McPherson County
South Dakota

NATURAL HAZARD MITIGATION PLAN
EXPIRES:

PREPARED BY:
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TABLE OF CONTENTS

I. INTRODUCTION

CHANGES/REVISIONS TO EXECUTIVE SUMMARY:
Only minor changes were made to the Introduction section as compared to the 2014 Mitigation Plan.

INTRODUCTION

McPherson County has determined that it is vulnerable to natural hazards that have the possibility of causing threat to the health, welfare, and security of its citizens. The cost of response and recovery from potential disasters in terms of potential loss of life, property or infrastructure can be reduced when attention is turned to mitigating the impacts of a natural hazard before an event occurs.

This plan identifies the County's vulnerabilities and will be used by local leaders to mitigate risks associated with natural hazards. The purpose of the plan is to help identify a strategy that can significantly reduce risks to people, property, and infrastructure. The plan is based on the premise that mitigation works. With increased attention to mitigating natural hazards, communities reduce the impact natural hazards have on its citizens and local governing bodies. With appropriate measures of planning local governing bodies can avoid creating new problems in the future. Since many mitigation actions can be implemented at minimal cost, it is possible by implementing activities defined in the plan that the County will save money and reduce losses in the future.

Section headings and subheadings follow the organization of the Local Mitigation Plan Review Tool. Several appendices accompany this plan. They contain technical data, meeting minutes, and other relevant information that compliments the content of this plan.

This is not an emergency response or emergency management plan. Certainly, the plan can be used in conjunction with other types of planning documents to identify weaknesses and/or refocus emergency response planning. Sometimes emergency response planning aligns with mitigation strategies and can be enhanced through mitigation efforts. However, the focus of this plan is for local leaders to discuss and implement strategies and identify activities that avoid or eliminate future risks as well as reduce or eliminate existing risks caused by natural hazards.

PURPOSE OF THE NATURAL HAZARD MITIGATION PLAN

In October 2000, the Disaster Mitigation Act (DMA2K) was signed to amend the 1988 Robert T. Stafford Disaster Relief and Emergency Assistance Act. Section 322 of the Disaster Mitigation Act requires that local governments, as a condition of receiving federal disaster mitigation funds, have a local disaster mitigation plan in place. The plan must:

1. Identify hazards and their associated risks and vulnerabilities;
2. Develop and prioritize mitigation activities; and
3. Encourage cooperation and communication between all levels of government and the public.

The purpose of this plan is to meet the hazard mitigation planning needs for McPherson County and participating entities. Consistent with the Federal Emergency Management Agency's

guidelines, this plan will review all possible activities related to natural hazards to reach efficient solutions, link hazard management policies to specific activities, educate and facilitate communication with the public, build public and political support for mitigation activities, and develop implementation and planning requirements for future hazard mitigation projects.

PURPOSE

The purpose of the local natural hazard mitigation plan is to fulfill federal, state, and local hazard mitigation planning responsibilities; to promote pre and post disaster mitigation measures; implement short/long range strategies that minimize suffering, loss of life, and damage to property and infrastructure resulting from hazardous or potentially hazardous conditions to which citizens and institutions within the county are exposed; and to eliminate or minimize conditions which would have an undesirable impact on the citizens, economy, environment, and the well-being of the county. This plan will aid city, township, and county agencies and officials in enhancing public awareness to the threat hazards have on its citizens, property, and infrastructure; and what can be done to help prevent or reduce the vulnerability to risks of each McPherson County jurisdiction.

PLAN USE

First, the plan should be used to help local elected and appointed officials plan, design and implement programs and projects that will help reduce their community's vulnerability to natural hazards. Second, the plan should be used to facilitate inter-jurisdictional coordination and collaboration related to natural hazard mitigation planning and implementation. Third, the plan should be used to develop or provide guidance for local emergency response planning. Finally, when adopted, the plan will bring communities in compliance with the Disaster Mitigation Act of 2000.

SCOPE

1. Provide opportunities for public input and encourage participation and involvement regarding the mitigation plan.
2. Identify hazards and vulnerabilities within the county and local jurisdictions.
3. Combine risk assessments with public and emergency management ideas.
4. Develop goals based on the identified hazards and risks.
5. Review existing mitigation measures for gaps and establish projects to sufficiently fulfill the goals.
6. Prioritize and evaluate each strategy/objective.
7. Review other plans for cohesion and incorporation with the Natural Hazard Mitigation Plan.
8. Establish guidelines for updating and monitoring the plan.
9. Present the plan to McPherson County and the participating communities within the county for adoption.

LOCAL GOALS

These ideas form the basis for the development of the Plan and are shown from highest priority, at the top of the list, to those of lesser importance nearer the bottom.

- Protection of life before, during, and after the occurrence of a disaster;
- Protection of emergency response capabilities (critical infrastructure);

- Establish and maintain communication and warning systems;
- Protection of critical facilities;
- Government continuity;
- Protection of developed property, homes and businesses, industry, education opportunities and the cultural fabric of a community, by combining hazard loss reduction with the community's environmental, social, and economic needs; and
- Protection of natural resources and the environment, when considering mitigation measures.

LONG-TERM GOALS

- Eliminate or reduce the long-term risk to human life and property from identified natural and man-made hazards;
- Aid both the private and public sectors in understanding the risks they may be exposed to and finding mitigation strategies to reduce those risks;
- Avoid risk of exposure to identified hazards;
- Minimize the impacts of those risks when they cannot be avoided;
- Mitigate the impacts of damage as a result or identified hazards;
- Accomplish mitigation strategies in such a way that negative environmental impacts are minimized;
- Provide a basis for funding of projects outlined as hazard mitigation strategies; and
- Establish a regional platform to enable the community to take advantage of shared goals, resources, and the availability of outside resources.

WHAT IS HAZARD MITIGATION?

Hazard mitigation is defined as any cost-effective action(s) that has the effect of reducing, limiting, or preventing vulnerability of people, property, and the environment to potentially damaging, harmful, or costly hazards. Hazard mitigation measures, which can be used to eliminate or minimize the risk to life and property, fall into three categories: First are those that keep the hazard away from people, property, and structures; second are those that keep people, property, and structures away from the hazard; and third are those that do not address the hazard at all but rather reduce the impact of the hazard on the victims, such as insurance. This mitigation plan has strategies that fall into all three categories.

Hazard mitigation measures must be practical and cost effective, as well as environmentally and politically acceptable. Actions taken to limit the vulnerability of society to hazards must not in themselves be more costly than the value of anticipated damages.

Mitigation actions should be incorporated into the planning activities associated with capital improvements with consideration given to areas with the greatest vulnerability to natural hazards. Capital investments, whether for homes, roads, public utilities, pipelines, power plants, or public works, determine to a large extent the nature and degree of hazard vulnerability of a community. Once a capital facility is in place, very few opportunities will present themselves over the useful life of the facility to correct any errors in location or construction with respect to hazard vulnerability. It is for these reasons, that zoning and ordinances (which manage development in high vulnerability areas) along with building codes (which ensure that new buildings are built to withstand the damaging forces of hazards) are often the most useful mitigation approaches local governments can implement.

Previously, mitigation measures have been the most neglected programs within emergency management. Since the priority to implement mitigation activities is generally low in comparison to the perceived threat, some important mitigation measures take time to implement. Mitigation success can be achieved, however, if accurate information is portrayed through complete hazard identification and impact studies, followed by effective mitigation management. Hazard mitigation is useful for eliminating long-term risk to people, property, and infrastructure in South Dakota.

This plan evaluates the impacts, risks and vulnerabilities of natural hazards within the jurisdictional areas of the entire county. The plan supports, provides assistance, identifies and describes mitigation projects for each of the local jurisdictions who participated in the process of drafting the plan update. The suggested actions and plan implementation for local governments could reduce the impact of future natural hazard occurrences. Lessening the impact of natural hazards can prevent such occurrences from becoming disastrous, but will only be accomplished through coordinated partnership with emergency managers, political entities, public works officials, community planners and other dedicated individuals working to implement this program.

MCPHERSON COUNTY PROFILE

GEOGRAPHIC BACKGROUND

McPherson County is named after James B. McPherson, a Civil War general. The County was established in 1873 by the Territorial Legislature. The original county boundaries included land now in North Dakota and excluded a small area along the eastern border that is now within the county. The present boundaries were established in 1885 and the first permanent settlers arrived in 1882. The geographic area of McPherson County is 1,137 square miles of land and 15 square miles of water. In March of 1884, Leola was made the county seat. Leola is situated at the intersections of SD Highway 10 and SD Highway 45.

The main industry in the county is agriculture. Most businesses within the county are agriculture-related or goods-related; necessary for serving the day-to-day needs of the rural population base. Soil is the most important natural resource in McPherson County. It provides a growing medium for crops and for the grass grazed by livestock. Other natural resources are ground water, wildlife, sand, and gravel. Sand and gravel are deposited in scattered areas throughout the county. These deposits range from a few inches to more than 50 feet in thickness. They consist mainly of fine to coarse sand and some gravel, silt, and clay. Because of an excessive amount of fine rock fragments, such as shale, chalk, and clay ironstone, the sand and gravel are unsuitable as concrete aggregate or as construction material. They are suitable, however, as subgrade material for roads and as bituminous aggregate.

The central and western parts of McPherson County are on the Missouri Coteau. The contour of the land is undulating to hilly. Many potholes or closed depressions exist in the central and western parts of the county, and the drainage pattern is poorly defined. Spring Creek is the main drainageway. It flows westward to the Oahe Reservoir. The eastern part of the county is on the Drift Prairie part of the James River Lowland. Relief is dominantly level to undulating. The drainage pattern is well defined. The two principal drainage ways are Foot Creek and Snake Creek. They flow southeast to the James River. Land elevations range from 1,400 feet above sea level in the southeastern part of the county to about 2,100 feet in the north-central part of the county.

Crompton, Elm, Eureka, Leola, and Wolff Lakes provide opportunities for fishing, boating, and waterfowl hunting. The drainage ways flow only intermittently and provide water only during periods of snowmelt and high rainfall. In some areas shallow ground water of good quality is available in sufficient volume for irrigation.

POPULATION DEMOGRAPHICS

According to the Census Bureau, in 2010 the County had a population of 2,459, a decline of 15.3 percent from the 2000 census. With only 2,459 people residing in 1,137 square miles, it averages 2.16 persons per square mile. In most classification systems McPherson County is defined as sparsely populated and extremely rural.

Within McPherson County there are four incorporated municipalities. The largest is the City of Eureka, which has a population of 868; followed by Leola (pop. 457); Long Lake (pop. 31); Wetonka (pop. 8); and Hillsview (pop. 3) respectively. In addition to these communities, McPherson County also has four townships located in the northeast part of the county and two areas of unorganized territory called West McPherson and Central McPherson, as well as four Hutterite Colonies: Grassland Colony, Long Lake Colony, Spring Creek Colony and Boulder Colony. The Hutterites are a communal people, living on hundreds of scattered colonies throughout the prairies of northwestern North America.

The colonies tend to have relatively large populations in comparison to some of the organized municipalities such as Wetonka, Long Lake, and Hillsview, ranging anywhere from 60 to 150 people in one colony. Typically the colonies limit their populations and break off and create new colonies when the cap is met because the colonies are only designed to sustain a limited number of people. The exact population of the colonies is unknown, however some of the information can be derived from the Census; specifically, when information is analyzed at the township level. For example, Weber Township has a total population of 156. Spring Creek Colony is located within Weber Township and 145 of the 156 residents in the township are classified as “non-institutionalized group quarters.” This classification is commonly used for populations living in colonies; thus it can be assumed that those 145 residents classified as such are the residents of the Spring Creek Colony.

Unfortunately since McPherson County has only four organized townships and only one of the four colonies is located within a township, the population and statistical information for the other three colonies is not available.

According to the 2010 Census, the County is predominately white (98.1%) and has a nearly one to one male to female ratio. Of the 2,459 residents in McPherson County, nearly one third (30%) are 65 years and older. Most of the residents within the County fall into the low to moderate income category. With 733 of the population being 65 years or older, the County can expect further decline in population over the course of the next two decades if the trend continues. A combination of two factors, 1) the aging population, and 2) youth leaving rural areas to pursue higher education followed by employment in urban areas, has contributed to the steady decline in population which is prevalent in many of the rural areas of South Dakota.

The 2010 Census reported 1,025 occupied housing units located within the 1,137 square miles of land located in McPherson County which averages less than one occupied housing unit per

square mile. Census also reported 363 vacant properties in the county; with only 16 of those being for sale and 61 for rent.

ECONOMIC PROFILE

Agriculture is the principle enterprise in McPherson County. About fifty-five percent of the farm income is derived from the sale of livestock and livestock products. While the first settlers grew mostly wheat, eventually, fertility was reduced due to wind and water erosion. In 1954 the McPherson County Conservation District was formed to alleviate the situation. Grass was seeded on the eroding cropland and trees were planted to provide protection for farmsteads and to help control wind erosion.

In 1975 there were 670 farms in McPherson County with the average size farm being 1,090 acres according to the United States Department of Agriculture. The trend is toward fewer and larger farms. In 2017 the USDA Census of Agriculture, the estimated number of farms in McPherson County was approximately 382 with an average acreage of 1,893 per farm. Although there is a decline in the number of small farms along with a continuous trend in declining population, McPherson County's agriculture industry is surviving.

GOVERNANCE

McPherson County is governed by a five-member board of commissioners. The sheriff and three deputies provide law enforcement for the entire county. The sheriff also acts as the Emergency Manager for McPherson County. The City of Leola has an aldermanic government made up of a seven-member council and also has a city police chief who provides law enforcement within the city limits of Leola. The City of Eureka has an aldermanic government with a six-member board. Eureka contracts with the sheriff's office for law enforcement within the city. Hillsview, Long Lake, and Wetonka all have a three-member board of trustees that serves as the governing body. They do not have their own law enforcement officials, but are covered by the county sheriff's office.

The colonies keep to themselves and have their own form of governance within. For the most part they live peacefully and tend to be self-sustaining and self-sufficient in most aspects of life. However, they do rely on public resources for law enforcement, medical and ambulatory services, and fire protection when necessary. McPherson County is required to provide those services to all areas that lie within the boundaries of the county. The colonies have adapted equipment as a means for hauling water to assist in fighting grass fires. FEM Electric provides power to all three of the colonies.

Due to the extremely rural nature of the county, it is important to note that many of the residents who serve in the public capacity are constantly stepping in and filling many other roles. For example, the county sheriff not only works as law enforcement but also volunteers for the local fire department as firefighter/emergency response personnel and serves in other capacities such as participating in the mitigation planning efforts of the county and volunteering for other local planning groups. While this is just one example, the general attitude of the people in McPherson County is to step in and help out whenever and wherever necessary. Despite the challenging expectations for those serving in many different capacities - taking on duties that in other places would be considered several different full time positions, McPherson County residents are committed to helping their neighbors and take much pride in doing what they can with limited resources. In McPherson County, being self-sufficient and resourceful *is* the way of life.

CLIMATE

McPherson County is located in North-Central South Dakota, a place known to have some of the largest temperature variances in the world, from 35 degrees below zero Fahrenheit in the winter to 109 degrees Fahrenheit above zero in the summer. The annual precipitation average is 19 inches, of this approximately 80 percent falls between April and September. Thunderstorms occur approximately 36 days per year. The average seasonal snowfall is 35 inches. The prevailing wind is from the northwest with an average speed of 13 miles per hour. However the county has experienced strong winds with speeds above 100mph. Wind speed tends to be the highest in the spring.

Sometimes the county experiences high precipitation and rapid snow melt which cause localized flooding of roads, culverts, and bridges. Eureka and Leola also experience lowland flooding within their communities during times of high water table, excessive precipitation, and rapid snow melt. McPherson County participates in the National Flood Insurance Program (NFIP). The only mapped community in McPherson County is the City of Eureka. Eureka Lake which is a manmade lake is located within the City of Eureka and could be conceived as a possible natural hazard to the residents, property, and infrastructure of Eureka. Long Lake which is located outside the city limits to the west of the Town of Long Lake does not pose a threat to the town due to the difference in elevations between the two. There are many lowland sloughs, small creeks and waterways that vary between being completely dry and filling up during periods of high precipitation and rapid snow melt.

