tires and clothing and equipment in mechanical transmittal.

In cattle, the first symptoms include dullness, refusal to feed, and a fall in milk production. From there the symptoms expand to blisters on tongue, gums, muzzle, nostrils, teats, and the spaces between the hoof segments, sometimes crippling the animals. In other animals, there may be fewer signs of the disease and, in some cases, animals die without showing any symptoms.

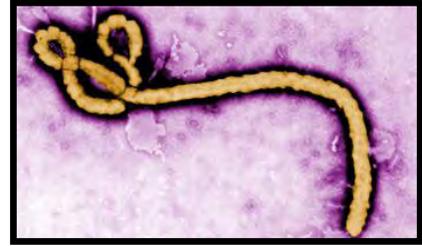
For additional information on Foot (Hoove) and Mouth Disease, look on the Federation of American Scientists website <http://fas.org/>.

Chronic Wasting Disease

Chronic Wasting Disease (CWD) is also a wildlife disease that has received much attention in Minnesota and Wisconsin in the past few years. This is a degenerative brain disease similar to “mad cow disease”. It can be spread to wild herds from captive herds or vice versa. At this point there is no recorded occurrence of CWD in wild deer in Minnesota. However, one of the most important means of ensuring that the disease is not spread is to ensure all captive cervidae (elk and deer) farms are registered with and licensed by the Minnesota Department of Agriculture.

Ebola and Marburg Fevers

Ebola and Marburg haemorrhagic fevers are caused by the Ebola and Marburg virus respectively, both belonging to the same virus family. Both are rare diseases, but have the potential to cause high death rates. There are five species of the genus Ebolavirus (Filoviridae family): Zaïre ebolavirus, Sudan ebolavirus, Reston ebolavirus, Taï Forest ebolavirus and Bundibugyo ebolavirus (source www.ecdc.europa.eu).



Ebola virus disease is not an airborne disease and only symptomatic patients are contagious. Transmission requires direct contact with blood, secretions, organs or other bodily fluids of dead or living infected persons or animals. Therefore the risk of infection is considered very low if precautions are strictly followed. Clinical illness starts as a flu-like syndrome, rapidly evolving to severe disease with bleedings. No treatment or vaccine is available for either disease.

Infectious Disease Risk Assessment and Vulnerability Summary

Similar to the other hazards, predicting the timing of infectious diseases is extremely difficult. Table 3AF provides a risk assessment for infectious diseases in McLeod County. Individual risk assessments for each city are provided in Chapter Four.

Plans and Programs

- The McLeod County Public Health Department monitors the incidence of infectious disease. Ongoing, the medical providers and Public Health report on sixty-three different diseases to the MDH.
- The Minnesota Division of Homeland Security and Emergency Management, in cooperation with the Minnesota Department of Agriculture, sponsor regional planning, and response exercises.
- The Health Alert Network (HAN) has been developed as part of Center for Disease Control's (CDC) Public Health Emergency Preparedness & Response Program. The HAN also coordinates and maintains CDC's Public Health Emergency Preparedness & Response Website (<http://www.bt.cdc.gov/>). The HAN is a nationwide, integrated information and communications system serving as a platform for distribution of health alerts, dissemination of prevention guidelines and other information, national disease surveillance, and electronic laboratory reporting, as well as for CDC's bioterrorism and related initiatives to strengthen preparedness at the local and state levels.

**Table 3AF:
Infectious Diseases Risk Assessment for McLeod County**

Question	Response
<i>Priority Rank?</i>	9 th out of 17 Hazards Countywide
<i>Location?</i>	Countywide
<i>Historic Events?</i>	No major events
<i>How Often?</i>	Infrequent
<i>Where Would It Strike?</i>	Small population within county
<i>How Bad Could Hazard Get?</i>	Major outbreak of life-threatening disease
<i>When Would Hazard Likely Occur?</i>	Year round
<i>What Other Hazards Could Occur Simultaneously?</i>	Riots, terrorist attack, natural hazard event
<i>Economic Impacts?</i>	Tourism industry, local businesses
<i>Loss of Life Impacts?</i>	Major if life-threatening outbreak
<i>Warning Time?</i>	Varies (24 hours normally)
<i>Overall Risk Level?</i> Minimal	Citizens/People: Moderate Animals/Livestock: Moderate Housing: Minimal Critical Facilities: Minimal Infrastructure: Minimal

***McLeod County Infectious Disease
Hazard Summary and Assessment***

- Of the 17 hazards profiled for McLeod County, mitigating the effects of infectious disease outbreaks ranks as McLeod County’s 9th overall priority.
- Raising public awareness is the best defense against preventing infectious diseases. This is becoming more challenging as McLeod County’s population is becoming more culturally diverse and because communication methods and social media have changed the way information is disseminated to the public.

Chapter Three: Hazards Profile

- Working on MOU's MOA's with community partners to provide access to medical and mental/behavioral health services in our community in the event of a disaster.
- Provide guidance to community partners, particularly groups representing the functional needs of at-risk populations, to assist them in educating their own constituency groups regarding plans for addressing preparedness for and recovery from the jurisdiction's identified risks and for access to health services that may apply to the incident.
- In collaboration with jurisdictional partners, document short term and long term health service delivery priorities and goals in an infectious disease outbreak.
- Identify and update strategies for the repair or rebuilding of public health services in a recovery/response (COOP Plan).

Section L: Groundwater Contamination

Water Supply Contamination

Water supply contamination occurs when non-point source pollutants are introduced into public groundwater and/or surface water supplies. Microbiological and chemical contaminants can enter water supplies. For instance, chemicals can migrate from disposal sites and contaminate sources of drinking water. Animal wastes and pesticides can be carried to lakes and streams by rainfall runoff or snow melt. Human wastes may be discharged into receiving waters that ultimately flow to water bodies used for drinking water. As the number of potential pollutants increase and the population grows in McLeod County, there are a growing number of such threats to our drinking water systems.

Historical Events

In McLeod County, groundwater is most often used for domestic consumption. All of the cities within the county serve their residents through municipal facilities. Rural residents are often served by private wells, although some private wells do exist within city limits.

Monitoring of water supplies occurs in several ways. All municipal wells are required by the MDH to be tested annually for nitrates and twice per month for bacteria. In addition, municipal wells are tested every two years for a variety of other contaminants, including heavy metals. Requirements for private wells are generally less stringent, however, some testing does occur. Restaurants and resorts with their own water supply are required by the MDH to test annually for nitrates and bacteria. All newly drilled wells are required to be tested and in some cases, lending institutions make testing a requirement prior to loan approval. In addition, public entities, including the County Health Department, University of Minnesota Extension Service, and Department of Agriculture, also offer testing programs to homeowners.

Water Supply Contamination Risk Assessment and Vulnerability Summary

Similar to the other hazards, predicting the timing of groundwater contamination is extremely difficult. Table 3AG provides a risk assessment for groundwater contamination in McLeod County. Individual risk assessments for each city are found in Chapter Four.

**Table 3AG:
Groundwater Contamination Risk Assessment for McLeod County**

Question	Response
<i>Priority Rank?</i>	6 th out of 17 Hazards Countywide
<i>Location?</i>	Countywide
<i>Historic Events?</i>	Individual systems and municipal systems have either gotten old or flooding has prevented from working
<i>How Often?</i>	During flood or as systems age
<i>Where Would It Strike?</i>	Countywide
<i>How Bad Could Hazard Get?</i>	Water source could be contaminated
<i>When Would Hazard Likely Occur?</i>	Anytime
<i>What Other Hazards Could Occur Simultaneously?</i>	Erosion/landslide, severe wind, scrap tire fires, structure fires, hazardous materials, utility failure
<i>Economic Impacts?</i>	Extremely expensive for local fire departments
<i>Loss of Life Impacts?</i>	Extremely dangerous for firefighters
<i>Warning Time?</i>	3-6 Hours
<i>Overall Risk Level?</i> Minimal	Citizens/People: Minimal Animals/Livestock: Minimal Housing: Minimal Critical Facilities: Minimal Infrastructure: Minimal

Plans and Programs

- *Drinking Water Standards, Requirements.* The U.S. Environmental Protection Agency (EPA), as required by the Safe Drinking Water Act of 1974, sets uniform nationwide minimum standards for drinking water. State public health and environmental agencies have the primary responsibility for ensuring that each public water supplier meets these federal drinking water standards or more stringent ones established by the State.

Chapter Three: Hazards Profile

- *Public Water Supply Monitoring.* The EPA requires an ongoing water quality-monitoring program to ensure public water systems are working properly. Local officials work together with the MDH and the EPA to ensure that all public water supplies are safe. Also, the EPA requires all local suppliers to promptly inform the public if their supply becomes contaminated. Inspections of drinking water in restaurants, bars and other private businesses are conducted at least yearly by Countryside Public Health Service.
- *Wellhead Protection Program.* McLeod County is in its first stage of setting up a wellhead protection plan that is required by the State of Minnesota. The cities in the county will be doing wellhead protection plans that will comply with the State and Federal guidelines that are set up for wellheads.
- *Well Construction and Testing.* Since 1974, all water wells constructed in Minnesota must meet the location and construction requirements of the Minnesota Well Code. These requirements pertain to private wells also. Public Health tests private wells annually for contamination.
- *Feedlot Pollution Prevention.* Several steps are being taken to protect ground water sources from feedlot runoff. County ordinances require that all feedlots within the county participate in the State's feedlot programs. County extension services promote best management practices to minimize runoff from feedlots into rivers. County zoning ordinances also limit feedlot locations. Expanding an existing feedlot is allowed with some limitations.
- *Sealed Wells.* Soil and Water Conservation District has received grant money to help home owners seal their unused wells

McLeod County Groundwater Contamination Hazard Summary and Assessment

- Of the 17 hazards profiled for McLeod County, mitigating groundwater contamination ranks as McLeod County's 6th overall priority.
- Some feedlots are not in compliance with Minnesota Pollution Control Agency (MPCA) rules and operators have not been informed of some standards.

Section M: Hazardous Materials Incidents

Hazardous materials are chemical substances, which if released or misused can pose a threat to the environment or health of a community. These chemicals are used in industry, agriculture, medicine, research, and consumer goods throughout McLeod County. Hazardous materials are comprised of substances that are either flammable or combustible, explosive, toxic, noxious, corrosive, oxidizers, irritants or radioactive. These materials exist as a part of everyday life. In fact, they make the standard of living that we enjoy possible.

From a hazard mitigation perspective, the existence of hazardous materials presents two distinct arenas that must be addressed: those associated with hazardous materials use at fixed facilities and those associated with the transport of hazardous materials. In either case, a hazardous material spill or release can pose a risk to life, health, or property. An incident can force the evacuation of a few people, a section of a facility, or an entire neighborhood or community, resulting in significant economic impact. Spilled material can be costly to cleanup and may render the spill site unusable for an extended period of time.

Transportation. Road, rail, aircraft, and pipeline all convey hazardous materials presenting differing levels of risk of unwanted release of the hazardous materials. Transported products include hazardous materials moving from producers to users, moving between storage and use facilities, and hazardous waste moving from generators to treatment and disposal facilities.

The road system in McLeod County provides a network to transport both hazardous and non-hazardous material throughout the region and between local communities. Risks with hazardous materials even vary based on the classification of the road and its proximity to people and property. According to the most recent findings at the Minnesota Department of Transportation (Mn/DOT), more than half of all accidents involving hazardous materials have occurred on the State roadways. Roads are a major concern in McLeod County due to the lack of information available regarding what is traveling on the road system on a daily basis.

Rail transportation of hazardous material will affect the county along State Highways 212 and 7. Approximately 11 percent of all statewide transportation incidents involving hazardous material in 2002 were from rail transport, according to Mn/DOT statistics. Valve leakage and safety valve releases can be sources of material spills on pressurized and general service tank cars or other hazardous materials containers such as covered hoppers, inter-modal trailers/containers, or portable tanks. These leaks can manifest themselves as odors or vaporous clouds from tanker top valves; spraying or splashing from tanker top valves; wetness on the side of the car; or drainage from the bottom outlet valve. Depending on the type of rail car involved, a leak or spill could result in hundreds to thousands of gallons/pounds of a substance being released.

Chapter Three: Hazards Profile

Pipeline. Minnesota Pipe Line Company (MPL) is proposing the construction of a new 24-inch diameter crude petroleum pipeline. The proposed pipeline requires a new route and new permanent right-of-way approximately 50 feet in width for 176 miles (generally west and south of the Twin Cities metropolitan area), in the counties of Morrison, Stearns, Meeker, Wright, McLeod, Carver, Sibley, Scott, and Dakota. This proposed pipeline would run southeasterly through Hale, Rich Valley, Bergen, and Helen townships in McLeod County. See the project map in Appendix B.

Fixed Facilities. A variety of hazardous materials exist in fixed facilities throughout McLeod County. They range from flammable liquids stored to radioactive materials and chemical agents. Some materials are particularly lethal even in small amounts, while others require strong concentrations with prolonged exposure periods to cause harm. Businesses housing hazardous materials are listed in the Emergency Operations Plan and Chapter One of this plan.

Facilities storing or using hazardous materials above minimum amounts have developed and filed a Risk Management Plan with the Local Emergency Planning Committee, State Emergency Response Commission and the EPA. Each plan identifies the significant hazards for the facility, the likely release scenario for the hazards, the estimated population impacted by the release, and the specific steps to take in the event of a release to protect that population from harm.

Methamphetamine and Clandestine Drug Labs. The illegal production and use of methamphetamine (meth) has been increasing in Minnesota since the late 1990s. In 2003, there were more than 500 clandestine drug labs where methamphetamine was made (meth labs) and other meth-related events (meth chemical dumps, anhydrous ammonia thefts) discovered in the State. Most of the meth labs (75%) were located away from the largest Minnesota cities, in rural or semi-rural areas.

Each drug lab is a potential hazardous waste site requiring evaluation and possibly cleanup by hazardous waste (HazMat) professionals. There are possible health effects in people exposed to lab chemicals before, during, and after the drug-making process. While many of the ingredients used to make illicit drugs are common household products, both the production process and the mixtures produced can be extremely dangerous. In Minnesota, numerous law enforcement officers and staff from health, social service, and other agencies have collapsed or become ill at clan lab sites. Jail and hospital staff members have become ill from exposure to meth lab chemicals on the clothing of people living or working at lab sites. The MDH has received reports of people who have moved into former lab sites and have suffered chest and respiratory symptoms months after lab chemicals were removed.

Chapter Three: Hazards Profile

The impact of illegal drug-making labs is also felt by neighbors and occupants when labs catch fire, explode and cause the release of chemicals and chemical waste into the surrounding environment. Finally, clan labs have been associated with increased crime in the surrounding community, including domestic abuse, theft, and child endangerment.

Roughly 50 percent of Minnesota residences where drug labs have been discovered have also housed children. Recognizing the special risks to children living in lab environments, the Minnesota legislature has recently expanded child neglect and endangerment law to include endangerment through exposure to illegal drug manufacture and sales.

In many Minnesota communities, there are no laws requiring cleanup of a hazardous waste site (particularly one contaminated by non-standard use of common household products) in a private residence. The Minnesota Bureau of Criminal Apprehension usually gets involved in the case and the cleanup to make sure it is thoroughly investigated and cleaned.

House File 1 from the 2005 Minnesota Legislative Session (MN Statutes 152.0275) states that a peace officer who arrests a person at a clandestine lab site *shall notify* the appropriate county or local health department, state duty officer, and child protection services of the arrest and the location of the site. Each local community health services administrator *shall maintain* information related to property within the administrator's jurisdiction that is currently or was previously a clandestine lab site. The information maintained *must include* the name of the owner, the location of the property, the extent of the contamination, the status of the removal and remediation work on the property, and whether the order has been vacated. The administrator *shall make* this information available to the public either upon request or by other means.

The State of Minnesota requires that hazardous waste generators register for a permit allowing the use of hazardous substances. Through the permitting process, the State assures that hazardous materials are handled properly and do not pollute the surrounding environment.

The EPA requires that producers of specified quantities of hazardous materials prepare and file a Risk Management Plan. The Risk Management Plan is required under the Clean Air Act and is an analysis of the off-site consequences of accidental releases of regulated substances.

The Hazardous Substances Emergency Events Surveillance (HSEES) system was established by Agency for Toxic Substances & Disease Registry (ATSDR) to collect and analyze information about acute releases of hazardous substances that need to be cleaned up or neutralized according to Federal, State, or local law, as well as threatened releases that result in a public health action such as an evacuation. The goal of HSEES is to reduce the morbidity (injury) and mortality (death) that result from hazardous substances events, which are experienced by first responders, employees, and the general public.

Chapter Three: Hazards Profile

HSEES captures data on approximately 9,000 events annually. Over the years, the national database has remained fairly consistent, while individual states may vary. Contrary to popular belief, fixed-facility events represent about 70 - 75% and transportation-related events about 25 - 30% of all reported events. Most events occur on weekdays between 6 a.m. and 6 p.m. Events tend to increase in spring and summer when agricultural activities are at a peak.

Figure 2F shows the locations of HSEES events from 1995-2005 for the State of Minnesota with McLeod County's summary data of HSEES events listed below.

McLeod County

Events: 60

Fixed Facility Events: 47

Transportation Events: 13

Victims: 7

Evacuations: 9

Top chemicals released:^{1,2} Chlorine (21), Pesticides and fertilizers (11), Volatile organic compounds (8), Other inorganic substances³ (7), Acids (5), Ammonia (5)

Notes:

- 1) The top five chemical categories of substances released are presented, with the number of releases indicated with parentheses beside the category. If more than one category qualifies for fifth place (i.e., there is a tie for fifth place), all of the categories qualifying for fifth place are presented.
- 2) More than one substance could be released in an event. The total number of substance categories released may therefore equal more than the total number of events in a county.
- 3) "Other inorganic substances" include inorganic chemicals that did not qualify as acids, bases, ammonia, and chlorine.
- 4) "Other" includes substances that could not be classified.
- 5) "Mixture" includes substances from different chemical categories that were mixed prior to being released.
- 6) "Formulations" include substances that are formulated by a manufacturer and sold to wholesalers or retailers. Some examples include hairspray, carpet cleaners, and other cleaning products.
- 7) "Oxy-organics" include various antifreeze and glycol substances.

Historical Events

Hazardous materials exist as part of everyday life in McLeod County. These materials make life easier and more comfortable for residents throughout the county. The challenge is to use, store, and transport hazardous materials in a safe way that does not harm the community and prepare an effective response to unwanted releases of hazardous materials when they occur. A hazardous materials accident can occur anywhere at anytime.

Chapter Three: Hazards Profile

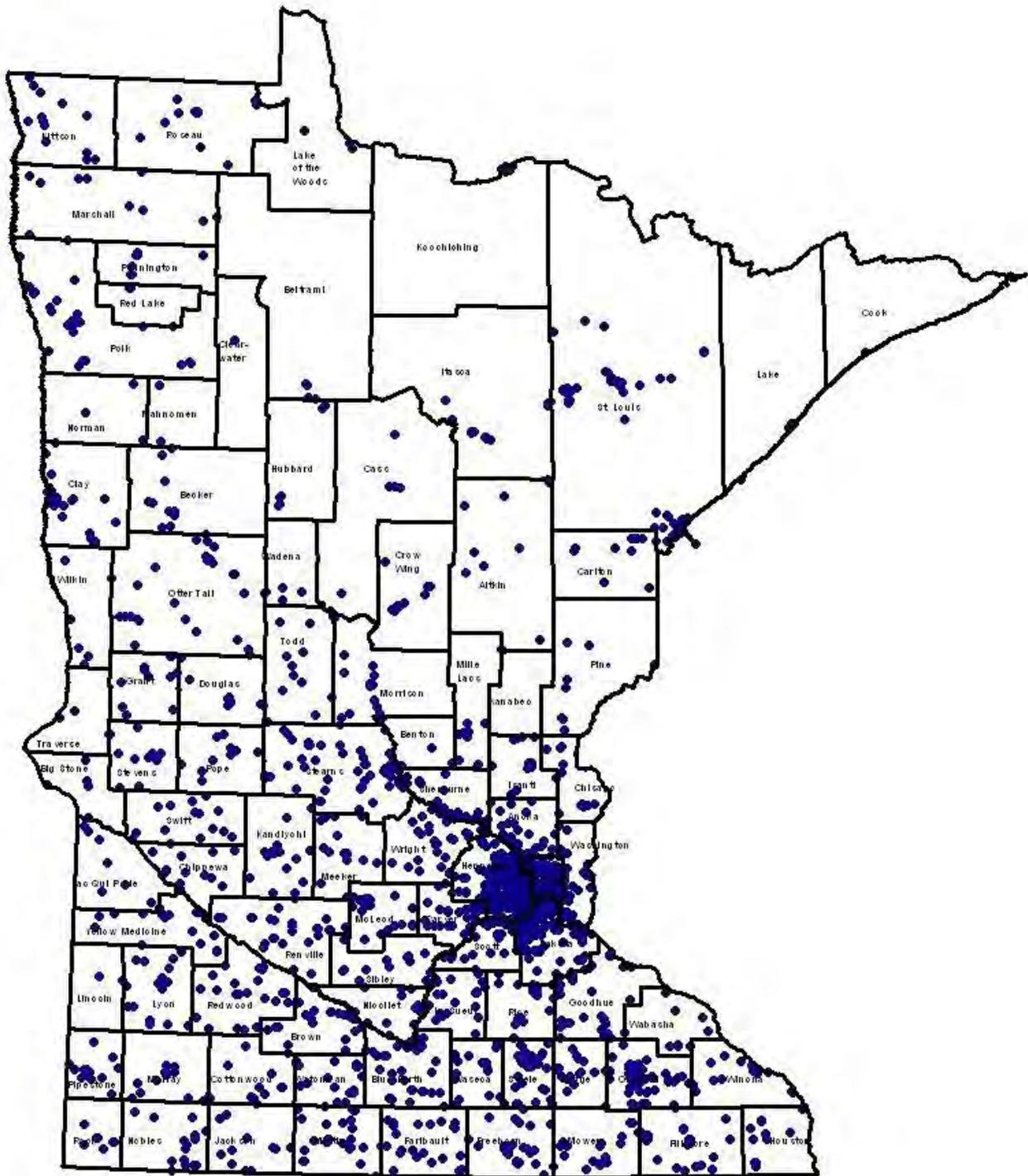
McLeod County has not experienced a major hazardous materials spill or accident to date. Minor incidents have occurred but these have had little or no impact on the community at large. The likelihood of a major event is considered to be marginal, but an isolated minor accident is a constant concern.

McLeod County is a rural area and could be a potential area for meth lab hazards.

Vulnerability from hazardous materials during unwanted release is considered great. The specific hazards created by a release are dependent on the hazardous characteristics of the material, the amount released, the location where the release occurs, and the weather and topographic conditions in the area. Identifying specific materials and those involved in transportation can provide a more specific assessment of the vulnerability.

The major concern for hazardous materials events for fixed facilities are primarily in the city of Hutchinson. Hutchinson contains the majority of the county's population and employers. The transport of hazardous materials in McLeod County is highly unpredictable. People and property on or immediately adjacent to transportation corridors throughout the county are at higher risk than those located one mile or more from a major county corridor. McLeod County assumes that the highest risk of an incident would be to areas in proximity to both rail lines and major roads and from large quantities of hazardous materials moving into and out of McLeod County. The airport facility also provides further concern based on the possibility of an aircraft or site incident involving some sort of hazardous material.

Figure 2F:
Hazardous Substances Emergency Events Surveillance HSEES Sites (1995-2005)



Source: Minnesota Department of Health website:
<http://www.health.state.mn.us/divs/eh/hazardous/surv/hseesmap.html>

Hazardous Waste Generators

Currently, there are 213 hazardous waste generators in McLeod County, as listed in Table 3AH by the Environmental Protection Agency (EPA). Hazardous wastes generated by these facilities include a wide range of environmentally damaging materials including acids, industrial solvents, petroleum products, photographic chemicals, among many others.

**Table 3AH:
Hazardous Waste Generators in McLeod County (as of 8/19/14)**

Facility Name	EPA ID	Nearest City	Generator Size
3M - Hutchinson	MND006172902	Glencoe	Generation, Large Quantity
AB Mauri Food Inc.	MND980826465	Hutchinson	Generation, Small Quantity
ADM Alliance Nutrition	MNS000116590	Glencoe	Generation, Minimal quantity
AG Systems	MNS000172809	Hutchinson	Generation, Small Quantity
Allina Health Services	MNS000191486	Hutchinson	Generation, Minimal quantity
American Energy Systems Inc.	MNR000111773	Hutchinson	Generation, Minimal quantity
Americas Fitness Center	MNS000153148	Glencoe	Generation, Minimal quantity
Andys Body Shop	MND982207854	Winsted	Generation, Minimal quantity
Anytime Auto Repair & Towing	MNS000183020	Winsted	Generation, Minimal quantity
Arnolds of Glencoe Inc.	MND022802144	Hutchinson	Generation, Small Quantity
Auto Value	MNS000103085	Glencoe	Generation, Minimal quantity
AWI Manufacturing Inc.	MNS000178327	Hutchinson	Generation, Minimal quantity
AZZ Galvanizing - Winsted	MNS000136846	Glencoe	Generation, Large Quantity
B & B Tire & Auto Repair LLC	MND023119738	Hutchinson	Generation, Minimal quantity
Bath & Body Works 1387	MNS000182584	Hutchinson	Generation, Small Quantity
Beeler Chiropractic Clinic Inc.	MNR000112565	Hutchinson	Generation, non-generator
Best Buy Store 1514	MNS000197566	Glencoe	Generation, Small Quantity
Big Don's Cathedral	MND059033456	Winsted	Generation, Minimal quantity
Blade Photo Imaging	MNS000131805	Winsted	Generation, Minimal quantity
Bradley Olson Residence	MNS000179093	Hutchinson	Generation, Minimal quantity
Bradys Clean Out Service LLC	MNS000119826	Glencoe	Generation, Minimal quantity
Brandon Tire	MND985698240	Hutchinson	Generation, Minimal quantity
Brian Matthew Hauer Enterprises	MNS000167833	Glencoe	Recycling, lamp processing

Chapter Three: Hazards Profile

Brownton, City of	MND050359546	Hutchinson	Generation, Minimal quantity
Brownton, City of	MNR000003384	Hutchinson	Burning & Oil, non-permitted
Brownton Oil & Marine	MND061450714	Hutchinson	Generation, Minimal quantity
Bryan's Service	MNNONGEN1149	Glencoe	Generation, Minimal quantity
Bryn Gardd Dental Care	MNR000054205	Winsted	Generation, Minimal quantity
Calemart Inc. dba Sam's Tire	MND022801948	Winsted	Generation, Small Quantity
CAR Shop Inc.	MNR000079848	Hutchinson	Generation, Small Quantity
Casey's General Store Inc.	MNR000102889	Glencoe	Generation, Minimal quantity
Cashwise Pharmacy 3011	MNS000174003	Hutchinson	Generation, Small Quantity
Christensen Auto Repair	MND982069759	Glencoe	Generation, Minimal quantity
Coborn's Pharmacy 2027	MNS000175844	Hutchinson	Generation, Small Quantity
Contemporary Dental PLLC	147615751	Hutchinson	Generation, non-generator
Crow River Auto & Truck Repair	MND981800113	Hutchinson	Generation, Minimal quantity
Crow River Country Club	304470305	Glencoe	Generation, Minimal quantity
Delta Fabricating Corp	MND982070328	Winsted	Generation, Small Quantity
Dimax Corp	MNS000189852	Winsted	Generation, temporary
Doering Carol A	MNR000064154	Hutchinson	Generation, Minimal quantity
Dollar Tree 01296	MNS000200741	Glencoe	Generation, Minimal quantity
Dr Daniel G Carlson DDS	MNS000131847	Hutchinson	Generation, Minimal quantity
Drug Lab CleanUp Hutchinson PD	MNP200001614	Glencoe	
DSL Cabinets LLC	MN0000486902	Hutchinson	Generation, Minimal quantity
Family & Cosmetic Gentle	MNS000128207	Hutchinson	Generation, Minimal quantity
Family Dollar Store 5609	MNS000201871	Hutchinson	Generation, Small Quantity
Family Pharmacy South	MNS000162875	Glencoe	Generation, Minimal quantity
Family RexAll Drug	MNS000162883	Winsted	Generation, Small Quantity
Feeding Children International of	MND985761360	Winsted	Generation, temporary
FH Neufeld Dental Clinic	MNS000131789	Hutchinson	Generation, Minimal quantity
First Lutheran School	147616452	Glencoe	Generation, Minimal quantity
Forbes Auto Store Inc.	MNR000071381	Hutchinson	Generation, Minimal quantity
Franklin Printing	MND043856186	Glencoe	
Fun Sports	MNR000041335	Hutchinson	Generation, Minimal quantity
General Parts Dist LLC	MND985721257	Hutchinson	Generation, Minimal quantity
GF Nemitz Sons Paint Wall	706038692	Hutchinson	Generation, Minimal quantity

Chapter Three: Hazards Profile

Glencoe Auto Body Inc.	MND985715317	Glencoe	Generation, Small Quantity
Glencoe City of Henry Hill	MNS000148726	Winsted	Generation, temporary
Glencoe Oil Co	MND985710078	Winsted	Generation, Minimal quantity
Glencoe Regional Health Services	MND077629624	Hutchinson	Generation, Small Quantity
Glencoe Regional Health Clinic	147616841	Glencoe	Generation, Minimal quantity
Glencoe Veterinary Clinic PA	MNS000197848	Hutchinson	Generation, Minimal quantity
Glencoe WWTP	147616734	Glencoe	Generation, Minimal quantity
Goebel Fixture Co	MND006184907	Hutchinson	Generation, Large Quantity
Goebel Fixture Co - Hutchinson	MNS000178251	Hutchinson	Generation, Small Quantity
GR Daniels Trucking Inc.	MND985703594	Hutchinson	Generation, non-generator
Hansen Truck Service	MND985703495	Glencoe	Generation, Small Quantity
Harmony River Living Center	MNS000180778	Winsted	Generation, Small Quantity
Harpel Brothers Inc.	MND022801609	Winsted	Generation, Small Quantity
Harwood Winsted Body Shop	MNR000110502	Hutchinson	
Holy Trinity School	MNR000077842	Glencoe	Generation, non-generator
Hutch Auto Body Inc.	MND985694181	Hutchinson	Generation, Small Quantity
Hutchinson Area Trans Services	MNR000020495	Glencoe	Generation, other
Hutchinson Auto Center Inc.	MND006453740	Hutchinson	Generation, Small Quantity
Hutchinson City of - Fire	702231952	Hutchinson	Generation, non-generator
Hutchinson City of - Parks	MNS000132092	Hutchinson	Generation, Minimal quantity
Hutchinson Civic Arena	704251115	Glencoe	Generation, non-generator
Hutchinson Concrete	MNR000109694	Winsted	Generation, Minimal quantity
Hutchinson Coop	MNS000110932	Winsted	Generation, Minimal quantity
Hutchinson Dental Center PA	702564162	Hutchinson	Generation, Minimal quantity
Hutchinson Family Dentistry	MNS000182063	Glencoe	Generation, Minimal quantity
Hutchinson Health	MND079717724	Hutchinson	Generation, Small Quantity
Hutchinson Leader/Red Wing	MND006190318	Glencoe	Generation, non-generator
Hutchinson Manufacturing Inc.	MND006183461	Hutchinson	Generation, Small Quantity
Hutchinson Pet Hospital	147674089	Hutchinson	Generation, Minimal quantity
Hutchinson Plumbing & Heating	MNS000184309	Hutchinson	Generation, temporary
Hutchinson Police Services	MNS000164954	Glencoe	Collect, HHW, Pharmaceutical
Hutchinson TACC	MND980682587	Winsted	Generation, Minimal quantity
Hutchinson Technology Inc.	MND006456768	Winsted	Generation, Large Quantity
Hutchinson Technology Inc.	MNR000057455	Hutchinson	

Chapter Three: Hazards Profile

Hutchinson Telephone Co.	3610680	Glencoe	Generation, non-generator
Hutchinson Utilities Commission	MND980275796	Hutchinson	Generation, Small Quantity
Hutchinson Utilities Commission	MND068169515	Glencoe	Generation, Small Quantity
Hutchinson Wholesale Supply	MND056080617	Hutchinson	Generation, Minimal quantity
Hutchinson WTP	702393984	Hutchinson	Generation, non-generator
Hutchinson WWTP	MNR000042440	Hutchinson	Generation, Minimal quantity
Impressions Inc. - Hutchinson	MNR000028977	Glencoe	Generation, non-generator
Indoor Boat Storage Inc.	MND985744275	Winsted	Generation, Small Quantity
ISD 2859 - Glencoe Senior High	MN0000327122	Winsted	Generation, Small Quantity
ISD 2859 - LInc.oln Junior High	MN0000327106	Hutchinson	Generation, Minimal quantity
ISD 2859 Glencoe-Silver Lake	MN0000327114	Glencoe	Generation, Minimal quantity
ISD 423 - Hutchinson High School	MND985720937	Hutchinson	Generation, non-generator
ISD 423 Hutchinson Schools	MNR000024554	Glencoe	Generation, non-generator
ISD 423 West Elementary School	HWLIC1002877	Hutchinson	Generation, non-generator
James J Neff DDS	MND985722305	Hutchinson	Generation, Minimal quantity
JC Penney 1076-9	MNS000127134	Hutchinson	Generation, Minimal quantity
Jerry Otto dba Jerry's TV	MNS000149682	Glencoe	Generation, Minimal quantity
Jerry's Transmission Service Inc.	MND985687805	Winsted	Generation, Small Quantity
JMS Custom Service Inc.	MND097086938	Winsted	Generation, non-generator
Joels Sport Shop	147674394	Hutchinson	Generation, Minimal quantity
John's Repair	MND981783731	Glencoe	
Jon Otteson Photography	MND982428492	Hutchinson	Generation, non-generator
Jungclaus Implement Inc.	MND022801989	Glencoe	Generation, Small Quantity
Juul Contracting Co	MND985713510	Hutchinson	Generation, Small Quantity
KDUZ/KARP Radio	MND985718717	Hutchinson	Generation, Minimal quantity
Keaveny Drug - Winsted	MNS000159004	Hutchinson	Generation, Minimal quantity
Kens Landscaping & Tree Care	147617369	Glencoe	Burning & Oil, non-permitted
Kevin's Auto Body	MNS000127910	Winsted	Generation, temporary
Kevin's Auto Service Inc.	MNS000174821	Winsted	Generation, Minimal quantity
Knife River Corp N Central	MNR000002063	Hutchinson	Generation, Small Quantity
Knife River Corp N Central	MNR000070235	Glencoe	Generation, Small Quantity
Kocks Jewelry	147674584	Hutchinson	Generation, Minimal quantity
Kuehl James W Dds	MND985722792	Glencoe	Generation, Minimal quantity
L & P Supply Co	147674675	Hutchinson	Generation, Small Quantity

Chapter Three: Hazards Profile

Leans Service	MNL1656	Hutchinson	Generation, oily waste
Lester Building Systems Inc.	MND985744556	Hutchinson	Generation, Minimal quantity
Lester Prairie Engine Repair	MND981532088	Glencoe	Generation, Minimal quantity
Lester Prairie Medical Clinic	MNS000132746	Winsted	Generation, Minimal quantity
Lester Prairie School	MND985747963	Winsted	Generation, non-generator
Lester Prairie Veterinary Clinic	MNS000159186	Hutchinson	Generation, Small Quantity
Lester Prairie WWTP	MNS000182113	Glencoe	Generation, Minimal quantity
Lynn Card Co	147674873	Hutchinson	Generation, Minimal quantity
Mahogany Bay Bristol Classic Ltd	MNR000116459	Glencoe	Generation, Minimal quantity
Maplewood Academy	MNR000019679	Hutchinson	Generation, Minimal quantity
Marshall Concrete Products Inc.	MND006182539	Hutchinson	Generation, Minimal quantity
Mathews Farms	MND985678465	Hutchinson	Generation, non-generator
McKimm Milk Transit Inc.	MND985771625	Glencoe	Generation, Small Quantity
McLeod County Court House	MNR000052175	Winsted	Collect, HHW, Pharmaceutical
McLeod Cooperative Power	MND006961361	Winsted	Generation, Small Quantity
McLeod County Chiropractic	MNS000134585	Hutchinson	Generation, non-generator
McLeod County Highway	MNR000012138	Glencoe	Generation, Minimal quantity
McLeod County Public Health	MNS000159418	Hutchinson	Generation, Minimal quantity
McLeod County Regional Rail	MNS000115444	Glencoe	Generation, temporary
McLeod County Sheriff's Office	MNS000188672	Hutchinson	Generation, Minimal quantity
McLeod Publishing Inc.	MND095958500	Hutchinson	Generation, non-generator
Meyers-Sterner Industries Inc.	MNR000077545	Hutchinson	Generation, temporary
Miller Manufacturing Inc.	MND985742956	Glencoe	Generation, Small Quantity
Millerbernd Manufacturing Co	MND006186415	Winsted	Generation, Small Quantity
Minnesota Ag Power Inc.	MNS000130252	Winsted	Generation, Small Quantity
Minnesota DNR - Hutchinson	MND153446687	Hutchinson	Generation, Minimal quantity
MNDOT District 8 Hutchinson	MND985755099	Glencoe	Burning, oil waste, non-
MNDOT Glencoe	MNS000100891	Hutchinson	Generation, Minimal quantity
My Own Body Shop	MND985742402	Glencoe	Generation, Minimal quantity
Nelson Photography	MND077621209	Hutchinson	Generation, non-generator
New Century Charter School	MNS000131227	Hutchinson	Generation, Minimal quantity
North Central International Inc.	MNR000034959	Hutchinson	Generation, Small Quantity
Nygaard Industrial Painting Inc.	MNS000144808	Glencoe	Generation, Small Quantity
O'Reilly Auto Parts - 1522	MNS000198366	Winsted	Generation, Small Quantity

Chapter Three: Hazards Profile

On Trax Truck Repair	MNS000177139	Winsted	Generation, Small Quantity
Parkview Dental PLLC	MND985747773	Hutchinson	Generation, Minimal quantity
Phoenix Solutions Co	MNS000150961	Glencoe	Generation, Minimal quantity
Plato Woodwork Inc.	MND041199456	Hutchinson	Generation, Large Quantity
Prairie Senior Cottages	MNS000163931	Glencoe	Generation, Minimal quantity
Pride Solutions LLC	314536301	Hutchinson	Generation, Minimal quantity
Pro-Maintenance Inc.	MNS000155853	Hutchinson	Generation, non-generator
R&R Excavating Inc.	MNS000135707	Hutchinson	Generation, Minimal quantity
Rannow Bruce W	MNS000203042	Glencoe	Generation, Minimal quantity
Red Wing Publishing dba Crow	MND006453476	Winsted	Generation, Small Quantity
Regional Eye Surgery Center	MNS000139543	Winsted	Generation, Minimal quantity
Ridgeview Winsted Clinic	MNS000115360	Hutchinson	Generation, Minimal quantity
Ridgewater College - Hutchinson	MND985721240	Glencoe	Generation, Minimal quantity
Ridgewater College - Hutchinson	MND066908849	Hutchinson	Generation, Small Quantity
Rund Chiropractic Center	147615876	Glencoe	Generation, non-generator
S-B Tires	MNS000114553	Hutchinson	Generation, Small Quantity
Schiroo Electrical Rebuilding Inc.	MND022801203	Hutchinson	Generation, Small Quantity
Seneca Foods Corp	MND120506332	Glencoe	Generation, Small Quantity
Shopko 023	MNS000158311	Glencoe	Generation, Minimal quantity
Shopko 023 - Pharmacy	MNS000176131	Winsted	Generation, Small Quantity
Shopko Hometown 732	MNR000018580	Winsted	Generation, Small Quantity
Sidco 4x4	MNR000112896	Hutchinson	Generation, Minimal quantity
SJF Material Handling Inc.	MND985740471	Glencoe	Generation, Small Quantity
Sorensen Sales & Rental	MND022828495	Hutchinson	Generation, non-generator
Southwest Metro Task Force	MNP000001235	Glencoe	Generation, temporary
St Anastasia School	147676514	Hutchinson	Generation, non-generator
St Mary's Care Center	MND120079835	Hutchinson	Generation, Minimal quantity
St Pius X School - Glencoe	147618011	Hutchinson	Generation, Minimal quantity
Staff Manufacturing Rite Way	MNS000102293	Glencoe	Generation, Small Quantity
Starkey Labs Inc. Glencoe Plant	MND985687896	Winsted	Generation, Small Quantity
State Special Waste Facility	MND985762970	Winsted	Collect, HHW, permanent, PCA
State Special Waste Facility	MNR000081281	Hutchinson	Collect, HHW, permanent, PCA
Stewart Clinic	MNS000160838	Glencoe	Generation, Minimal quantity
Stewart Energy Products Inc.	MND981959471	Hutchinson	Transportation, used oil &

Chapter Three: Hazards Profile

Stewart Maintenance	MNR000041319	Glencoe	
Structural Specialties Inc.	620370973	Hutchinson	Generation, Minimal quantity
Suburban Mold & Machine Inc.	MNS000115287	Hutchinson	Generation, non-generator
SuperAmerica 4315	MNR000005348	Hutchinson	
Target Store T1210	MNS000109835	Glencoe	Generation, Small Quantity
Tetra Park CPS	MNR000080838	Winsted	Generation, non-generator
Thomas A Schoeneberger DDS	MNS000161133	Winsted	Generation, Minimal quantity
Thomas H Inglis DDS	704317601	Hutchinson	Generation, non-generator
Tom's Garage	WCERT1002496	Glencoe	Generation, non-generator
Town & Country Tire	MND022828032	Hutchinson	Generation, Minimal quantity
Underground Products Inc.	MNS000194621	Glencoe	Generation, Small Quantity
UPS - Glencoe	MND981528045	Hutchinson	Generation, Minimal quantity
Valley Sales of Hutchinson Inc.	MND052743424	Hutchinson	Generation, Small Quantity
Virgil Mathews Repair	MND985731124	Hutchinson	Generation, Minimal quantity
Wal-Mart SuperCenter 1738	MNR000020115	Glencoe	Generation, Small Quantity
Walgreens 15680	MNS000194506	Winsted	Generation, Minimal quantity
Warrior Mfg LLC	MNS000130104	Winsted	Generation, Small Quantity
Waste Management - Spruce Ridge	MND985739762	Hutchinson	Generation, Small Quantity
Winsted City of	MNS000131854	Glencoe	Generation, Minimal quantity
Winsted City of - Pharmaceutical	MNS000166561	Hutchinson	Collect, HHW, Pharmaceutical
Yamaha Motorsports	MNS000100461	Glencoe	Generation, Minimal quantity

Superfund Sites

The Superfund sites in Minnesota are listed on the Minnesota Permanent List of Priorities (PLP). This list was approved by the MPCA in July 2006. The PLP lists 77 sites statewide where investigation and cleanup are needed, cleanup is underway, or cleanup has been completed and long-term monitoring or maintenance continues. Currently, there are no Superfund sites in McLeod County.

Hazardous Material Incidents Risk Assessment and Vulnerability Summary

Table 3AI provides a risk assessment for hazardous material incidents in McLeod County. Individual risk assessments for each city are provided in Chapter Four.

**Table 3AI:
Hazardous Material Incidents Risk Assessment for McLeod County**

Question	Response
<i>Priority Rank?</i>	12 th out of 17 Hazards Countywide
<i>Location?</i>	Countywide, normally in cities
<i>Historic Events?</i>	None
<i>How Often?</i>	Unlikely
<i>Where Would It Strike?</i>	Specific locations throughout county, along roads and railroads
<i>How Bad Could Hazard Get?</i>	Major spill could be devastating to human and animal life
<i>When Would Hazard Likely Occur?</i>	Year-round
<i>What Other Hazards Could Occur Simultaneously?</i>	Fire, Water Contamination
<i>Economic Impacts?</i>	Could shut down area of spill
<i>Loss of Life Impacts?</i>	Yes
<i>Warning Time?</i>	None
<i>Overall Risk Level?</i> Minimal	Citizens/People: Moderate Animals/Livestock: Minimal Housing: Minimal Critical Facilities: Minimal Infrastructure: Moderate

Plans and Programs

- *State Agency Cooperation.* McLeod County works directly with the appropriate State agencies to address needs for responding to and mitigating the impacts of a hazardous event.

Chapter Three: Hazards Profile

- *Emergency Operations Plan.* McLeod County currently has an emergency operations plan, known as the McLeod County Emergency Operations Plan, which outlines procedures for dealing with hazardous material accidents, spills, or releases.
- *Hazardous Chemicals Collection.* McLeod County’s Emergency Manager works with the Department of Public Safety and Emergency Response Commission to assist in the statewide collection of hazardous chemicals existing at facilities throughout McLeod County so that local emergency officials can prepare for incidents.
- *Water Plan.* McLeod County’s Local Comprehensive Water Plan recognizes that the county’s ground water is impacted by both agricultural and residential fertilizer and pesticide applications. It further recognizes the number of hazardous waste generators by minor civil division from the Minnesota Pollution Control Agency.
- *Environmental Health Regulations.* McLeod County has worked to develop environmental health regulations and a County Safety Procedures and Policy Guide. These documents are cross-departmental plans that deal with hazardous material. They serve to provide guidelines to protect the citizens of the county.
- *Training of Emergency Personnel.* All emergency personnel are trained to at least the minimum Hazardous Materials Awareness level and all first responder groups conduct the required Occupational Health and Safety Administration training on a yearly basis.
- *Meth Lab Ordinance.* The County has adopted a meth lab ordinance.

McLeod County Hazardous Materials Summary and Assessment

- Of the 17 hazards profiled for McLeod County, mitigating hazardous material incidents ranks as McLeod County’s 12th overall priority.
- Plans, policies, and/or procedures are not in place to deal with a meth lab incident in the county. Law enforcement and emergency services are able to deal with meth labs, but the general public is not as aware of the risks. Lack of information and awareness has left the county susceptible to an accident that could impact a large area.

Chapter Four: Community Profiles & Hazard Risk Assessment

Chapter Four provides a community profile and hazard risk assessment for the nine cities located in McLeod County. The community profile portion includes demographics, development trends, and total taxable market values for each jurisdiction.* The risk assessment includes a floodplain analysis and a table rating each hazard using the following five categories:

1. **Likely Hazard Frequency:** This asks *how often the hazard is likely to occur*, ranging from rarely to yearly. The following frequency descriptions were used:
 - a) Rarely (not occurring at least once every 10 years on average)
 - b) 6-10 years (occurring once every 6-10 years on average)
 - c) 2-5 years (occurring once every 2-5 years on average)
 - d) Yearly (occurring once or more per year on average)

2. **Average Risk Severity or Likely Impact:** This rates the *overall average severity or likely impact* of the hazard, ranging from minimal to severe. The following categories were used:
 - a) Minimal (total damage limited to under \$25,000)
 - b) Moderate (total damage ranging between \$25,000 to \$100,000)
 - c) Severe (total damage over \$100,000)

3. **High Risk Categories:** This indicates *which categories are considered to be at high risk for each type of disaster*. The following categories were used:
 - a) People = P
 - b) Buildings = B (includes houses, businesses, and similar structures)
 - c) Agriculture = A (includes both crops and livestock)
 - d) Infrastructure = I (includes roads, bridges, utilities, storm sewers, etc.)

4. **Overall Risk Level:** This rates each hazard's overall risk by multiplying the hazard's likely frequency by the average risk severity using the following values:

<i>Likely Frequency</i>	<i>multiplied by</i>	<i>Average Severity</i>
◆ Rarely = 1		◆ Minimal = 1
◆ 6-10 Years = 2		◆ Moderate = 2
◆ 2-5 Years = 3		◆ Severe = 3
◆ Yearly = 4		

= Equals Overall Risk Level

(Score: 1-4 Low Risk; 5-8 Moderate Risk; 9-12 High Risk)

* The 2012 population and household numbers were estimates provided by the State Demographer's Office. The 2014 Taxable Market Values were provided by the McLeod County Auditor-Treasurer's Office.

Risk Assessment Methodology

Risk assessments takes into consideration a number of variables that are difficult to determine with any level of certainty. For example, the vast majority of tornadoes cause very little damage, however, an F4 or F5 tornado causes widespread damage. Likewise, every spring, portions of McLeod County experience flooding, although it is the massive 100-year flood that most people associate with ‘flooding.’ All of the hazards profiled share similar characteristics in that when most occur, the damage they cause is considered minor. Unfortunately, all of the hazards have the potential to cause severe damage. The assessment uses the *average severity or likely impact* to determine each jurisdiction’s hazard risk.

The 2012 massive stormwater flooding in Duluth, Minnesota, highlights a common problem in conducting risk assessments. Some analysts were able to caution that such an event could occur, however, it was not thought as being very likely. Taking measures ahead of time would’ve been extremely expensive. Even after the disaster occurred, people still disagree on the extent of rebuilding, with some feeling that building in hazard areas (i.e., flood plains, severe erosion sites, etc.) should be avoided at all costs since nature always seems to find a way to overcome technology.

Flooding (Riverine and Stormwater)

According to the National Climatic Data Center, McLeod County has experienced flooding 20 times since 1993. This places flooding at a pace of occurring once every year. The average risk severity for each city for flooding is customized based upon the information profiled in Chapter Three and found on the Flood Insurance Rate Maps (NFIP) created by the Federal Emergency Management Agency (FEMA). If a city was shown to have experienced flooding, they were given the *likely hazard frequency* of flooding once every 2-5 years. If the cities have not historically experienced flooding, they were given the *likely hazard frequency* of rarely occurring. Likewise, depending on specific flooding histories, cities ranged from minimal to severe in their risk severity scores (the average likely impact or damage when flooding does occur). The end result is a wide range of *overall risk levels* for each city (refer to the **Overall Risk Level** methodology described on Page 4-1).

Tornadoes

Tornadoes were identified as occurring on average every 6-10 years per jurisdiction, based primarily on the 17 tornadoes reported countywide for McLeod County since 1950. The *average lively impact* was considered severe regardless of the vast majority of tornadoes being either F0 or F1 historically. This is because even a F1 tornado can collectively cause severe damage in

Chapter Four: Risk Assessment

urban areas in a short duration. This means all cities received an overall risk assessment score of 6 out of 12 points (2 points for occurring every 6-10 years, multiplied by 3 points for having a ‘severe’ average severity rating = 6 overall risk level).

Winter Storms

Winter storms are common throughout Minnesota and even severe winter storms occur annually. Due to their frequency, all jurisdictions are usually well prepared. The overall risk assessment for winter storms scored an 8 out of 12 points for cities (occurring annually with moderate damage on average). Once again, a severe winter storm can be crippling for communities, especially impacting infrastructure. Severe winter storms also affect the local economy when travel is limited.

Thunderstorms (Severe Wind, Lightning, and Hail)

Thunderstorms are fairly common throughout the Midwest. They often include lightning and high winds, and occasionally include hail. Fortunately they normally cause minimal damage. Each storm, however, can result in severe damage in concentrated areas. This places buildings and infrastructure at high-risk for cities. Although small hail is fairly common, severe hail rarely occurs. Severe hail can cause a wide range of damage, depending greatly upon where it is located. As a result, the risk assessment only takes into consideration the above average hail event that takes place once every 6 to 10 years per jurisdiction and causes moderate damage.

Fire (Structural and Wildfires)

Structural fires are fairly common in both urban and rural areas; however, the average severity is slightly higher for cities due to the close proximity of surrounding buildings. Fire-fighting technologies and rapid response has greatly helped to minimize structural fires from spreading. With this in mind, structural fires pose a minimal threat to townships (with the exception of agricultural buildings) and a moderate threat to cities (due to the close proximity and higher property values on average). This gives cities an overall risk level of 8 out of 12 (occurring yearly with moderate damage) for structural fires. For the smaller populated cities, the overall risk level was drop to a score of 6 (occurring every 2-5 years with moderate damage). All cities received an overall risk level of 1 out of 12 for wildfires (rarely occurring with minimal damage).

Chapter Four: Risk Assessment

Drought

Chapter Three highlighted that droughts have occurred in the area about once every ten years. Townships are affected slightly more than cities, since irrigation wells are affected and crop failures increase. The overall risk assessment rates droughts as 4 out of 12 for cities (occurring every 6-10 years with moderate damage).

Extreme Temperatures (*Extreme Heat and Cold*)

When temperatures reach above 105 or below 40 degrees, the National Weather Service issues Heat or Wild Chill advisories. Although the information contained in Chapter Three shows that McLeod County has experienced extreme temperatures fairly regularly, the damages reported as a result were minimal. As a result, the likely frequency was placed at occurring every 2-5 years for extreme heat and annually for extreme cold. The risk severity for both was considered minimal. The overall risk assessment score for all of jurisdictions was 3 for extreme heat (occurring once every 2-5 years with minimal damage) and 4 for extreme cold (occurring annually with minimal damage). Unfortunately, extreme temperatures have more serious effects on our vulnerable populations, such as the elderly and people living in poorly built structures.

Severe Erosion & Landslides

Nature is constantly eroding away at the landscape, although severe erosion and landslide events rarely occur. Most of the highly susceptible areas have adjusted from previous events over the course of time. As a result, changes occur gradually and often without incident. Fortunately severe erosion and potential landslide sites are not common in urban areas, due to the built environment. When development does occur near these areas, however, the potential for disaster is great. For the risk assessment, the cities that regularly experience riverine flooding rate higher than those cities that rarely experience problems. This is due to the close relationship between flooding and severe erosion. The City of Brownton rates even higher due to the current situation of five houses being located adjacent to a severely erosion section of Buffalo Creek.

Earthquakes

According to the National Seismic Hazard Mapping Project, McLeod County is located in an area that has a low risk of experiencing an earthquake. The average severity, however, is rated as moderate since it wouldn't take much to cause damage to structures. As a result, the overall risk assessment score is 2 out of 12 for cities.

Chapter Four: Risk Assessment

Dam or Levee Failure

Most of the water control structures found in McLeod County are considered smaller water retention projects, and therefore would not cause much damage if they failed. The one exception to this is the Hutchinson Dam on the Crow River. Many of the concerns regarding this dam were mitigated in 2008 when the old structure (build in 1857) was replaced in 2008 with 310 large boulders, mimicking natural rapids.

Infectious Disease

The infectious disease portion of Chapter Three profiled a number of diseases that affect both people and animals. For cities, the concentration of people poses a greater risk of disease than the sparsely populated townships. Conversely, the concentration of livestock in the townships places them at a higher risk for animal disease. As a result, cities received an infectious disease risk assessment score of 6 out of 12 (outbreaks occurring every 2-5 years with moderate damage). Fortunately, vaccinations and public education can greatly mitigate the impacts.

Water Contamination

Water contamination events seldom occur, however, when they do, they pose a severe risk to heavily populated areas. Fortunately, municipal water supplies are tested routinely so actions can be taken before problems get worse. The overall risk assessment score for water contamination is 4 for cities (occurring rarely with severe damage).

Hazardous Materials

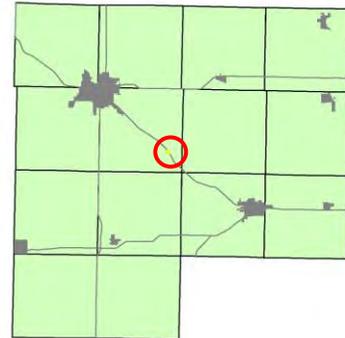
The transportation and storage of hazardous materials were the two main categories used to conduct the risk assessment. By using the major roadways and railroad maps found in the Appendix, cities and townships were assigned either a minimal or moderate risk level depending on whether a major roadway or railroad was located in their jurisdiction. It was also estimated that chemical spills occur rarely in townships and once every 6-10 years in municipalities. The increase in meth labs also places the heavier populated areas at an additional risk. As a result, each city has a customized overall risk level based upon the type of infrastructure that exists in the community.