TRANSPORTATION

Transportation planning for streets and roads begins with understanding the relationship between land use and road network. Streets and roads balance functions of mobility and land access. On one side, such as interstate highways, mobility is the primary function of the network. On the other side, such as local roads, land access to farms and residences is the primary service. In between these two extremes, mobility and land access varies depending on the function of the road network.

Functional classification is the process of grouping streets and roads into classes according to the function they are intended to provide. Listed below is McPherson County's functional classification system. The classification is according to the rural systems classification as developed by the Federal Highway Administration.

1. Principal Arterials – serve longer strips of a statewide or interstate nature, carry the highest traffic volumes, connect larger urban areas, provide minimal land access, and include both interstate and non-interstate principal arterial highways.

2. Minor Arterials – interconnect the principal arterials, provide less mobility and slightly more land access, and distribute travel to smaller towns, and major resorts attracting longer trips.

3. Major Collectors – provide both land access and traffic circulation connecting county seats not served by arterials and connect intra-county traffic generators like schools, shipping points, county parks, and important mining and agricultural areas.

4. Minor Collectors – collect traffic from local roads and bring all developed areas within a reasonable distance of a collector road.

5. Local Roads – provide direct access to adjacent land and to the highest classified roads and serve short trips.

SD Highway 10 is the main East/West route through the county and SD Highway 45 is the main North/South route through the county. In addition to Hwy 10 and 45, the county recognizes SD Hwy 47, SD Hwy 247, and SD Hwy 239 as major routes through the county. Other than the State and County road systems, no other transportation systems exist.

The Eureka City Airport has a single paved runway used by light private/general aviation and crop spraying aircraft. The airport does not have any navigation aid, communications or flight service capabilities.

The Mound City & Eastern Railway was a small, short-lived railroad that operated in McPherson County, South Dakota from 1929 to 1940 when it was abandoned. The railroad was conceived in the early twentieth century as part of a plan to provide rail access to the small town of Mound City in neighboring Campbell County, South Dakota. The projected route of the railway extended eastward from Mound City to the town of Leola, South Dakota, where a connection could be made with the Minneapolis and St. Louis Railway. Only 18 miles of track were completed running northwest from Leola to the Town of Long Lake. Financial difficulties ended work at Long Lake and the remainder of the line was never built. Initially, the company operated conventional trains pulled by steam locomotives, but by the 1930s limited financial resources and a lack of traffic forced the railroad to resort to a gasoline engine capable of dragging five or six cars, making two or three trips a week, except in winter when the rail frequently shut down. Substantial portions of the old railway grade remain evident today.

The county has the Northern Border Pipeline main facility near Wetonka, and the pipeline traverses southeast to northwest through the county. No towns are serviced by the natural gas pipeline within McPherson County. The Dakota Access Pipeline, a crude oil pipeline also cuts across the very southwest corner of the county. No towns are serviced by this pipeline within McPherson County.

NATIONAL FLOOD INSURANCE PROGRAM PARTICIPATION

One jurisdiction located within McPherson County participates in the National Flood Insurance Program (NFIP): Eureka and McPherson County participate. The remaining towns currently do not participate in the NFIP: Hillsview, Leola, Long Lake, and Wetonka. Table 1.1 was taken from the 2014 Plan. It lists population, latitude and longitude, elevation, and NFIP status of communities within the county. Population statistics were taken from Census 2010 and location and elevation were taken from Wikipedia. NFIP status was provided by McPherson County Emergency Management.

Table 1.1: McPherson County Municipalities Overview				
Name	**Pop. (2010)**	**Location**	**Elevation**	**NFIP**
Cities/Towns				
Eureka	868	45°46′9″N 99°37′19″W	1890 ft	Yes
Hillsview	3	45°40′4″N 99°33′38″W	1850 ft	No
Leola	457	45°43′16″N 98°56′19″W	1591 ft	No
Long Lake	31	45°51′23″N 99°12′24″W	1952 ft	No
Wetonka	8	45°37′28″N 98°46′8″W	1470 ft	No

Table 1.2 lists the McPherson County Townships by population:

Township	**Population**	**Township**	**Population**
Hoffman	25	Wacker	15
Wachter	30	Weber	156

II. PREREQUISITES

CHANGES/REVISIONS TO PREREQUISITES:
Changes to this section revolve around changes in participating jurisdictions. Table 2.1 was changed to show changes in plan participants. Table 2.3 was changed to reflect changes in plan participants.

ADOPTION BY LOCAL GOVERNING BODY

The local governing body that oversees the update of the McPherson County Natural Hazard Mitigation Plan ("Plan" or "Mitigation Plan") is the McPherson County Commission. The Commission has tasked the McPherson County Emergency Management Office with the responsibility of ensuring that the Plan is compliant with Federal Emergency Management Agency (FEMA) Guidelines and corresponding regulations.

MULTI-JURISDICTIONAL PLAN PARTICIPATION

This plan is a multi-jurisdictional plan which serves the entire geographical area located within the boundaries of McPherson County, South Dakota. McPherson County has five incorporated municipalities. Two of the municipalities located within McPherson County elected to participate in the planning process and the update of the existing McPherson County Natural Hazard Mitigation (NHMP) Plan. The participating local jurisdictions include the following municipalities:

Table 2.1: Plan Participants

New Participants	Continuing Participants	Not Participating
	Eureka	Hillsview
	Leola	Long Lake
	McPherson County	Wetonka

Long Lake and Wetonka participated in 2014 but didn't participate this time and were moved in Table 2.1 from new participants to not participating. FEM Electric participated in past but with new changes to participation requirements, rural electrics participate in the State Hazard Mitigation Plan process and are no longer required to participate at the county level. FEM was removed from the plan participants list altogether because it is not anticipated that they will participate in the McPherson County plan in the future.

Townships were removed from not participating list due to lack of participation in the last few plan updates. Representatives from townships have never participated in the planning process. Townships also lack any planning mechanisms for development and projects. Townships also do not have the resources available to come up with twenty-five percent match for projects.

The non-participants include Hillsview, Long Lake and Wetonka. All of these communities have populations under forty people. The non-participating communities will be given the option to complete the requirements for the plan and to formally adopt the plan during the annual update of the plan, if they desire to be added at a later time.

The McPherson County Commission and each of the listed participating municipalities will pass resolutions to adopt the updated Plan.

The McPherson County Mitigation Plan will be adopted by resolution by the participating incorporated municipalities, the McPherson County Commission. The Resolutions of Adoption are included as supporting documentation for the Plan. The dates of adoption by resolution for each of the jurisdictions are summarized in Table 2.2.

Table 2.2: Dates of Plan Adoption by Jurisdiction

Jurisdiction	Date of Adoption
McPherson County Commission	
Eureka	
Leola	
Long Lake	Did not participate
Wetonka	Did not participate
Hillsview	Did not participate

All of the participating jurisdictions were involved in the plan update. Representatives from Eureka and Leola along with the County attended the planning meetings and provided valuable perspective on the changes required for the plan. All representatives took part in the risk assessment by reviewing the risk assessment worksheets that were completed as part of the 2014 planning process. It was determined that not much information had changed as far as risk identification and assessment. They also provided additional details on the process for development at the local level regarding building permits, regulations, and oversight which is documented in further detail in Chapter IV of the plan.

Representatives also took information from the planning meetings back to their respective councils and presented the progress of the plan update on a monthly basis. The local jurisdictions have also presented the Resolution of Adoption to their councils and will pass the resolutions upon FEMA approval of the Plan update. The Resolutions are included as Appendix B at the end of this section.

Table 2.3 was derived to help define “participation” for the local jurisdictions who intend on adopting the plan. Out of ten categories, each jurisdiction must have at least eight of the participation requirements fulfilled.

Nature of Participation	Eureka	Leola	Long Lake	Hillsview	Wetonka	McPherson County
Attended Meetings or work sessions	☒	☒	☐	☐	☐	☒
Submitted inventory and summary of reports and plans relevant to hazard mitigation.	☒	☒	☐	☐	☐	☒
Reviewed Risk Assessment Worksheet.	☒	☒	☐	☐	☐	☒
Submitted description of what is at risk (including local critical facilities and infrastructure at risk from specific Hazards) Worksheet 3A	☒	☒	☐	☐	☐	☒
Submitted a description or map of local land-use patterns (current and proposed/expected).	C	C	C	C	C	C
Developed goals for the community.	☒	☒	☐	☐	☐	☒
Developed mitigation actions with an analysis/explanation of why those actions were selected.	☒	☒	☐	☐	☐	☒
Prioritized actions emphasizing relative cost-effectiveness.	☒	☒	☐	☐	☐	☒
Reviewed and commented on draft Plan.	☒	☒	☐	☐	☐	☒
Hosted opportunities for public involvement (allowed time for public comment at a minimum of 2 city council/county commission meetings after giving a status report on the progress of the Plan update)	☒	☒	☐	☐	☐	☒

III.PLANNING PROCESS

CHANGES/REVISIONS TO PLANNING PROCESS:

- In the 2014 Mitigation Plan, the Planning Team conducted a Mitigation Survey of county residents. They decided not to conduct the survey for the 2019 Plan, so that section was removed entirely.
- Additional information was added for county commissioners and city council members who participated and provided feedback during the planning process.

DOCUMENTATION OF THE PLANNING PROCESS

"An open and public involvement process is essential to the development of an effective plan." Requirement 201.6(b).

Public meetings were held at the McPherson County Courthouse to inform the public about the required Plan update. The McPherson County Emergency Manager worked with NECOG staff to organize resources. A planning committee was formed from those persons who attended the public meetings. None had previously served as planning committee members during the drafting of the previous plan. After the informational meetings were held, the committee started working through the existing plan and noting deficiencies, corrections, and updates that needed to be made.

Participating jurisdictions were provided a copy of the mitigation strategy and were instructed to review all goals and projects and determine if changes were needed. Plan representatives were then asked to discuss the mitigation strategy and the city council or county commission meetings to determine if projects should be left in the plan, removed or if they have been completed. Plan participants were also asked to consider if recent development in their jurisdiction has created new risk or changed previously identified risks. The meeting minutes and agendas for each of the meetings were published in the local newspaper or paper of record.

The public was provided several opportunities at City Council meetings to comment on the plan during the drafting stage of the plan update. State law requires that public meetings allow for public comment during the meetings as described in SDCL 1-25-1.

> …The public body shall reserve at every regularly scheduled official meeting a period for public comment, limited at the public body's discretion, but not so limited as to provide for no public comment. At a minimum, public comment shall be allowed at regularly scheduled official meetings which are designated as regular meetings by statute, rule, or ordinance.

It was during this legally required public comment period that the public was allowed to provide comments. Mitigation Planning was listed on the required notices for the City Council and County Commission meetings. Notices for public meetings require a minimum of time, date, and location, and were posted in accordance with SDCL 1-25.1.1:

> 1-25-1.1. …Each political subdivision shall provide public notice, with proposed agenda, that is visible, readable, and accessible for at least an entire, continuous twenty-four hours immediately preceding any official meeting, by posting a copy of the notice, visible to the public, at the principal office of the political subdivision holding the meeting. The proposed agenda shall include the date, time, and location of the meeting. The notice shall also be

posted on the political subdivision's website upon dissemination of the notice, if a website exists. For any special or rescheduled meeting, the information in the notice shall be delivered in person, by mail, by email, or by telephone, to members of the local news media who have requested notice. For any special or rescheduled meeting, each political subdivision shall also comply with the public notice provisions of this section for a regular meeting to the extent that circumstances permit.

No comments from the public were received during the public comment period at the City Council meetings. Even though no one from the public showed up to comment on the plan update, discussion took place among the council members, engineers, finance officers, city engineers and/or attorneys (when relevant), and city staff and was documented in the meeting minutes of the local jurisdictions and published in the paper or record for each entity as required by law.

SELECTION OF THE PLANNING TEAM [§201.6(c)(1)]

The McPherson County Emergency Manager and staff from Northeast Council of Governments led the development of the plan update. Participating jurisdictions and their staff were also instrumental in leading the discussions at the planning meetings. The local jurisdictions were represented by city council members and/or finance officers who attended the meetings. The council members then took the information from the work sessions back to their jurisdictions and discussed the progress of the plan at their council meetings. Those who attended the initial planning meeting for the Plan update were asked to volunteer to serve on the planning committee. The planning committee was tasked with reviewing the drafts and providing comments after Northeast Council of Governments initiated changes to the existing plan. Each of the local jurisdictions had a member of their respective councils represent the municipalities in the plan. Those representatives are listed by jurisdiction:

Table 3.1: Plan Representatives for Local Jurisdictions

Jurisdiction	Name	Title
Eureka	Nicole Frerk	Finance Officer
	Lloyd Miller	Mayor
Leola	Sondra Waltman, Finance Officer	Finance Officer
	Deb Weiszhaar	Assistant Finance Officer
	Jeff Tschappat	Sewer and Water Superintendent
	Daniel Yost	Public Works Director
McPherson County	Dave Ackerman	Sheriff/Emergency Manager
	Lindley Howard	Auditor
	Trisha Erdmann	Deputy Auditor
	Dawn Jenner	Highway Secretary
	Donna Brietag	Treasurer
	Tiffany Weiszhaar	Deputy Treasurer
	April Mehlhoff	Deputy Register of Deeds
	Becky Wolff	
	Vicki Geffre	Register of Deeds
	Sharon Guthmiller	Sheriff Secretary
	Lanette Butler	Director of Equalization
	Jackie Kessler	Deputy Appraiser:

The representatives from the municipalities were asked to share the progress of the plan at their monthly council/commission meetings and to ensure that those attending the meetings were aware that they are invited to make comments on and participate in the process of updating the new plan. Comments provided by local residents at the city council meetings were collected and incorporated into the plan.

McPherson County Commissioners Involved in the Plan	
Sid Feickert	Commissioner
Rick Beilke	Commissioner
Delmar Metzger	Commissioner
Jeff Neuharth	Commissioner
Anthony Kunz	Commissioner

Eureka City Council Members Involved in the Plan	
Lloyd Miller	Mayor
Jeremy Eberhart	Council Member
Josh Flemmer	Council Member
Dennis Heilman	Council Member
Dennis Schwingler	Council Member
Connie Woehlhaff	Council Member

Leola City Council Members Involved in the Plan	
Thomas Theisen	Mayor
Lindsey Bollinger	Council Member
Tim Collins Jr.	Council Member
Richard Reis	Council Member
Gayle Seibel	Council Member
Michael Yost	Council Member
Jackie Rau	Council Member

NEIGHBORING JURISDICTION PARTICIPATION [201.6(b)(2)]
After the plan was drafted it was emailed to all of the participants and to the emergency managers in the neighboring counties of: Campbell, Walworth, Edmunds, and Brown; and McIntosh County and Dickey County in North Dakota. Everyone who received an email copy of the plan draft was allowed 32 days to comment on the draft.

PUBLIC INVOLVEMENT [§201.6(b)(1)]
The public was provided several opportunities to comment on the plan during the drafting stages, at the Planning Meetings, City Council Meetings and County Commission Meetings. At each City Council and County Commission meeting, there was a public forum, which gives the public an opportunity to comment on anything on the agenda; however, no one from the public showed up to comment on the plan or to help with the plan update. Those who were most involved were the representatives from the municipalities and those previously mentioned as being instrumental in leading discussions. Table 3.2 identifies the location and date of each opportunity that was provided for the public to comment and how it was advertised. After the plan was drafted it was posted on the McPherson County website and posted on the McPherson County Sheriff's Facebook page asking the public to provide comments. Everyone was allowed 32 days to comment on the draft.

Location of Opportunity	Date				How Was Meeting Advertised			
		City Council Meeting	County Commission Meeting	Planning Meeting	Public Notice	Agenda	Mailing	Website
Eureka	11/12/2019	☒	☐	☐	☐	☒	☐	☐
	12/9/2019	☒	☐	☐	☐	☒	☐	☐
Hillsview	N/A	☐	☐	☐	☐	☐	☐	☐
Leola	10/24/2019	☐	☐	☒	☐	☐	☐	☐
	11/4/2019	☒	☐	☐	☐	☒	☐	☐
	12/2/2019	☒	☐	☐	☐	☒	☐	☐
Long Lake	N/A	☐	☐	☐	☐	☐	☐	☐
	N/A	☐	☐	☐	☐	☐	☐	☐
McPherson County	9/4/2018	☐	☒	☐	☐	☒	☐	☐
	10/2/2018	☐	☒	☐	☐	☒	☐	☐
	12/4/2018	☐	☒	☐	☐	☒	☐	☐
	12/3/2019	☐	☒	☐	☐	☒	☐	☐

TECHNICAL REVIEW OF EXISTING DOCUMENTS [§201.6(b)(3)]

The review and incorporation of existing plans, studies, reports and technical information was completed by the plan author. Each of the communities were asked to provide a list of existing documents that they have available. Many of the smaller communities do not have such documents. Additionally, the 2014 Plan was used as a resource for the new plan because most of the natural hazard profile research had already been completed when it was drafted. In addition to the 2014 Plan, the plan author reviewed several other existing documents including but not limited to the South Dakota State Hazard Mitigation Plan, the South Dakota Drought Mitigation Plan and the City and County's Zoning Ordinances and Comprehensive Plans, and the flood damage prevention ordinance. In McPherson County, Eureka and Leola have their own comprehensive plans and zoning ordinances. Long Lake and Wetonka are covered under the County Zoning Ordinances and Comprehensive Plan therefore they do not have their own individual zoning or planning documents. Hillsview has formally opted out of McPherson County Zoning however they still comply with the County's zoning ordinances. Enforcement of the county zoning is managed by the County. A summary of the technical review and incorporation of existing plans is included in Table 3.6 provided on page 17.

Existing Program/Policy/ Technical Documents	Local Jurisdiction					
	Eureka	Hillsview	Leola	Long Lake	Wetonka	McPherson County
Comprehensive Plan	✓	N/A	✓	N/A	N/A	C
Growth Management Plan	N/A	N/A	N/A	N/A	N/A	N/A
Flood Damage Prevention Ordinance	✓	N/A	N/A	N/A	N/A	✓
Floodplain Management Plan	✓	N/A	N/A	N/A	N/A	✓
Flood Insurance Studies or Engineering studies for streams	N/A	N/A	N/A	N/A	N/A	N/A
Hazard Vulnerability Analysis (by the local Emergency Management Agency)	C	C	C	C	C	C
Emergency Operations Plan	N/A	N/A	C	N/A	N/A	C
Zoning Ordinance	✓	N/A	✓	C	C	C
Building Code	IBC 2012	IBC 2012	IBC 2012	IBC 2012	IBC2012	IBC 2012
Drainage Ordinance	N/A	N/A	N/A	N/A	N/A	√
Critical Facilities maps	N/A	N/A	C	N/A	N/A	N/A
Existing Land Use maps	✓	N/A	✓	N/A	N/A	N/A
Elevation Certificates	N/A	N/A	N/A	N/A	N/A	N/A
State Hazard Mitigation Plan	✓	✓	✓	✓	✓	✓
HAZUS	N/A	N/A	N/A	N/A	N/A	N/A

NA: the jurisdiction does not have this program/policy/technical document

C: the jurisdiction is regulated under the County's policy/program/technical document

O The jurisdiction has the program/policy/technical document, but did not review/incorporate it in the mitigation plan

✓ the jurisdiction reviewed the program/policy/technical document

IBC 2012: Jurisdiction follows International Building Code 2012

REVIEW OF THE 2014 PLAN

The planning committee reviewed and analyzed each section of the plan and each section was revised as part of the update process. The 2014 Plan did not include all requirements listed in the Local Mitigation Plan Tool. When the planning committee reviewed the 2014 Plan, they found that the Plan would be more easily read and understood if it followed the outline of the planning tool. The outline was then used to create a new Table of Contents and the rest of the plan was developed from the Table of Contents. The plan author also used the Local Mitigation Planning Handbook (dated March 2013) and the How-to Guides provided by FEMA to develop tables for the updated plan.

When the planning committee reviewed the 2014 Plan, some of the appendices were eliminated, and others were revised. Additional appendices were added. Every section of the plan was reconsidered by the planning committee and the group decided which sections were useful and which sections should be eliminated. The committee review of the plan took place over the course of work sessions that were held on the following dates:

September 12, 2018 (LEPC Meeting)
McPherson County Commission Meeting - October 4, 2018
November 7, 2018 (LEPC Meeting)
McPherson County Commission Meeting - December 4, 2018
February 13, 2019 (LEPC Meeting)
July 10, 2019 (Leola)
October 24, 2019 (Leola)
Leola City Council Meeting – November 4, 2019
Eureka City Council Meeting – November 12, 2019
Leola City Council Meeting – December 2, 2019
McPherson County Commission Meeting – December 3, 2019
Eureka City Council Meeting – December 9, 2019
McPherson County Commission Meeting – January 7, 2020

The meeting minutes from each of the work sessions give and overview of how each section was analyzed, discussion that took place, and changes that were made. The meeting minutes are attached as Appendix A to the plan for reference.

IV. HAZARD IDENTIFICATION AND RISK ASSESSMENT

CHANGES/REVISIONS TO RISK ASSESSMENT:

- The 2014 Plan had a section titled Risk Assessment. This section has been updated to Hazard Identification and Risk Assessment.
- The method for evaluating the Vulnerability by Jurisdiction was changed.
- The section on Overall Vulnerability for each community was updated, as necessary.
- Calculations on Probability of Future Hazard Events was added to comply with new requirements.
- The tables about past occurrences of hazards that were included in the Hazard Profile were moved to Appendix C
- Estimating Potential Losses, Methodology for Calculating estimated losses and Analyzing Development Trends are entirely new sections

IDENTIFYING HAZARDS [§201.6(c)(2)(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."*

Many websites have been further developed and updated since the drafting of the previous McPherson County Mitigation Plan in 2014. Some of those websites were used as resources for the updated plan. Specifically, the National Oceanic Atmosphere Administration (NOAA) and National Weather Service were used to research natural hazards and disasters that have occurred within the last twenty years within the geographic location covered under the McPherson County Plan. Looking at the data, it appears that data was inconsistently reported from the 1990s and earlier. There are gaps where during a period of several years, only one or two incidents may be reported. That doesn't seem to be consistent with what residents living in the area report. A summary of the findings for significant hazard occurrences from the past twenty years is provided in Table 4.1:

Table 4.1: Significant Hazard Occurrences 2010 – 2019				
Type of Hazard	**# of Occurrences Since 2000**	**# of Years**	**Probability of Future Events, as a %**	**Source**
Hail	70	10	100%	NOAA
Winter Weather (2) / Winter Storm (8) / Blizzard (20) / Ice Storm (1) / Heavy Snow (8)	39	10	100%	NOAA
Thunderstorm Wind	36	10	100%	NOAA
Extreme Cold/Wind Chill	24	10	100%	NOAA
High Wind	18	10	100%	NOAA
Drought	12	10	100%	NOAA
Flood (5) / Flash Flood (2)	7	10	70%	NOAA
Tornado (4) / Funnel Cloud (1)	5	10	50%	NOAA
Heat () / Excessive Heat (2)	2	10	20%	NOAA
Wildfire / Other Fire*	139*	11	100%	NOAA & State Fire Marshall

* Timeline for Wildfire information is a period from 2008 – 2018.

While researching the hazard occurrences that have taken place in McPherson County, it became evident that the information found on the NOAA website was incomplete. Therefore, other sources were contacted whenever possible. Specifically, NOAA listed zero occurrences for wildfires in McPherson County, but the State Fire Marshall's Office was contacted to verify that information. Doug Hinkle, the State Fire Marshall, said their information is derived from the reports submitted by the local fire departments who respond to fires. He also explained that since many of the fire departments in McPherson County are Volunteer Fire Departments many times wildfires are extinguished and reports are never filed with the State. Thus, the information provided by the State Fire Marshall's office is not entirely complete either.

For the purpose of this plan we have used the numbers provided by the State Fire Marshall's Office as a point of reference in determining the likelihood of a wildfire hazard occurrence within the jurisdiction. The information provided by Doug Hinkle identifies 30 structure fires, 35 vehicle fires, and 139 outside fires reported between 2008 and 2018. Only the outside fires were reported in the above table. The cause of the outside fires is not listed, so it is not known for certain whether all or some of these fires resulted due to a natural hazard occurrence or as a result of human behavior. From 2008-2018 the total dollar loss accumulated was $3,125,300. Additionally, the State Fire Marshall provided information about the number of injuries and fatalities reported as a result of these fires. According to Hinkle's records, two civilian injury and one civilian fatalities were reported and zero firefighter injuries have been reported since 2008.

The probability of future events was calculated by taking the number of past occurrences divided by the number of years in the period and then converting that to a percentage. If the calculation yielded a number above one hundred percent, then a 100% probability (of annual occurrence) was used.

Table 4.2 is a list of hazards produced from the FEMA worksheets completed by each local jurisdiction located within McPherson County during the 2014 Plan Update. Representatives from each community completed the worksheet for their geographical location, while representatives of McPherson County completed the worksheet for county-wide risks. They reviewed this information during the 2019 planning process and determined that the information is still relevant and has not changed. All of the worksheets are included as Appendix D.

Table 4.2: Hazards Categorized by Likelihood of Occurrence		
High Probability	**Low Probability**	**Unlikely to Occur**
Hail	Drought	Avalanche
Winter Weather/Winter Storm	Flood/Flash Flood	Coastal Storm
Blizzard	Tornado	Hurricane
Thunderstorms	Heat/Excessive Heat	Volcanic Ash
Extreme Cold/Wind Chill	Ice Storm	Volcanic Explosion
High Wind	Heavy Snow	Tsunami
Wildfire/Other Fire		
Utility Interruptions**		
	** Utility interruptions are not a natural hazard but often occur as a result of natural hazards such as ice storms and strong winds.	

Every possible natural hazard was evaluated and then participants placed them in three separate columns depending on the likelihood of occurrence in the planning jurisdiction. Participants were given instructions that hazards that occur at least once a year were placed in the High Probability column; hazards that may have occurred in the past or could occur in the future but do not occur on a yearly basis were placed in the low probability column; and hazards or disasters that have never occurred in the area before and are unlikely to occur in the planning jurisdiction any time in the future were placed in the Unlikely to Occur column. Participants filled out the surveys according to their own observations and thoughts – it wasn't necessarily completed in a scientific manner.

Due to the topographical features of the County and the nature of the natural hazards that affect the geographical area covered by this plan, most areas of the county have similar likelihood of being affected by the natural hazards identified. Only the natural hazards from the High Probability and Low Probability Columns will be further evaluated throughout this plan. All manmade hazards and hazards in the Unlikely to Occur column will not be further evaluated in the plan.

Table 4.3 identifies the hazards that will be addressed in the Plan update throughout the planning process. Similar to Table 4.2, hazards that occur at least once a year were placed in the High Probability column; hazards that may have occurred in the past or could occur in the future but do not occur on a yearly basis were placed in the low probability column; and hazards or disasters that have never occurred in the area before and are unlikely to occur in the planning jurisdiction any time in the future were placed in the Unlikely to Occur column. However, Table

4.3 is based on actual history of the occurrences in the past 10 years, according to data from NOAA and the State Fire Marshall's Office.

Table 4.3: Overall Summary of Vulnerability by Jurisdiction

Natural Hazards Identified	McPherson Co	Eureka	Leola	Long Lake	Hillsview	Wetonka
Drought	H	H	H	O	O	O
Earthquakes	L	L	L	O	O	O
Extreme Cold	H	H	H	O	O	O
Extreme Heat	M	M	M	O	O	O
Flood/Flash Flood	M	M	M	O	O	O
Freezing Rain/Sleet*	H	H	H	O	O	O
Hail	H	H	H	O	O	O
Heavy Rain**	H	H	H	O	O	O
Ice Jam	L	L	L	O	O	O
Landslides	L	NA	NA	O	O	O
Lightning***	H	H	H	O	O	O
Heavy Snow	M	M	M	O	O	O
Strong Winds	H	H	H	O	O	O
Tornados	M	M	M	O	O	O
Wildfires	H	H	H	O	O	O
Winter Weather/Winter Storms/Blizzards/Ice Storm/Heavy Snow	H	H	H	O	O	O

NA : Not applicable; not a hazard to the jurisdiction
L : Low probability of occurring (< once every 10 years)
M : Medium probability of occurring (< once per year)
H : High probability of occurring (at least once per year) :
O Jurisdiction did not participate in the mitigation planning process
***** NOAA data shows 0 occurrences over a 10 year period; however participants felt this has a high probability of occurring at least once a year
****** NOAA data shows 0 occurrences over a 10 year period; however participants felt this has a high probability of occurring at least once a year
******* NOAA data shows 0 occurrences of lightning over a 10 year period. Because there were 36 instances of thunderstorm winds during that same period, it can be inferred that lightning occurred with most of those storms.

COMMUNITY VULNERABILITY [§201.6(c)(2)(ii)]

Eureka Narrative of Overall Vulnerability: The Town of Eureka has identified that they are particularly vulnerable to drought, extreme cold, freezing rain/sleet, hair, heavy rain, lightning, strong winds, fires and blizzards/winter storms. These hazards were given a rating of "H" for high risk in Table 4.3. Many of these hazards pose the risk of knocking down utility lines which

results in loss of power. Due to the extreme weather conditions in Northeastern South Dakota, the threat of losing power for even a few days can be deadly. During the winter months, an event that causes disruption of utilities can take days, even weeks to repair. Sometimes ice storms take out several miles of power lines and it takes weeks to repair the line and get them up and running again. With no power, many people are left without a source for heat which in turn increases the risk of people freezing to death in their homes. There are also several people in the community that have life-preserving medical devices that require power for operation. Even though these hazards have a high chance of occurring and causing disruption to daily activities, the City of Eureka is incredibly self-sufficient. Eureka experienced an event where they lost power for several weeks. The hospital allowed people with medical devices that require power to take shelter at the hospital. Additionally, the fire department has a backup generator on site, so that facility can be used for additional shelter space if needed. The City would like to identify a designated winter storm shelter in town and provide a backup generator for power in the event of a power outage.

The lift stations and water tower have backup generators and the City also has artesian wells that can be used as a secondary water source if they lose their water tower. The City has three lift stations; one of the lift stations does occasionally flood during periods of high rain or wet weather. Water can enter the system through one of the manholes, which can back up the lift station. The City is undergoing a project to move two of the manholes to higher elevation, which should alleviate this problem.

Strong winds and tornados are common in Eureka. While most people take shelter in their basements, the City has a public storm shelter in the basement of City Hall which is designated for public use during these types of events. The local girl scouts have constructed a tornado storm shelter at City Park which is big enough to accommodate eight to ten people. The shelter was built according to FEMA codes and has been approved by FEMA.

The City has also recently completed a storm sewer project that serves the entire town. When the storm sewer is above capacity, excess water will run down the streets. The storm sewer drains into the natural water drainage areas.

Eureka has a manmade lake that is used for recreation. There is a culvert that allows the water in Eureka Lake to run to the west side of county road 47 which splits the lake into East and West Lake. All of the area on the west side of County Road 47 is considered “West” lake. West Lake is more likely to flood but since it is deed restricted only undeveloped land would be affected. The lake is filled by artesian wells when the water levels are low. When the levels are high due to snow melt and excessive rain, the water runs into West Lake. West Lake is not owned by the City, however the land surrounding West Lake is city owned. The City regulates the land around the lake and no building or development is allowed.

Eureka is the only community in McPherson County that participates in the NFIP program, however, the level of participation is minimal. About 33 years ago the community started the process of participating in NFIP but due to lack of understanding of the program not much has been accomplished. After the designated floodplain administrator left the position, there was no follow up education for the new city management/administrative staff and new city council board members. Over the past two decades no progress has been made. While the city “participates” in NFIP, there is no record of floodplain ordinance ever being passed nor is there record of a resolution designating a floodplain administrator. The current city staff has no training on the NFIP program and therefore lacks understanding of the program. However, they have indicated in their mitigation strategy that they will pursue better knowledge of the program and determine

whether or not they should even be participating. Since there has never been a flood insurance policy sold in Eureka, it may not be worth the hassle of the paperwork involved. The area around Eureka Dam that is not already developed is owned by the City and deed restricted, so nothing will be built there. The homes and other developments around the lake that currently exist are all at least six to seven feet above elevation of the dam.

Eureka takes a lot of pride in their ability to be self sufficient and their ability to come together as a community and take care of people without outside help during events like the ice storm that left them without power for several weeks. The whole community plays a role in mitigation efforts, which is clearly demonstrated by the proactive approach they have taken in establishing storm sewer, shelters, backup power for utilities, and a plan for extended periods without power. Eureka is also proactive in restricting development in areas that have the potential of being flooded.