City of Biscay Community Profile & Hazard Risk Assessment

Located in Hassan Valley Township

Demographics

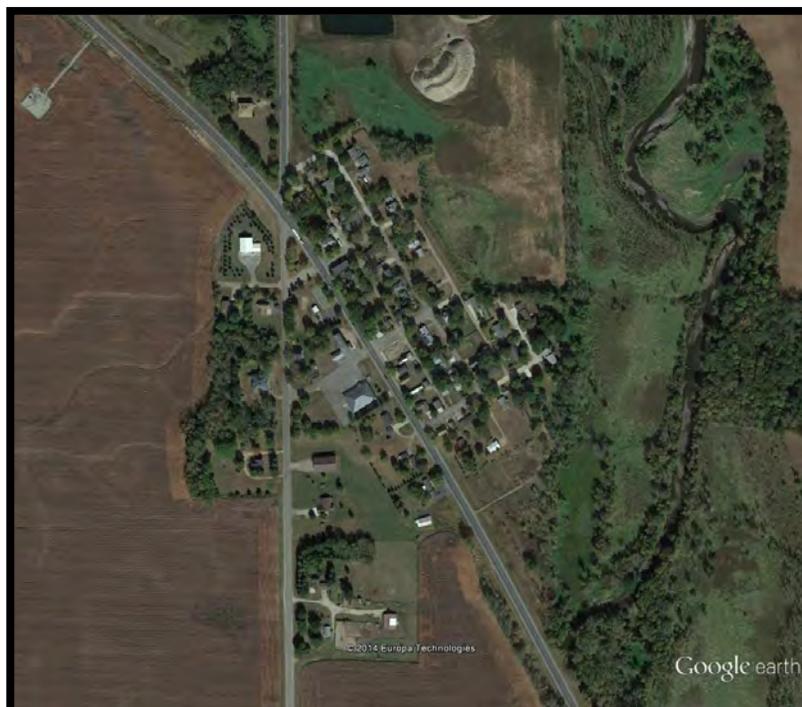
- **Estimated 2012 Population:** 113
- **Estimated 2012 Households:** 43
- **2012 Persons Per Household:** 2.63
- **2014 Taxable Market Value:** \$3,072,900



Overview

Biscay is a small city located in Hassen Valley Township in central McLeod County. According to the Minnesota State Demographer, the community had approximately 113 people living in 43 households in 2012. Map 4A shows an aerial photo created with Google Earth on September 23, 2012.

**Map 4A:
City of Biscay Aerial Photo (2012)**



Development Trends



Required Information

Table 4A shows how the City of Biscay has grown in population from 105 people in 1970 to 113 people in 2012. This represents a 4% growth rate. If the City of Biscay continues to grow at the same rate over the next 15 years, it can expect to have approximately 118 people living in 45 houses in 2030 (a gain of 5 people and 2 houses).

**Table 4A: City of Biscay
Population & Household Projections**

	Year (U.S. Census)					Projected		2010-30 Change	% Change
	1970	1980	1990	2000	2012*	2020	2030		
Population	105	114	113	114	113	117	118	5	4%
Households (average household size is 2.6)					43	45	45	2	5%

**Estimated by the Minnesota State Demographer's Office*

Floodplain Analysis



Required Information

Map 4B was created using the Federal Emergency Management Agency's (FEMA) Flood Map Service Center (<http://msc.fema.gov/portal/search>). Although the Map is small, one can see the floodplain (shown in blue) only covers a small portion of southeastern Biscay. Examining Maps 4A and 4B, it can be determined that no development currently exists in this area.

**Map 4B:
City of Biscay's Floodplain**



Chapter Four: Risk Assessment

Biscay's Hazard Risk Assessment



The City of Biscay's Hazard Risk Assessment is presented in Table 4B. The Table presents each of the hazards profiled for McLeod County and rates each of them in four risk assessment categories: Likely Hazard Frequency (how often the hazard is likely to occur); Average Risk Severity or Likely Impact (how severe the hazard is likely to be); High Risk Categories (i.e., buildings, people, infrastructure, agriculture); and Overall Risk Level (scores 1-12 with 1 being low risk and 12 being high risk).

The following features impacted the City of Biscay's Hazard Risk Assessment in Table 4B:

- **Major Roadways:** State Highway 22 and CSAH 4
- **Railroads:** None
- **Pipelines:** None
- **Flood Plain:** None
- **Special At-Risk Hazard Categories:**
 - ◆ **Hazardous Materials** due to State Highway and CSAH 4.

Hazard Mitigation Planning Documents and Participation

- **Participation Resolution:** August 14, 2007
- **Adoption Resolution:** Will be completed after FEMA approval.

**Table 4B:
City of Biscay Hazard Risk Assessment**

Hazard	Likely Hazard Frequency	Average Risk Severity or Likely Impact	High Risk Categories*	Overall Risk Level (1 low -12 high)
Flooding:				
<i>Stream/River</i>	Rarely	Moderate	B, I	2
<i>Stormwater/Urban</i>	6-10 Years	Moderate	B, I	4
Tornadoes (F1 average)	6-10 Years	Severe	P, B, A, I	6
Winter Storms	Annually	Moderate	P, A, I	8
Thunderstorms:				
<i>Severe Wind</i>	2-5 Years	Moderate	B, A, I	6
<i>Severe Hail</i>	6-10 Years	Severe	B, A, I	8
<i>Severe Lightning</i>	2-5 Years	Minimal	B, I	3
Fire				
<i>Structural</i>	Yearly	Moderate	B, P, A, I	8
<i>Wildfires</i>	Rarely	Minimal	B, A, I	1
Drought	6-10 Years	Moderate	P, A, I	4
Extreme Temperatures:				
<i>Extreme Cold</i>	Yearly	Moderate	P, A, I	8
<i>Extreme Heat</i>	2-5 Years	Moderate	P, A, I	6
Severe Erosion/Landslide	Rarely	Severe	B, I	4
Earthquakes	Rarely	Moderate	P, B, I	2
Dam or Levee Failure	Rarely	Moderate	B, A, I	2
Infectious Disease	2-5 Years	Moderate	P, A	6
Water Contamination	Rarely	Severe	P, A, I	4
Hazardous Materials	6-10 Years	Moderate	I, P	4

**High Risk categories include:*

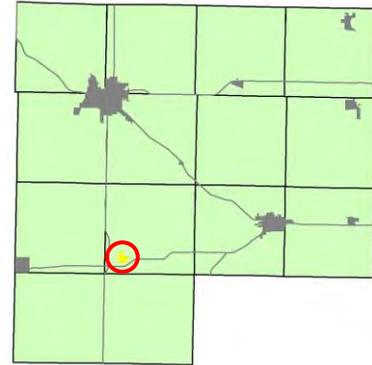
P=People; B=Buildings; A=Agriculture (crops or livestock); I=Infrastructure

City of Brownton Community Profile & Hazard Risk Assessment

Located in Sumter Township

Demographics

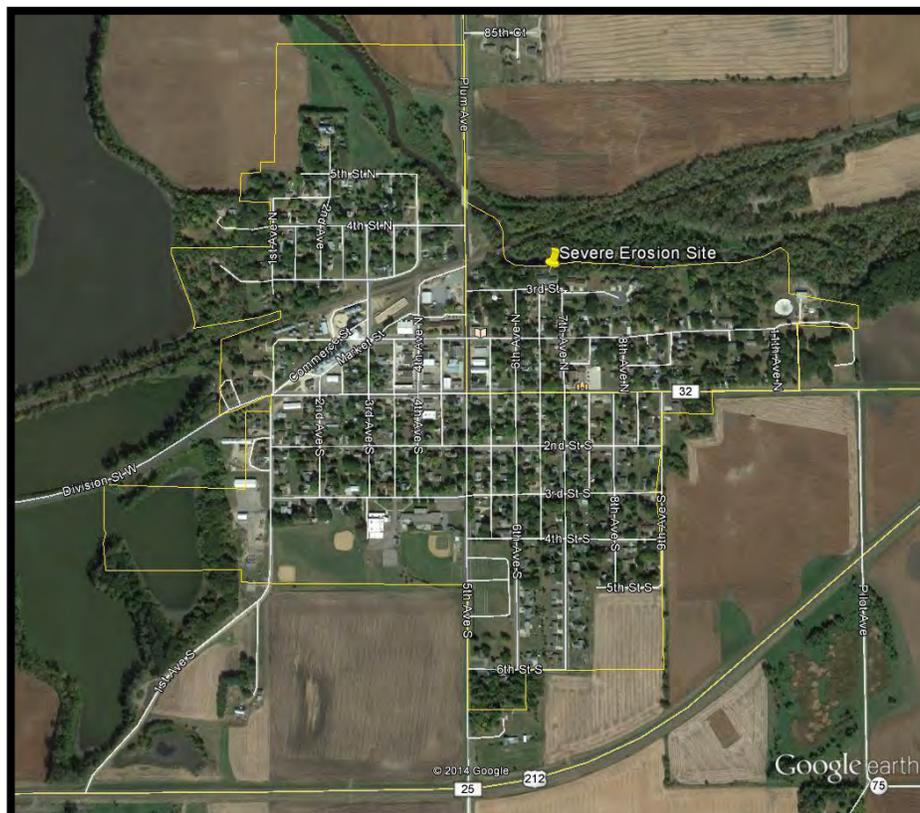
- **Estimated 2012 Population:** 739
- **Estimated 2012 Households:** 307
- **2012 Persons Per Household:** 2.4
- **2014 Taxable Market Value:** \$15,195,200



Overview

The City of Brownton is located in Sumter Township in west-central McLeod County. According to the Minnesota State Demographer, the community had approximately 739 people living in 307 households in 2012. Map 4C shows an aerial photo created with Google Earth on September 23, 2012.

**Map 4C:
City of Brownton Ariel (2012)**



Development Trends

Table 4C shows how the City of Brownton has grown in population from 688 people in 1970 to 739 people according in 2012. This represents a 12% growth rate. If the City of Brownton continues to grow at the same rate over the next 15 years, it can expect to have approximately 850 people living in 353 houses in 2030 (a gain of 88 people and 46 houses).



**Table 4C: City of Brownton
Population & Household Projections**

Required Information

	Year (U.S. Census)					Projected		2010-30 Change	% Change	
	1970	1980	1990	2000	2012*	2020	2030			
Population	688	697	781	807	739	824	850	88	12%	
Households (average household size is 2.4)						307	342	353	46	15%

**Estimated by the Minnesota State Demographer’s Office*

Floodplain Analysis

Map 4D: City of Brownton’s Floodplain

Map 4D was created online using the McLeod County GIS website. The City has a floodplain located on both sides of Buffalo Creek. The south side of the Creek, where development in the City has taken place, is extremely steep and therefore essentially protects the community from flooding. The steep bank, however, is one of the County’s severe erosion sites. One of the City’s mitigation steps is to properly restore the bank to prevent further erosion. ***no buildings are listed as Repetitive Loss Structures (RLS) with FEMA.***



Created on line at www.co.mcleod.mn.us

Hazard Mitigation Planning Features



Brownton’s Hazard Risk Assessment is presented in Table 4D. The Table presents each of the hazards profiled for McLeod County and rates each of them in four risk assessment categories: Likely Hazard Frequency (how often the hazard is likely to occur); Average Risk Severity or Likely Impact (how severe the hazard is likely to be); High Risk Categories (i.e., buildings, people, infrastructure, agriculture); and Overall Risk Level (scores 1-12 with 1 being low risk and 12 being high risk).

The following features impacted the City of Brownton’s Hazard Risk Assessment:

- **Major Roadways:** CSAH 25, CSAH 32, and CSAH 102
- **Railroads:** Twins Cities & Western
- **Pipelines:** None
- **Flood Plain:** Along both sides of Buffalo Creek
- **Special At-Risk Hazard Categories:**
 - ◆ **Hazardous Materials** due to CSAHs and railroad.
 - ◆ **Flood Plain**: Along both sides of Buffalo Creek

Hazard Mitigation Planning Documents and Participation

- **Participation Resolution:** August 7, 2007
- **Adoption Resolution:** Will be completed after FEMA approval.

**Table 4D:
City of Brownton Risk Assessment**

Hazard	Likely Hazard Frequency	Average Risk Severity or Likely Impact	High Risk Categories*	Overall Risk Level (1 low -12 high)
Flooding:				
<i>Stream/River</i>	2-5 Years	Severe	B, I	9
<i>Stormwater/Urban</i>	6-10 Years	Moderate	B, I	4
Tornadoes (F1 average)	6-10 Years	Severe	P, B, A, I	6
Winter Storms	Annually	Moderate	P, A, I	8
Thunderstorms:				
<i>Severe Wind</i>	2-5 Years	Moderate	B, A, I	6
<i>Severe Hail</i>	6-10 Years	Severe	B, A, I	8
<i>Severe Lightning</i>	2-5 Years	Minimal	B, I	3
Fire				
<i>Structural</i>	Yearly	Moderate	B, P, A, I	8
<i>Wildfires</i>	Rarely	Minimal	B, A, I	1
Drought	6-10 Years	Moderate	P, A, I	4
Extreme Temperatures:				
<i>Extreme Cold</i>	Yearly	Moderate	P, A, I	8
<i>Extreme Heat</i>	2-5 Years	Moderate	P, A, I	6
Severe Erosion/Landslide	Yearly	Severe	B, I	12
Earthquakes	Rarely	Moderate	P, B, I	2
Dam or Levee Failure	Rarely	Moderate	B, A, I	2
Infectious Disease	2-5 Years	Moderate	P, A	6
Water Contamination	Rarely	Severe	P, A, I	4
Hazardous Materials	6-10 Years	Severe	I, P	6

**High Risk categories include:*

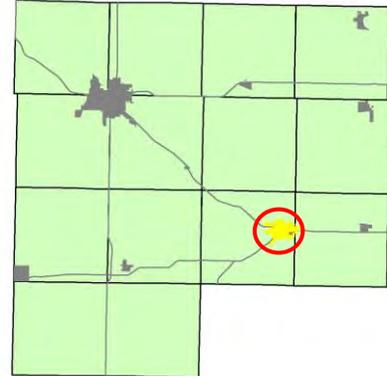
P=People; B=Buildings; A=Agriculture (crops or livestock); I=Infrastructure

City of Glencoe Community Profile & Hazard Risk Assessment

Located in Glencoe Township

Demographics

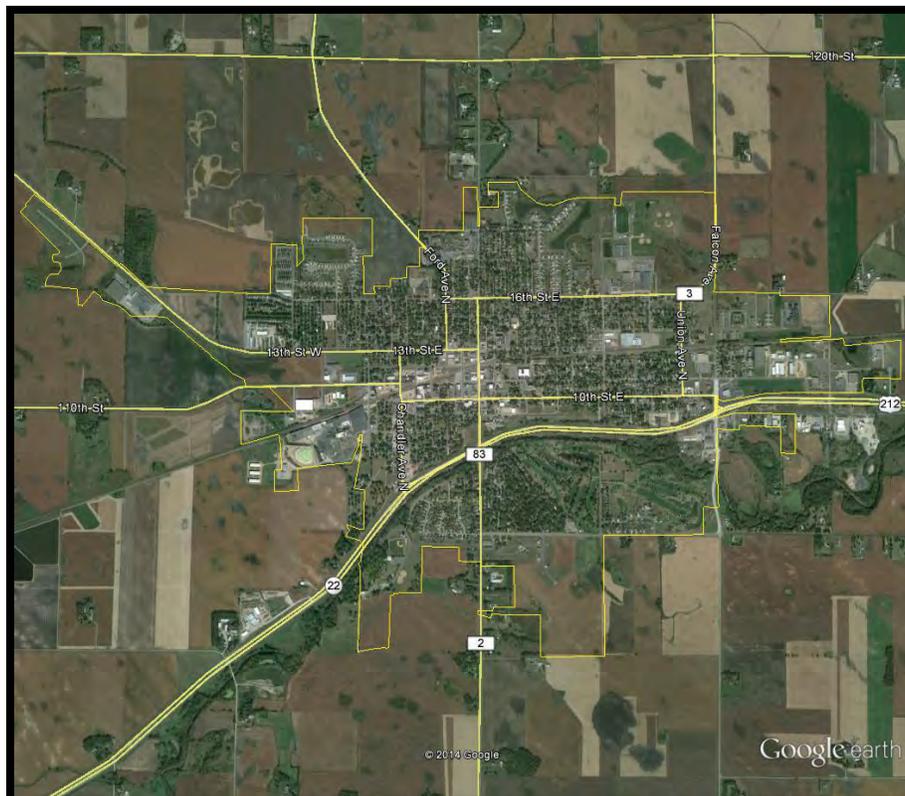
- **Estimated 2012 Population:** 5,586
- **Estimated 2012 Households:** 2,223
- **2012 Persons Per Household:** 2.45
- **2014 Taxable Market Value:** \$214,899,200



Overview

The City of Glencoe, the County Seat, is located in Glencoe Township in southeastern McLeod County. According to the Minnesota State Demographer, the community had approximately 5,586 people living in 2,223 households in 2012. Map 4E shows an aerial photo created with Google Earth on September 23, 2012.

**Map 4E:
City of Glencoe Aerial Photo (2012)**



Development Trends



Required Information

Table 4E shows how the City of Glencoe has grown in population from 4,217 people in 1970 to 5,586 people in 2012. This represents a 15% growth rate. If the City of Glencoe continues to grow at the same rate over the next 15 years, it can expect to have approximately 6,423 people living in 2,622 houses in 2030 (a gain of 837 people and 399 households).

**Table 4E: City of Glencoe
Population & Household Projections**

	Year (U.S. Census)					Projected		2010-30 Change	% Change	
	1970	1980	1990	2000	2012*	2020	2030			
Population	4,217	4,396	4,648	5,453	5,586	6,035	6,423	837	15%	
Households (average household size is 2.45)						2,223	2,463	2,622	399	18%

**Estimated by the Minnesota State Demographer's Office.*

Map 4F: NW Glencoe's Floodplain

Floodplain Analysis

Maps 4F,
4G, 4H,
and 4I



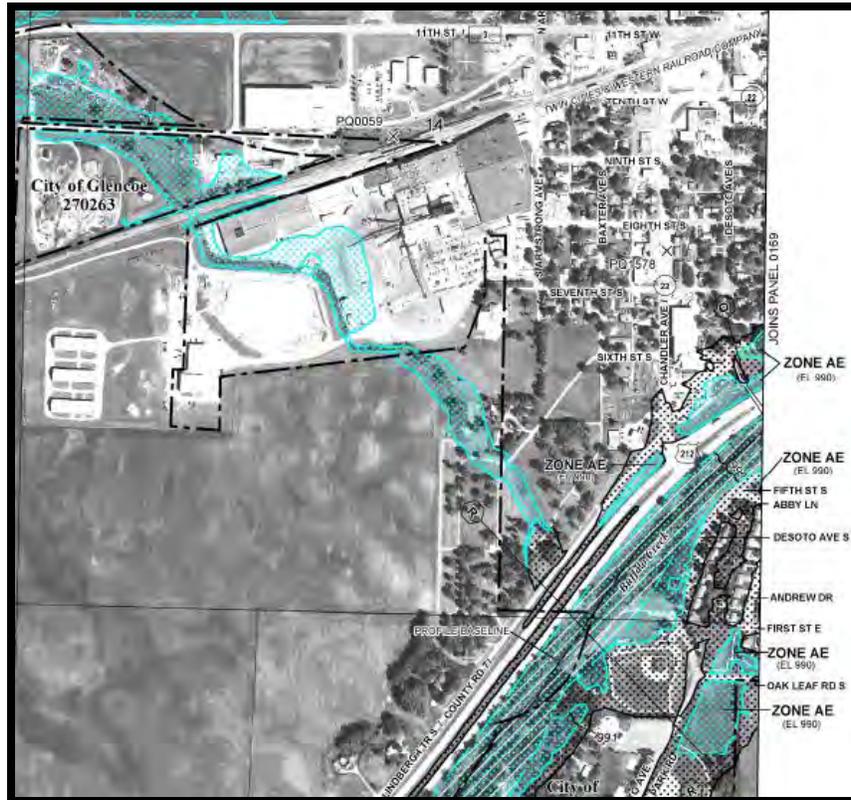
Required

were created using the FEMA's Flood Map Service Center. Each map represents an area of the City that has a floodplain (shown in blue). As you can see, the City of Glencoe has extensive development that is located within the floodplain, however, **no buildings are listed as Repetitive Loss Structures (RLS) with FEMA.**



Source: <http://msc.fema.gov/portal/search>

Map 4G: SW Glencoe's Floodplain



Source: <http://msc.fema.gov/portal/search>

Map 4H: East Central Glencoe's Floodplain



Source: <http://msc.fema.gov/portal/search>

Map 4I: SE Glencoe's Floodplain



Source: <http://msc.fema.gov/portal/search>

Hazard Mitigation Planning Features

The City of Glencoe's Hazard Risk Assessment is presented in Table 4F. The Tables presents each of the hazards profiled for McLeod County and rates each of them in four risk assessment categories: Likely Hazard Frequency (how often the hazard is likely to occur); Average Risk Severity or Likely Impact (how severe the hazard is likely to be); High Risk Categories (i.e., buildings, people, infrastructure, agriculture); and Overall Risk Level (scores 1-12 with 1 being low risk and 12 being high risk).



The following features impacted the City of Glencoe's Hazard Risk Assessment:

- **Major Roadways:** U.S. Highway 212, State Highway 22, CSAH 2, CSAH 3, CSAH 75, CSAH 77, CSAH 81, CSAH 83, and CSAH 106
- **Railroads:** Twin Cities & Western Railroad
- **Pipelines:** None
- **Flood Plain:** Along both sides of Buffalo Creek

Chapter Four: Risk Assessment

- **Special At-Risk Hazard Categories:**
 - ◆ **Hazardous Materials** due to U.S. and State Highways, CSAHs, and railroad.
 - ◆ **Flood Plain**: Along both sides of Buffalo Creek.

Hazard Mitigation Planning Documents and Participation

- **Participation Resolution:** January 16, 2007
- **Adoption Resolution:** Will be completed after FEMA approval.

**Table 4F:
City of Glencoe Risk Assessment**

Hazard	Likely Hazard Frequency	Average Risk Severity or Likely Impact	High Risk Categories*	Overall Risk Level (1 low -12 high)
Flooding:				
<i>Stream/River</i>	Annually	Severe	B, I	12
<i>Stormwater/Urban</i>	2-5 Years	Severe	B, I	9
Tornadoes (F1 average)	6-10 Years	Severe	P, B, A, I	6
Winter Storms	Annually	Moderate	P, A, I	8
Thunderstorms:				
<i>Severe Wind</i>	2-5 Years	Moderate	B, A, I	6
<i>Severe Hail</i>	6-10 Years	Severe	B, A, I	8
<i>Severe Lightning</i>	2-5 Years	Minimal	B, I	3
Fire				
<i>Structural</i>	Yearly	Moderate	B, P, A, I	8
<i>Wildfires</i>	Rarely	Minimal	B, A, I	1
Drought	6-10 Years	Moderate	P, A, I	4
Extreme Temperatures:				
<i>Extreme Cold</i>	Yearly	Moderate	P, A, I	8
<i>Extreme Heat</i>	2-5 Years	Moderate	P, A, I	6
Severe Erosion/Landslide	Rarely	Severe	B, I	4
Earthquakes	Rarely	Moderate	P, B, I	2
Dam or Levee Failure	Rarely	Moderate	B, A, I	2
Infectious Disease	2-5 Years	Moderate	P, A	6
Water Contamination	Rarely	Severe	P, A, I	4
Hazardous Materials	2-5 Years	Moderate	I, P	6

**High Risk categories include:*

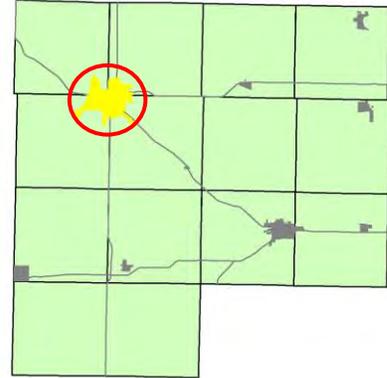
P=People; B=Buildings; A=Agriculture (crops or livestock); I=Infrastructure

City of Hutchinson Community Profile & Hazard Risk Assessment

Located in Acoma, Hutchinson, Lynn, and Hassen Valley Townships

Demographics

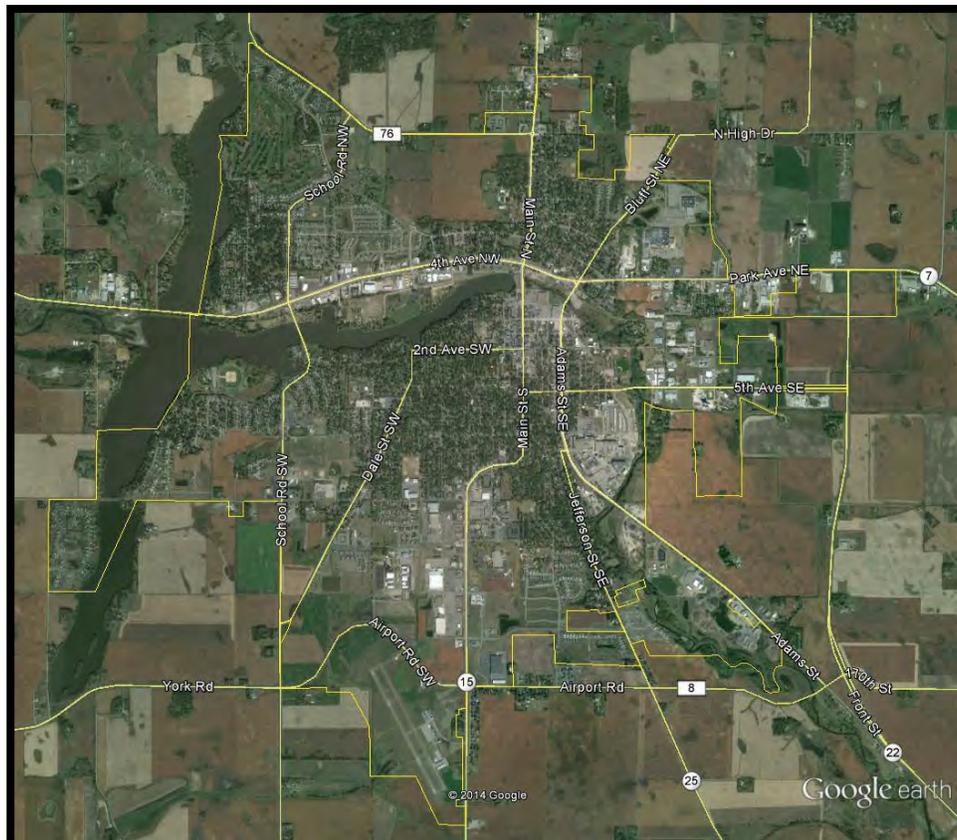
- **Estimated 2012 Population:** 14,034
- **Estimated 2012 Households:** 5,940
- **2012 Persons Per Household:** 2.3
- **2014 Taxable Market Value:** \$724,743,200



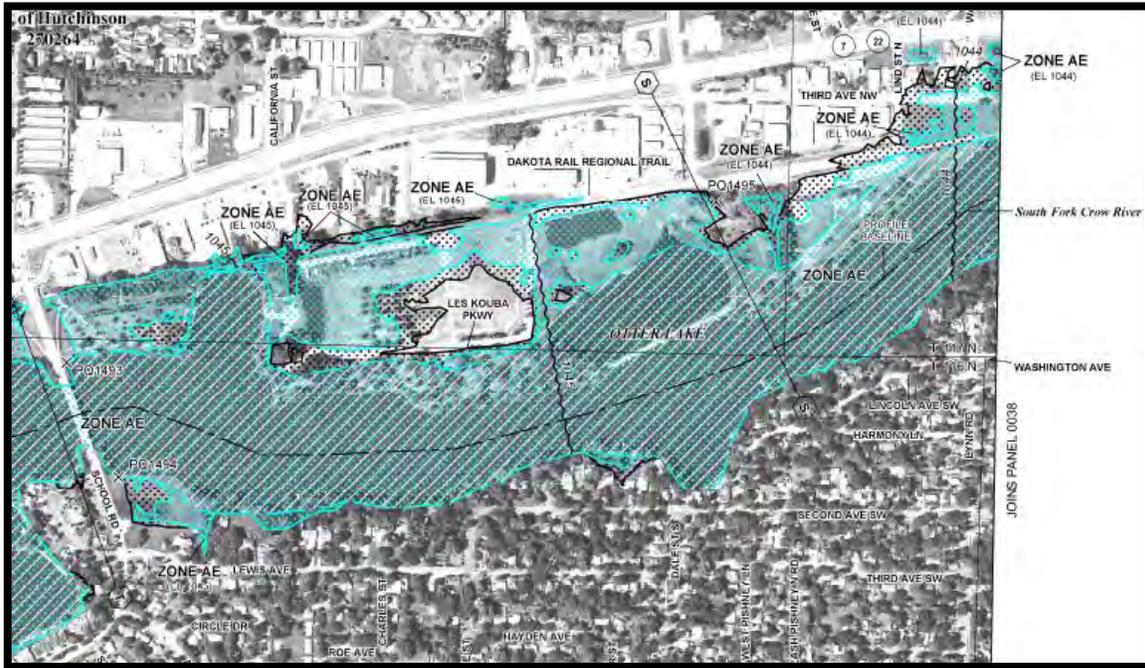
Overview

Hutchinson is surrounded by Acoma, Hutchinson, Lynn and Hassen Valley Townships in northwestern McLeod County. According to the Minnesota State Demographer, the community had approximately 14,034 people living in 5,940 households in 2012, making Hutchinson the largest in the area. Map 4A shows an aerial photo created with Google Earth (9- 23-2012).

Map 4J: City of Hutchinson Aerial Photo (2012)

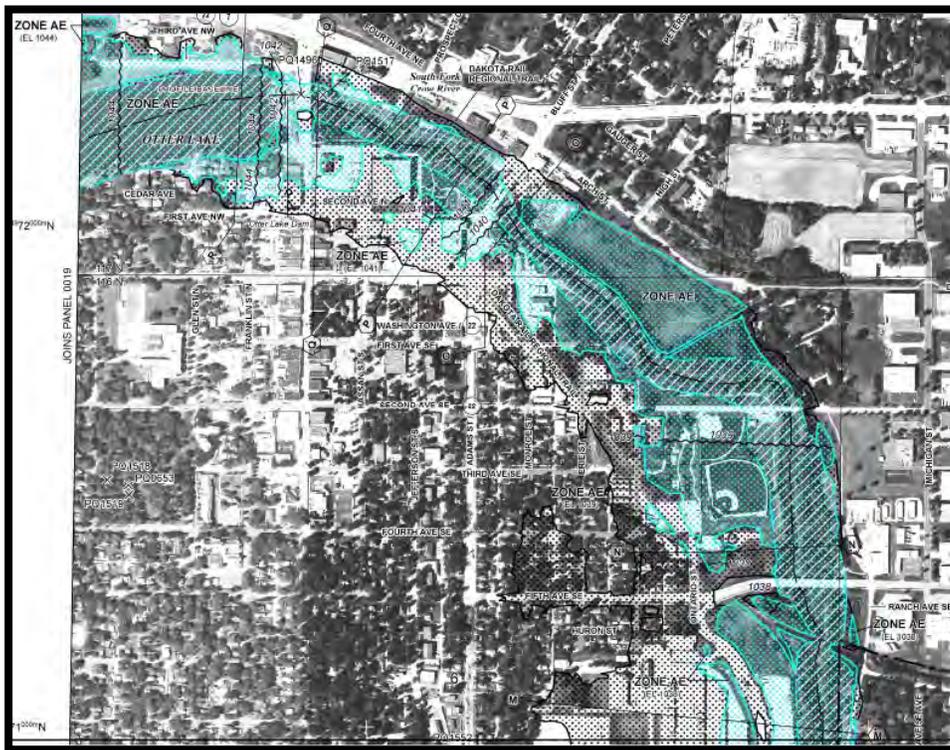


Map L: West Central Hutchinson Floodplain



Source: <http://msc.fema.gov/portal/search>

Map M: SE Hutchinson's Floodplain



Source: <http://msc.fema.gov/portal/search>

Hazard Mitigation Planning Features



The City of Hutchinson’s Hazard Risk Assessment is presented in Table 4H. The Tables presents each of the hazards profiled for McLeod County and rates each of them in four risk assessment categories: Likely Hazard Frequency (how often the hazard is likely to occur); Average Risk Severity or Likely Impact (how severe the hazard is likely to be); High Risk Categories (i.e., buildings, people, infrastructure, agriculture); and Overall Risk Level (scores 1-12 with 1 being low risk and 12 being high risk).

The following features impacted the City of Hutchinson’s Hazard Risk Assessment:

- **Major Roadways:** State Highway 7, State Highway 15, State Highway 22, CSAH 7, and CSAH 12
- **Railroads:** None
- **Pipelines:** Northern Natural Gas Corp – Natural Gas, entering the City from the northeast.
Hutchinson Utilities Pipeline – Natural Gas, entering the City from the southwest.
- **Flood Plain:** Around Otter Lake and along South Fork Crow River
- **Special At-Risk Hazard Categories:**
 - ◆ **Hazardous Materials** due to State Highways, CSAHs, and pipelines.
 - ◆ **Flood Plain**: See above description.

Hazard Mitigation Planning Documents and Participation

- **Participation Resolution:** August 28, 2007
- **Adoption Resolution:** Will be completed after FEMA approval.

**Table 4H:
City of Hutchinson Risk Assessment**

Hazard	Likely Hazard Frequency	Average Risk Severity or Likely Impact	High Risk Categories*	Overall Risk Level (1 low -12 high)
Flooding:				
<i>Stream/River</i>	Rarely	Moderate	B, I	2
<i>Stormwater/Urban</i>	6-10 Years	Moderate	B, I	4
Tornadoes (F1 average)	6-10 Years	Severe	P, B, A, I	6
Winter Storms	Annually	Moderate	P, A, I	8
Thunderstorms:				
<i>Severe Wind</i>	2-5 Years	Moderate	B, A, I	6
<i>Severe Hail</i>	6-10 Years	Severe	B, A, I	8
<i>Severe Lightning</i>	2-5 Years	Minimal	B, I	3
Fire				
<i>Structural</i>	Yearly	Moderate	B, P, A, I	8
<i>Wildfires</i>	Rarely	Minimal	B, A, I	1
Drought	6-10 Years	Moderate	P, A, I	4
Extreme Temperatures:				
<i>Extreme Cold</i>	Yearly	Moderate	P, A, I	8
<i>Extreme Heat</i>	2-5 Years	Moderate	P, A, I	6
Severe Erosion/Landslide	Rarely	Severe	B, I	4
Earthquakes	Rarely	Moderate	P, B, I	2
Dam or Levee Failure	Rarely	Moderate	B, A, I	2
Infectious Disease	2-5 Years	Moderate	P, A	6
Water Contamination	Rarely	Severe	P, A, I	4
Hazardous Materials	6-10 Years	Moderate	I, P	4

**High Risk categories include:*

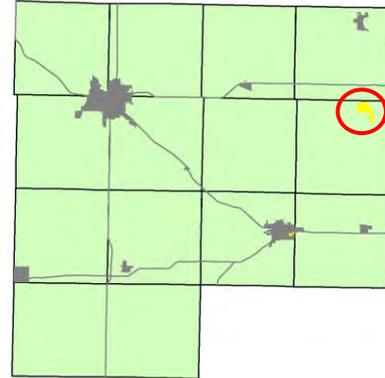
P=People; B=Buildings; A=Agriculture (crops or livestock); I=Infrastructure

City of Lester Prairie Community Profile & Hazard Risk Assessment

Located in Bergen Township

Demographics

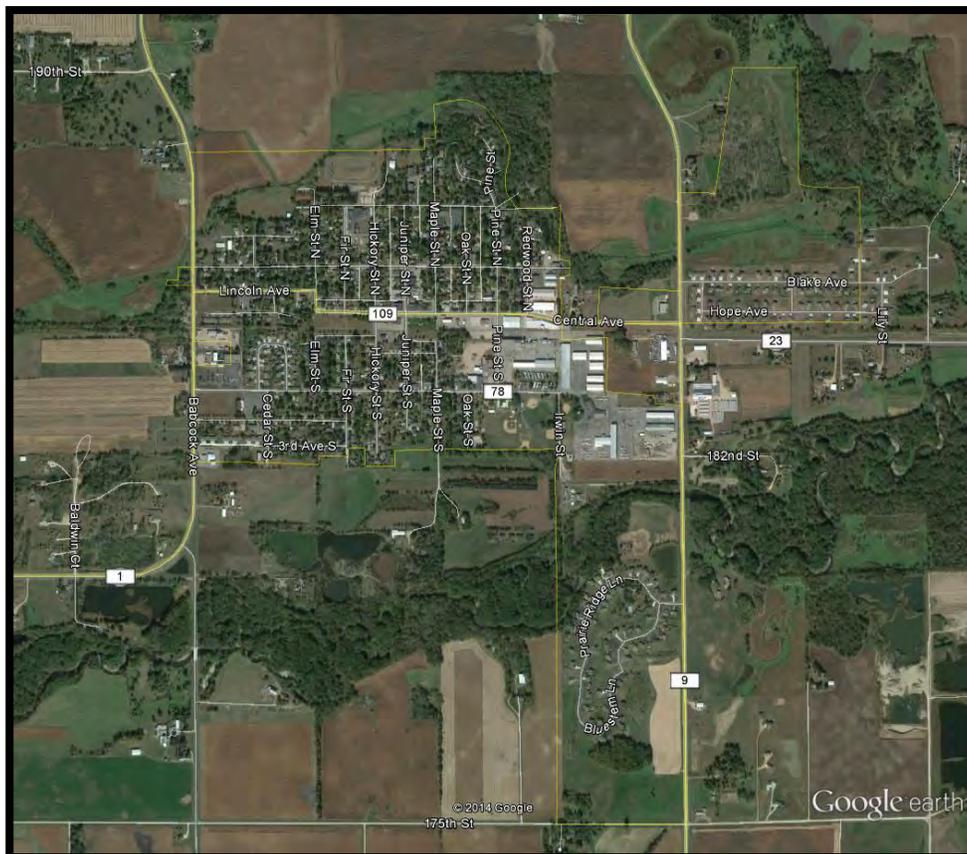
- **Estimated 2012 Population:** 1,707
- **Estimated 2012 Households:** 648
- **2012 Persons Per Household:** 2.6
- **2014 Taxable Market Value:** \$56,464,700



Overview

Lester Prairie is located in Bergen Township in northeastern McLeod County. According to the Minnesota State Demographer, the community had approximately 1,707 people living in 648 households in 2012. Map 4N shows an aerial photo created with Google Earth on September 23, 2012.

Map 4N: City of Lester Prairie Aerial Photo (2012)



Development Trends



Required Information

Table 4I shows how the City of Lester Prairie has grown in population from 1,162 people in 1970 to 1,707 in 2012. This represents a 7% growth rate since 1970. If the City of Lester Prairie continues to grow at the same rate over the next 15 years, it can expect to have approximately 1,849 people living in 711 houses in 2030 (a gain of 119 people and 63 households).

**Table 4I: City of Lester Prairie
Population & Household Projections**

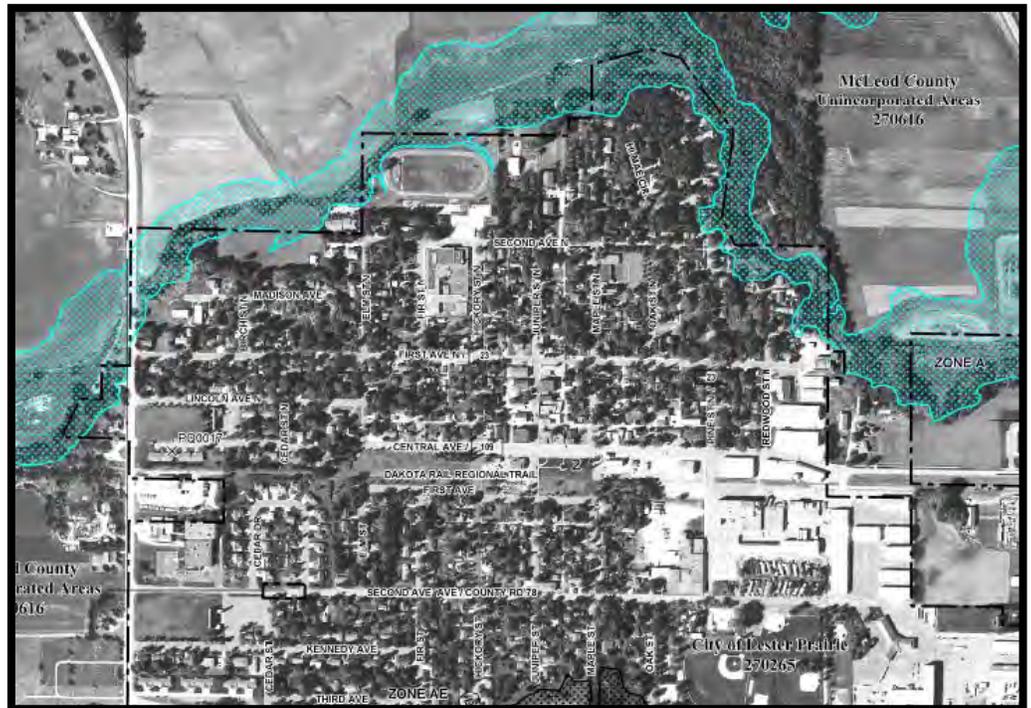
	Year (U.S. Census)					Projected		2010-30 Change	% Change	
	1970	1980	1990	2000	2012*	2020	2030			
Population	1,162	1,229	1,180	1,377	1,707	1,721	1,849	119	7%	
Households (average household size is 2.6)						648	662	711	63	10%

**Estimated by the Minnesota State Demographer's Office*

Floodplain Analysis

Map 40: City of Lester Prairie's Floodplain

Map 40 was created using the FEMA's Flood Map Service Center. The City has a floodplain located on both sides of the Crow River (shown in blue). It appears that no buildings are located within the floodplain and *no buildings are listed as Repetitive Loss Structures (RLS) with FEMA.*



Source: <http://msc.fema.gov/portal/search>

Hazard Mitigation Planning Features



The City of Lester Prairie’s Hazard Risk Assessment is presented in Table 4J. The Tables presents each of the hazards profiled for McLeod County and rates each of them in four risk assessment categories: Likely Hazard Frequency (how often the hazard is likely to occur); Average Risk Severity or Likely Impact (how severe the hazard is likely to be); High Risk Categories (i.e., buildings, people, infrastructure, agriculture); and Overall Risk Level (scores 1-12 with 1 being low risk and 12 being high risk).

The following features impacted the City of Lester Prairie’s Hazard Risk Assessment:

- **Major Roadways:** CSAH 1, CSAH 9, CSAH 23, CSAH 78, and CSAH 109.
- **Railroads:** None
- **Pipelines:** Northern Natural Gas Corp – Natural Gas; enters northwest corner of city at CSAH 1 and Central Ave.
- **Flood Plain:** Along South Fork Crow River
- **Special At-Risk Hazard Categories:**
 - ◆ **Hazardous Materials** due to State Highway, CSAHs, and pipeline.
 - ◆ **Flood Plain**: See above description.

Hazard Mitigation Planning Documents and Participation

- **Participation Resolution:** August 13, 2007
- **Adoption Resolution:** Will be completed after FEMA approval.

**Table 4J:
City of Lester Prairie Risk Assessment**

Hazard	Likely Hazard Frequency	Average Risk Severity or Likely Impact	High Risk Categories*	Overall Risk Level (1 low -12 high)
Flooding:				
<i>Stream/River</i>	Rarely	Moderate	B, I	2
<i>Stormwater/Urban</i>	6-10 Years	Moderate	B, I	4
Tornadoes (F1 average)	6-10 Years	Severe	P, B, A, I	6
Winter Storms	Annually	Moderate	P, A, I	8
Thunderstorms:				
<i>Severe Wind</i>	2-5 Years	Moderate	B, A, I	6
<i>Severe Hail</i>	6-10 Years	Severe	B, A, I	8
<i>Severe Lightning</i>	2-5 Years	Minimal	B, I	3
Fire				
<i>Structural</i>	Yearly	Moderate	B, P, A, I	8
<i>Wildfires</i>	Rarely	Minimal	B, A, I	1
Drought	6-10 Years	Moderate	P, A, I	4
Extreme Temperatures:				
<i>Extreme Cold</i>	Yearly	Moderate	P, A, I	8
<i>Extreme Heat</i>	2-5 Years	Moderate	P, A, I	6
Severe Erosion/Landslide	Rarely	Severe	B, I	4
Earthquakes	Rarely	Moderate	P, B, I	2
Dam or Levee Failure	Rarely	Moderate	B, A, I	2
Infectious Disease	2-5 Years	Moderate	P, A	6
Water Contamination	Rarely	Severe	P, A, I	4
Hazardous Materials	6-10 Years	Moderate	I, P	4

**High Risk categories include:*

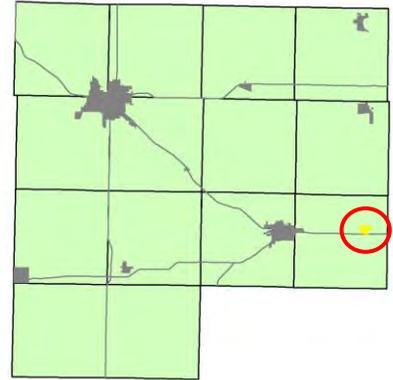
P=People; B=Buildings; A=Agriculture (crops or livestock); I=Infrastructure

City of Plato Community Profile & Hazard Risk Assessment

Located in Helen Township

Demographics

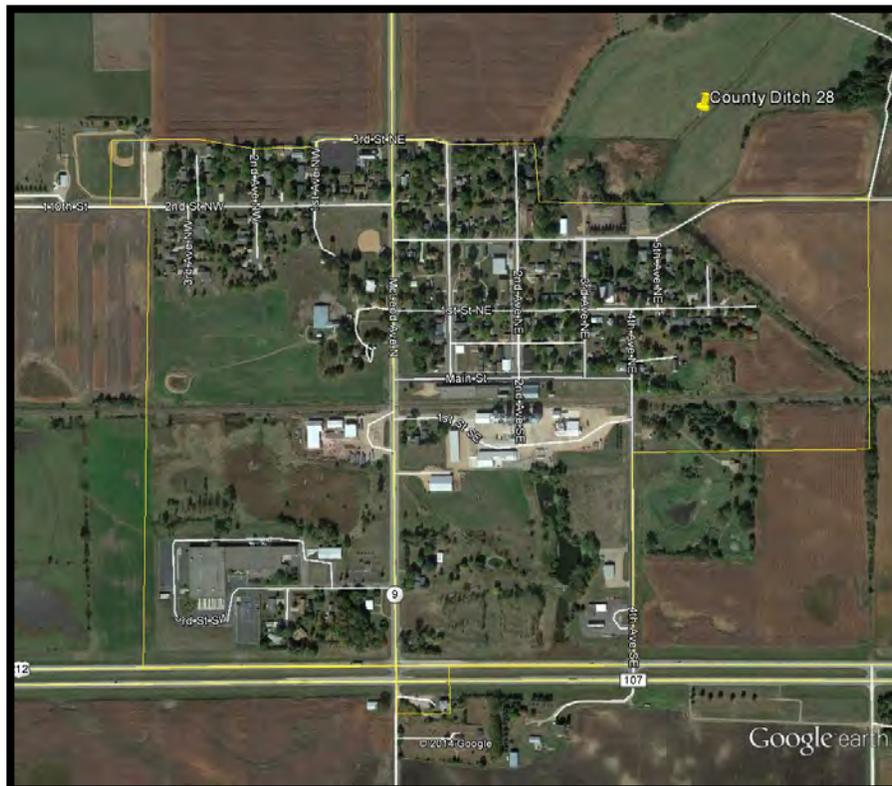
- **Estimated 2012 Population:** 319
- **Estimated 2012 Households:** 140
- **2012 Persons Per Household:** 2.3
- **2014 Taxable Market Value:** \$15,629,500



Overview

Plato is a small city located in Helen Township in western McLeod County along U.S. Highway 212. According to the Minnesota State Demographer, the community had approximately 319 people living in 140 households in 2012. Map 4P shows an aerial photo created with Google Earth on September 23, 2012.

Map 4P: City of Plato Aerial Photo (2012)



Development Trends



Table 4K shows how the City of Plato has grown in population from 303 people in 1970 to approximately 319 people in 2012. This represents a 4% growth rate. If the City of Plato continues to grow at the same rate over the next 15 years, it can expect to have approximately 333 people living in 145 houses in 2030. Due to the City’s close proximity to the Minneapolis-St. Paul Metropolitan Area, however, the community could greatly exceed historic grow rates.

**Table 4K: City of Plato
Population & Household Projections**

	Year (U.S. Census)					Projected		2010-30 Change	% Change
	1970	1980	1990	2000	2012*	2020	2030		
Population	303	390	355	336	319	335	333	13	4%
Households (average household size is 2.3)					140	146	145	5	3%

**Estimated by the Minnesota State Demographer’s Office*

Map 4Q: Plato’s Floodplain

Floodplain Analysis

Map 4Q was created using the FEMA’s Flood Map Service Center. The only floodplain threat to the community appears in the northeastern portion of the City where County Ditch 28 exists. Proper maintenance of the Ditch mitigates all flooding concerns. In addition, *no buildings are listed as Repetitive Loss Structures (RLS) with FEMA.*



Source: <http://msc.fema.gov/portal/search>

Hazard Mitigation Planning Features

The City of Plato’s Hazard Risk Assessment is presented in Table 4L. The Tables presents each of the hazards profiled for McLeod County and rates each of them in four risk assessment categories: Likely Hazard Frequency (how often the hazard is likely to occur); Average Risk Severity or Likely Impact (how severe the hazard is likely to be); High Risk Categories (i.e., buildings, people, infrastructure, agriculture); and Overall Risk Level (scores 1-12 with 1 being low risk and 12 being high risk).



The following features impacted the City of Plato’s Hazard Risk Assessment:

- **Major Roadways:** U.S. Highway 212, CSAH 9, and CSAH 107
- **Railroads:** Twins Cities & Western
- **Pipelines:** Northern Natural Gas Corp – Natural Gas; along southeast corner of city.
- **Flood Plain:** None
- **Special At-Risk Hazard Categories:**
 - ◆ **Hazardous Materials** due to U.S. Highway, CSAHs, railroad, and pipeline.

Hazard Mitigation Planning Documents and Participation

- **Participation Resolution:** January 8, 2007
- **Adoption Resolution:** Will be completed after FEMA approval.

**Table 4L:
City of Plato Risk Assessment**

Hazard	Likely Hazard Frequency	Average Risk Severity or Likely Impact	High Risk Categories*	Overall Risk Level (1 low -12 high)
Flooding:				
<i>Stream/River</i>	Rarely	Moderate	B, I	2
<i>Stormwater/Urban</i>	6-10 Years	Moderate	B, I	4
Tornadoes (F1 average)	6-10 Years	Severe	P, B, A, I	6
Winter Storms	Annually	Moderate	P, A, I	8
Thunderstorms:				
<i>Severe Wind</i>	2-5 Years	Moderate	B, A, I	6
<i>Severe Hail</i>	6-10 Years	Severe	B, A, I	8
<i>Severe Lightning</i>	2-5 Years	Minimal	B, I	3
Fire				
<i>Structural</i>	Yearly	Moderate	B, P, A, I	8
<i>Wildfires</i>	Rarely	Minimal	B, A, I	1
Drought	6-10 Years	Moderate	P, A, I	4
Extreme Temperatures:				
<i>Extreme Cold</i>	Yearly	Moderate	P, A, I	8
<i>Extreme Heat</i>	2-5 Years	Moderate	P, A, I	6
Severe Erosion/Landslide	Rarely	Severe	B, I	4
Earthquakes	Rarely	Moderate	P, B, I	2
Dam or Levee Failure	Rarely	Moderate	B, A, I	2
Infectious Disease	2-5 Years	Moderate	P, A	6
Water Contamination	Rarely	Severe	P, A, I	4
Hazardous Materials	6-10 Years	Moderate	I, P	4

**High Risk categories include:*

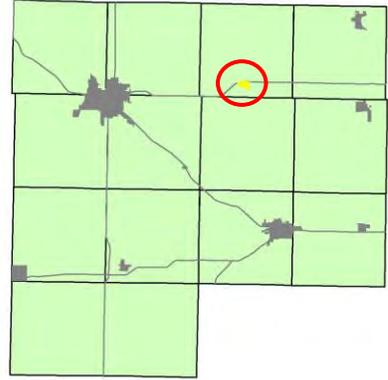
P=People; B=Buildings; A=Agriculture (crops or livestock); I=Infrastructure

City of Silver Lake Community Profile & Hazard Risk Assessment

Located in Hale Township

Demographics

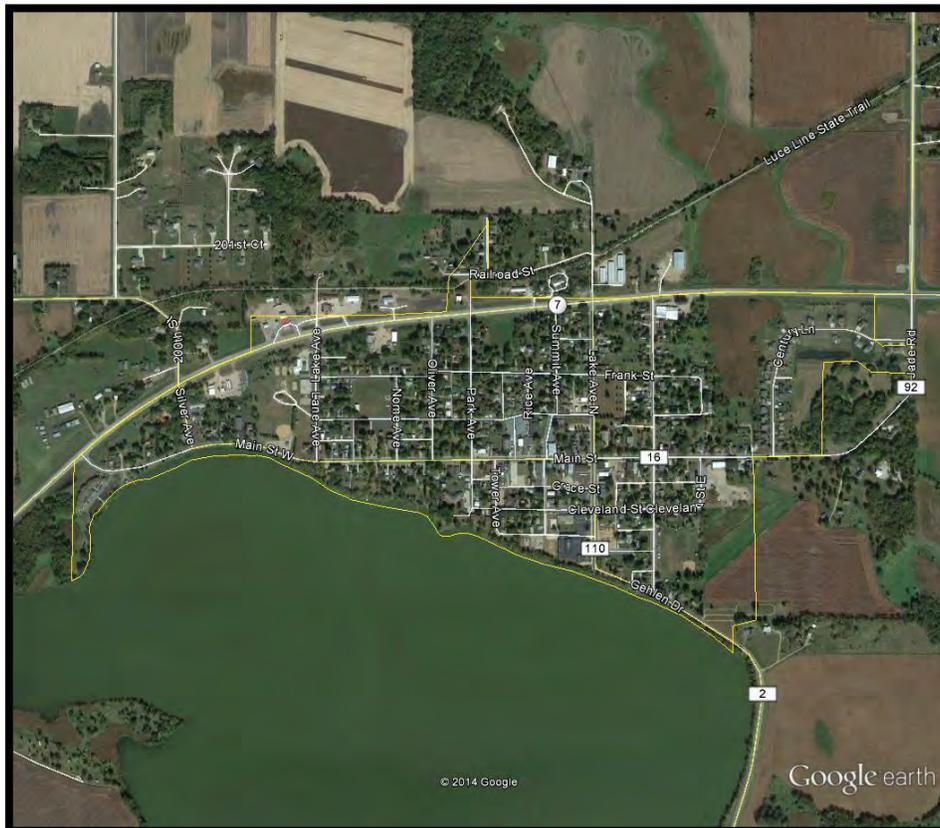
- **Estimated 2012 Population:** 829
- **Estimated 2012 Households:** 350
- **2012 Persons Per Household:** 2.4
- **2014 Taxable Market Value:** \$29,886,100



Overview

Silver Lake is located in Hale Township in north central McLeod County. According to the Minnesota State Demographer, the community had approximately 829 people living in 350 households in 2012. Map 4R shows an aerial photo created with Google Earth on September 23, 2012.

Map 4R: City of Silver Lake's Aerial Photo (2012)



Chapter Four: Risk Assessment

Development Trends



Table 4M shows how the City of Silver Lake has grown in population from 694 people in 1970 to 829 people in 2012. This represents a 6% growth rate. If the City of Silver Lake continues to grow at the same rate over the next 15 years, it can expect to have approximately 890 people living in 371 houses in 2030.