Leola Narrative of Overall Vulnerability: The Town of Leola has identified that they are particularly vulnerable to drought, extreme cold, freezing rain/sleet, hair, heavy rain, lightning, strong winds, fires and blizzards/winter storms. These hazards were given a rating of “H” for high risk in Table 4.3. Many of these hazards pose the risk of knocking down utility lines which results in loss of power. Due to the extreme weather conditions in Northeastern South Dakota, the threat of losing power for even a few days can be deadly. During the winter months, an event that causes disruption of utilities can take days, even weeks to repair. Sometimes ices storms take out several miles of power lines and it takes weeks to repair the line and get them up and running again. With no power, many people are left without a source for heat which in turn increases the risk of people freezing to death in their homes. There are also several people in the community that have life-preserving medical devices that require power for operation. In the last five years, Leola has renovated the Citizens Building as a storm shelter. The County Courthouse has also been designated as a storm shelter. Many of the residents have also taken it upon themselves to purchase backup generators for their homes to accommodate their specific needs. Leola has recently installed an elevator in the Citizens Building that will provide ADA access to the lower level which will serve as a storm shelter. The city has also installed a backup generator and accessible bathrooms to meet ADA compliance.

Leola has a flatter terrain than some of the other communities in McPherson County which makes it more vulnerable to overland flooding which occurs after periods of excessive rain, heavy snow, and rapid snowmelt. During and after heavy rain events, the community has problems with the basements filling with water in the west side of town.

Long Lake Narrative of Overall Vulnerability: {Even though the Town of Long Lake is not participating in the 2019 Plan Update, this information was identified in the 2014 Plan Update and is being kept in here because it is still valuable information and is included as a source of reference.}

The Town of Long Lake has also identified that they are particularly vulnerable to drought, extreme cold, freezing rain/sleet, hair, heavy rain, lightning, strong winds, fires and blizzards/winter storms. These hazards were given a rating of “H” for high risk in Table 4.3. Many of these hazards pose the risk of knocking down utility lines which results in loss of power. Due to the extreme weather conditions in Northeastern South Dakota, the threat of losing power for even a few days can be deadly. During the winter months, an event that causes disruption of utilities can take days, even weeks to repair. Sometimes ices storms take out several miles of power lines and it takes weeks to repair the line and get them up and running again. With no power, many people are left without a source for heat which in turn increases the risk of people

freezing to death in their homes. The community of Long Lake does not have any source of backup power that is available for public use. Some of the local residents have their own portable generators but the availability of privately owned equipment is not reliable. The community would like to install two stationary generators; one at the fire department and one at the community center.

Long Lake is comprised of mostly older homes, some of which are not in good condition, and many structures such as garages, pole barns and outbuildings that are used mostly for equipment storage. Due to the age of the structures, the structures themselves could be deemed a hazard in strong wind, fires, or tornado events. Long Lake does not have a tornado shelter, but most people seek shelter in their basements or with their neighbors if they do not have one. While Long Lake could benefit from passing a nuisance ordinance and enforcing a stricter building code, the City Council is made up of only three people and the City does not have any full time staff. As with most Class 3 Municipalities, enforcement of ordinances is very difficult if not impossible. A community that does not have a full time finance officer or maintenance personnel is not likely to hire a full time code enforcement officer.

Fires pose a significant risk to the town because Long Lake does not have a city water supply or fire hydrants. While Long Lake used to have an agreement with WEB Rural Water to fill a 1,000 gallon poly tank for additional water supply for fire emergencies, WEB no longer provides water for fire protection. Water is supplied directly to individual users rather than as bulk supply to the town. The only ability Long Lake has to fight fires is the local volunteer fire department which has two grass rigs that hold about 1,000 gallons each. Long Lake relies heavily on mutual aid from neighboring communities such as Ashley, North Dakota and Leola and Eureka. All of these communities are at least 23 miles away. With additional aid being at least 25 minutes (possibly longer since all of the fire departments rely on volunteers) it is possible for a structure or wildfire to spread rapidly and become out of control before additional aid arrives. The Town of Long Lake is located 1.5 miles from Long Lake which could easily be used to draw water from if dry hydrants were installed. This would cut down significantly on the amount of time it would take to fill trucks during a fire event.

Long Lake does not experience flooding or flood-related issues. The Town of Long Lake is located about 1.5 miles from Long Lake and the elevation difference is significant enough that the lake does not pose a threat.

NATURAL HAZARDS IN THE PLAN JURISDICTION

For the purpose of consistency throughout the plan, additional definitions were included to reflect all of the hazards that have a chance of occurring in the area and all of the hazards are alphabetized. For all of the hazards identified the probability of future occurrence is expected to be the same for all jurisdictions covered in the Plan.

Blizzards are snow storms that last at least three hours with sustained wind speeds of 35 mph or greater, visibility of less than a quarter mile, temperatures lower than 20°F and white out conditions. Snow accumulations vary, but another contributing factor is loose snow existing on the ground which can get blown around and aggravate the white out conditions resulting in limited or zero visibility. These conditions are extremely dangerous to motorists and cause many traffic accidents each year; many resulting in death. When such conditions arise, blizzard warnings or severe blizzard warnings are issued. Severe blizzard conditions exist when winds obtain speeds of at least 45 mph plus a great density of falling or blowing snow and a temperature of 10°F or lower.

Drought According to the National Weather Service, "Drought is a deficiency in precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals, and/or people. It is a normal, recurrent feature of climate that occurs in virtually all climate zones, from very wet to very dry. Human factors, such as water demand and water management, can exacerbate the impact that drought has on a region." Generally, this occurs when a region receives consistently below average precipitation. It can have a substantial impact on the ecosystem and agriculture of the affected region. Although droughts can persist for several years, even a short, intense drought can cause significant damage and harm the local economy.

The U.S. Drought Monitor measures Drought Intensity on a scale:

- D0 – Abnormally Dry
- D1 – Moderate Drought
- D2 – Severe Drought
- D3 – Extreme Drought
- D4 – Exceptional Drought

Dam Failure Dams function to serve the needs of flood control, recreation, and water management. During a flood, a dam's ability to serve as a control agent may be challenged. An excessive amount of water may result in a dam breach, simply an overflowing. Dams that are old or unstable, dams that receive extreme amounts of water, or dams that get debris pile-up behind their face may result in dam failure, a cracking and/or breaking. The County has seven dams but only one has been identified as a significant hazard, the others are all classified as low-hazard dams.

Earthquakes are a sudden rapid shaking of the earth caused by the shifting of rock beneath the earth's surface. Earthquakes can cause buildings and bridges to collapse, disrupt gas, electric and phone lines, and often cause landslides, flash floods, fires, avalanches, and tsunamis. Larger earthquakes usually begin with slight tremors but rapidly take the form of one or more violent shocks, and are followed by vibrations of gradually diminishing force called aftershocks. The underground point of origin of an earthquake is called its focus; the point on the surface directly above the focus is the epicenter.

Extreme Cold What constitutes extreme cold and its effects can vary across different areas of the country. However, Eastern South Dakota is prone to much more extreme temperatures than other areas in the United States. Temperatures typically range between zero degrees Fahrenheit and 100 degrees Fahrenheit, so extreme cold could be defined in the McPherson County planning jurisdiction as temperatures below zero.

Extreme Heat, also known as a heat wave, is a prolonged period of excessively hot weather, which may be accompanied by high humidity. There is no universal definition of a heat wave; the term is relative to the usual weather in the area. Temperatures in McPherson County have a very wide range typically between zero to one hundred degrees Fahrenheit, therefore anything outside those ranges could be considered extreme. The term is applied both to routine weather variations and to extraordinary spells of heat which may occur only once a century.

Flooding is an overflow of water that submerges land, producing measurable property damage or forcing evacuation of people and vital resources. Floods can develop slowly as rivers swell during an extended period of rain, or during a warming trend following a heavy snow. Even a very small stream or dry creek bed can overflow and create flooding. Two different types of flooding hazards are present within McPherson County.

1. **Inundation flooding** occurs most often in the spring. The greatest risks are realized typically during a rapid snowmelt. There are no rivers in McPherson County however there are many creeks and ditches. Spring Creek runs through the northwest portion of McPherson County from Campbell County. In the past 10 years there have been five flood events in McPherson County; the events occurred in March of 2010, June of 2011, May 2018, March and April 2019. Snowmelt runoff from an expansive snow cover flooded many creeks, roads, and thousands of acres of pasture and cropland through northeast South Dakota in the spring of 2010. There were numerous road closures in neighboring counties, however McPherson County only had a few. Most lakes and rivers in northeast South Dakota were at or very near record levels. On June 20, 2011, a large upper level low pressure area long with deep moisture brought very heavy rains to northeast South Dakota. Rainfall amounts of three to seven inches occurred across much of the area resulting in widespread flooding. On May 17, 2018 extreme rainfall occurred with amounts in the county ranging from 4 – 13 inches of rain causing extensive flooding and flash flooding. Many roads and cropland were flooded and damaged. Several roads had to be barricaded. There was some sandbagging at some farmsteads with several homes receiving water in their basements. In March 2019, Snowmelt flooded several roads in McPherson County with some buildings threatened or flooded. On March 30th, County Road 23 two miles south of Highway 10 went underwater and was closed. In April 2019, the continuation of snowmelt from a much above normal snowfall winter combined with a historic heavy snow/blizzard in mid-April resulted in widespread flooding across McPherson County. Countless roads along with thousands of acres of cropland were flooded throughout April. Impacts include damaged roads, culverts, and bridges, and livestock, homes, and businesses were affected. McPherson County declared an emergency/disaster in March and April due to the widespread flooding and March blizzard. South Dakota's governor declared a disaster for the State in March. This declaration was followed by a Presidential disaster declaration that affected most of the State.

2. **Flash Flooding** typically occurs during the summer months. This flooding is primarily localized, though enough rain can be produced to cause inundation flooding in Leola, Eureka, and surrounding areas. Heavy, slow moving thunderstorms often produce large amounts of rain. Eastern parts of McPherson County are relatively flat area, allowing

moisture to remain in low-lying areas. The threat of flooding would be increased during times of high soil moisture. In addition, debris carried by water can significantly compromise the effectiveness of otherwise adequately designed bridges, dams, culverts and other structures. McPherson County has been a part of a number of past flooding events that have hit the region. In the past two decades, there have been flash flood events in McPherson County five consecutive years between 2006 and 2010. The most recent event was in May 2018.

Freezing Rain/Ice occurs when temperatures drop below 30 degrees Fahrenheit and rain starts to fall. Freezing rain covers objects with ice, creating dangerous conditions due to slippery surfaces, platforms, sidewalks, roads, and highways. Sometimes ice is unnoticeable, and is then referred to as black ice. Black ice creates dangerous conditions, especially for traffic. Additionally, a quarter inch of frozen rain can significantly damage trees, electrical wires, weak structures, and other objects due to the additional weight bearing down on them.

Hail is formed through rising currents of air in a storm. These currents carry water droplets to a height at which they freeze and subsequently fall to earth as round ice particles. Hailstones usually consist mostly of water ice and measure between 5 and 150 millimeters in diameter, with the larger stones coming from severe and dangerous thunderstorms.

Heavy Rain is defined as precipitation falling with intensity in excess of 0.30 inches (0.762 cm) per hour. Short periods of intense rainfall can cause flash flooding while longer periods of widespread heavy rain can cause rivers to overflow.

Ice Jams occur when warm temperatures and heavy rain cause snow to melt rapidly. Snow melt combined with heavy rains can cause frozen rivers to swell, which breaks the ice layer on top of the river. The ice layer often breaks into large chunks, which float downstream and often pile up near narrow passages other obstructions, such as bridges and dams.

Landslide is a geological phenomenon which includes a wide range of ground movement, such as rock falls, deep failure of slopes and shallow debris flows, which can occur in offshore, coastal and onshore environments. Although the action of gravity is the primary driving force for a landslide to occur, there are other contributing factors build up specific sub-surface conditions that make the area/slope prone to failure, whereas the actual landslide often requires a trigger before being released.

Lightning results from a buildup of electrical charges that happens during the formation of a thunderstorm. The rapidly rising air within the cloud, combined with precipitation movement within the cloud, results in these charges. Giant sparks of electricity occur between the positive and negative charges both within the atmosphere and between the cloud and the ground. When the potential between the positive and negative charges becomes too great, there is a discharge of electricity, known as lightning. Lightning bolts reach temperatures near 50,000˚ F in a split second. The rapid heating and expansion, and cooling of air near the lightning bolt causes thunder.

Severe Winter Storms deposit four or more inches of snow in a 12-hour period or six inches of snow during a 24-hour period. Such storms are generally classified into four categories with some taking the characteristics of several categories during distinct phases of the storm. These categories include: freezing rain, sleet, snow, and blizzard. Generally winter storms can range from moderate snow to blizzard conditions and can occur between October and April. The months of May, June, July, August, and September could possibly see snow, though the

chances of a storm is very minimal. Like summer storms, winter storms are considered a weather event not a natural hazard, and thus will not be evaluated as a natural hazard throughout this plan.

Sleet does not generally cling to objects like freezing rain, but it does make the ground very slippery. This also increases the number of traffic accidents and personal injuries due to falls. Sleet can severely slow down operations within a community. Not only is there a danger of slipping, but with wind, sleet pellets become powerful projectiles that may damage structures, vehicles, or other objects.

Snow is a common occurrence throughout the County during the months from October to April. Accumulations in dry years can be as little as 5-10 inches, while wet years can see yearly totals between 110-120 inches. Snow is a major contributing factor to flooding, primarily during the spring months of melting.

Strong winds are usually defined as winds over 40 m/h, are not uncommon in the area. Winds over 50 m/h can be expected twice each summer. Strong winds can cause destruction of property and create a safety hazards resulting from flying debris. Strong winds also include severe localized wind blasting down from thunderstorms. These downward blasts of air are categorized as either microbursts or macrobursts depending on the amount geographical area they cover. Microbursts cover an area less than 2.5 miles in diameter and macrobursts cover an area greater than 2.5 miles in diameter.

Subsidence is defined as the motion of a surface as it shifts downward relative to a datum. The opposite of subsidence is uplift, which results in an increase in elevation. There are several types of subsidence such as dissolution of limestone, mining-induced, faulting induced, isostatic rebound, extraction of natural gas, ground-water related, and seasonal effects.

Summer Storms are generally defined as atmospheric hazards resulting from changes in temperature and air pressure which cause thunderstorms that may cause hail, lightning, strong winds, and tornados. Summer storms are considered a weather event rather than a natural hazard, therefore summer storms are not evaluated as a natural hazard throughout this plan.

Thunderstorms are formed when moisture, rapidly rising warm air, and a lifting mechanism such as clashing warm and cold air masses combine. The three most dangerous items associated with thunderstorms are hail, lightning, and strong winds.

Tornados are violent windstorms that may occur singularly or in multiples as a result of severe thunderstorms. They develop when cool air overrides warm air, causing the warm air to rapidly rise. Many of these resulting vortices stay in the atmosphere, though touchdown can occur. The Fujita Tornado Damage Scale categorizes tornadoes based on their wind speed:

F0=winds less than 73 m/h
F1=winds 73-112 m/h
F2=winds 113-157 m/h
F3=winds 158-206 m/h
F4=winds 207-260 m/h
F5=winds 261-318 m/h
F6=winds greater than 318 m/h

Wildland Fires are uncontrolled conflagrations that spread freely through the environment. Other names such as brush fire, bushfire, forest fire, grass fire, hill fire, peat fire, vegetation fire, and wildland fire may be used to describe the same phenomenon. A wildfire differs from the other fires by its extensive size; the speed at which it can spread out from its original source; its ability to change direction unexpectedly; and to jump gaps, such as roads, rivers and fire breaks.

Fires start when an ignition source is brought into contact with a combustible material that is subjected to sufficient heat and has an adequate supply of oxygen from the ambient air. Ignition may be triggered by natural sources such as a lightning strike, or may be attributed to a human source such as “discarded cigarettes, sparks from equipment, and arched power lines.

HAZARD PROFILE [§201.6(c)(2)(ii)]

Requirement §201.6 (c)(2)(i): [The risk assessment shall include a] description of the type of the… 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.

Geographic location of each natural hazard is addressed in the updated plan. Most of the hazards identified have the potential of occurring anywhere in the County. Previous occurrences are listed individually by the type of hazard and by location in the following tables. Table 4.4 identifies the Latitude and Longitude of the local jurisdictions along with the population, elevation, and number occupied homes according to the 2010 US Census.

Table 4.4: Latitude/Longitude of Communities within the County

City	Population	Location		Elevation	Occupied Units
Eureka	868	45°46′9″N	99°37′19″W	1890 ft	420
Hillsview	3	45°40′4″N	99°33′38″W	1850ft	1
Leola	457	45°43′16″N	98°56′19″W	1591 ft	214
Long Lake	31	45°51′23″N	99°12′24″W	1952ft	22
Wetonka	8	45°37′28″N	98°46′8″W	1470ft	3

Population and Occupied Units information was collected from US Census Bureau website: http://factfinder2.census.gov

Additionally, the extent (i.e., magnitude or severity) of each hazard, information on previous occurrences of each hazard and the probability of future events (i.e., chance or occurrence) for each hazard are addressed in the following tables. While the planning committee reviewed all hazard occurrences that have been reported in the last 100 years, the list for some of the hazards was extremely long. The information provided in the tables is not a complete history, but rather an overview of the hazard events which have occurred over the last ten years. The planning committee felt the hazard trend for the last 10 years could be summarized in this

section and decided to include any new occurrences that have taken place since the previous plan was drafted.

DAM FAILURE

Dam breach or failure is of lesser concern for the citizens of McPherson County than flooding due to the location of the dams in the County. Dam Failure is usually associated with intense rainfall or a prolonged flood condition (rainy day), or it can occur anytime (clear day). Dam failure can be caused by a variety of sources, to include: faulty design, construction and operational inadequacies, outliving its useful life, intentional breaches, or a flood event larger than the design. The greatest threat from dam failure is to people and property in areas immediately below the dam since flood discharges decrease as the flood wave moves downstream.

The degree and extent of damage depend on the size of the dam and circumstances of the failure. A large dam failure might bring about considerable loss of property, destruction of cropland, roads and utilities and even loss of life; as well as similar consequences to a small dam failure: loss of irrigation water for a season and extreme financial hardship to many farmers. More severe consequences of dam failure can include loss of income, disruption of services and environmental devastation.

Dam Data

McPherson County has one high-risk dam identified by the National Inventory of Dams: Eureka Dam. The Eureka Dam is owned by the City of Eureka. It has a height of fifteen feet and capacity of 594 acre feet.

In general, Eureka Dam is in reasonably good structural condition. It is, however, seriously inadequate hydrologically because the dam is capable of passing about thirty percent of the Probable Maximum Flood (PMF). Since Lundquist Dam is an intermediate size dam with a Category I hazard classification, the minimum spillway design flood is fifty percent of the PMF.

The locations of the dams are found in Table 4.5:

4.5 Dam Locations in McPherson County

ID	Name	Owner	Location (Lat/Long)	Hazard	Height	Storage
SD00665	Leola (Lunkquist) Dam	SD School and Public Lands	45.7266 -98.9533	Low	12 ft	163 acre ft
SD00666	Eureka Lake	City of Eureka	45.7166 -98.64000	Significant	15 ft	594 acre ft
SD02203	Crompton Lake	SD School and Public Lands	45.61166 -98.86353	Low	20 ft	1,225 acre ft
SD00667	Wolff Lake	SD School and Public Lands	45.89166 -99.41833	Low	20 ft	285 acre ft
SD02418	Dohn Dam	Private	45.89166 -99.63833	Low	17 ft	153 acre ft
SD02495	Krein Dam	Private	45.66170 -98.95500	Low	10 ft	560 acre ft
SD02249	Perch Lake Dam	US Fish and Wildlife Service	45.635 -99.1766	Low	26 ft	472 acre ft

DROUGHT AND WILDFIRE

South Dakota's climate is characterized by cold winters and warm to hot summers. There is usually light moisture in the winter and marginal to adequate moisture for the growing season for crops in the eastern portion of the state. Semi-arid conditions prevail in the western portion. This combination of hot summers and limited precipitation in a semi-arid climatic region places South Dakota in a potential position of suffering a drought in any given year. The climatic conditions are such that a small departure in the normal precipitation during the hot peak growing period of July and August could produce a partial or total crop failure.

South Dakota's economy is closely tied to agriculture and only magnifies the potential loss which could be suffered by the state's economy during drought conditions. Table 4.6 identifies the 20-year drought history for McPherson County.

Table 4.6 McPherson County 20-Year Drought History

Location	Date	Intensity
McPherson County	June 2002	D0-D1
McPherson County	June – September 2006	D0-D3t
McPherson County	October – December 2012	D1-D2
McPherson County	January – April 2013	D1-D2
McPherson County	June – September 2017	D1-D3
McPherson County	September 2018	D0-D2

Drought in McPherson County tends to be cyclical depending on weather patterns in the region. Over the course of the past three decades McPherson County has had regular drought occurrences, every two to three years on average. Roughly every 50 years a significant drought is experienced within the county, while many less severe droughts occur.

Major drought occurrences:

- 2017 – McPherson County experienced drought in the summer and through the Fall of 2017. Most of the counties across central and north central South Dakota had enacted burn bans due to the very high to extreme fire danger. Many counties, including McPherson, issued drought declarations with the Governor declaring a statewide drought emergency. The South Dakota Drought Task force was also activated. During that period, much of central and northern South Dakota had only received 50 to 75 percent of normal precipitation. McPherson County enacted a burn ban in June 2017.

- 1988-1989: An abnormally low amount of precipitation in the summer of 1987 combined with a hot and dry summer during 1988, left South Dakota in serious condition. McPherson County experienced 75 to 100 percent crop damage in both years. Farmers were forced to sell cattle due to lack of feed and grazing. Sometimes drought disasters are declared due to failure of growth in small grains during spring planting.

- 1930s: During the infamous dust bowl years, McPherson County was not spared a fair share of problems. Particularly dry summers were in 1934 and 1936.

- 1880s-1890s: The years 1887, 1894-1896, 1898-1901 were very dry years.

A strong possibility exists for simultaneous emergencies during droughts. Wildfires are the most common. As mentioned on page 21 of this plan, the accuracy of the fire history is questionable, because the State Fire Marshall's Office collects information from the County, thus the accuracy of the information reported relies on the local fire departments, some of which are volunteer fire departments that are responsible for filing the reports.

McPherson County is mostly pasture grassland and CRP so the probability of wildfire occurrences depends on the weather conditions. There are no urban interface areas in McPherson County so the likelihood of occurrence is not more prevalent in any part of the County. Property at risk includes all public and private land and structures in the fire's path.

FLOOD

Flooding is a temporary overflow of water onto lands not normally covered by water producing measurable property damage or forcing evacuation of people and resources. Floods can result in injuries and even loss of life when fast flowing water is involved. Six inches of moving water is enough to sweep a vehicle off a road. Disruption of communication, transportation, electric service, and community services, along with contamination of water supplies and transportation accidents are very possible. A summary of the 10-year flood history has been included in tables 4.7 and 4.8. More information on flood history is included in tables C.1 and C.2 in Appendix C.

Table 4.7 McPherson County 20-Year Flash Flood History 2010 to 2019

Location	Date	Time	Property Damage
Leola	May 22, 2010	20:10	$0
Several supercell thunderstorms developed along a very strong warm front. Nearly one-hundred power poles were downed along with several high line towers leaving nearly a thousand customers without power. Also, very strong straight line winds and large hail up to the size of golf balls affected parts of the area causing some damage. Heavy rain of over two inches fell in Leola within one hour causing street flooding throughout town.			
Long Lake	May 17, 2018	16:10	$54,000
Extreme rainfall and severe weather occurred along a stationary frontal boundary extending across the region. Thunderstorms training over the same area brought rainfall amounts from 3 to over 13 inches causing extensive flash flooding. Many roads and cropland were flooded and damaged. Several roads had to be barricaded. There was some sandbagging at some farmsteads with several homes receiving water in their basements. The South Dakota governor requested a Presidential Disaster Declaration for Campbell, Walworth, and McPherson counties. The total estimated damage in all three counties was 3,115,000 dollars. Some extreme rainfall amounts include, 3.96 inches at Eureka, 6.17 inches 11 miles southwest of Eureka, 6.70 inches 5 miles west of Hillsview, 8 inches 5 miles west of Long Lake, 9 inches at Long Lake, 9.5 inches 4 miles north northwest of Long Lake, and 13.15 inches 3 miles northwest of Long Lake. Severe weather with hail up to the size of golf balls along with winds gusting to near 80 mph also brought damage to parts of central and north central South Dakota. The city of Eureka reported significant roof and property damage due to large hail.			

Table 4.8 McPherson County 20-Year Flood History 2010 to 2019			
Location	**Date**	**Time**	**Property Damage**
Greenway	March 15, 2010	8:00	$0
Snowmelt runoff from an expansive snow cover flooded many creeks, roads, along with thousands of acres of pasture and cropland throughout northeast South Dakota. There were numerous road closures. The flooding lasted through the end of the month and for many locations into April. Several farms were surrounded by water with some people stranded. Thousands of acres of cropland will not be planted due to too much water. Many people in northeast South Dakota have had too much water for many years. The road damage was extensive and repairs will be in the millions of dollars. Many roads across the area will also have to be raised. Many people had extra long commutes due to flooded roads with some people having to move out of their homes.			
Greenway	June 20, 2011	14:00	$0
A large upper level low pressure area along with deep moisture brought very heavy rains to central, north central, and northeast South Dakota. Rainfall amounts of 3 to 7 inches occurred across much of the area resulting in widespread flooding. Many creeks were flooded along with many roads and thousands of acres of crop and pastureland by the two day heavy rain event. Many roads were closed across the area. The two day rainfall amounts were generally more than the normal June rainfall across the region. Some rainfall amounts across the region included: 3.69 inches at Leola.			
Greenway	May 17, 2018	20:10	$0
Extreme rainfall and severe weather occurred along a stationary frontal boundary extending across the region. Thunderstorms training over the same area brought rainfall amounts from 3 to over 13 inches causing extensive flash flooding. Many roads and cropland were flooded and damaged. Several roads had to be barricaded. There was some sandbagging at some farmsteads with several homes receiving water in their basements. The South Dakota governor requested a Presidential Disaster Declaration for Campbell, Walworth, and McPherson counties. The total estimated damage in all three counties was 3,115,000 dollars. Some extreme rainfall amounts include, 3.96 inches at Eureka, 6.17 inches 11 miles southwest of Eureka, 6.70 inches 5 miles west of Hillsview, 8 inches 5 miles west of Long Lake, 9 inches at Long Lake, 9.5 inches 4 miles north northwest of Long Lake, and 13.15 inches 3 miles northwest of Long Lake. Severe weather with hail up to the size of golf balls along with winds gusting to near 80 mph also brought damage to parts of central and north central South Dakota. The city of Eureka reported significant roof and property damage due to large hail. Extensive flooding from very heavy rains remained through the night and most of the next day for much of western and northern McPherson county.			
Greenway	March 26, 2019	7:00	$0
Much above normal winter snowfall and melt water/ice jams along with heavy rains in the middle of March brought flooding across parts of central and northeast South Dakota for late March. Rivers and creeks flooded across much of the area along with many fields and roads. The flooding damaged many of the roads and culverts across the region. Some structures were also flooded. Many counties issued emergency declarations for the flooding to include the mid-March snowstorm. South Dakota's governor also declared a state of emergency. Much of this flooding continued into early April as the snowmelt continued with the high water delaying planting. Snowmelt flooded several roads in McPherson county with some buildings threatened or flooded. On March 30th, County Road 23 two miles south of Highway 10 went underwater and was closed.			
Greenway	April 1, 2019	0:00	$0
The continuation of snowmelt from a much above normal snowfall winter combined with a			

historic heavy snow/blizzard in mid-April resulted in widespread flooding across central and northeast South Dakota. Countless roads along with thousands of acres of cropland were flooded throughout April. Impacts include damaged roads, culverts, and bridges, and livestock, homes, and businesses were affected. Delayed planting resulted across all of the region as well. Cattle and calves were stressed by the cold and wet pattern, as the mud and cold caused some sickness with the livestock. Flooded roads made it difficult for many farmers or ranchers to get to their fields or livestock. The wet pattern along with the flooding continued into May, further delaying planting across the region. All counties declared emergencies/disasters in March and April due to the widespread flooding and March blizzard. South Dakota's governor declared a disaster for the state in March. This declaration was followed by a disaster declaration by the President of the United States. As a result, 24 of the 26 counties across central and northeast South Dakota, including McPherson County were able to have access to public property damage assistance. Overall, damage estimates from the blizzards and floods for the state were at 43 million dollars.

Table 4.7 shows flash flood events that occurred in McPherson County over the course of the past two decades. While this information is valuable in showing the likelihood of future flood events, the information collected from the NOAA website appears to be incomplete as it mostly does not show values in the property and crop damage column. It would be reasonable to assume that damage was caused in each event listed but for whatever reason was not reported in dollars lost or damaged. For the purpose of mitigation planning, future damage was estimated based on the historical evidence that flooding will occur in McPherson County on a regular basis. One should note that the type of flooding is not always a result of an overflowing body of water but usually a result of flash flooding and high ground water which leaves the ground saturated and unable to absorb any additional water from rainfall or snowmelt.

Information found on the NOAA website is sometimes inaccurate due to incomplete reporting at the local, State, and Federal level.

NFIP: [§201.6(c)(2)(ii)]
Currently Eureka is the only community in McPherson County that participates in the NFIP program; however, currently there are no flood insurance policies in the community. McPherson County has never been mapped therefore no DFIRMS are available.

CRS Program:
McPherson County is not part of the Community Rating System program at this time.

CURRENT FLOODING CONDITIONS:
Mitigation for flooding is always a priority even during dry years. The County regularly has roads that flood in the spring due to snowmelt, runoff and heavy rains. This past year County Road 11 and several township roads were flooded. Flooding in McPherson County is a challenge to the residents and property owners who are affected each year.

HAIL
Table C.3 (located in Appendix C) indicates seventy hail occurrences by location throughout the county over a ten year period. There were even fifteen instances with hail over 2.0 inches in diameter. However, the information provided by the NOAA and SHELDUS websites was incomplete due to inconsistent reporting after such hazards occur. Obviously, with such a high

number of occurrences it is reasonable to expect that at least some property or crop damage was sustained in the communities during some of the occurrences, even though the damage may not have been reported or recorded.

The City of Eureka reported significant damage to roofs and other property due to large hail in a May 2018 storm that generated 1.75 inch diameter hail. Another storm in Eureka in September 2018 with the same size hail resulted in reports of broken windows from hail damage.

It is possible that most damage was not reported because it was believed to be insignificant at the time, or because those responsible for reporting such information did not report to the proper agencies.

Again, hail is common for this region during the spring, summer, and fall and causes thousands of dollars of damage every year. Unfortunately the total damages for each event are not available but hopefully in the near future a method for collecting this data will evolve so that it can be made available to local governments for mitigation planning.

HIGH/SEVERE WIND

Severe wind events are common in eastern South Dakota. Several times a year the residents of McPherson County can expect to experience strong winds in excess of 40 mph. Gusts of wind in excess of 100 mph have also been recorded for the area. NOAA shows 18 reports of high/severe wind during the last ten years. Many of the reports don't include damage due to high winds. Many of the storm reports state that there was property and tree damage but no value is placed on the damage.

In April 2010, strong winds developed across the region and combined with low humidity and dry fuels fanned several grass fires, the largest of which was started from a downed power line in neighboring Campbell County. The fire grew to be five miles long by two miles wide and traveled eight miles before it was brought under control. Almost 6000 acres were burned with nearly 20 fire departments dispatched.

It's not uncommon for high winds to knock down power lines and for residents to be without power for a time until the poles can be repaired.

A complete 10-year history of High/Severe Winds can be found in Table C.4 in Appendix C

LIGHTNING/THUNDERSTORM

The extent or severity of lightening can range from significant to insignificant depending on where it strikes and what structures are hit. Water towers, cell phone towers, power lines, trees, buildings and other structures all have the possibility of being struck by lightning. People who leave shelter during thunderstorms to watch or follow lightening also have the possibility of being struck by lightning. The lightning history for the past 10 years shows zero occurrences listed on the NOAA website. Because there were 36 instances of thunderstorm winds during that same period, it can be inferred that lightning occurred with all of those storms.