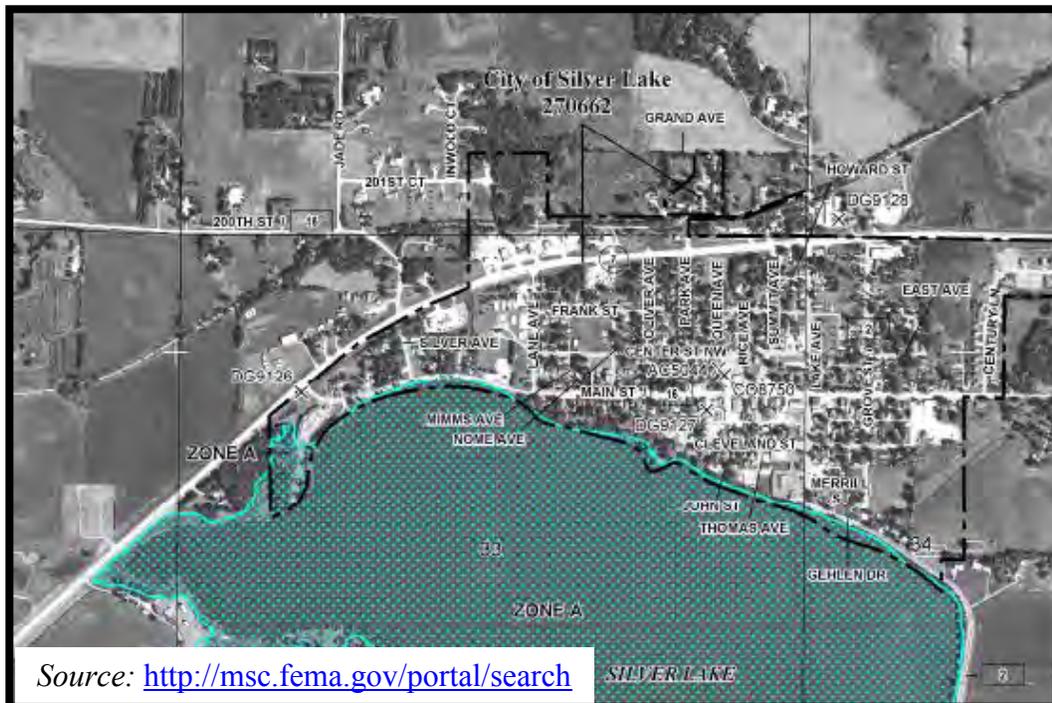
**Table 4M: City of Silver Lake
Population & Household Projections**

	Year (U.S. Census)					Projected		2010-30 Change	% Change
	1970	1980	1990	2000	2012*	2020	2030		
Population	694	698	764	761	829	856	890	53	6%
Households (average household size is 2.4)					350	356	371	21	6%

**Estimated by the Minnesota State Demographer's Office*

Floodplain Analysis

Map 4S was created using the FEMA's Flood Map Service Center. Silver Lake provides a flood basis for the City. As a result, the community only has a small portion located in the floodplain in the extreme southwestern portion of the City. *No buildings are listed as Repetitive Loss Structures (RLS) with FEMA.*



**Map 4S:
City of Silver
Lake's
Floodplain**

Hazard Mitigation Planning Features



The City of Silver Lake’s Hazard Risk Assessment is presented in Table 4N. The Tables presents each of the hazards profiled for McLeod County and rates each of them in four risk assessment categories: Likely Hazard Frequency (how often the hazard is likely to occur); Average Risk Severity or Likely Impact (how severe the hazard is likely to be); High Risk Categories (i.e., buildings, people, infrastructure, agriculture); and Overall Risk Level (scores 1-12 with 1 being low risk and 12 being high risk).

The following features impacted the City of Silver Lake’s Hazard Risk Assessment:

- **Major Roadways:** State Highway 7, CSAH 2, CSAH 16, and CSAH 110
- **Railroads:** None
- **Pipelines:** Northern Natural Gas Corp – Natural Gas; enters northeast corner of city.
- **Flood Plain:** Small section in SW area of the City adjacent to Silver Lake.
- **Special At-Risk Hazard Categories:**
 - ◆ **Hazardous Materials** due to State Highway, CSAHs and pipeline.

Hazard Mitigation Planning Documents and Participation

- **Participation Resolution:** January 2, 2007
- **Adoption Resolution:** Will be completed after FEMA approval.

**Table 4N:
City of Silver Lake Risk Assessment**

Hazard	Likely Hazard Frequency	Average Risk Severity or Likely Impact	High Risk Categories*	Overall Risk Level (1 low -12 high)
Flooding:				
<i>Stream/River</i>	Rarely	Moderate	B, I	2
<i>Stormwater/Urban</i>	6-10 Years	Moderate	B, I	4
Tornadoes (F1 average)	6-10 Years	Severe	P, B, A, I	6
Winter Storms	Annually	Moderate	P, A, I	8
Thunderstorms:				
<i>Severe Wind</i>	2-5 Years	Moderate	B, A, I	6
<i>Severe Hail</i>	6-10 Years	Severe	B, A, I	8
<i>Severe Lightning</i>	2-5 Years	Minimal	B, I	3
Fire				
<i>Structural</i>	Yearly	Moderate	B, P, A, I	8
<i>Wildfires</i>	Rarely	Minimal	B, A, I	1
Drought	6-10 Years	Moderate	P, A, I	4
Extreme Temperatures:				
<i>Extreme Cold</i>	Yearly	Moderate	P, A, I	8
<i>Extreme Heat</i>	2-5 Years	Moderate	P, A, I	6
Severe Erosion/Landslide	Rarely	Severe	B, I	4
Earthquakes	Rarely	Moderate	P, B, I	2
Dam or Levee Failure	Rarely	Moderate	B, A, I	2
Infectious Disease	2-5 Years	Moderate	P, A	6
Water Contamination	Rarely	Severe	P, A, I	4
Hazardous Materials	6-10 Years	Moderate	I, P	4

**High Risk categories include:*

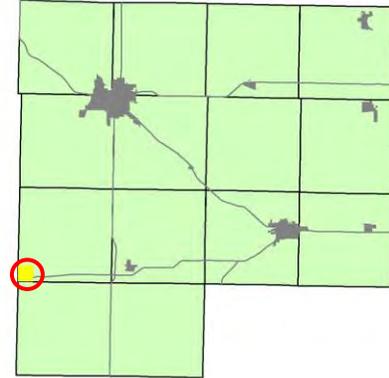
P=People; B=Buildings; A=Agriculture (crops or livestock); I=Infrastructure

City of Stewart Community Profile & Hazard Risk Assessment

Located in Collins Township

Demographics

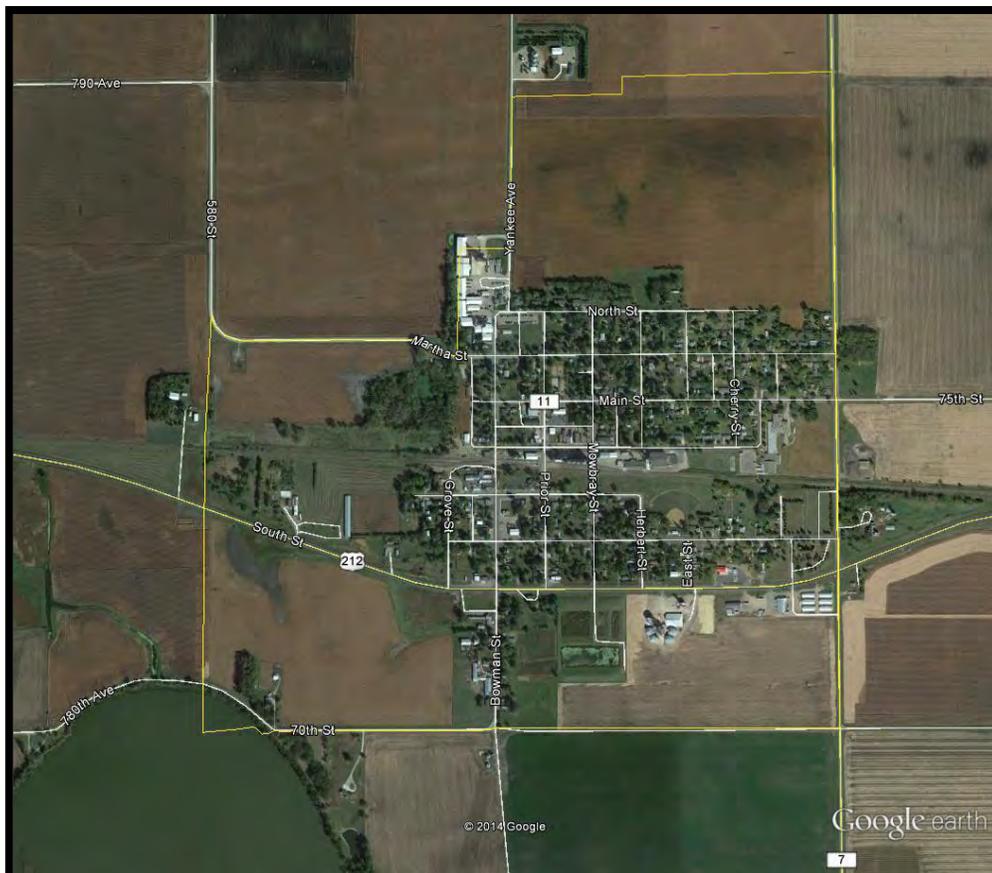
- **Estimated 2012 Population:** 563
- **Estimated 2012 Households:** 232
- **2012 Persons Per Household:** 2.4
- **2014 Taxable Market Value:** \$14,846,100



Overview

The City of Stewart is located in Collins Township in west central McLeod County. According to the Minnesota State Demographer, the community had approximately 563 people living in 232 households in 2012. Map 4A shows an aerial photo created with Google Earth on September 23, 2012.

Map 4T: City of Stewart's Aerial Photo (2012)



Chapter Four: Risk Assessment

Development Trends

Table 4O shows how the City of Stewart has grown in population from 666 people in 1970 to 563 people in 2012, representing a 13% loss rate. If this trend was to continue over the next 15 years, the community would expect to have approximately 500 people living in 208 households in 2030.



**Table 4O: City of Stewart
Population & Household Projections**

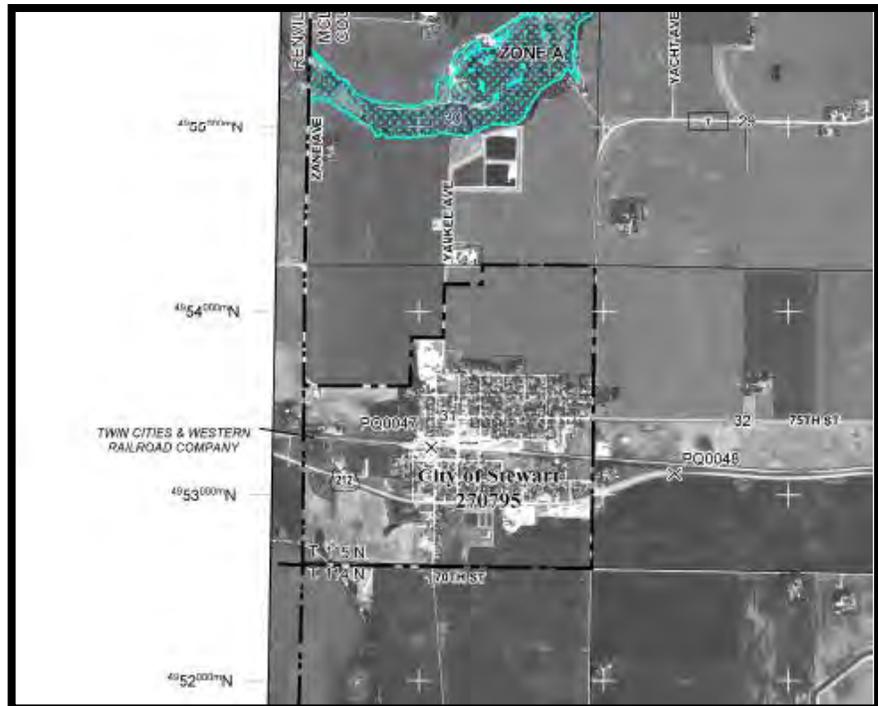
	Year (U.S. Census)					Projected		2010-30 Change	% Change
	1970	1980	1990	2000	2012*	2020	2030		
Population	666	616	566	564	563	524	500	-71	-13%
Households (average household size is 2.4)					232	218	208	-24	-10%

**Estimated by the Minnesota State Demographer’s Office*

Floodplain Analysis

Map 4U: City of Stewart’s Floodplain

Map 4U was created using the Federal Emergency Management Agency’s Flood Map Service Center (<http://msc.fema.gov/portal/search>). Notice the only floodplain surrounds Buffalo Creek to the north of the community. As a result, *no buildings are listed as Repetitive Loss Structures (RLS) with FEMA.*



Hazard Mitigation Planning Features



The City of Stewart’s Hazard Risk Assessment is presented in Table 4P. The Tables presents each of the hazards profiled for McLeod County and rates each of them in four risk assessment categories: Likely Hazard Frequency (how often the hazard is likely to occur); Average Risk Severity or Likely Impact (how severe the hazard is likely to be); High Risk Categories (i.e., buildings, people, infrastructure, agriculture); and Overall Risk Level (scores 1-12 with 1 being low risk and 12 being high risk).

The following features impacted the City of Stewart’s Hazard Risk Assessment:

- **Major Roadways:** U.S. Highway 212, CSAH 7, and CSAH 111
- **Railroads:** Twins Cities & Western
- **Pipelines:** None
- **Flood Plain:** None
- **Special At-Risk Hazard Categories:**
 - ◆ **Hazardous Materials** due to U.S. Highway, CSAHs, and railroad.

Hazard Mitigation Planning Documents and Participation

- **Participation Resolution:** August 6, 2007
- **Adoption Resolution:** Will be completed after FEMA approval.

**Table 4P:
City of Stewart Risk Assessment**

Hazard	Likely Hazard Frequency	Average Risk Severity or Likely Impact	High Risk Categories*	Overall Risk Level (1 low -12 high)
Flooding:				
<i>Stream/River</i>	Rarely	Moderate	B, I	2
<i>Stormwater/Urban</i>	6-10 Years	Moderate	B, I	4
Tornadoes (F1 average)	6-10 Years	Severe	P, B, A, I	6
Winter Storms	Annually	Moderate	P, A, I	8
Thunderstorms:				
<i>Severe Wind</i>	2-5 Years	Moderate	B, A, I	6
<i>Severe Hail</i>	6-10 Years	Severe	B, A, I	8
<i>Severe Lightning</i>	2-5 Years	Minimal	B, I	3
Fire				
<i>Structural</i>	Yearly	Moderate	B, P, A, I	8
<i>Wildfires</i>	Rarely	Minimal	B, A, I	1
Drought	6-10 Years	Moderate	P, A, I	4
Extreme Temperatures:				
<i>Extreme Cold</i>	Yearly	Moderate	P, A, I	8
<i>Extreme Heat</i>	2-5 Years	Moderate	P, A, I	6
Severe Erosion/Landslide	Rarely	Severe	B, I	4
Earthquakes	Rarely	Moderate	P, B, I	2
Dam or Levee Failure	Rarely	Moderate	B, A, I	2
Infectious Disease	2-5 Years	Moderate	P, A	6
Water Contamination	Rarely	Severe	P, A, I	4
Hazardous Materials	6-10 Years	Moderate	I, P	4

**High Risk categories include:*

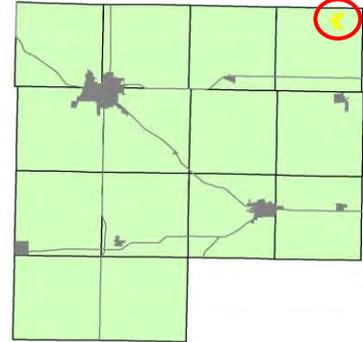
P=People; B=Buildings; A=Agriculture (crops or livestock); I=Infrastructure

City of Winsted Community Profile & Hazard Risk Assessment

Located in Winsted Township

Demographics

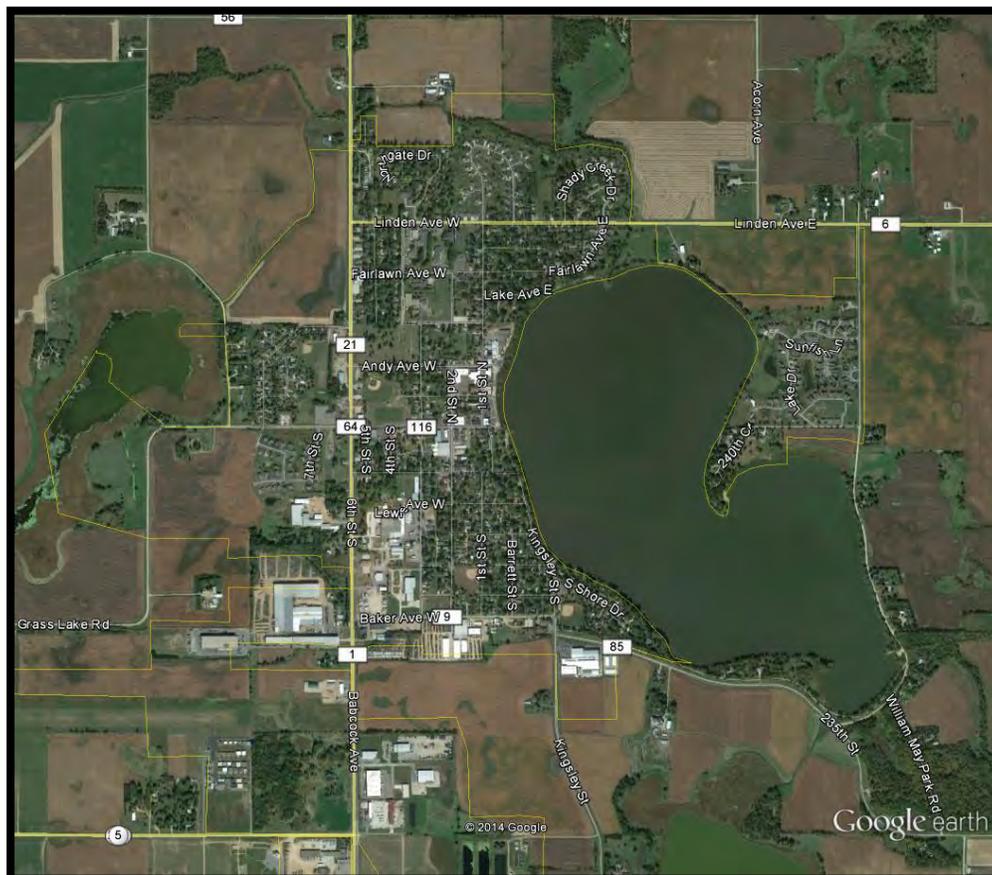
- **Estimated 2012 Population:** 2,330
- **Estimated 2012 Households:** 942
- **2012 Persons Per Household:** 2.4
- **2014 Taxable Market Value:** \$101,896,900



Overview

The City of Winsted is located in Winsted Township in northeastern McLeod County. According to the Minnesota State Demographer, the community had approximately 2,330 people living in 942 households in 2012. Map 4A shows an aerial photo created with Google Earth on September 23, 2012.

Map 4V: City of Winsted's Aerial Photo (2012)



Development Trends



Table 4Q shows how the City of Winsted has grown in population from 1,266 people in 1970 to 2,230 people in 2012. This represents a 22% growth rate. If the City of Winsted continues to grow at the same rate over the next 15 years, it can expect to have approximately 2,864 people living in 1,193 households in 2030.

**Table 4Q: City of Winsted
Population & Household Projections**

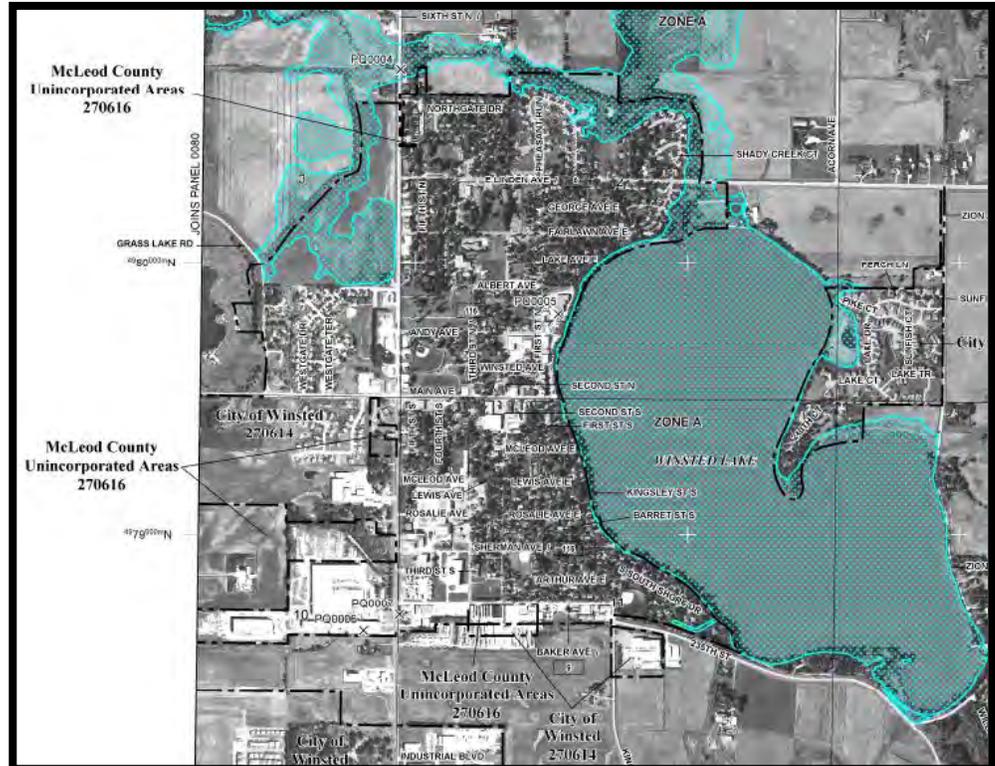
	Year (U.S. Census)					Projected		2010-30 Change	% Change	
	1970	1980	1990	2000	2012*	2020	2030			
Population	1,266	1,522	1,581	2,094	2,330	2,589	2,864	509	22%	
Households (average household size is 2.4)						942	1,079	1,193	251	27%

**Estimated by the Minnesota State Demographer's Office*

Floodplain Analysis

Map 4W was created using FEMA's Flood Map Service Center. Winsted Lake serves as a flood basin for the community. **No buildings in Winsted are listed as Repetitive Loss Structures (RLS) with FEMA.**

Map 4W: City of Winsted's Floodplain



Source: <http://msc.fema.gov/portal/search>

Hazard Mitigation Planning Features



Winsted’s Hazard Risk Assessment is presented in Table 4R. The Table presents each of the hazards profiled for McLeod County and rates each of them in four risk assessment categories: Likely Hazard Frequency (how often the hazard is likely to occur); Average Risk Severity or Likely Impact (how severe the hazard is likely to be); High Risk Categories (i.e., buildings, people, infrastructure, agriculture); and Overall Risk Level (scores 1-12 with 1 being low risk and 12 being high risk).

The following features impacted the City of Winsted’s Hazard Risk Assessment:

- **Major Roadways:** CSAH 1, CSAH 6, CSAH 9, CSAH 85, and CSAH 116.
- **Railroads:** None
- **Pipelines:** Northern Natural Gas Corp – Natural Gas, along western edge of city.
Williams Brothers Pipeline Co – Crude Oil, along southern edge of city.
- **Flood Plain:** None
- **Special At-Risk Hazard Categories:**
 - ◆ **Hazardous Materials** due to State Highway, CSAHs, and pipeline.

Hazard Mitigation Planning Documents and Participation

- **Participation Resolution:** January 16, 2007
- **Adoption Resolution:** Will be completed after FEMA approval.

**Table 4R:
City of Winsted Risk Assessment**

Hazard	Likely Hazard Frequency	Average Risk Severity or Likely Impact	High Risk Categories*	Overall Risk Level (1 low -12 high)
Flooding:				
<i>Stream/River</i>	Rarely	Moderate	B, I	2
<i>Stormwater/Urban</i>	6-10 Years	Moderate	B, I	4
Tornadoes (F1 average)	6-10 Years	Severe	P, B, A, I	6
Winter Storms	Annually	Moderate	P, A, I	8
Thunderstorms:				
<i>Severe Wind</i>	2-5 Years	Moderate	B, A, I	6
<i>Severe Hail</i>	6-10 Years	Severe	B, A, I	8
<i>Severe Lightning</i>	2-5 Years	Minimal	B, I	3
Fire				
<i>Structural</i>	Yearly	Moderate	B, P, A, I	8
<i>Wildfires</i>	Rarely	Minimal	B, A, I	1
Drought	6-10 Years	Moderate	P, A, I	4
Extreme Temperatures:				
<i>Extreme Cold</i>	Yearly	Moderate	P, A, I	8
<i>Extreme Heat</i>	2-5 Years	Moderate	P, A, I	6
Severe Erosion/Landslide	Rarely	Severe	B, I	4
Earthquakes	Rarely	Moderate	P, B, I	2
Dam or Levee Failure	Rarely	Moderate	B, A, I	2
Infectious Disease	2-5 Years	Moderate	P, A	6
Water Contamination	Rarely	Severe	P, A, I	4
Hazardous Materials	6-10 Years	Moderate	I, P	4

**High Risk categories include:*

P=People; B=Buildings; A=Agriculture (crops or livestock); I=Infrastructure

Chapter Five:
Mitigation Strategy
~ Goals, Objectives & Action Steps ~

This Chapter identifies the County’s Mitigation Strategy, which consists of Goals, Objectives, and Action Steps collectively designed to mitigate the negative impacts of McLeod County’s Hazards. The Mitigation Plan will cover a span of five years (2015-2020). Overall, this Chapter will guide the County and key stakeholders in prioritizing emergency management activities, pursuing funding opportunities, and implementing projects. Specific information has been included with each Action Step, including which stakeholders are involved, an implementation target year (unless ongoing), and an estimated cost to implement the activity.



A. Definition of Goals, Objectives, and Action Steps

The Goals, Objectives, and Action Steps that are identified in this Chapter were developed with input from the public, various State and local governmental units/agencies, and the McLeod County Hazard Mitigation Plan Task Force. Goals, Objectives, and Action Steps are defined as follows:

Goals: A goal is an idealistic statement intended to be attained at some undetermined future date. Goals are purposely general in nature and usually address large-scale problems. “Reducing flooding countywide” is an example of a goal.

Objectives: An objective is an action-oriented statement that supports the completion of a goal. There may be more than one objective per goal and often can be measured when completed. “Increase upland water storage by 250 acres” is an example of an objective aimed at reducing flooding countywide.

Action Steps: An Action Step is a specific activity that will be completed in order to accomplish an objective, which in turn will help achieve a goal. “Implement the 80-acre Baker Wetland Restoration project” is an example of a specific Action Step aimed at meeting the example flood mitigation goal and objective.

B. Action Step Information

Each Action Step identified has been assigned specific information on overall priority, which stakeholders are involved, the activity’s estimated cost, and a list of jurisdictions participating during implementation. If a year is not indicated (mostly found in parenthesis), the Action Step is

intended to be implemented on an ongoing or annual basis. Table 5A provides a sample of this information. In addition, each category is described in detail following Table 5A.

**Table 5A:
Mitigation Plan Table Descriptions**

Goal: The Mitigation Plan contains three goal areas.		
Objective: The Mitigation Plan contains 8 objectives designed to support the three goals.		
Action Step: ~ Covers the 5-year implementation period unless otherwise noted...		Overall Priority
Estimated 5-Year Costs		
1.A.1. The Mitigation Plan contains 54 Action Steps. Some Action Steps contain multiple activities which are identified.		High, Medium, or Low
Stakeholders (*lead): Which Stakeholders will be involved	Participating Jurisdictions: A list of local jurisdictions (i.e., cities, watershed districts, counties, etc.) participating in implementing the identified action step.	Estimated 5-Year Cost to Implement
		Cost Benefit Score: Priority (1) x Cost (2) = 2

Stakeholder(s): This lists who potentially will be involved in the implementation of the identified initiative. An *asterisk next to a stakeholder indicates they are responsible for taking the lead to implement the action step. A listing of the most common coordinating stakeholders and their respective acronyms is provided:

All – refers to all Hazard Mitigation Plan stakeholders

Local Stakeholders

BCWD – Buffalo Creek Watershed District

Cities – All of the cities located in McLeod County

MC – McLeod County

CB – County Board

DA – Ditch Authority

ES – Environmental Services Department

EM – Emergency Management

FD – Local Fire Departments

Media – Local newspapers and radio stations

Chapter 5: Mitigation Strategy

HD – Highway Department

PH – County Public Health

PZ – Planning & Zoning Department

Ridgewater – Ridgewater College

Townships – McLeod County Association of Townships

Task Force – The McLeod County Hazard Mitigation Plan Task Force

SWCD – McLeod County Soil and Water Conservation District

WPTF – McLeod County Water Plan Task Force

Regional Stakeholders:

MMDC – Mid-Minnesota Development Commission

CROW – Crow River Organization of Waters

DU – Ducks Unlimited

State and Federal Agency Stakeholders:

BWSR – Minnesota Board of Water and Soil Resources

DNR – Minnesota Department of Natural Resources

MDA – Minnesota Department of Agriculture

MDH – Minnesota Department of Health

MGS – Minnesota Geological Survey

MPCA – Minnesota Pollution Control Agency

NRCS – Natural Resources Conservation Service

UME – University of Minnesota Extension

USACE - United States Army Corps of Engineers

USDA – United States Department of Agriculture/FSA - Farm Service Agency

USFWS – United States Fish and Wildlife Service

Participating Jurisdictions: Identifies which Local Governmental Units (LGUs) are committed to implanting the identified action step. The LGUs potentially include cities, townships, watershed districts, and McLeod County. Since this is McLeod County’s Hazard Mitigation Plan, most of the identified action steps pertain to McLeod County.

Overall Priority: Identifies if the mitigation strategy is considered to be a High, Medium, or Low priority for implementation by using the following definitions.

High Priority: High priority action steps are considered to be an essential part of the County’s Mitigation Plan. Efforts will be made to properly implement the action step over the next five years or during the target implementation year identified (in parenthesis is applicable).

Chapter 5: Mitigation Strategy

Medium Priority: Medium priority action steps are considered to be secondary in importance compared to high priority action steps. All reasonable attempts to implement medium priority action steps will be made if both time and money are available.

Low Priority: Low priority action steps were discussed but were not considered important enough to list. Many these included ongoing emergency management activities that did not merit being listed separately as an Action Step.

Estimated 5-Year Costs: Refers to the dollar amount estimated to implement the mitigation strategy over the next five years. For example, if an action step is anticipated to cost approximately \$1,000 per year (i.e., for staff time, printing expenses, etc), the estimated five-year cost would total \$5,000. The 5-year costs are simply intended to be estimates rather than actual expenses. If the action item has a one-time fixed cost, the one-time cost estimate also appears in the 5-year costs column.

Cost Benefit Score: This section pertains to multiplying the priority score (i.e., High, Medium, or Low Priority) by the estimated 5-year cost using the following criteria:

<u>Priority Score</u>		<u>Estimated Cost Score</u>		<u>= Cost Benefit Score</u>
High	= 10	Up to \$10,000	= 1.0	
Medium	= 5	\$10,001 to \$50,000	= 0.75	
Low	= 1	Over \$50,000	= 0.5	

The cost benefit scores range from 1 to 10, with 10 being the highest level of cost benefit. For example, if a high priority action step is anticipated to cost \$25,000 over the next five years, it would receive a cost benefit score of 7.5 (10 x 0.75 = 7.5). This is determined by giving the action step a score of 10 points for being a high priority project, multiplied by .75 for costing between \$10,001 to \$50,000 (10 x .75 = 7.5).

Note: *A full cost benefit analysis will need to be conducted on the mitigation strategies seeking State and/or Federal funding. The cost benefit analysis included for each action step is intended to simply help sort the implementation steps based upon priority and estimated costs.*

**C: Goals, Objectives
& Action Steps (2015-2020)**

<i>Goal 1: Enhance McLeod County’s Local Capacity to be more resilient to the effects of all hazards.</i>		
<i>Goal 1, Objective A: To ensure that Citizens are prepared for disasters and know what to do when one occurs.</i>		
<i>Action Step: ~ All Action Steps cover the 5-year implementation period unless otherwise noted...</i>	<i>Overall Priority</i>	<i>Estimated 5-Year Costs</i>
1.A.1. Early Warning System. Maintain an extensive and reliable severe weather early warning system countywide.	High	\$75,000
a) Continue to regularly test the County’s Emergency Alert System (EAS).	High	\$2,500
b) Conduct a countywide assessment of the adequacy of warning siren coverage and create new coverage map (2015).	High	\$5,000
c) Install new warning sirens in Piepenburg and Lake Marion Regional Parks. Upgrade and/or install additional warning sirens where needed.	High	50,000
d) Work towards planning for and/or requiring new warning sirens as part of the land use development process (2015-16).	Medium	\$2,500
e) Continue to participate and make improvements to the Integrated Public Alert and Warning System (IPAWS).	Medium	\$15,000
<i>Stakeholders (*lead):</i> *EM, Cities, HD, CB	<i>Participating Jurisdictions:</i> McLeod County and the cities of Brownnton, Biscay, Glencoe, Hutchinson, Lester Prairie, Plato, Silver Lake, Stewart, and Winsted.	<i>Cost Benefit Score:</i> Priority (10) x Cost (0.5) = 5



➤ **1.A.1.** refers to Goal 1, Objective A, Action Step 1. The 5-Year Estimated Costs for all of the Action Step’s components (listed a-e) are totaled in the first row (i.e., 1.A.1. steps a–e total \$75,000).

Chapter 5: Mitigation Strategy

Goal 1, Objective A continued...

<i>Action Step:</i> ~ All Action Steps cover the 5-year implementation period unless otherwise noted...		<i>Overall Priority</i>	<i>Estimated 5-Year Costs</i>
1.A.2. Severe Weather. Promote how the public can be prepared for severe weather events.		High	\$25,000
a. Participate annually in Minnesota’s Severe Weather Awareness Week every April.		Medium	\$5,000
b. Use public announcements in local newspapers and radio stations to increase citizen knowledge on disaster plans and what to do during emergencies.		High	\$5,000
c. Provide educational “Best Management Practices” to residents on protecting life and property during severe weather events. i. Develop a customized flyer by location to alert citizens on what steps to take in the event of severe weather and target delivery to vulnerable populations. ii. Provide a link off the County’s website (including Sheriff’s Office, County Public Health, etc.) to key emergency management information. iii. Advertise the importance of having Home Emergency Plans and provide a link off the County’s website for residences to customize sample plans to fit their unique situation.		High	\$15,000
<i>Stakeholders (*lead):</i> *EM, PH, Media	<i>Participating Jurisdictions:</i> McLeod County.	<i>Cost Benefit Score:</i> Priority (10) x Cost (.75) = 7.5	
1.A.3. Vulnerable Populations. Inventory vulnerable populations and provide assistance to them during severe weather events.		High	\$10,000
<i>Stakeholders (*lead):</i> *PH, EM	<i>Participating Jurisdictions:</i> McLeod County.	<i>Cost Benefit Score:</i> Priority (10) x Cost (1) = 10	
1.A.4. Fire Safety. Expand fire safety education outreach with school children and the public, including promoting the importance of having a Home Emergency Plan.		Medium	\$10,000
<i>Stakeholders (*lead):</i> *PH, EM, FD	<i>Participating Jurisdictions:</i> McLeod County.	<i>Cost Benefit Score:</i> Priority (5) x Cost (1) = 5	

Goal 1, Objective B: To ensure that all stakeholders are adequately prepared to respond to both natural and manmade disasters before they occur.			
Action Step: ~ All Action Steps cover the 5-year implementation period unless otherwise noted...		Overall Priority	Estimated 5-Year Costs
1.B.1. NIMS. Provide opportunities for local jurisdictions to receive training requirements using the National Incident Management System (NIMS).		High	\$10,000
Stakeholders (*lead): *EM	Participating Jurisdictions: McLeod County.	Cost Benefit Score: Priority (10) x Cost (1) = 10	
1.B.2. Shelters & Generators. Pursue building storm shelters and having access to portable generators where needed.		High	\$106,500
a. Conduct a countywide assessment of storm shelter and electric generator needs (2015).		High	\$10,000
b. Apply for funding to build community shelters where needed.		High	\$10,000
c. Ensure that critical facilities and Emergency Operations Centers (EOC) have access to back-up power supplies. Apply for generators as needed.		High	\$40,000
d. Encourage that public and private outdoor recreation sites (i.e., golf courses, parks, etc.) and events (concerts, parades, etc.) plan for where to provide adequate storm shelter. Incorporate appropriate language into the permitting process (2015).		Medium	\$1,500
e. Assist the City of Glencoe with securing funds to purchase two portable generators for flooding and emergency management (2015).		High	\$30,000
f. Assist the City of Silver Lake with securing funds to purchase a generator for the Silver Lake Auditorium in 2016 (serves as the community’s Emergency Operations Center).		High	\$15,000
Stakeholders (*lead): *EM, Cities, CB	Participating Jurisdictions: McLeod County and the cities of Brownton, Biscay, Glencoe, Hutchinson, Lester Prairie, Plato, Silver Lake, Stewart, and Winsted.	Cost Benefit Score: Priority (10) x Cost (.5) = 5	

Chapter 5: Mitigation Strategy

Goal 1, Objective B continued...

<i>Action Step:</i> ~ All Action Steps cover the 5-year implementation period unless otherwise noted...		<i>Overall Priority</i>	<i>Estimated 5-Year Costs</i>
1.B.3. Winsted Shelters. Partner with the City of Winsted to build/retrofit storm shelters in community parks. Target building a shelter in Hainlin Park in 2015.		High	\$75,000
<i>Stakeholders (*lead):</i> *Winsted, EM	<i>Participating Jurisdictions:</i> The City of Winsted and McLeod County	<i>Cost Benefit Score:</i> Priority (10) x Cost (.5) = 5	
1.B.4. Lester Prairie Shelter. Partner with the City of Lester Prairie to build/retrofit a community storm shelter at the Lester Prairie High School in 2016.		High	\$75,000
<i>Stakeholders (*lead):</i> *Lester Prairie, EM	<i>Participating Jurisdictions:</i> The City of Lester Prairie and McLeod County	<i>Cost Benefit Score:</i> Priority (10) x Cost (.5) = 5	
1.B.5. Glencoe Shelters. Partner with the City of Glencoe to build/retrofit storm shelters in community parks. Target building a shelter in Oak Leaf Park in 2015 followed by Oscar Olson Park in 2017.		High	\$150,000
<i>Stakeholders (*lead):</i> *Glencoe, EM	<i>Participating Jurisdictions:</i> The City of Glencoe and McLeod County	<i>Cost Benefit Score:</i> Priority (10) x Cost (.5) = 5	
1.B.6. Lester Prairie Lift Generators. Assist the City of Lester Prairie in securing grant funds to install emergency generators in four lift stations.		High	\$50,000
<i>Stakeholders (*lead):</i> *Winsted, EM	<i>Participating Jurisdictions:</i> The City of Lester Prairie and McLeod County.	<i>Cost Benefit Score:</i> Priority (10) x Cost (.5) = 5	

Chapter 5: Mitigation Strategy
Goal 1, Objective B continued...

<i>Action Step:</i> ~ All Action Steps cover the 5-year implementation period unless otherwise noted...		<i>Overall Priority</i>	<i>Estimated 5-Year Costs</i>
1.B.7. Mock Disasters. Participate in emergency preparedness mock training disasters.		Medium	\$10,000
<i>Stakeholders (*lead):</i> *EM, PH, Cities, Media	<i>Participating Jurisdictions:</i> McLeod County and the cities of Brownton, Biscay, Glencoe, Hutchinson, Lester Prairie, Plato, Silver Lake, Stewart, and Winsted.	<i>Cost Benefit Score:</i> Priority (5) x Cost (1) = 5	
1.B.8. Power Lines. Work with electric companies and Federal, State, and local agencies to review and identify all electrical transmissions in the County that need to be upgraded and/or buried in order to protect them from severe weather events.		Medium	\$150,000
<i>Stakeholders (*lead):</i> *EM, HD	<i>Participating Jurisdictions:</i> McLeod County.	<i>Cost Benefit Score:</i> Priority (5) x Cost (.5) = 2.5	
1.B.9. Ridgewater College Plan. Work with Ridgewater College and the City of Hutchinson to develop an Emergency Management Plan for Ridgewater College. One of the key needed components is to evaluate the College's storm shelter needs.		High	\$15,000
<i>Stakeholders (*lead):</i> *Ridgewater, Hutchinson, EM	<i>Participating Jurisdictions:</i> The City of Hutchinson and McLeod County.	<i>Cost Benefit Score:</i> Priority (10) x Cost (.75) = 7.5	
1.B.10. Emergency Signage. Upgrade and expand emergency management signage to be used during extreme weather events (i.e., detour signs during floods, road closed signs, etc.).		High	\$5,000
<i>Stakeholders (*lead):</i> *EM, HD, CB	<i>Participating Jurisdictions:</i> McLeod County.	<i>Cost Benefit Score:</i> Priority (10) x Cost (1) = 10	

Goal 2: Implement fiscally sound projects which mitigate the impacts of natural disasters.			
Goal 2, Objective A: To proactively reduce the County's susceptibility to flooding.			
Action Step: <i>~ All Action Steps cover the 5-year implementation period unless otherwise noted...</i>		Overall Priority	Estimated 5-Year Costs
2.A.1. Marsh Water Project. Partner with the City of Glencoe and the Buffalo Creek Watershed District to implement the Marsh Water Project to mitigate flooding.		High	\$1,400,000
Stakeholders (*lead): *BCWD, Glencoe, EM, BWSR	Participating Jurisdictions: McLeod County, the Buffalo Creek Watershed District, and the City of Glencoe.	Cost Benefit Score: Priority (10) x Cost (.5) = 5	
2.A.2. JD 15 Plan. Partner with the Buffalo Creek Watershed District (BCWD) in 2015 on creating an enhanced Drainage Management Plan for the 105 square mile Judicial Ditch 15 (JD 15) subwatershed.		High	\$35,000
Stakeholders (*lead): *BCWD, DA, ES, EM, MDA, BWSR	Participating Jurisdictions: McLeod County and the Buffalo Creek Watershed District.	Cost Benefit Score: Priority (10) x Cost (.5) = 5	
2.A.3. Glencoe North Diversion Project. Partner with the City of Glencoe on the North Diversion Project to mitigate seasonal flooding.		High	\$500,000
Stakeholders (*lead): *BCWD, Glencoe, EM, BWSR	Participating Jurisdictions: McLeod County, the Buffalo Creek Watershed District, and the City of Glencoe.	Cost Benefit Score: Priority (10) x Cost (.5) = 5	
2.A.4. Hydrogeologic Study. Partner with FEMA to conduct an analysis of the County's hydrology and flooding problems (2016).		High	\$75,000
Stakeholders (*lead): *ES, DNR, BWSR, BCWD, CROW	Participating Jurisdictions: McLeod County and the Buffalo Creek Watershed District.	Cost Benefit Score: Priority (10) x Cost (.5) = 5	

Chapter 5: Mitigation Strategy

Goal 2, Objective A continued...

Action Step: ~ All Action Steps cover the 5-year implementation period unless otherwise noted...		Overall Priority	Estimated 5-Year Costs
2.A.5. Lester Prairie Flood Plan. Address seasonal flooding issues by implementing Lester Prairie’s Flood Management & Response Plan.		High	\$50,000
Stakeholders (*lead): *Lester Prairie, EM, CROW	Participating Jurisdictions: The City of Lester Prairie and McLeod County.	Cost Benefit Score: Priority (10) x Cost (.75) = 7.5	
2.A.6. Road & Bridges. Identify existing buildings, roads, and bridges throughout the County that are at risk from flooding and identify proper mitigation strategies.		High	\$10,000
Stakeholders (*lead): *HD, EM, Townships, CB	Participating Jurisdictions: McLeod County.	Cost Benefit Score: Priority (10) x Cost (1) = 10	
2.A.7. Monitoring Gauges. Upgrade flood monitoring gauges and work with stakeholders to install more upstream from the County along Buffalo Creek and the Crow River (2015).		Medium	\$15,000
Stakeholders (*lead): *ES, EM, WPTF, DNR, BCWD, CROW	Participating Jurisdictions: McLeod County and the Buffalo Creek Watershed District.	Cost Benefit Score: Priority (5) x Cost (.75) = 3.75	
2.A.8. Stormwater Management Plan. Pursue funding to develop a McLeod County Stormwater Management Plan and target conservation funding on implementation activities.		Medium	\$50,000
Stakeholders (*lead): *ES, WPTF, SWCD, MDA, MPCA, BCWD, CROW	Participating Jurisdictions: McLeod County and the Buffalo Creek Watershed District.	Cost Benefit Score: Priority (5) x Cost (.75) = 3.75	
2.A.9. Glencoe Creamery. Partner with the City of Glencoe to pursue funding for the acquisition and demolition of the former Glencoe Creamery property, which is located adjacent to Buffalo Creek in the Flood Plain.		High	\$150,000
Stakeholders (*lead): *Glencoe, EM, BCWD	Participating Jurisdictions: The City of Glencoe, the Buffalo Creek Watershed District, and McLeod County	Cost Benefit Score: Priority (10) x Cost (.5) = 5	

Chapter 5: Mitigation Strategy

Goal 2, Objective A continued...

Action Step: <i>~ All Action Steps cover the 5-year implementation period unless otherwise noted...</i>		Overall Priority	Estimated 5-Year Costs
2.A.10. Retention Ponds. Work with the Buffalo Creek Watershed District to identify three potential stormwater retention ponds and/or wetland restorations. Secure conservation funding to implement.		High	\$50,000
Stakeholders (*lead): *BCWD, ES, DU, WPTF, BWSR	Participating Jurisdictions: McLeod County and the Buffalo Creek Watershed District.	Cost Benefit Score: Priority (10) x Cost (.75) = 7.5	
2.A.11. Stormwater Plans. Assist communities with developing and implementing Stormwater Management Plans.		Medium	\$10,000
Stakeholders (*lead): *ES, WPTF	Participating Jurisdictions: McLeod County and the cities of Brownton, Biscay, Glencoe, Hutchinson, Lester Prairie, Plato, Silver Lake, Stewart, and Winsted.	Cost Benefit Score: Priority (5) x Cost (1) = 5	
2.A.12. Storm Sewers. Apply for grant assistance to upgrade storm sewer systems.		Medium	\$10,000
Stakeholders (*lead): *Cities, ES, WPTF	Participating Jurisdictions: McLeod County and the cities of Brownton, Biscay, Glencoe, Hutchinson, Lester Prairie, Plato, Silver Lake, Stewart, and Winsted.	Cost Benefit Score: Priority (5) x Cost (1) = 5	
2.A.13. City of Glencoe Water Pumps. Apply for grant assistance to purchase two portable water pumps for the City of Glencoe to use during flooding emergencies.		High	\$30,000
Stakeholders (*lead): *Glencoe, EM	Participating Jurisdictions: McLeod County and the City of Glencoe.	Cost Benefit Score: Priority (10 x Cost (.75) = 7.5	

Goal 2, Objective B: To mitigate the impacts of severe weather events, including lightning, extreme temperatures and summer/winter storms.			
Action Step: ~ All Action Steps cover the 5-year implementation period unless otherwise noted...		Overall Priority	Estimated 5-Year Costs
2.B.1. Severe Storms. Inform citizens on how best to be prepared for severe winter and summer storms by providing tips for staying home and coping with potential power failures.		Medium	\$10,000
Stakeholders (*lead): *EM, PH, Media	Participating Jurisdictions: McLeod County.	Cost Benefit Score: Priority (5) x Cost (1) = 5	
2.B.2. Extreme Temperatures. Provide educational information and “best practices” for protecting life and property during extreme temperatures on the website.		Medium	\$10,000
Stakeholders (*lead): *PH, EM, Media	Participating Jurisdictions: McLeod County.	Cost Benefit Score: Priority (5) x Cost (1) = 5	
2.B.3. Living Snow Fence. Work with the SWCD and Highway Department to establish living snow fences with willing landowners to mitigate blowing and drifting snow in problem areas.		High	\$25,000
Stakeholders (*lead): *HD, SWCD, Townships	Participating Jurisdictions: McLeod County.	Cost Benefit Score: Priority (10) x Cost (.75) = 7.5	
2.B.4. Lightning Strikes. Assess and retrofit critical facilities to improve resistance to lightning strikes.		Medium	\$25,000
Stakeholders (*lead): *EM, FD	Participating Jurisdictions: McLeod County.	Cost Benefit Score: Priority (5) x Cost (.75) = 3.75	
2.B.5. Freezing Pipes. Examine alternatives to running water to prevent pipes from freezing in order to help protect the County’s aquifers.		Medium	\$10,000
Stakeholders (*lead): *PH, ES, EM, WD, DNR	Participating Jurisdictions: McLeod County and the cities of Brownton, Biscay, Glencoe, Hutchinson, Lester Prairie, Plato, Silver Lake, Stewart, and Winsted.	Cost Benefit Score: Priority (5) x Cost (1) = 5	

<i>Goal 2, Objective C: To stabilize severe erosion and potential landslide sites.</i>			
<i>Action Step: ~ All Action Steps cover the 5-year implementation period unless otherwise noted...</i>		<i>Overall Priority</i>	<i>Estimated 5-Year Costs</i>
2.C.1. Severe Erosion Inventory. Conduct a county-wide assessment of severely eroding sites (2016). Target conservation funding to address problem areas.		High	\$125,000
a) Work with the County’s GIS department to map any severe erosion sites or potential high risk landslide areas (slopes greater than 10% and larger than 40 feet).		Medium	\$5,000
b) Work with the County Soil and Water Conservation District (SWCD) and watershed stakeholders to target conservation funding to address problem areas. Implement 2-3 projects annually.		High	\$120,000
Stakeholders (*lead): *ES, HD, SWCD, BCWD, CROW	Participating Jurisdictions: McLeod County.	Cost Benefit Score: Priority (10) x Cost (.5) = 5	
2.C.2. Brownton Severe Erosion Site. Partner with the City of Brownton and the Buffalo Creek Watershed District to properly mitigate the Brownton Erosion Site along Buffalo Creek.		High	\$100,000
Stakeholders (*lead): *BCWD, Brownton, ES, EM	Participating Jurisdictions: The City of Brownton, McLeod County, and the Buffalo Creek Watershed District.	Cost Benefit Score: Priority (10) x Cost (.5) = 5	

Goal 2, Objective D: To protect groundwater supplies from contamination and overuse.			
Action Step: ~ All Action Steps cover the 5-year implementation period unless otherwise noted...		Overall Priority	Estimated 5-Year Costs
2.D.1. Drought Plan. Develop a Drought Contingency Plan with proper policies and ordinance language that limit water usage during drought emergencies.		Medium	\$15,000
Stakeholders (*lead): *ES, Cities, CB, MDA, DNR	Participating Jurisdictions: McLeod County.	Cost Benefit Score: Priority (5) x Cost (.75) = 3.75	
2.D.2. Water Conservation. Identify a stakeholder who can provide inexpensive household water conservation kits. Promote the use through a media campaign.		High	\$10,000
Stakeholders (*lead): *PH, UME, Media	Participating Jurisdictions: McLeod County.	Cost Benefit Score: Priority (10) x Cost (1) = 10	
2.D.3. Groundwater Recharge. Examine alternatives to enhance groundwater recharge, such as minimizing impervious surfaces during development and protecting and/or restoring sensitive groundwater recharge areas with conservation funds.		High	\$10,000
Stakeholders (*lead): *ES, MDA, DNR, Cities, BCWD, CROW, PZ	Participating Jurisdictions: McLeod County and the Buffalo Creek Watershed District.	Cost Benefit Score: Priority (10) x Cost (1) = 10	
2.D.4. Groundwater Security. Inventory security issues (i.e., the need for fencing, proper signage, etc.) at groundwater supply and wellhead protection areas (2017).		High	\$15,000
Stakeholders (*lead): *EM, Cities, CB	Participating Jurisdictions: McLeod County and the cities of Brownton, Biscay, Glencoe, Hutchinson, Lester Prairie, Plato, Silver Lake, Stewart, and Winsted.	Cost Benefit Score: Priority (10) x Cost (.75) = 7.5	

Goal 3: Effectively implement and administer the McLeod County Hazard Mitigation Plan.		
Goal 3, Objective A: To continue to use strong stakeholder participation to ensure that quality projects are identified and implemented.		
Action Step: ~ All Action Steps cover the 5-year implementation period unless otherwise noted...	Overall Priority	Estimated 5-Year Costs
3.A.1. Task Force Meetings. Hold a McLeod County Hazard Mitigation Task Force meeting annually to review current events and to prioritize local hazard mitigation projects. Use the media to invite the public to participate in each meeting, including a formal press release.	High	\$5,000
Stakeholders (*lead): *EM, HMTF, MMDC	Participating Jurisdictions: McLeod County and the cities of Brownton, Biscay, Glencoe, Hutchinson, Lester Prairie, Plato, Silver Lake, Stewart, and Winsted.	Cost Benefit Score: Priority (10) x Cost (1) = 10
3.A.2. Local Match. Facilitate the development of priority projects and seek appropriate funding for implementation. Ensure that local match is available to leverage funding for priority projects to the greatest extent possible.	High	\$100,000
Stakeholders (*lead): *CB, Cities	Participating Jurisdictions: McLeod County and the cities of Brownton, Biscay, Glencoe, Hutchinson, Lester Prairie, Plato, Silver Lake, Stewart, and Winsted.	Cost Benefit Score: Priority (10) x Cost (.5) = 5
3.A.3. Keep the Plan Current. Revise the Plan based upon new priorities as needed. Begin the planning process to update the Plan in 18 months prior to its expiration.	High	\$30,000
Stakeholders (*lead): *EM, All	Participating Jurisdictions: McLeod County and the cities of Brownton, Biscay, Glencoe, Hutchinson, Lester Prairie, Plato, Silver Lake, Stewart, and Winsted.	Cost Benefit Score: Priority (10) x Cost (.5) = 5

Goal 3, Objective B: To proactively keep current with local, State, and Federal hazard mitigation activities, plans, programs, projects, and funding opportunities.			
Action Step: ~ All Action Steps cover the 5-year implementation period unless otherwise noted...		Overall Priority	Estimated 5-Year Costs
3.B.1. Hazard Mitigation Training. Ensure that local Emergency Management Staff receives proper Hazard Mitigation related training as available through the State and FEMA.		High	\$15,000
Stakeholders (*lead): *EM, CB	Participating Jurisdictions: McLeod County.	Cost Benefit Score: Priority (10) x Cost (.75) = 7.5	
3.B.2. Integrated Plans. Work towards fully integrating the County’s Threat and Hazard Identification and Risk Assessment (THIRA) and Emergency Operation Plan (EOP) into the Hazard Mitigation Plan.		Medium	\$10,000
Stakeholders (*lead): *EM	Participating Jurisdictions: McLeod County.	Cost Benefit Score: Priority (5) x Cost (1) = 5	
3.B.3. Statewide Tracking System. Participate in the development of a statewide tracking system for mitigation projects.		Medium	\$500
Stakeholders (*lead): *EM	Participating Jurisdictions: McLeod County.	Cost Benefit Score: Priority (5) x Cost (1) = 5	

Summary of Estimated Five-Year Costs

Goal 1, Objective A	\$120,000	Goal 2, Objective C	\$225,000
Goal 1, Objective B	\$646,500	Goal 2, Objective D	\$50,000
Goal 2, Objective A	\$2,385,000	Goal 3, Objective A	\$135,000
Goal 2, Objective B	\$80,000	Goal 3, Objective B	\$25,500
		Totals	\$3,667,000

D. Assessment of the 2008 Action Steps

This section examines the action steps listed the 2008 McLeod County Hazard Mitigation Plan. First, a brief assessment is provided on the implementation activities that took place since the 2008 Plan was adopted. Second, information is provided on whether the 2008 action steps were continued and/or revised as part of the updated Plan.