Since lightning is common in this region of the United States and in McPherson County it is evident that the information reported in the NOAA website is inaccurate and incomplete. Since

no information was provided a table showing location, date, time, and magnitude was not included in the plan. It is reasonable to believe that lightning can occur anywhere in the County.

Thunderstorms and high wind occurrences in the County are also very common. Table C.5 in Appendix C denotes the extent and severity of such hazards. The County continues to educate residents of the dangers of such storms through public service announcements and other printed media.

TORNADOS

The annual risk for intense summer storms is very high. All of McPherson County is susceptible to summer storms. Warning time for summer storms is normally several hours, sufficient for relocation and evacuation if necessary. However, tornadoes may occur with little or no warning. Table C.6 in Appendix C includes the tornado history in McPherson County over the course of the past 10 years. There have been four occurrences of tornados in McPherson County in the last ten years.

June 2002 - a powerful supercell thunderstorm produced six tornados from eastern McPherson County and across northern Brown County during the evening hours. The first weak tornado (F0) touched down briefly 6.4 miles northeast of Leola and resulted in no damage. The second tornado (F1) touched down 8.5 miles northeast of Leola and crossed over into McPherson County where it dissipated 9 miles northwest of Barnard. This tornado brought down many trees and a barn and caused damage to the siding and the roof of a farmhouse in McPherson County and caused no damage in Brown County. A third weak satellite tornado (F0) occurred following the dissipation of the second tornado and resulted in no damage.

A fourth strong tornado (F3) developed 6 miles west of Barnard and moved east and dissipated 3 miles southeast of Barnard. This tornado brought down some high power lines along with a support tower and tossed a pickup truck 100 yards into a group of trees. The pickup truck was totaled. The tornado caused extensive damage to two farmhouses, several farm buildings, and farm equipment. One farmhouse lost its garage and most of its roof with many trees completely snapped off down low and debarked.

The fifth tornado developed 5 miles southeast of Barnard and became a violent tornado (F4). This tornado caused damage to one farmhouse, several outbuildings, trees, and equipment as it moved northeast and strengthened. The tornado then completely demolished two unoccupied homes, several outbuildings, and many trees, along with destroying or damaging some farm equipment before dissipating 7.6 miles northeast of Barnard. Also, a sixth weak satellite tornado (F0) occurred with this violent tornado and caused no damage. This was the first F4 tornado recorded in Brown county and one of few recorded in South Dakota.

The total estimated property loss exceeded a million dollars. This is just one example of the extent and severity of a tornado; however, gathering historical data on tornadoes and thunderstorms is very difficult due to the number of occurrences and unconfirmed reports. Each year, many storms and a few tornadoes affect the county. Summer storms in McPherson County usually produce a wide range of damage making damage estimates very difficult. A complete listing of all summer storms having occurred within the county is not possible due to inaccurate reporting. The National Weather Service reports online were the primary source for this information.

July 2008 - In the early morning hours of July 31st, a line of storms originating in North Dakota began to expand and surge southeast into northeast South Dakota. As the storms moved southeast, they began to tap into warmer, more humid air and rapidly evolve into a line of severe thunderstorms. Widespread damage occurred in a wide swath extending from Long Lake in McPherson County all the way into eastern Grant County and southern Big Stone County in Minnesota. The most extensive damage was generally found along and near U.S. Highway 12 from Aberdeen to Milbank. Several observing stations in the path of this system measured wind speeds ranging from 70 mph to over 115 mph. Estimated wind speeds from damage surveys indicated even stronger winds with peak speeds of 120 mph.

May 2010 - Several supercell thunderstorms developed along a very strong warm front and produced nine tornadoes from Akaska to Bowdle to Hecla. The other tornadoes ranged from EF0 to EF2 and caused extensive tree and building damage. Nearly one-hundred power poles were downed along with several high line towers leaving nearly a thousand customers without power. A tornado entered southeast McPherson County from northeast Edmunds County. The tornado struck a farm along State Highway 45 where a calving shed was completely destroyed with large sections of the roof blown over 100 yards. The tornado then caused moderate damage to a barn with one collapsed wall. Multiple softwood and hardwood trees were uprooted and many power poles were completely snapped near the base. The tornado tore the roof off a turkey barn at the Long Lake Colony. Several Wetonka homes also sustained minor roof damage. The wind speeds were estimated between 111 and 120 mph. Tornadoes in Edmunds and McPherson counties damaged 60 utility poles. FEM Electric customers on 40 meters were without power for 48 hours. Emergency repair and restoration costs for FEM Electric were estimated at $210,000.

September 2014 - A weak tornado touched down quickly northwest of Long Lake with no damage reported.

July 2015 - A small rope tornado touched down briefly in an open field near Leola.

The information provided illustrates how several tornados can occur very close together in the same area. While the 10-year history for McPherson County does not indicate that tornados occur very often and when they do the tornados many times do not touch down, or cause any damage; however many of the neighboring counties have had severe damage caused by tornado so it is reasonable to expect that similar tornado events can occur in McPherson County.

EXTREME TEMPERATURES

Extreme temperatures in McPherson County are common occurrences. It is expected that at least two times each year there will be extreme heat or extreme cold in the area. The following information was found on the SHELDUS and NOAA websites. It is possible that people in the area have adapted to this type of extreme temperatures and thus such weather events are not reported as often as they occur. It is also possible that the information has only in recent years been tracked or reported. Table C.7, located in Appendix C identifies dates and times of the temperature extremes.

July 2011 - A large upper level high pressure area built over the region bringing very hot and humid conditions. This was the worst heat wave to hit the region since July 2006. Surface dew point temperatures in the 70s and lower 80s brought extreme heat index values of up to 110 to 125 degrees. The dewpoints were some of the highest ever recorded in the region. The

prolonged heat took its toll on livestock with fifteen hundred cattle perishing during the heat. Numerous sports and outdoor activities were cancelled. The highest heat index value occurred at Leola with a temperature of 98 degrees and a dewpoint of 82 degrees, the heat index hit 125 degrees.

July 2016 - A very warm and abnormally large upper level high pressure area along with high dew points brought high heat indices to central and northeast South Dakota. High temperatures were in the upper 80s to the 100s with overnight lows in the upper 60s to the mid 70s. A few of the highest heat index values include: 110 degrees at Eureka.

The counterpart to extreme cold is extreme heat which also has dangerous implications to humans, livestock, and critical structures and facilities if certain conditions are present. On July 23, 2007, high heat indices along with very little wind contributed to the deaths of over 2800 cattle in Brown, McPherson, Day, and Marshall Counties. Most of the cattle deaths occurred on July 23rd. The high heat indices continued through the 25th with some more cattle deaths but protective measures kept the death count down. Most of the cattle that died were on feedlots. The total loss was around 3 million dollars.

January 2010 - Arctic high pressure combined with strong northwest winds resulting in extreme wind chills from 35 to nearly 50 degrees below zero across central and northeast South Dakota. Some of the lowest wind chills included, -43 in Leola and Faulkton. Several record lows were also tied or broken during the morning hours of the 8th.

December 2013 - Arctic air combined with northwest winds to 5 to 15 mph brought extreme wind chills to north central and northeast South Dakota. Wind chills of 35 degrees below to almost 50 degrees below zero occurred across the region. Some of the lowest wind chills include; 39 degrees below zero at Mobridge, Eureka, and Britton.

January 2014 - The coldest air in recent history moved into the region during the early morning hours of the 5th and continued into the afternoon hours of the 6th. The combination of sub-zero temperatures with north winds produced dangerously cold wind chills from 40 below to around 55 degrees below zero. Winds gusted to over 40 mph at times. Several area activities were cancelled, as well as many schools on Monday the 6th. Some of the coldest wind chills include; 51 below in Clark and Leola.

December 2016 - After the fresh snowfall from the day before, bitter cold Arctic air built into the region Saturday and Sunday bringing record low temperatures along with extreme wind chills to all of the region. Record lows in the 20s and 30s below zero occurred on both Saturday night before midnight and Sunday Morning at several locations. Both Aberdeen and Watertown broke their record low by several degrees on Sunday morning with both falling to 37 degrees below zero. This Arctic air combined with 10 to 20 mph winds brought wind chills to 35 to 60 degrees below zero across the region. Many church services were cancelled on Sunday. Some bitter wind chills include, 36 degrees below at Pierre, 40 degrees below at Sisseton, 43 degrees below at Mobridge, 48 degrees below at Watertown, and 58 degrees below zero at Aberdeen.

December 2017/January 2018 - Extreme wind chills which began on December 30th, 2017 across central and northeast South Dakota continued into January 1st. Wind chills of 35 to near 55 degrees below zero occurred off and on during this time. Record lows set on the morning of January 1st were in the 30s below zero with even some 40s below zero. Some of the record lows on January 1st include -30 degrees at Mobridge, -32 degrees at Aberdeen and Timber Lake. Temperatures did not respond well for daytime highs on January 1st as several record

low highs in the single digits below zero occurred. Some of the most bitter wind chills on the 1st include -45 degrees at Mobridge and Eureka, and -49 degrees at Aberdeen.

January 2019 - Following in behind a high wind/blizzard event, bitter cold arctic air along with northwest winds brought extreme wind chills to north central and northeast South Dakota. The extreme wind chills began during the morning hours of the 29th and continued through the morning hours of the 31st. Many record lows and record low maximums were set mainly on the 30th. Highs were in the teens below zero on the 30th across the east. Some of the record low temperatures were, 37 degrees below zero at Eureka and Aberdeen
.
Most schools along with college campuses and businesses across the region had late starts or cancelled classes for two days. Mail service was also cancelled. Extreme wind chills from 35 degrees below to near 60 degrees below zero occurred. Some of the lowest wind chills include, 47 degrees below zero at Aberdeen; 54 degrees below zero at Watertown; and 59 degrees below zero at Sisseton.

February 2019 - Arctic air brought extreme wind chills to central and northeast South Dakota from the early morning to around noon on the 8th. Wind chills ranged from 35 degrees below zero to near 50 degrees below zero. Many activities were cancelled and schools started late or closed for the day. Some of the lowest wind chills included, 45 degrees below zero at Aberdeen, Webster, Gettysburg, and Mobridge; 47 degrees below zero at Eureka.

March 2019 - Extremely cold arctic air dominated the weather across central and northeast South Dakota from the late evening of the 2nd through the morning of the 3rd. Record lows in the teens below and 20s below zero were set across the region. Most of the record lows shattered the previous record lows by 5 to 10 degrees. In fact, Britton in northeast South Dakota fell to 29 degrees below zero breaking the old record of 19 degrees below zero.

The arctic cold along with north winds brought dangerously cold wind chills ranging from 35 below zero to near 55 below zero across the region. Some of the extreme wind chills included, 40 degrees below zero at Aberdeen; 42 degrees below zero at Pierre; 49 degrees below zero at Britton and Eureka.

WINTER STORMS

Table C.8, located in Appendix C shows just how common snow and ice storms are in McPherson County. While such storms would be considered extreme in many parts of the Country, the consistent nature of such weather hazards are expected in this area. Thus, planning and response mechanisms for snow and ice storms are vital to the County and are routine procedures in McPherson County due to the common nature of such storms.

Winter storms in South Dakota are known to cover large geographical areas, often an entire county or multiple counties can be affected by a single storm. All of the storms identified in Table C.8 were considered to have occurred countywide. Due to the multiple occurrences of winter storms each year, an exhaustive compilation is not possible.

April 1997 An ice storm that affected Edmunds and McPherson counties damaged 400 utility poles and caused 1,500 wire breaks. FEM Electric customers on 600 meters were without power for seven days. Business and economic impacts of this storm were estimated at $3,000,000 and emergency repair and restoration costs were estimated at $1,000,000.

Tables C.9 and C.10, also located in Appendix C show the 10-year history for heavy snow and blizzards. Both are components of winter storms and therefore it is possible the information overlaps. However, since the NOAA database has the event history separated, the information was included as it was found on the database.

Tables C.8 through C.10 may have some overlapping information. It is evident that the information is being reported and recorded more accurately now than in previous decades which is most likely a result of technology, internet, and a coordinated and focused effort to share information between agencies and local governments.

ASSESSING VULNERABILITY: OVERVIEW

Requirement §201.6(c)(2)(ii): [The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.

The following paragraphs summarize the description of the jurisdiction's vulnerability to each hazard and the impact of each hazard on the jurisdiction**.**

Blizzards are characterized by high winds, blowing snow, cold temperatures, and low visibility. Blizzards create conditions such as icy roads, closed roads, downed power lines and trees. McPherson County's population is especially vulnerable to these conditions because people tend to leave their homes to get places such as work, school, and stores rather than staying inside. Traffic is one of the biggest hazards in McPherson County during a blizzard because people often get stuck, stranded, and lost when driving their vehicles which usually prompts others such as family and or emergency responders to go out in the conditions to rescue them.

Drought can be defined as a period of prolonged lack of moisture. High temperatures, high winds, and low relative humidity all result from droughts and are caused by droughts. A decrease in the amount of precipitation can adversely affect stream flows and reservoirs, lakes, and groundwater levels. Crops and other vegetation are harmed when moisture is not present within the soil.

South Dakota's climate is characterized by cold winters and warm to hot summers. There is usually light moisture in the winter and marginal to adequate moisture for the growing season for crops in the eastern portion of the state. Semi-arid conditions prevail in the western portion. This combination of hot summers and limited precipitation in a semi-arid climatic region present a potential position of suffering a drought in any given year. The climatic conditions are such that a small departure in the normal precipitation during the hot peak growing period of July and August could produce a partial or total crop failure. The fact that South Dakota's economy is closely tied to agriculture only magnifies the potential loss which could be suffered by the state's economy during drought conditions. Roughly every fifty years a significant drought is experienced within the county, while less severe droughts have occurred as often as every three years.

Earthquakes occur in the area, but have not had a great enough magnitude or intensity in the past 10 years to be reported. The magnitude and intensity of an earthquake is measured by the Richter scale and the Mercalli scale. An earthquake of noteworthy magnitude has not occurred in the County for decades, but it would be reasonable to expect that a large earthquake would have comparative impact on McPherson County as it would anywhere else. McPherson County does not have skyscrapers or very many tall buildings other than the courthouse and grain

elevators, but it also does not have building codes in place that require homes or buildings to be retrofitted. If earthquakes were a regular occurrence in McPherson County, the County would be extremely vulnerable because of the lack of building requirements but since the likelihood of an earthquake is minimal, the risk is also considered low.

Extreme Cold temperatures often accompany a winter storm, so you may have to cope with power failures and icy roads. Whenever temperatures drop decidedly below normal and as wind speed increases, heat can leave your body more rapidly. These weather-related conditions may lead to serious health problems. Extreme cold is a dangerous situation that can bring on health emergencies in susceptible people, such as those without shelter or who are stranded, or who live in a home that is poorly insulated or without heat. Exposure is the biggest threat/vulnerability to human life, however, incidences of exposure are isolated and thus unlikely to happen in masses.

Extreme Heat Severe heat waves have caused catastrophic crop damage, thousands of deaths from hyperthermia, and widespread power failures due to increased use of air conditioning. Loss of power as well as crop and livestock damage are the largest vulnerability to the county during extreme heat. Both have an effect on quality of life, however, neither are detrimental to the existence of the population of McPherson County.

Flooding Floods can result in injuries and even loss of life when fast flowing water is involved. Six inches of moving water is enough to sweep a vehicle off a road. Disruption of communication, transportation, electric service, and community services, along with contamination of water supplies and transportation accidents are very possible.

Freezing Rain causes adverse conditions such as slippery surfaces and extra weight buildup on power lines, poles, trees, and structures. The additional weight can often cause weak structures to cave in and cause tree branches and power lines to break and fall. McPherson County and the local jurisdictions within are susceptible to these conditions due to the types of structures and surfaces that exist in the county that cannot be protected from freezing rain. Traffic on the roads and highways tend to be the biggest hazard during freezing rain conditions because vehicles often slide off the road which prompts emergency responders and others to have to go out on rescue missions in the adverse conditions.