Plan Review Checklist...

(D2) Was the plan revised to reflect progress in local mitigation efforts?
Requirement 44 CFR 201.6(d)(3)

2008 Plan Goal 1:

“To be well prepared for all natural and manmade disasters countywide.”

1. **Command and Control:** Ensure cities, townships, and volunteers receive training requirements using the National Incident Management Systems (NIMS).

Assessment: NIMS training has been provided annually.

Continued? Yes, refer to action step 1.B.1.

2. **Redundant Communication System:** Need to have a radio back-up system to be used for coordination and an alert system when phone lines and cell phones are down.

Assessment: The County invested in a back-up radio system.

Continued? No, the action step was completed.

3. **EOC:** Identify an emergency operations center in each jurisdiction (EOC). Evaluate the readiness of buildings for preventing damage. Inventory and assess whether buildings have back-up power system.

Assessment: EOCs have been identified in the County’s Emergency Operations Plan (EOP). It was also discussed the County’s access to three mobile generators would satisfy the second portion of the action step, however the County would like to assess this again over the next five years.

Continued? Yes, refer to action step 1.B.2.

4. **Shelters.** Work with the Red Cross on identifying congregate shelters locally, including cities, townships, and heavily populated areas.

Assessment: The County EOP has identified congregate shelters, however the list needs to be periodically updated.

Continued? Yes, refer to action step 1.B.2.

5. **Generators.** Ensure that mobile generators are both available and are fully functional with critical facilities.

Assessment: The County currently has access to three mobile generators.

Continued? Yes, refer to action step 1.B.2.

- 6. Communications Interoperability.** Develop a fully-functional interoperable communications system to coordinate with multiple public safety agencies and organizations.

Assessment: The County invested in a back-up radio system.

Continued? No, the Action Step was accomplished.

- 7. 800 M.H. System.** Pursue the funding necessary to equip communication systems to the 800 M.H. System.

Assessment: This action step was completed.

Continued? No, the Action Step was accomplished.

2008 Plan Goal 2:

“To minimize the extent of damage caused by violent storms and extreme temperatures”

1. **Recreation Shelter.** Encourage public and private outdoor recreation sites to provide shelter, where feasible, or advice on where to find shelter from violent storms. Examples of such sites include parks, golf courses, and public landings at area lakes and rivers.

Assessment: This action step was listed as a medium priority and was not implemented.

Continued? Yes, Action Step 1.B.2.

2. **Events.** Encourage or require that events with large gatherings of people, such as outdoor festivals or concerts, sporting events, and parades have a plan to protect and/or evacuate people during violent storms or provide relief from extreme temperatures.

Assessment: Conversations on emergency preparedness took place with the County’s larger events.

Continued? Yes, Action Step 1.B.2.

3. **Warning System.** Evaluate the County’s current warning system: how County is notified; who is notified; how people and organizations within County are notified. Make changes as necessary.

Assessment: This Action Step was completed and updated in the County’

Continued? Yes, Action Step 1.A.1. identifies continued improvements to IPAWS.

4. **Inventory.** Inventory and assess the adequacy and condition of various County warning systems, including weather monitoring stations, the NOAA alert system, civil defense sirens, weather radio signal coverage and reverse 911 calling systems.

Assessment: The County’s assisted two communities with upgrading warning sirens.

Continued? Yes, Action Step 1.A.1.

Chapter 5: Mitigation Strategy

5. **Storm Spotters.** Ensure that severe storm spotter volunteers and emergency service personnel are adequately trained.
Assessment: This Action Step was completed but is an ongoing activity.
Continued? No, the Task Force decided this was a routine emergency management activity.
6. **Media.** Continue cooperation with local radio and TV stations to provide local weather alert program services.
Assessment: Local media sources have been outstanding with cooperating on severe weather announcements and related emergency management information.
Continued? Yes, Action Step 1.A.2.
7. **Critical Facilities.** Evaluate the readiness of all critical facilities for preventing damage from lightning and wind and seek funding to install equipment as necessary. Educate local residents of options to protect their own homes and property from lightning damage.
Assessment: This Action Step was listed as a medium priority and was not implemented.
Continued? Yes, Action Step 1.B.4.
8. **EOP.** Review response plans as part of Emergency Operations Plan (EOP) and staff and equipment needs to implement.
Assessment: This Action Step is completed annually as part of the County’s EOP.
Continued? No, the Task Force decided this was a routine emergency management activity.
9. **Generators.** Inventory and assess whether public buildings, schools and other critical facilities have the capacity for backup electric generators.
Assessment: This medium priority Action Step became obsolete due to local electricians having multiple options on how to operate backup generators.
Continued? No
10. **Plans.** Implement State and local plans for coordination with surrounding counties during violent storms or extreme temperatures.
Assessment: Yes, mutual aid agreements have been signed and the McLeod County Public Health Department is working with regional stakeholders on implementing extreme temperatures relief stations.
Continued? No
11. **Education.** Provide educational information and “best practices” for protecting life and property during violent storms or extreme temperatures on the website.
Assessment: Yes, this information is linked off of the County’s Emergency Management webpage.
Continued? Yes, Action Step 2.B.2.

2008 Plan Goal 3:

“To minimize the damage caused by flooding”

1. **Ordinance.** Enforce and maintain local floodplain ordinances to ensure that new construction is built above the regulatory flood protection elevation. Consider additional regulations needed to protect life and property where appropriate.
Assessment: No additional residential, commercial or industrial development has taken place in the County’s designated floodplain. Additional regulations were not considered, however, the County’s Flood Rate Insurance Study was completed in July 2014.
Continued? Although a specific Action Step was not identified, the County will continue to enforce its Floodplain Ordinance.

2. **Floodplain.** Identify any areas where life or property are threatened by flood events, but are not located within the 100-year flood protection elevation.
Assessment: This was accomplished. The expanded floodplain in the Glencoe area was targeted over the last five years. The North Diversion Project and the Marsh Water Project have been identified in this Plan as a result.
Continued? Yes, Action Steps 2.A.1 and 2.A.3.

3. **Relocation.** Explore finding funds to assist with the buyout or relocation for structures that have been damaged during past flood protection elevation.
Assessment: The Glencoe Creamery was identified in this Plan for demolition due to its abandonment and frequent flooding.
Continued? Yes, Action Step 2.A.9.

4. **Roads & Bridges.** Identify roads and bridges in the County that flood on a regular basis and prioritize these for improvements.
Assessment: The Highway Department has completed this, however ongoing monitoring is needed.
Continued? Yes, Action Step 2.A.6.

5. **Monitoring Gauges.** Explore how monitoring gauges in rivers throughout the County can assist in the early warning of flood events. Map gauges and work towards add new ones where needed.
Assessment: The monitoring gauges have been mapped, however, new gauges are still needed upstream of the County along Buffalo Creek.
Continued? Yes, Action Step 2.A.7.

6. **Flood Prevention.** Provide educational information and “best practices” for flood damage prevention on the McLeod County website.
Assessment: Some material is linked off the County’s website, however more is needed.
Continued? Yes, 1.A.2.

2008 Plan Goal 4:

“To minimize the damage caused by droughts”

1. Provide educational materials on County website of best management practices for efficient and wise use of water throughout the year.
Assessment: The watersheds have stepped up to provide this information on their website.
Continued? Action Step 3.A.2. identifies pursuing water conservation kits.
2. Develop plans to limit water use for non-essential purposes, such as lawn watering, car washing, etc., during drought periods as necessary. This is commonly referred to as a Drought Contingency Plan.
Assessment: The County did not develop a Drought Contingency Plan, however the County’s Water Plan Task Force identified doing so in the County’s updated 2013 Water Plan.
Continued? Yes, Action Step 3.A.1.
3. Continue monitoring of test wells to monitor aquifer levels and water quality. Assess whether additional test wells are necessary.
Assessment: County Public Health and the MPCA continued to test water quality, while the DNR continued to test aquifer levels.
Continued? No, these activities are considered ongoing by the various stakeholders.

2008 Plan Goal 5:

“To minimize the damage caused by wildfires”

1. Explore necessity of conducting prescribed burning on County or other public lands. Conduct prescribed burns as deemed appropriate.
Assessment: The Minnesota DNR conducted two prescribed burns over the last five years.
Continued? No, this is an ongoing activity by the DNR.
2. Examine implementing the DNR FIREWISE wildfire susceptibility model for McLeod County.
Assessment: This was examined and a decision was made to not implement locally.
Continued? No.
3. Work with local fire chiefs, fire wardens, and others to continue and expand fire safety education outreach with school children and the public.
Assessment: Local fire departments continued to provide fire safety education in K-6 grade levels.
Continued? Yes, Action Step 1.A.4.

2008 Plan Goal 6:

“To protect life and minimize the spread of infectious disease”

1. Continue to work with local media and other agencies in disseminating information on potential risks and ways of addressing them.

Assessment: This is one of the main daily activities of McLeod County Public Health.

Continued? No, however this is an ongoing Public Health activity.

2. Continue County education and immunization programs to make residents aware of the resources available to them to prevent infectious diseases. Ensure that the diverse cultures in the County are provided information in an effective manner.

Assessment: This is one of the main daily activities of McLeod County Public Health.

Continued? No, however this is an ongoing Public Health activity.

3. Add education materials to County website regarding information about public health and infectious diseases.

Assessment: This information has been regularly updated.

Continued? No, however this is an ongoing Public Health activity.

4. Review and maintain the McLeod County Public Health Emergency Plan that outlines procedures for dealing with infectious diseases on a regular basis.

Assessment: This has been accomplished.

Continued? No, however this is an ongoing Public Health activity.

5. Implement and maintain the Health Alert Network (HAN).

Assessment: This was accomplished in 2009.

Continued? No.

6. Work with State and Federal agencies and local hospitals and clinics to identify, track, and address infectious diseases that have the potential to impact the County and region.

Assessment: This was accomplished as part of the HAN.

Continued? No.

7. Enforce and maintain local and State environmental health regulations.

Assessment: This is a daily function of McLeod County Public Health and Environmental Services.

Continued? No, however this is ongoing by both departments.

Chapter 5: Mitigation Strategy

8. Review and assess quarantine and infectious outbreak response plans in the McLeod County Public Health Emergency Plan on a regular basis.

Assessment: This information has been updated, however additional efforts are needed as infectious diseases evolve.

Continued? No, however this is an ongoing Public Health activity.

9. Review and maintain internal County public health policies.

Assessment: This information has been regularly updated.

Continued? No, however this is an ongoing Public Health activity.

10. Work with Federal and State agencies, local public health departments, hospitals, clinics, and other medical agencies to coordinate efforts to address infectious disease outbreaks that disrupt the social and economic patterns of the County, disrupt the livelihood of the population of the County, such as, but not limited to: adequate food, clean water, energy supply, safe shelter, and a functional ecosystem.

Assessment: This is a daily function of McLeod County Public Health.

Continued? No, however this is an ongoing activity.

11. Cooperate with the Minnesota Board on Animal Health on implementing regulations regarding infection diseases in animals.

Assessment: This is a daily function of McLeod County Emergency Management and Public Health.

Continued? No, however this is an ongoing activity.

2008 Plan Goal 7:

“To protect life and minimize the damage caused by structural fires”

1. Provide educational information to residents on the County website on the importance of periodic inspection of wood burning chimneys, electrical systems, heating systems, smoke detectors, and other best management practices to prevent fires.

Assessment: This is an ongoing activity by the local fire departments.

Continued? Yes, Action Step 1.A.4.

2. Identify areas where homes and other structures have poor access for emergency vehicles and equipment due to lack of road maintenance, inadequate road width or for other reasons. Explore educational or regulatory options to ensure adequate access.

Assessment: This medium priority action step was not implemented.

Continued? No.

Chapter 5: Mitigation Strategy

3. Provide educational programs to youth, focusing on reducing risk of fires, smoke detectors, fire safety, and evacuation plans.

Assessment: This is an ongoing activity by the local fire departments.

Continued? Yes, Action Step 1.A.4.

2008 Plan Goal 8:

“To protect life and minimize the damage caused by hazardous materials”

1. Utilize State and Federal resources to develop a hazardous materials education program and public relations campaign for the County.

Assessment: This is an ongoing activity by McLeod County Hazardous Waste Facility.

Continued? No.

2. Continue participation in Regional Hazardous Materials Response Team.

Assessment: This is an ongoing activity by the McLeod County Emergency Management.

Continued? No, however the activity is ongoing.

3. Work with local fire departments to assist them in identifying areas of high risk involving hazardous material and response plans.

Assessment: This is an ongoing activity by the Regional Hazardous Materials Response Team.

Continued? No, however the activity is ongoing.

4. Maintain a list of locations of fixed facilities using hazardous materials and associated transportation corridors. Work with the Minnesota Pollution Control Agency to update this list as necessary.

Assessment: The MPCA maintains this list.

Continued? No.

5. Develop an emergency warning system to warn and instruct at-risk persons as to the existence of a specific threat and what to do.

Assessment: Early warning for hazardous material accidents have been include in the County’s Emergency Operations Plan.

Continued? No.

6. Continue to cooperate with local, State, and Federal agencies, and the private sector in coordinating emergency response to hazardous material releases.

Assessment: This is an ongoing activity by the local fire departments.

Continued? Yes, Action Step 1.A.4.

Chapter 5: Mitigation Strategy

7. Continue the use of the Unified Incident Command System for all hazard materials incidents that may occur in the County.

Assessment: This is an ongoing activity by Emergency Management.

Continued? No, however the activity is ongoing.

8. Review and maintain the County's ordinances addressing meth labs.

Assessment: The County's ordinances related to meth labs have been updated.

Continued? No, however the County will periodically examine additional ordinance.

9. Continue participation in local, regional, and State exercises that practice and test implementation of local plans to respond to hazardous material releases.

Assessment: This is an ongoing activity by the local fire departments and Emergency Management.

Continued? Yes, Action Step 1.B.7.

10. Ensure that every member of the County's Emergency Responder group is trained to at least the Hazardous Materials Awareness level.

Assessment: This is an ongoing activity, however, more training is needed.

Continued? No, however this is still an ongoing priority and activity.

11. Ensure that the first responder group conducts any required Occupational Health and Safety Administration training and maintains current records on all completed training.

Assessment: This is an ongoing activity.

Continued? No, however this is still an ongoing priority and activity.

2008 Plan Goal 9:

"To protect life and minimize the damage caused by water contamination"

1. Continue the County inspection and pumping/maintenance programs for existing and new septic systems.

Assessment: The Environmental Services Department performs SSTS inspections.

Continued? No, however this is still an ongoing priority and activity.

2. Educate landowners about the importance of sealing unused wells. Continue the Soil and Water Conservation District's abandoned well sealing and cost-share program within the County.

Assessment: This is an ongoing activity by the SWCD.

Continued? No, however this is still an ongoing priority and activity.

Chapter 5: Mitigation Strategy

3. Continue definition and mapping of wellhead protection areas within the County. Consider regulatory and educational programs to prevent contamination.
Assessment: The MPCA and Minnesota Department of Health have continued to map Wellhead Protection Areas (WPAs).
Continued? No, however the County is updating their interactive GIS website to include WPAs.
4. Provide education on the importance of private well inspections to residents.
Assessment: McLeod County Environmental Services and County Public Health implement this.
Continued? No, however this is still an ongoing priority and activity.
5. Provide education materials on the County's website for protecting water supplies and preparing for water emergencies.
Assessment: This medium priority action step was not implemented.
Continued? No, however this is still an ongoing priority and activity.
6. Continue cooperating with the State in the development of a Geologic Atlas to help define and locate ground water resources and locate private wells within the County.
Assessment: The area's Geologic Atlas was completed.
Continued? No, however the County would benefit from learning how best to use the Atlas.
7. Continue cooperation with local, regional, State, and Federal agencies and with private organizations in the protection and enhancement of surface and ground water resources.
Assessment: This is an ongoing activity.
Continued? No, however, this is the emphasis of the County's Water Plan.
8. Review and assess plans for distribution of clean water and other water supply contamination response plans in the McLeod County Emergency Operations Plan on a regular basis.
Assessment: This is an ongoing activity by Emergency Management and Public Health.
Continued? No, however this is still an ongoing priority and activity.
9. Provide education and regulatory and financial incentives to landowners on soil erosion and proper nutrient and pest management.
Assessment: This is an ongoing local activity by the SWCD and Natural Resource Conservation Service.
Continued? No, however this is still an ongoing priority and activity.

2008 Plan Goal 10:

“To protect life and minimize the damage caused by terrorism”

Assessment: The following seven action steps are ongoing activities by the County’s Sheriff’s Office and Emergency Management.

Continued? No, however these action steps are ongoing priorities and activities.

1. Review and assess current risks and vulnerabilities and potential targets for terrorism within the County.
2. Work with State and Federal agencies engaged in the statewide and nationwide counter-terrorism operations and programs.
3. Review and assess the McLeod County Emergency Operations Plan on a regular basis.
4. Scan the building plans for all public buildings and facilities in the County. Provide digital and/or hardcopy of product to emergency response units (fire, police, sheriff).
5. Review and assess plans for evacuation in the McLeod County Emergency Operations Plan on a regular basis.
6. Provide outreach and educational materials about hazard/disaster preparedness measures that they can take on the County website.
7. Develop and maintain an efficient and expeditious sharing of information.

E. New Action Step Priorities

Although many of the action steps listed in this Plan are similar in nature to the ones listed in the 2008 Plan, *the emphasis in the updated Plan was to list specific projects rather than ongoing emergency management efforts.* The following action steps represent new priorities identified throughout the planning process:



Plan Review Checklist...
(D3) Was the plan revised to reflect changes in priorities? *Requirement 44 CFR 201.6(d)(3)*

- 1.A.1.c. Installing new warning sirens in Piepenburg and Lake Marion Regional Parks.
- 1.A.1.d. Work towards planning for and/or requiring new warning sirens as part of the land use development process (2015-16).
- 1.A.2.c. Advertise the importance of having Home Emergency Plans and provide a link off the County’s website for residences to customize sample plans to fit their unique situation.
- 1.A.3. Inventory vulnerable populations and provide assistance to them during severe weather events.
- 1.B.2.d. Assist the City of Glencoe with securing funds to purchase two portable generators (2015).
- 1.B.2.e. Assist the City of Silver Lake with securing funds to purchase a generator for the Silver Lake Auditorium in 2016 (serves as the community’s Emergency Operations Center).
- 1.B.3. Partner with the City of Winsted to build/retrofit storm shelters in community parks. Target building a shelter in Hainlin Park in 2015.
- 1.B.4. Partner with the City of Lester Prairie to build/retrofit a community storm shelter at the Lester Prairie High School in 2016.
- 1.B.5. Partner with the City of Glencoe to build/retrofit storm shelters in community parks. Target building a shelter in Oak Leaf Park in 2015 followed by Oscar Olson Park in 2017.
- 1.B.6. Assist the City of Lester Prairie in securing grant funds to install emergency generators in four lift stations.

Chapter 5: Mitigation Strategy

- 1.B.7. Participate in emergency preparedness mock training disasters.
- 1.B.9. Work with Ridgewater College and the City of Hutchinson to develop an Emergency Management Plan for Ridgewater College. One of the key needed components is to evaluate the College's storm shelter needs.
- 1.B.10. Upgrade and expand emergency management signage to be used during extreme weather events (i.e., detour signs during floods, road closed signs, etc.).
- 2.A.1. Partner with the City of Glencoe and the Buffalo Creek Watershed District to implement the Marsh Water Project to mitigate flooding.
- 2.A.2. Partner with the Buffalo Creek Watershed District (BCWD) in 2015 on creating an enhanced Drainage Management Plan for the 105 square mile Judicial Ditch 15 (JD 15) subwatershed.
- 2.A.3. Partner with the City of Glencoe on the North Diversion Project to mitigate seasonal flooding.
- 2.A.4. Partner with FEMA to conduct an analysis of the County's hydrology and flooding problems.
- 2.A.5. Address seasonal flooding issues by implementing Lester Prairie's Flood Management & Response Plan.
- 2.A.8. Pursue funding to develop a McLeod County Stormwater Management Plan and target conservation funding on implementation activities.
- 2.A.9. Partner with the City of Glencoe to pursue funding for the acquisition and demolition of the former Glencoe Creamery property, which is located adjacent to Buffalo Creek in the Flood Plain.
- 2.A.10. Work with the Buffalo Creek Watershed District to identify three potential stormwater retention ponds and/or wetland restorations. Secure conservation funding to implement.
- 2.B.3. Work with the SWCD and Highway Department to establish living snow fences with willing landowners to mitigate blowing and drifting snow in problem areas.
- 2.B.5. Examine alternatives to running water to prevent pipes from freezing in order to help protect the County's aquifers.

Chapter 5: Mitigation Strategy

- 2.C.1. Conduct a county-wide assessment of severely eroding sites. Target conservation funding to address problem areas.
- 3.A.3. Examine alternatives to enhance groundwater recharge, such as minimizing impervious surfaces during development and protecting and/or restoring sensitive groundwater recharge areas with conservation funds.
- 3.A.4. Inventory security issues (i.e., the need for fencing, proper signage, etc.) at groundwater supply and wellhead protection areas.
- 3.A.1. Hold a McLeod County Hazard Mitigation Task Force meeting annually to review current events and to prioritize local hazard mitigation projects. Invite the public.

Assessment of New Action Step Priorities

The list of new action steps represents an increased emphasize on identifying specific implementation projects rather than listing ongoing emergency management activities. Many ongoing activities, however, were still important enough to include in the Plan update. The emphasis on specific projects produced a number of flood mitigation projects as well as new warning siren and storm shelter locations. In addition, more stakeholders were involved in identifying the action steps, which ultimately led to a better planning process. Notice too that Action Step 3.A.1. indicates the McLeod County Hazard Mitigation Task Force will continue to meet annually to review events and to prioritize local hazard mitigation projects. The meeting will be advertised encouraging member of the public to attend.



F. Old vs. New Goals

Table 5B shows the ten goals listed in the 2008 Plan were condensed into three goal areas in the 2015 Plan update. Rather than having a goal listed for 10 separate hazard areas, the three goal areas in the 2015 Plan have the following emphasize:



- 1. Enhancing local capacity to be more resilient to all hazards;
- 2. Implementing fiscally sound projects that mitigate impacts; and
- 3. Effectively implementing and administering the McLeod County Hazard Mitigation Plan.

**Table 5B:
Comparison of 2008 vs. 2015 Goals**

2008 Plan Goals	2015 Plan Goals
Goal 1: <i>“To be well prepared for all natural and manmade disasters countywide”</i>	<p style="text-align: center;">Goal 1: <i>Enhance McLeod County’s Local Capacity to be more resilient to the effects of all hazards.</i></p>
Goal 2: <i>“To minimize the extent of damage caused by violent storms and extreme temperatures”</i>	
Goal 3: <i>“To minimize the damage caused by flooding”</i>	
Goal 4: <i>“To minimize the damage caused by droughts”</i>	<p style="text-align: center;">Goal 2: <i>Implement fiscally sound projects which mitigate the impacts of natural disasters.</i></p>
Goal 5: <i>“To minimize the damage caused by wildfires”</i>	
Goal 6: <i>“To protect life and minimize the spread of infectious disease”</i>	
Goal 7: <i>“To protect life and minimize the damage caused by structural fires”</i>	<p style="text-align: center;">Goal 3: <i>Effectively implement and administer the McLeod County Hazard Mitigation Plan.</i></p>
Goal 8: <i>“To protect life and minimize the damage caused by hazardous materials”</i>	
Goal 9: <i>“To protect life and minimize the damage caused by water contamination”</i>	
Goal 10: <i>“To protect life and minimize the damage caused by terrorism”</i>	

Chapter Six: Plan Implementation & Administration

Chapter Six contains information on implementing and administering the Plan, including a list of summary of estimated project costs and information on plan coordination, implementation, plan duration, the County’s role in implementation, other agencies roles in implementation, recommendations for State programs, intergovernmental conflicts/resolution process, plan evaluation, major and minor plan amendment procedures.

A. High Priority Mitigation Projects

Chapter Five outlines two types of implementation action steps. The first type of action steps identified in the County’s Mitigation Plan can be categorized as routine or “ongoing” activities. Although they are not entirely day-to-day responsibilities, they clearly are considered normal activities carried out by the County’s departments and emergency management staff. For example, promoting what citizens should do in the event of severe weather would be considered a high priority ongoing activity.

The second type of implementation action step communicated in Chapter Five refers to specific projects that were identified during the planning process by either the participating jurisdictions and/or the Hazard Mitigation Plan Task Force. For example, working with the Buffalo Creek Watershed District and the City of Glencoe on implementing the Marsh Water Project to address flooding concerns would be considered a specific implementation project. Table 6A provides a list of McLeod County’s High Priority Mitigation Projects. For more information on the listed action steps, please refer to Chapter Five.

**Table 6A:
McLeod County’s High Priority Mitigation Projects**

Number	Project Description	Estimated Cost
1.A.1.b.	Conduct a countywide assessment of the adequacy of warning siren coverage and create new coverage map (2015).	\$5,000
1.A.1.c.	Install new warning sirens in Piepenburg and Lake Marion Regional Parks (2016). Upgrade and/or install additional warning sirens where needed.	\$50,000

**Table 6A:
McLeod County’s High Priority Mitigation Projects
Continued...**

Number	Project Description	Estimated Cost
1.A.2.c.	Develop a customized flyer by location to alert citizens on what steps to take in the event of severe weather and target delivery to vulnerable populations.	\$15,000
1.B.2.a.	Conduct a countywide assessment of storm shelter and electric generator needs (2015).	\$10,000
1.B.2.e.	Assist the City of Glencoe with securing funds to purchase two portable generators for flooding and emergency management (2015).	\$30,000
1.B.2.f.	Assist the City of Silver Lake with securing funds to purchase a generator for the Silver Lake Auditorium in 2016 (serves as the community’s Emergency Operations Center).	\$15,000
1.B.3.	Winsted Shelters. Partner with the City of Winsted to build/retrofit storm shelters in community parks. Target building a shelter in Hainlin Park in 2015.	\$75,000
1.B.4.	Partner with the City of Lester Prairie to build/retrofit a community storm shelter at the Lester Prairie High School in 2016.	\$75,000
1.B.5.	Partner with the City of Glencoe to build/retrofit storm shelters in community parks. Target building a shelter in Oak Leaf Park in 2015 followed by Oscar Olson Park in 2017.	\$150,000
1.B.6.	Assist the City of Lester Prairie in securing grant funds to install emergency generators in four lift stations.	\$50,000
1.B.9.	Work with Ridgewater College and the City of Hutchinson to develop an Emergency Management Plan for Ridgewater College. One of the key needed components is to evaluate the College’s storm shelter needs.	\$15,000
1.B.10.	Upgrade and expand emergency management signage to be used during extreme weather events (i.e., detour signs during floods, road closed signs, etc.).	\$5,000
2.A.1.	Partner with the City of Glencoe and the Buffalo Creek Watershed District to implement the Marsh Water Project to mitigate flooding.	\$1,400,000
2.A.2.	Partner with the Buffalo Creek Watershed District (BCWD) in 2015 on creating an enhanced Drainage Management Plan for the 105 square mile Judicial Ditch 15 (JD 15) subwatershed.	\$35,000

**Table 6A:
McLeod County’s High Priority Mitigation Projects
Continued...**

Number	Project Description	Estimated Cost
2.A.3	Partner with the City of Glencoe on the North Diversion Project to mitigate seasonal flooding.	\$500,000
2.A.4.	Partner with FEMA to conduct an analysis of the County’s hydrology and flooding problems (2016).	\$75,000
2.A.5.	Address seasonal flooding issues by implementing Lester Prairie’s Flood Management & Response Plan.	\$50,000
2.A.9.	Partner with the City of Glencoe to pursue funding for the acquisition and demolition of the former Glencoe Creamery property, which is located adjacent to Buffalo Creek in the Flood Plain.	\$150,000
2.A.10.	Work with the Buffalo Creek Watershed District to identify three potential stormwater retention ponds and/or wetland restorations. Secure conservation funding to implement.	\$50,000
2.C.1.	Conduct a county-wide assessment of severely eroding sites (2016). Target conservation funding to address problem areas.	\$125,000
2.C.2.	Partner with the City of Brownton and the Buffalo Creek Watershed District to properly mitigate the Brownton Erosion Site along Buffalo Creek.	\$100,000
2.D.2.	Identify a stakeholder who can provide inexpensive household water conservation kits. Promote the use through a media campaign.	\$10,000
2.D.4.	Inventory security issues (i.e., the need for fencing, proper signage, etc.) at groundwater supply and wellhead protection areas (2017).	\$15,000
Total Estimated 5-Year Costs for High Priority Projects		\$3,005,000

B. Summary of 5-Year Implementation Costs

It is the intent of McLeod County to accomplish all the “High Priority” projects listed in Chapter Five. Many of the projects, however, will be dependent upon receiving grants and/or cost-share funding from the various stakeholders in order to be implemented. Table 6B provides a cost summary of each action step, broken down by goals and objectives. If the County was fortunate

Chapter 6: Plan Implementation & Administration

enough to receive proper funding for all of the projects listed, the grand total of projects listed total \$3,617,000 over the next five years.