Hail causes damage to property such as crops, vehicles, windows, roofs, and structures. McPherson County and its local jurisdictions are vulnerable to hail, like most other areas in the State due to the nature of the hazard. Mitigating for hail is difficult and is usually found in the form of insurance policies for structures, vehicles, and crops.

Heavy Rain causes damage to property such as homes and roads. Often when heavy rains occur it causes sewers to backup in homes due to excess water entering the wastewater collection lines. The excess water sometimes has no place to go and thus basements fill up with water which results in damage to water heaters, furnaces, and damage to living quarters for people who live in basement apartments. Roads and bridges can be washed out, thus causing traffic hazards for travelers and commuters. Many times the roads have to be closed causing rural traffic to have to take alternate routes which can sometimes be an additional 5-10 miles out of the way. All areas of McPherson County are vulnerable when heavy rains occur. Typically storm sewers are built for the average storm and therefore do not accommodate excessive or heavy rains.

Ice Jams cause damage to bridges, roads, and culverts due to water currents pushing large chunks of ice under or through small openings. There are two locations in the County which are at risk of ice jams: one on County Road 23 and the other is the bridge on County Road 1, 7 miles North of Highway 10. There may also be other unidentified areas throughout the county that are vulnerable to ice jams.

Landslides have a low chance of occurring in McPherson County due to the relatively flat topography.

Lightning often strikes the tallest objects within the area. In towns trees and poles often receive the most strikes. In rural areas, shorter objects are more vulnerable to being struck. Electrical lines and poles are also vulnerable because of their height and charge. In addition, many streetlights function with sensors. Since thunderstorms occur primarily during hours of darkness, lightning strikes close to censored lights cause the lights to go out, causing a potential hazard for drivers. Flickering lights and short blackouts are not at all uncommon in the county.

One of lightning's dangerous attributes includes the ability to cause fires. Since the entire county is vulnerable to lightning strikes and subsequent fires, these fires will be treated under the fire section of this plan.

Most injuries from lightning occur near the end of thunderstorms. Individuals who sought shelter leave those areas prior to the entire completion of the thunderstorm. Believing it is safe to freely move around, concluding lightning strikes catch them off guard.

Severe Winter Storms have a high risk of occurrence. Heavy snow can immobilize transportation, down power lines and trees and cause the collapsing of weaker structures. Livestock and wildlife are also very vulnerable during periods of heavy snow. Most storms can be considered to have occurred countywide. Due to the multiple occurrences of winter storms each year, an exhaustive compilation is not possible.

Additionally, winter storms often result in some forms of utility mishaps. High voltage electric transmission/distribution lines run the length of McPherson County. These lines are susceptible to breaking under freezing rain and icy conditions and severing during high blizzard winds. Within the county there are fiber optics associated with phone transmissions that are the lifeline to communications. Any electrical complications bring associated risk of food spoilage, appliance burnout, loss of water, and potential harm for in-house life support users. Limited loss of power is not uncommon on an annual basis. A typical power interruption lasts from one to three hours. Most residents are prepared to deal with this type of inconvenience.

The greatest danger during winter weather is traveling. Many individuals venture out in inclement weather. Reasons include the necessity of getting to work, going to school, going out just to see how the weather is, and to rescue stranded persons.

Snow Drifts are caused by wind blowing snow and cold temperatures. These drifts can be small finger drifts on roadways causing cautionary driving, or 20-40 foot high drifts that block entire highways, roads, and farmyards for several days.

Populations at highest vulnerability for this type of hazard are rural homeowners, which account for approximately 44 percent of the county, and the elderly. As with any weather event, those dependent upon healthcare supplies and other essentials will also bear the brunt of highway

closures and slowed transportation due to snow and ice. Emergency services will also be delayed during winter storms.

Snow removal policies and emergency response is at excellent performance and no projects will be considered in this area. Generators provide back-up power to many critical facilities within Redfield and in rural areas. However, some of the critical facilities that could be utilized in disaster situations do not have backup generators. Also, some facilities have generators that only power a portion of operations.

Strong Winds can be detrimental to the area. Trees, poles, power lines, and weak structures are all susceptible and vulnerable to strong winds. When strong winds knock down trees, poles, power lines, and structures it creates additional traffic hazards for travelers and commuters. Strong winds are a common occurrence in all parts of McPherson County. The farming community tends to be vulnerable because many old farm sites have weak, dilapidated, or crumbling structures or structures such as grain bins which can easily be blown over. Another area of particular vulnerability would be those areas with dense tree growth where dead or decaying trees lose their stability and can be blown over or knocked down easily.

Subsidence is a hazard that has a very low probability of occurring in the area. Therefore the jurisdictions do not consider themselves particularly vulnerable to such a hazard.

Thunderstorms cause lightning and large amounts of rain in a small timeframe. The entire county experiences thunderstorms on a regular basis and is only vulnerable when weather events outside the norm occur. Specific vulnerabilities are further identified in the paragraphs for “Lightning” and “Heavy Rains”.

Tornadoes present significant danger and occur most often in South Dakota during the months of May, June, and July. The greatest period of tornado activity (and actually all of the tornadoes in the last ten years) is from 12:00 pm to midnight. Within this time frame, most tornadoes occur between 4 pm and 6 pm. The annual risk for intense summer storms is very high. Often associated with summer storms are utility problems. High voltage electrical transmission lines run the length of McPherson County. These lines are susceptible to breaking during high winds and hail. Tall trees located near electrical lines can be broken in wind or by lightning strikes and land on electrical lines, severing connections. Any electrical complications bring associated risk of food spoilage, appliance burnout, loss of water, and potential harm to in-house life support dependents. Limited loss of power is common on an annual basis. Typical power interruptions last around 1 to 3 hours. Most residents are prepared to deal with this.

Wildfires occur primarily during drought conditions. Wildfires can cause extensive damage, both to property and human life, and can occur anywhere in the county. Even though wildfires can have various beneficial effects on wilderness areas for plant species that are dependent on the effects of fire for growth and reproduction, large wildfires often have detrimental atmospheric consequences, and too frequent wildfires may cause other negative ecological effects. Current techniques may permit and even encourage fires in some regions as a means of minimizing or removing sources of fuel from any wildfire that might develop.

Since there are no remote forested regions in McPherson County, wildfires can be easily spotted and are capable of being maintained. McPherson County does not have any areas that are considered Wildland-urban interface because property outside city limits is primarily agricultural land, thus, there are no urban interface areas at risk in McPherson County. In addition, fire interference with traffic on highways is not a major concern. The most important

factor in mitigating against wildfires continues to be common sense and adherence to burning regulations and suggestions disseminated by the County.

Moisture amounts have the biggest impact on fire situations. During wet years, fire danger is low. More controlled burns are conducted and less mishaps occur. During dry years, severe restrictions are placed on any types of burns. For information on dealing with open/controlled burning within the county, see SDCL 34-29B and 34-35.

Hunting season brings thousands of hunters to the area. Shots have the potential to ignite dry grassland, hay bales, or storage areas. This is a risk that is addressed in hunting education and safety.

ADDRESSING VULNERABILTY: REPETITIVE LOSS PROPERTIES
Requirement §201.6(c)(2)(ii): [The risk assessment] must also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged by floods.

The NFIP defines repetitive loss properties are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. At least two of the claims must be more than 10 days apart. McPherson County does not keep an official record of repetitive loss properties however; the State of South Dakota Office of Emergency Management (SDOEM) provided a Statewide listing repetitive loss properties and there were no listings for McPherson County.

ASSESSING VULNERABILITY: IDENTIFYING STRUCTURES
Requirement §201.6(c)(2)(ii)(A): 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 area…

One of the primary purposes of this plan is identifying critical facilities, emergency shelters, and summer storm shelters and equipping those facilities with the means to provide the necessary energy for access to sanitation and maintain important functions during a natural hazard occurrence. In the event of a disaster as a result of severe summer or winter storms, a terrorist attack, or a hazardous materials incident, McPherson County and participating entities will have the ability to prevent further loss of life by generator powered critical facility shelters. The City of Eureka and the Town of Leola have many structures that are vital to emergency operations including the County's only hospital, a nursing home, the McPherson County Courthouse which also serves at the local emergency operations center when needed. Table 4.10 is a list of critical facilities that would cause the greatest distress in the county if destruction occurred. The table is organized alphabetically by location (column 1) and then alphabetically by structure name (column 5).

Table 4.10: Critical Structures in McPherson County					
Location	**Value**	**Size of Bldg**	**Type**	**Structure Name**	**Owner Type**
Eureka	4,2552,827	1248 sq ft	Govt Building	City Hall/Police Station//Library	City
Eureka	500,000	6240 sq ft	Fire Dept	Firehall	Fire Dist
Eureka	513,032	14000 sq ft	Govt Bldg	City Shop	City
Eureka	1,000,000	4800	Govt Bldg	County Highway	County
Eureka	575,000	200,000 gal	Govt Structure	Water Tower	City
Eureka	14,631	186 sq ft	Govt Structure	City Well #1	City
Eureka	23,126	303 sq ft	Govt Structure	City Well #2	City
Eureka	13,372	170 sq ft	Govt Structure	City Well #3	City
Eureka	43,888	200,000 gal	Private Structure	WEB Water Reservoir	Private
Eureka	100,000	23 acres	Govt Structure	Wastewater Lagoon	City
Eureka	68,451	Unknown	Govt Structure	Lift Station at Fire Hall	City
Eureka	68,000	Unknown	Govt Structure	Lift Station at Ballpark	City
Eureka	135,473	Unknown	Govt Structure	West Lift Station	City
Eureka	100,000	Unknown	Govt Structure	City Parks	City
Eureka	5,000,000	80100 sq ft	Govt Bldg	Eureka School & Auditorium	Public
Eureka	unknown	3932 sq ft	Govt Bldg	Eureka School Bus Bldg	Public
Eureka	unknown	3540 sq ft	Private Bldg	Senior Citizen's Bldg	Private
Eureka	unknown	19446 sq ft	Nursing Home	Avera Health Care Center	Private
Eureka	unknown	28,709 sq ft	Hospital/Assisted Living	Eureka Community Health Services - Avera	Private
Eureka	1,018,000		Govt Structure	Airport	City
Eureka	unknown	1560 sq ft	Private	Vision Care Clinic	Private
Eureka	unknown	24000 sq ft	Private	Eureka Manufacturing	City
Eureka	unknown	28,000 sq ft	Private Bldg	Dakota Woodworking	Private
Eureka	45,000	224 sq ft	Private	Round Reservoir & equipment	Private
Eureka	560,500	Unknown	Private	Museum	Private
Long Lake	$350,000	7960 sq ft	Govt Bldg	Old School/Community Bldg	City
Long Lake	$38,000	5616 sq ft	Private	Apartment Bldg	Private
Long Lake	$23,043	6016 sq ft	Private	L&L Bar	Private
Long Lake	$250,000	2496 sq ft	Non profit	Church	Private
Long Lake	$50,000	Unknown	Govt Bldg	County Shed	County
Long Lake	$50,000	Unknown	Govt Structure	Fire Hall	Govt
Long Lake	$200,000	6,000 sq ft	Non profit	American Legion	Private
Leola	$330,000	2,400 sq ft	Govt Bldg	Municipal Building	City
Leola	Unknown	4,480	Fire District	Leola Fire Dept	Fire Dist
Leola	$86,000	4,480 sq ft	Govt	Leola Citizens Bldg	City
Leola	$318,000		Govt Structure	City Shop/ Water Tower/ Storage Tank	City
Leola	Unknown	6,000	Govt Bldg	SD DoT Bldg	State

Leola	Unknown	Unknown	Education	Leola School	School
Leola	$22,541	1,675	Private	USPS Bldg	Private
Leola	$230,000	Unknown	Govt Bldg	Library/Med Bldg	City
Leola	Unknown	Unknown	Govt Bldg	Leola Bus Garage	School
Leola	$276,976	3,164	Private	Cortrust Bank & Ins.	County
Leola	$918,856	4,369	Private	Agtegra	Coop
Leola	$60,730	9,680	Private	Agtegra	Coop
Leola	$23,702	121,300 gal/ 42,000 gal	Private	Agtegra	Coop
Leola	$18470	Bldg 2148 sq ft/ 2000 gal	Private	Gene's Oil	Private
Leola	$28,520	Bldg 84 sq ft/ 18,000 gal tank	Private	Bulk Plat-Propane	Private
Leola	Unknown	Bldg 1056 sq ft	Coop	Valley Telecommunication	Coop
Leola	Unknown	No Figures	Private	Leola Grocery	Private
Leola	$44,430	5,184 sq ft	Non Profit	American Legion/ Bar	Public
Leola	$50,789	6,000 sq ft	Private	USDA Farm Service Agency	Private
Leola	$155,000	Unknown	City Structure	Swimming Pool	City
Leola	Unknown	4,136 sq ft	Private Bldg	United Methodist Church	Church
Leola	Unknown	10,408 sq ft	Private Bldg	St. James Lutheran	Church
Leola	Unknown	4,000 sq ft	Private Bldg	St. Paul's Lutheran	Church
Leola	Unknown	6,943 sq ft	Private Bldg	OLPH Catholic	Church
Leola	$9,454	864 sq ft	Private	McPherson Co Abstract & Title Company	Private
Leola	$90030	5680 sq ft	Private	G's Convenience	Private
Leola	Unknown	Unknown	Govt Bldg	North Central Heritage Museum	Public
Leola	$49,638	2912 sq ft	Private	Swine Robotics	Private
MCPHERSON	$100,000	60 x 120	Govt Bldg	Eureka Pole Structure	County
MCPHERSON	$500,000	26 x 100	Govt Bldg	Eureka Wooden Shop	County
MCPHERSON	$26,000	80 x 40	Govt Bldg	Eureka Steel Building	County
MCPHERSON	$2,500	Unknown	Govt Bldg	Long Lake Storage Bldg	County
MCPHERSON	$7,000	24 x 100	Govt Bldg	Leola Wood Bldg	County
MCPHERSON	$24,000	40 x 60	Govt Bldg	Leola Steel Bldg	County
MCPHERSON	$100,000	60 x 120	Govt Bldg	Leola Pole Bldg	County
MCPHERSON	$2,567,797	19,603	Govt Bldg	County Courthouse	County

The information provided in Table 4.10 was taken from plan participants. The information that was included in the 2014 plan was provided to them and then participants were asked to review the information and provide any changes or updates as necessary. The participants were instructed to think of structures that would cause the most devastation to their communities if the structures were to be lost in a natural hazard event, "In other words, list those structures that you cannot live/operate without." Plan participants were then instructed to determine value of

those structures. Most of the values provided are the insured values from the insurance policies. The plan author acknowledges that determining what is "critical" can mean something different to every community and that the information provided in the table is not comprehensive. However, the information provided by the plan participants was used a baseline and can be supplemented in future years during the annual plan review and/or during the 5-year update. By using information provided by the representatives from each community it also helps establish a sense of ownership in the Natural Hazard Mitigation Plan.

While the information may not be comprehensive it does give FEMA, SDOEM, and any other readers of the Plan an idea of how communities in rural South Dakota feel about certain structures. For example, FEMA may not view a City Park as a "critical" structure, however, in many small communities the City Park or baseball field is the hub of where activities take place and may also be the only thing that attracts tourists and people from outside the community. So it may be the case that without these "landmarks" the communities' existence would be at stake.

ASSESSING VULNERABILITY: ESTIMATING POTENTIAL LOSSES

Requirement §210.6(c)(2)ii)(B): [The plan should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate…

The information provided in the following tables was collected from the local jurisdictions by the representatives from each community. The McPherson County Emergency Manager provided the information for McPherson County and representatives from the participating local jurisdictions provided information regarding their vulnerabilities. Inconsistencies and missing information result from lack of existing mechanisms, plans, and technical documents available to the communities and also a result of people who are serving their communities on a volunteer basis as opposed to many other areas in the nation which have larger communities who pay salaried professionals to represent them during the drafting process. Each of the communities provided the best available data considering the lack of resources in which to access the information.

The assessor's office provided the assessed valuation of properties within the municipalities. All properties with structures, whether owner occupied or not were included in the valuations provided in Tables 4.11 through 4.16. The reports provided by the assessor's office did not include the number of structures or the number of people in each structure; thus, many of the tables are missing this information. The information from the assessor did not include the number of structures in special flood hazard areas. Those tables that do have number of structures or number of people listed are a result of the municipalities providing the information. Some of the communities are small enough they can count every structure and every resident, which shows just how rural some of these communities are.