**Table 6B:
Summary of 5-Year Implementation Costs**

Goal	Objective	Action Step	Cost	Objective Total	Goal Total	Project Total
1	A	1	\$75,000			
		2	\$25,000			
		3	\$10,000			
		4	\$10,000	\$120,000		
1	B	1	\$10,000			
		2	\$106,500			
		3	\$75,000			
		4	\$75,000			
		5	\$150,000			
		6	\$50,000			
		7	\$10,000			
		8	\$150,000			
		9	\$15,000			
		10	\$5,000	\$646,500	\$766,500	
2	A	1	\$1,400,000			
		2	\$35,000			
		3	\$500,000			
		4	\$75,000			
		5	\$50,000			
		6	\$10,000			
		7	\$15,000			
		8	\$50,000			
		9	\$150,000			
		10	\$50,000			
		11	\$10,000			
		12	\$10,000			
		13	\$30,000	\$2,385,000		
2	B	1	\$10,000			
		2	\$10,000			
		3	\$25,000			
		4	\$25,000			
		5	\$10,000	\$80,000		

**Table 6B:
Summary of 5-Year Implementation Costs
Continued...**

Goal	Objective	Action Step	Cost	Objective Total	Goal Total	Project Total
2	C	1	\$125,000			
		2	\$100,000	\$225,000		
2	D	1	\$15,000			
		2	\$10,000			
		3	\$10,000			
		4	\$15,000	\$50,000	\$2,740,000	
3	A	1	\$5,000			
		2	\$100,000			
		3	\$30,000	\$135,000		
3	B	1	\$15,000			
		2	\$10,000			
		3	\$500	\$25,500	\$160,500	\$3,667,000

C. Implementation Steps by Participating Jurisdictions

The County’s mitigation plan includes a number of implementation projects identified by each of the participating jurisdictions. Table 6C summarizes the action steps each jurisdiction has committed to accomplish over the next five years. It should be noted that most of the projects listed will require grant assistance and/or outside funding in order to be implemented.

**Table 6C:
List of Mitigation Projects by Jurisdiction**

Number	Jurisdiction & Project Description
<i>City of Biscay:</i>	
1.A.1.	Early Warning System. Maintain an extensive and reliable severe weather early warning system countywide. a. Continue to regularly test the County’s Emergency Alert System (EAS).
1.B.2.	Shelters & Generators. Pursue building storm shelters and having access to portable generators where needed.

Table 6C:
List of Mitigation Projects by Jurisdiction
Continued...

Number	Jurisdiction & Project Description
<i>City of Biscay (continued...):</i>	
1.B.7.	Mock Disasters. Participate in emergency preparedness mock training disasters.
2.A.11.	Stormwater Plans. Assist communities with developing and implementing Stormwater Management Plans.
2.A.12.	Storm Sewers. Apply for grant assistance to upgrade storm sewer systems.
2.B.5.	Freezing Pipes. Examine alternatives to running water to prevent pipes from freezing in order to help protect the County’s aquifers.
3.A.4.	Groundwater Security. Inventory security issues (i.e., the need for fencing, proper signage, etc.) at groundwater supply and wellhead protection areas (2017).
3.A.1.	Task Force Meetings. Hold a McLeod County Hazard Mitigation Task Force meeting annually to review current events and to prioritize local hazard mitigation projects. Invite the Public.
3.A.2.	Local Match. Facilitate the development of priority projects and seek appropriate funding for implementation. Ensure that local match is available to leverage funding for priority projects to the greatest extent possible.
3.A.3.	Keep the Plan Current. Revise the Plan based upon new priorities as needed. Begin the planning process to update the Plan in 18 months prior to its expiration.
<i>City of Brownton:</i>	
1.A.1.	Early Warning System. Maintain an extensive and reliable severe weather early warning system countywide. a. Continue to regularly test the County’s Emergency Alert System (EAS).
1.B.2.	Shelters & Generators. Pursue building storm shelters and having access to portable generators where needed.
1.B.7.	Mock Disasters. Participate in emergency preparedness mock training disasters.
2.A.11.	Stormwater Plans. Assist communities with developing and implementing Stormwater Management Plans.
2.A.12.	Storm Sewers. Apply for grant assistance to upgrade storm sewer systems.

Table 6C:
List of Mitigation Projects by Jurisdiction
Continued...

Number	Jurisdiction & Project Description
<i>City of Brownton (continued...):</i>	
2.B.5.	Freezing Pipes. Examine alternatives to running water to prevent pipes from freezing in order to help protect the County’s aquifers.
2.C.2.	Brownton Severe Erosion Site. Partner with the City of Brownton and the Buffalo Creek Watershed District to properly mitigate the Brownton Erosion Site along Buffalo Creek.
2.D.4.	Groundwater Security. Inventory security issues (i.e., the need for fencing, proper signage, etc.) at groundwater supply and wellhead protection areas (2017).
3.A.1.	Task Force Meetings. Hold a McLeod County Hazard Mitigation Task Force meeting annually to review current events and to prioritize local hazard mitigation projects. Invite the Public.
3.A.2.	Local Match. Facilitate the development of priority projects and seek appropriate funding for implementation. Ensure that local match is available to leverage funding for priority projects to the greatest extent possible.
3.A.3.	Keep the Plan Current. Revise the Plan based upon new priorities as needed. Begin the planning process to update the Plan in 18 months prior to its expiration.
<i>City of Glencoe:</i>	
1.A.1.	Early Warning System. Maintain an extensive and reliable severe weather early warning system countywide. a. Continue to regularly test the County’s Emergency Alert System (EAS).
1.B.2.	Shelters & Generators. Pursue building storm shelters and having access to portable generators where needed. e. Assist the City of Glencoe with securing funds to purchase two portable generators for flooding and emergency management (2015).
1.B.5.	Glencoe Shelters. Partner with the City of Glencoe to build/retrofit storm shelters in community parks. Target building a shelter in Oak Leaf Park in 2015 followed by Oscar Olson Park in 2017.
1.B.7.	Mock Disasters. Participate in emergency preparedness mock training disasters.
2.A.1.	Marsh Water Project. Partner with the City of Glencoe and the Buffalo Creek Watershed District to implement the Marsh Water Project to mitigate flooding.
2.A.3	Glencoe North Diversion Project. Partner with the City of Glencoe on the North Diversion Project to mitigate seasonal flooding.

Table 6C:
List of Mitigation Projects by Jurisdiction
Continued...

Number	Jurisdiction & Project Description
<i>City of Glencoe (continued...):</i>	
2.A.9.	Glencoe Creamery. Partner with the City of Glencoe to pursue funding for the acquisition and demolition of the former Glencoe Creamery property, which is located adjacent to Buffalo Creek in the Flood Plain.
2.A.11.	Stormwater Plans. Assist communities with developing and implementing Stormwater Management Plans.
2.A.12.	Storm Sewers. Apply for grant assistance to upgrade storm sewer systems.
2.A.13.	City of Glencoe Water Pumps. Apply for grant assistance to purchase two portable water pumps for the City of Glencoe to use during flooding emergencies.
2.B.5.	Freezing Pipes. Examine alternatives to running water to prevent pipes from freezing in order to help protect the County’s aquifers.
2.B.4.	Groundwater Security. Inventory security issues (i.e., the need for fencing, proper signage, etc.) at groundwater supply and wellhead protection areas (2017).
3.A.1.	Task Force Meetings. Hold a McLeod County Hazard Mitigation Task Force meeting annually to review current events and to prioritize local hazard mitigation projects. Invite the Public.
3.A.2.	Local Match. Facilitate the development of priority projects and seek appropriate funding for implementation. Ensure that local match is available to leverage funding for priority projects to the greatest extent possible.
3.A.3.	Keep the Plan Current. Revise the Plan based upon new priorities as needed. Begin the planning process to update the Plan in 18 months prior to its expiration.
<i>City of Hutchinson:</i>	
1.A.1.	Early Warning System. Maintain an extensive and reliable severe weather early warning system countywide. a. Continue to regularly test the County’s Emergency Alert System (EAS).
1.B.2.	Shelters & Generators. Pursue building storm shelters and having access to portable generators where needed.
1.B.7.	Mock Disasters. Participate in emergency preparedness mock training disasters.
1.B.9.	Ridgewater College Plan. Work with Ridgewater College and the City of Hutchinson to develop an Emergency Management Plan for Ridgewater College. One of the key needed components is to evaluate the College’s storm shelter needs.
2.A.11.	Stormwater Plans. Assist communities with developing and implementing Stormwater Management Plans.

Table 6C:
List of Mitigation Projects by Jurisdiction
Continued...

Number	Jurisdiction & Project Description
<i>City of Hutchinson (continued...):</i>	
2.A.12.	Storm Sewers. Apply for grant assistance to upgrade storm sewer systems.
2.B.5.	Freezing Pipes. Examine alternatives to running water to prevent pipes from freezing in order to help protect the County’s aquifers.
2.B.4.	Groundwater Security. Inventory security issues (i.e., the need for fencing, proper signage, etc.) at groundwater supply and wellhead protection areas (2017).
3.A.1.	Task Force Meetings. Hold a McLeod County Hazard Mitigation Task Force meeting annually to review current events and to prioritize local hazard mitigation projects. Invite the Public.
3.A.2.	Local Match. Facilitate the development of priority projects and seek appropriate funding for implementation. Ensure that local match is available to leverage funding for priority projects to the greatest extent possible.
3.A.3.	Keep the Plan Current. Revise the Plan based upon new priorities as needed. Begin the planning process to update the Plan in 18 months prior to its expiration.
<i>City of Lester Prairie:</i>	
1.A.1.	Early Warning System. Maintain an extensive and reliable severe weather early warning system countywide. a. Continue to regularly test the County’s Emergency Alert System (EAS).
1.B.2.	Shelters & Generators. Pursue building storm shelters and having access to portable generators where needed.
1.B.4.	Lester Prairie Shelter. Partner with the City of Lester Prairie to build/retrofit a community storm shelter at the Lester Prairie High School in 2016.
1.B.6.	Lester Prairie Lift Generators. Assist the City of Lester Prairie in securing grant funds to install emergency generators in four lift stations.
1.B.7.	Mock Disasters. Participate in emergency preparedness mock training disasters.
2.A.5.	Lester Prairie Flood Plan. Address seasonal flooding issues by implementing Lester Prairie’s Flood Management & Response Plan.
2.A.11.	Stormwater Plans. Assist communities with developing and implementing Stormwater Management Plans.

Table 6C:
List of Mitigation Projects by Jurisdiction
Continued...

Number	Jurisdiction & Project Description
<i>City of Lester Prairie (continued...):</i>	
2.A.12.	Storm Sewers. Apply for grant assistance to upgrade storm sewer systems.
2.B.5.	Freezing Pipes. Examine alternatives to running water to prevent pipes from freezing in order to help protect the County’s aquifers.
2.B.4.	Groundwater Security. Inventory security issues (i.e., the need for fencing, proper signage, etc.) at groundwater supply and wellhead protection areas (2017).
3.A.1.	Task Force Meetings. Hold a McLeod County Hazard Mitigation Task Force meeting annually to review current events and to prioritize local hazard mitigation projects. Invite the Public.
3.A.2.	Local Match. Facilitate the development of priority projects and seek appropriate funding for implementation. Ensure that local match is available to leverage funding for priority projects to the greatest extent possible.
3.A.3.	Keep the Plan Current. Revise the Plan based upon new priorities as needed. Begin the planning process to update the Plan in 18 months prior to its expiration.
<i>City of Plato:</i>	
1.A.1.	Early Warning System. Maintain an extensive and reliable severe weather early warning system countywide. a. Continue to regularly test the County’s Emergency Alert System (EAS).
1.B.2.	Shelters & Generators. Pursue building storm shelters and having access to portable generators where needed.
1.B.7.	Mock Disasters. Participate in emergency preparedness mock training disasters.
2.A.11.	Stormwater Plans. Assist communities with developing and implementing Stormwater Management Plans.
2.A.12.	Storm Sewers. Apply for grant assistance to upgrade storm sewer systems.
2.B.5.	Freezing Pipes. Examine alternatives to running water to prevent pipes from freezing in order to help protect the County’s aquifers.
2.B.4.	Groundwater Security. Inventory security issues (i.e., the need for fencing, proper signage, etc.) at groundwater supply and wellhead protection areas (2017).

Table 6C:
List of Mitigation Projects by Jurisdiction
Continued...

Number	Jurisdiction & Project Description
<i>City of Plato (continued...):</i>	
3.A.1.	Task Force Meetings. Hold a McLeod County Hazard Mitigation Task Force meeting annually to review current events and to prioritize local hazard mitigation projects. Invite the Public.
3.A.2.	Local Match. Facilitate the development of priority projects and seek appropriate funding for implementation. Ensure that local match is available to leverage funding for priority projects to the greatest extent possible.
3.A.3.	Keep the Plan Current. Revise the Plan based upon new priorities as needed. Begin the planning process to update the Plan in 18 months prior to its expiration.
<i>City of Silver Lake:</i>	
1.A.1.	Early Warning System. Maintain an extensive and reliable severe weather early warning system countywide. a. Continue to regularly test the County’s Emergency Alert System (EAS).
1.B.2.	Shelters & Generators. Pursue building storm shelters and having access to portable generators where needed. f. Assist the City of Silver Lake with securing funds to purchase a generator for the Silver Lake Auditorium in 2016 (serves as the community’s Emergency Operations Center).
1.B.7.	Mock Disasters. Participate in emergency preparedness mock training disasters.
2.A.11.	Stormwater Plans. Assist communities with developing and implementing Stormwater Management Plans.
2.A.12.	Storm Sewers. Apply for grant assistance to upgrade storm sewer systems.
2.B.5.	Freezing Pipes. Examine alternatives to running water to prevent pipes from freezing in order to help protect the County’s aquifers.
2.B.4.	Groundwater Security. Inventory security issues (i.e., the need for fencing, proper signage, etc.) at groundwater supply and wellhead protection areas (2017).
3.A.1.	Task Force Meetings. Hold a McLeod County Hazard Mitigation Task Force meeting annually to review current events and to prioritize local hazard mitigation projects. Invite the Public.
3.A.2.	Local Match. Facilitate the development of priority projects and seek appropriate funding for implementation. Ensure that local match is available to leverage funding for priority projects to the greatest extent possible.

Table 6C:
List of Mitigation Projects by Jurisdiction
Continued...

Number	Jurisdiction & Project Description
<i>City of Silver Lake (continued...):</i>	
3.A.3.	Keep the Plan Current. Revise the Plan based upon new priorities as needed. Begin the planning process to update the Plan in 18 months prior to its expiration.
<i>City of Stewart:</i>	
1.A.1.	Early Warning System. Maintain an extensive and reliable severe weather early warning system countywide. a. Continue to regularly test the County’s Emergency Alert System (EAS).
1.B.2.	Shelters & Generators. Pursue building storm shelters and having access to portable generators where needed.
1.B.7.	Mock Disasters. Participate in emergency preparedness mock training disasters.
2.A.11.	Stormwater Plans. Assist communities with developing and implementing Stormwater Management Plans.
2.A.12.	Storm Sewers. Apply for grant assistance to upgrade storm sewer systems.
2.B.5.	Freezing Pipes. Examine alternatives to running water to prevent pipes from freezing in order to help protect the County’s aquifers.
2.B.4.	Groundwater Security. Inventory security issues (i.e., the need for fencing, proper signage, etc.) at groundwater supply and wellhead protection areas (2017).
3.A.1.	Task Force Meetings. Hold a McLeod County Hazard Mitigation Task Force meeting annually to review current events and to prioritize local hazard mitigation projects. Invite the Public.
3.A.2.	Local Match. Facilitate the development of priority projects and seek appropriate funding for implementation. Ensure that local match is available to leverage funding for priority projects to the greatest extent possible.
3.A.3.	Keep the Plan Current. Revise the Plan based upon new priorities as needed. Begin the planning process to update the Plan in 18 months prior to its expiration.

Table 6C:
List of Mitigation Projects by Jurisdiction
Continued...

Number	Jurisdiction & Project Description
<i>City of Winsted (continued...):</i>	
1.A.1.	Early Warning System. Maintain an extensive and reliable severe weather early warning system countywide. a. Continue to regularly test the County’s Emergency Alert System (EAS).
1.B.2.	Shelters & Generators. Pursue building storm shelters and having access to portable generators where needed.
1.B.3.	Winsted Shelters. Partner with the City of Winsted to build/retrofit storm shelters in community parks. Target building a shelter in Hainlin Park in 2015.
1.B.7.	Mock Disasters. Participate in emergency preparedness mock training disasters.
2.A.11.	Stormwater Plans. Assist communities with developing and implementing Stormwater Management Plans.
2.A.12.	Storm Sewers. Apply for grant assistance to upgrade storm sewer systems.
2.B.5.	Freezing Pipes. Examine alternatives to running water to prevent pipes from freezing in order to help protect the County’s aquifers.
2.B.4.	Groundwater Security. Inventory security issues (i.e., the need for fencing, proper signage, etc.) at groundwater supply and wellhead protection areas (2017).
3.A.1.	Task Force Meetings. Hold a McLeod County Hazard Mitigation Task Force meeting annually to review current events and to prioritize local hazard mitigation projects. Invite the Public.
3.A.2.	Local Match. Facilitate the development of priority projects and seek appropriate funding for implementation. Ensure that local match is available to leverage funding for priority projects to the greatest extent possible.
3.A.3.	Keep the Plan Current. Revise the Plan based upon new priorities as needed. Begin the planning process to update the Plan in 18 months prior to its expiration.

D. Needed Revisions to Existing Plans, Ordinances, and Official Documents

This section of the Plan summarizes the needed revisions to the following plans, ordinances, and official documents based upon the contents of the McLeod County Hazard Mitigation Plan.



Required Information

- **McLeod County Comprehensive Land Use Plan (1995)**

The primary justification for updating the County’s Comprehensive Plan is due to it being over 20 year old. If the County decides to update the Comprehensive Plan in the next five years, one of the key components will be to examine the County’s flood mitigation efforts to determine if enough is being done to protect the floodplain from incompatible development.
- **McLeod County Zoning Ordinance (2006)**

Prior to having the County’s Comprehensive Plan updated, the County’s Zoning Ordinance could examine its floodplain provisions to determine if the language is strong enough to protect the floodplain from incompatible development.
- **McLeod County Comprehensive Water Plan (2013)**

This document was updated in 2013 and will be updated again in 2018. At that time, current flood mitigation efforts will need to be incorporated into the Water Plan.
- **McLeod County Emergency Operations Plan (2014)**

The EOP is updated annually. One item that was recognized during the planning process was the need to purchase additional emergency management signage.
- **McLeod County Public Health Emergency Preparedness Plan (2014)**

Many of the action items identified in Chapter Five of the Hazard Mitigation Plan stemmed from the ongoing Public Health Department’s ongoing activities listed in the EPP. The County is currently working on regionalizing some components of the EPP.
- **Buffalo Creek Watershed District Plan (2014)**

The Watershed District’s Plan was recently updated in 2014. As a result, the flood mitigation projects listed in the District’s Plan were incorporated into the Hazard Mitigation Plan. The District’s Plan will be updated in 2018. At that time, all current flood mitigation efforts will be identified in the District’s Plan.

E. Plan Evaluation, Monitoring, and Citizen Participation



Periodic review is needed to successfully implement the McLeod County Hazard Mitigation Plan. The County’s Emergency Manager, housed in the Sheriff’s Office, will be primarily responsible for plan implementation and administration activities. In addition, the County created the following two new Action Steps highlighted in Table 6D. Notice the public will be invited to participate in the annual Task Force Meetings listed in 3.A.1.

**Table 6D:
Plan Evaluation and Monitoring Action Steps**

<p>3.A.1. Task Force Meetings. Hold a McLeod County Hazard Mitigation Task Force meeting annually to review current events and to prioritize local hazard mitigation projects. Use the media to invite the public to participate in each meeting, including a formal press release.</p>	
<p>Stakeholders (*lead): *EM, HMTF, MMDC</p>	<p>Participating Jurisdictions: McLeod County and the cities of Brownton, Biscay, Glencoe, Hutchinson, Lester Prairie, Plato, Silver Lake, Stewart, and Winsted.</p>
<p>3.A.3. Keep the Plan Current. Revise the Plan based upon new priorities as needed. Begin the planning process to update the Plan in 18 months prior to its expiration.</p>	
<p>Stakeholders (*lead): *EM, CB, Cities, All</p>	<p>Participating Jurisdictions: McLeod County and the cities of Brownton, Biscay, Glencoe, Hutchinson, Lester Prairie, Plato, Silver Lake, Stewart, and Winsted.</p>

F. General Plan Administration

Plan Coordination

Hazard mitigation is a complicated task, involving many local, State, and Federal agencies, as well as private citizens. For any mitigation strategy to be successful, a well-coordinated effort is needed. McLeod County is committed to working with all of its stakeholders to reduce or eliminate long-term risk from hazards and their effects.

Chapter 6: Plan Implementation & Administration

Implementation Procedure

The County will ensure coordination and implementation of its McLeod County Hazard Mitigation Plan through its Hazard Mitigation Plan Task Force. The committee will meet, at least annually, to review progress, identify emerging problems, opportunities and issues, and continue to direct the implementation of the plan. The Emergency Management Director shall administer the implementation of this plan, coordinate the Task Force's activities, write grant proposals, prepare annual work plans and reports, and other activities as specified by the McLeod County Board of Commissioners.

Plan Duration

Coordination of the McLeod County Hazard Mitigation Plan initiatives will commence with the County Board of Commissioners adoption of the plan. Initiatives will be carried out throughout the lifetime of the plan, which is specified as 2015-2020 (five-year plan).

Role of the County in Implementation

The County recognizes the importance of hazard mitigation and the role citizens and local units of government play in decision making. The McLeod County Hazard Mitigation Plan's goals and mitigation strategies are a reflection of the hazard related concerns in the County. Implementation will be based on current needs and availability of funding. The annual work plan will be a detailed strategy of measurable criteria for actions to be carried out. The County realizes that completion of all goals and strategies requires staff and funds beyond its budget. It is also understood that State funding cannot provide the funding for all goals and strategies for all counties. The County, through various sources, will pursue outside funding opportunities as they become available.

Other Agencies Roles in Implementation

Throughout the McLeod County Hazard Mitigation Plan, the stakeholders involved in the County's interests are mentioned. It is hoped that relationships with these entities can be created or further enhanced, thus improving the coordination of the plan's initiatives.

Chapter 6: Plan Implementation & Administration

Recommendations for State Programs

To implement the mitigation strategies set forth in the McLeod County Hazard Mitigation Plan, continued cooperation between the County and various State agencies is necessary. In an effort to increase coordination in this effort, the County respectfully makes the following recommendations regarding State agency programs.

- The County should be informed of State agency program changes and the availability of funding.
- Data collected by State agencies should be readily shared with the County to avoid duplicative efforts.
- State agencies should continue to provide local and/or regional staff to assist local officials with agency programs.

Intergovernmental Conflicts/Resolution Process

In the development of the McLeod County Hazard Mitigation Plan, no intergovernmental conflicts arose. In the event of an intergovernmental conflict, the McLeod County Board of Commissioners shall request the Advisory Team to intervene and informally negotiate a resolution to the conflict.

Major Plan Amendment Procedure

The McLeod County Hazard Mitigation Plan is intended to be a five-year plan (2015-2020). The County, however, may propose amendments to the plan before it expires. The following procedures will be used by the County for major amendment proposals to the McLeod County Hazard Mitigation Plan.

1. When issues are brought to the attention of the County with regard to the need for amendments to its adopted McLeod County Hazard Mitigation Plan, the County will refer that person, group, local unit of government, or agency to the County's Advisory Team.
2. The County's Advisory Team will review the issue and may, if necessary, undertake studies relating to the issue. After review, the committee will determine whether the McLeod County Hazard Mitigation Plan should be amended.

Chapter 6: Plan Implementation & Administration

3. If the County's Advisory Team determines that the McLeod County Hazard Mitigation Plan should be amended, it will make recommendations to the Board of Commissioners. The Board of Commissioners shall approve or disapprove the proposed amendment.

After development, a proposed amendment to the McLeod County Hazard Mitigation Plan must be submitted for local review and comment in the following manner. The County must submit the proposed plan amendment to all local units of government wholly or partly within the County, the applicable regional development commission (if any) and other counties, or any other organizations that may be affected by the proposed plan amendment. Each local unit of government must review the proposed amendment, along with its own plans and/or official controls, and comment on the fiscal and policy ramifications of the amendment. Comments from local review must be submitted to the Board of Commissioners within 60 days after receiving a proposed plan amendment for comment, unless the Board of Commissioners determines that good cause exists for an extension of this period and grants an extension. The Board of Commissioners must conduct a public hearing on the proposed plan amendment after the 60-day period is completed, but before it is submitted to the State.

After conducting the public hearing, the Board of Commissioners must submit the proposed plan amendment, all written comments, and a record of the public hearing to the State Hazard Mitigation Officer for review. The State Hazard Mitigation Officer must complete the review within 90 days after receiving the proposed McLeod County Hazard Mitigation Plan amendment and supporting documentation.

The State Hazard Mitigation Officer may disapprove a proposed amendment if it determines the amendment is not consistent with State law, or the principles of sound hazard mitigation, or efficient management. If the amendment is disapproved, the State Hazard Mitigation Officer must provide a written statement of its reasons for disapproval. The disapproved McLeod County Hazard Mitigation Plan amendment may be revised by the Board of Commissioners and resubmitted for approval by the State Hazard Mitigation Officer within 120 days after receiving notice of disapproval, unless the State Hazard Mitigation Officer extends the period for good cause. The decision of the State Hazard Mitigation Officer to disapprove the amendment may be appealed by the Board of Commissioners to District Court. The Board of Commissioners must adopt and begin implementation of its amended McLeod County Hazard Mitigation Plan within 120 days after receiving notice of approval of the amendment from the State Hazard Mitigation Officer.

Chapter 6: Plan Implementation & Administration

Minor Plan Amendment Procedure

If an amendment to the McLeod County Hazard Mitigation Plan is considered to be minor in nature, the following process will be followed:

1. The Board of Commissioners will receive a recommendation from the Advisory Team for an amendment to the McLeod County Hazard Mitigation Plan.
2. At the Board of Commissioner's meeting, where the amendment is introduced, the County will hold a public hearing to explain the amendments and publish a legal notice of the hearing at least ten (10) days before the date of the hearing in the official County newspaper.

Revised Plan

All amendments adopted by the County will be printed in the form of replacement pages for the McLeod County Hazard Mitigation Plan. Each page will show deleted text as stricken and new text as underlines on draft amendments, as needed, and include the effective date of the amendment. The County will maintain a distribution list of agencies and individuals who have received a copy of the McLeod County Hazard Mitigation Plan and the County shall distribute copies of the amendment(s) within thirty days of adoption.