4.11 McPherson County Estimated Potential Dollar Losses to Vulnerable Structures

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in County	# in HA	% in HA	$ in County	$ in HA	% in HA	# in County	# in HA	% in HA
Residential	878	878	100%	$53,467,153	$53,467,153	100%	2,459	2,459	100%
Other Residential*	880	880	100	$7,875,589					
Commercial	168	168	100%	$8,154,255	$8,154,255	100%			

Industrial	0	0		0					
Agricultural	526	526	100%	$32,021,456	$32,021,456	100%			
Religious	11	11	100%						
Government	11	11	100%						
Education	5	5	100%						
Utilities									
Total	**2,479**	**2,479**	**100%**	**$101,518,453**	**$101,518,453**	**100%**	**2,459**	**2,459**	**100%**

*Other residential includes non-primary residences, garages, sheds, etc.

4.12 Eureka Estimated Potential Dollar Losses to Vulnerable Structures

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in HA	% in HA	$ in City	$ in HA	% in HA	# in County	# in HA	% in HA
Residential	364	364	100%	$18,398,043	$18,398,043	100%	868	868	100%
Other Residential*	403	403	100%	$3,606,043	$3,606,043	100%			
Commercial	91	91	100%	$4,059,193	$4,059,193	100%			
Industrial	0	0		0	0				
Agricultural	2	2	100%	Unknown	Unknown	100%			
Religious	7	7	100%	Unknown	Unknown	100%			
Government	6	6	100%			100%			
Education	1	1	100%			100%			
Utilities									
Total	**874**	**874**	**100%**	**$26,063,279+**	**$26,063,279+**	**100%**	**868**	**868**	**100%**

*Other residential includes non-primary residences, garages, sheds, etc.

4.13 Leola Estimated Potential Dollar Losses to Vulnerable Structures

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in HA	% in HA	$ in City	$ in HA	% in HA	# in City	# in HA	% in HA
Residential	162	162	100%	$7,194,372	$7,194,372	100%	457	457	100%
Other Residential*	200	200	100%	$2,296,837	$2,296,837	100%			
Commercial	48	48	100	$2,596,779	$2,596,779	100%			
Industrial	0	0		0	0				
Agricultural	34	34	100%	$49,556	$49,556	100%			
Religious	4	4	100%	Unknown	Unknown	100%			
Government	9	9	100%	Unknown	Unknown	100%			
Education	1	1	100%	Unknown	Unknown	100%			
Utilities	1	1	100%	Unknown	Unknown	100%			
Total	**459**	**459**	**100%**	**$12,137,544+**	**$12,137,544+**	**100%**	**457**	**457**	**100%**

*Other residential includes non-primary residences, garages, sheds, etc.

4.14 Long Lake Estimated Potential Dollar Losses to Vulnerable Structures

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in	% in	$ in City	$ in HA	% in	# in City	# in	% in

		HA	HA			HA		HA	HA
Residential	9	9	100%	$204,750	$204,750	100%	31	31	100%
Other Residential*	42	42	100%	$231,688	$231,688	100%			
Commercial	14	14	100%	$98,511	$98,511	100%			
Industrial	0	0		0	0				
Agricultural	1	1	100%	$4,159	$4,159	100%			
Religious	1	1	100%	$100,000	$100,000	100%			
Government	1	1	100%	$75,000	$75,000	100%			
Education									
Total	**68**	**68**	**100%**	**$714,108**	**$714,108**	**100%**	**31**	**31**	**100%**

*Other residential includes non-primary residences, garages, sheds, etc.

4.15 Wetonka Estimated Potential Dollar Losses to Vulnerable Structures

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in HA	% in HA	$ in City	$ in HA	% in HA	# in City	# in HA	% in HA
Residential	5	3	100%	$152,223	$152,223	100%	8	8	100%
Other Residential*	7	7	100%	$2,800	$2,800	100%			
Commercial	1	1	100%	$32,302	$32,302	100%			
Industrial	0	0		0	0				
Agricultural	2	2	100%	$2,763	$2,763	100%			
Religious									
Government									
Education									
Utilities									
Total	**15**	**15**	**100%**	**$190,088**	**$190,088**	**100%**	**8**	**8**	

*Other residential includes non-primary residences, garages, sheds, etc.

4.16 Hillsview Estimated Potential Dollar Losses to Vulnerable Structures

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in HA	% in HA	$ in City	$ in HA	% in HA	# in City	# in HA	% in HA
Residential	1	1	100%	$3,250	$3,250	100%	3	3	100%
Commercial									
Industrial									
Agricultural	9	9	100%	$63,411	$63,411	100%			
Religious									
Government									
Education									
Utilities									
Total	**10**	**10**		**$66,661**	**$66,661**	**100%**	**3**	**3**	**100%**

ASSESSING VULNERABILITY: ANALYZING DEVELOPMENT TRENDS

Requirement §201.6(c)(2)(ii)(C): [The plan should describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

The land use and development trends for each jurisdiction were identified by the representatives from each of the jurisdictions. None of the communities in McPherson County are experiencing growth or development at this time as all of the jurisdictions have experienced declining populations over the past two decades. At this time McPherson County communities are just trying to maintain the population they have, so the trend for development is sustaining the population and businesses that currently exist with the hope of attracting new residents and businesses to the county. Due to the extremely small populations McPherson County jurisdictions do not maintain plans for growth and development. There are areas of planning and development that have room for improvement such as zoning ordinances, comprehensive planning, municipal ordinances, improving their knowledge of the NFIP program and floodplain ordinance, as well as floodplain management. None of the jurisdictions have any set policies about prohibiting new construction in the floodplain because no jurisdiction in the county has been mapped.

McPherson County

McPherson County has recently started the process to update their zoning ordinances. They have some administrative processes they would like to update but are unsure what other changes may be made to their zoning. The last update was done in 2011. Depending on how they revise their zoning ordinances, they may also need to update their comprehensive plan.

McPherson County currently has a drainage permit ordinance and a process to follow for any landowners wishing to alter the drainage on their land. Projects can vary from changing the size of a culvert to altering drainage tiles to tiling land and more. Landowners need to apply for a permit from the County and provide any necessary documentation as required. An engineering study is sometimes required, depending on the project; a decision is made on a case by case basis by the Drainage Board. The County Highway Superintendent provides information on impacts to county infrastructure and is sometimes asked to survey the work being done once a drainage permit is approved. The county commission, acting as the drainage board, makes all decisions on approving or denying the application.

There has been some discussion about abandoning the drainage permit process as it places a large burden on county staff due to the time involved and the process can be quite contentious, pitting neighbor against neighbor.

The McPherson County Drainage Permit Ordinance is included as Appendix F.

City of Eureka

The City of Eureka utilizes the City's planning and zoning code book that was last created in 2001. Due to a lack of personnel, the City relies on contractors to follow code and does not have a process or staff for oversight and/or determining compliance. The area around Eureka Dam that is not already developed is owned by the City and deed restricted, so nothing will be built there. The homes and other developments around the lake that currently exist are all at least six to seven feet above elevation of the dam.

In the last 5 years, there has been a new hospital/medical clinic/assisted living facility built. The city also has a new high school building that replaced the older, outdated building. No significant housing development has occurred in the past five years.

City of Leola
The City of Leola regulates development within the city limits. As long as a building permit application meets all zoning requirements, a building permit is issued. The City does have a zoning administrator that reviews the application and inspects the property for setback requirements, etc. The Leola Development Corporation also has a hand in bringing any new developments and businesses to town.

The City recently received a grant from the Land and Water Conservation Fund to reline the City pool, however, the engineers have determined that there are significant problems with the pool and has advised the City that they may need to replace the pool entirely. The pool is a huge asset to the community as it is one of the few recreational opportunities the city has to offer. This project is still in the planning stages.

The city was also successful in securing funds from the SDDOT Transportation Alternatives Program for the construction 3,200 feet of new trail/path that leads from the school to Lundquist Lake, which is located north of the City. This trail will provide a safe place for bicycle and foot traffic to access the lake. Discussions have also occurred about developing housing around Lundquist Lake. The City is not mapped for Special Flood Hazard Areas or flood risk, so the associated risks with a housing development in this area are unknown. Plan author has communicated the importance of determining those risks before moving forward with any type of plans for this area.

UNIQUE OR VARIED RISK ASSESSMENT
Requirement §201.6(c)(2)(iii): For multi-jurisdictional plans, the risk assessment must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

While the extent to which each jurisdiction is affected by hazards varies slightly between the local jurisdictions, the implications are the same. Thus the steering committee decided that all areas outside the municipal jurisdictions of Eureka and Leola are equally affected by the types of hazards/risks previously discussed in the plan. Leola and Eureka are exceptions because of their proximity to the dams/lakes.

McPherson County
McPherson County has four Hutterite Colonies. As mentioned on Page 6, the Hutterites are a communal people, with several houses located in one colony. The colonies do pose a unique or varied risk as they are all located in very rural areas of the county and while they are pretty self sufficient, they do rely on volunteer fire departments and volunteer EMS in the event of an emergency.

City of Eureka
In the City of Eureka, the West Lift Station is prone to flood hazard during heavy rain events. If the lift station is lost due to flooding, it would impact the sewer system in town. The City has identified two projects to reduce the impact of flooding in the community including a hydrology study to determine if culvert resizing and/or grade raises are necessary and a second project to inspect culverts to determine if replacements are needed for proper flow.

Other than the area of the west side of town around the lake, Eureka doesn't have other areas of town that are susceptible to flooding. The City has also updated the siren system to warn people of tornados and other severe weather.

City of Leola
The City of Leola doesn't have major drainage issues. Most homes have basements that people can take shelter in during a storm. There are also two designated storm shelters in town.

V. MITIGATION STRATEGY

CHANGES/REVISIONS TO THE MITIGATION SECTION:

McPherson County: The County has identified two additional projects to reduce the impact of flooding in the county. With the exception of projects from the rural electric coop which were removed, all the other projects have been deemed still relevant and have remained in the plan.

Eureka: The City of Eureka had one mitigation activity listed for severe (summer) storms in the 2014 Mitigation Plan. The activity was to install a siren system to warn people of tornados and severe weather. This work was completed and therefore the project was removed from the 2019 draft of the plan. The City has also identified a need for a winter storm shelter with a backup generator that can be used in the event of a severe winter storm that knocks out power to the community. This is included in the 2019 draft of the plan.

Leola: The City of Leola had six projects listed in the 2014 Plan. Three of the projects revolved around reducing the impact of severe summer storms and severe winter storms. Two of those projects have been completed (retrofitting a building as a storm shelter and installing a backup generator). A third project to install a backup generator at the water tower is in the process of being completed. Since the project has been fully completed, it was left in the draft plan.

FEM Electric Association had two power line upgrade/replacement projects in the 2014 Plan that have been removed. FEM Electric Association now participates in the State Hazard Mitigation planning efforts and rural electrics are covered under that plan; rather than under the County Mitigation Plans.

Long Lake and Wetonka: Both Long Lake and Wetonka participated in the 2014 Plan. Neither town participated in the 2019 Plan Update. However, the projects were left in the plan as a frame of reference if they decide to participate in future plan updates.

MITIGATION REQUIREMENTS

Requirement §201.6(c)(3)(i): [The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

Requirement §201.6(c)(3)(ii): [The mitigation strategy shall include 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.

MITIGATION OVERVIEW

The State Hazard Mitigation Plan addresses several mitigation categories including warning and forecasting, community planning, and infrastructure reinforcement. McPherson County and participating entity's greatest needs are mitigating flood hazards, backup generators for critical infrastructure and storm shelters, and public awareness.

After meetings with the local jurisdictions and opportunities for public input, a series of mitigation goals were devised to best aid the County in reducing and lessening the effects of hazards. Projects previously identified in the 2014 Plan were carefully analyzed and discussed to determine which of the projects had enough merit to be included in the updated plan and to

determine if the projects meet the hazard mitigation needs of the county. These projects were evaluated based on a cost/benefit ratio and priority. A *high* priority classification means that the project should be implemented as soon as possible and would minimize losses at a very efficient rate. A *moderate* classification means that the project should be carefully considered and completed after the high priority projects have been completed. A *low* priority means that the project should not be considered in the near future. However, it is a potential solution and should not be eliminated until further evaluation can be completed. Such projects may be completed in light of failures of all other projects striving toward the same goal.

A timeframe for completion, oversight, funding sources, and any other relevant issues were addressed. These implementation strategies are geared toward the specific goal and area. Often, these projects will not encounter any resistance from environmental agencies, legal authorities, and political entities. Where these are a concern, address is made.

MCPHERSON COUNTY MITIGATION ACTIVITIES FOR FLOODING HAZARDS

Goal #1: Reduce the impact of flooding in McPherson County

Project #1: Inspect culverts and replace culverts that are collapsed or blocked.

Priority:	High
Funding Sources:	County, State, FEMA
Timeframe:	Ongoing
Oversight:	County
Cost:	Unknown

Project #2: Raise the grade on low-lying roads that get washed out during rapid snow melt, heavy rains, or flash floods.

Priority:	High
Funding sources:	County, State, FEMA
Timeframe:	5-10 years
Oversight:	County
Cost/Benefit:	Unknown

Project #3: Use HAZUS software to determine flood risk throughout the county.

Priority: Moderate
Funding sources: County, State, FEMA
Timeframe: TBD
Oversight: County
Cost/Benefit: A minimal cost would be incurred in purchasing the correct software; however office time spent would be more costly. This office time would include analysis and practical application of the data gathered. Funding of approximately $1,500 should serve the purpose of analyzing level 1 flood data. More detailed level 2 and 3 data would require considerable more time, but would serve the County well. A cost of $10,000 would provide ample time to compile more detailed flood data for specific portions of the county

Project #4: Address drainage issues throughout the county by conducting a hydrology study to determine if culvert resizing and/or grade raises are necessary.

Priority: High
Funding sources: County, State, FEMA
Timeframe: 3 – 5 years
Oversight: County
Cost/Benefit: County anticipates using Advance Assistance funds so it is possible a complete BCA would not be necessary.

Project #5: Replace box culvert on County Road 19 near the Leola Dam to address flooding issues.

Priority: High
Funding sources: City of Leola, County, State, School and Public Lands, SDDOT, FEMA
Timeframe: 1 -3 years
Oversight: City of Leola, County
Cost/Benefit: $300,000+

See Appendix G for SD DOT Hydraulic Data Sheet and Modeling Results

MCPHERSON COUNTY MITIGATION ACTIVITIES FOR SUMMER STORM HAZARDS

Goal #1: Reduce the impact of severe summer storms in the County

Project #1: Construct storm shelters wherever needed throughout the county and place signage along major thoroughfares where travelers can see the locations of the nearest shelters.

Priority:	Moderate
Funding sources:	County, State, FEMA
Timeframe:	3 – 5 years
Oversight:	County
Cost/Benefit:	TBD

Project #2: Evaluate existing shelters and other structures, such as schools, to determine usefulness (and accessibility) as community shelters. Retrofitting these facilities should be considered.

Project #3: Update warning siren system throughout the County

Priority: Moderate
Funding sources: County, State, FEMA
Timeframe: As needed
Oversight: County, Cities
Cost/Benefit: TBD

Project #4: Protect the public from summer storms through information and education. With existing and newly developed education materials, the public can be warned of the dangers of summer storms. Book covers, magnets, and brochures have been disseminated through severe weather campaigns. News releases and emergency checklists are also other options.

Some of the issues that may be addressed within the information would include: safety issues on downed power lines, electrical and fire dangers, the necessity for generators and advice on using them, survival strategies during storms, and purchasing of back-up power for various household and farming operations. There should also be information regarding the construction of safe rooms in new and existing houses and the designation/recognition of the safest places within houses during severe weather.

Project #5: Use HAZUS software to estimate losses particularly for tornados.

Priority: Moderate
Funding sources: County, State, FEMA
Timeframe: TBD
Oversight: County
Cost/Benefit: A minimal cost would be incurred in purchasing the correct software; however office time spent would be more costly. This office time would include analysis and practical application of the data gathered. Funding of approximately $1,500 should serve the purpose of analyzing basic datasets. Data analysis specific to homes and businesses would require considerable more time, but would serve the County and participating entities well. A cost of $10,000 would provide significant time to analyze more detailed cost-benefit data for specific portions of the county

MCPHERSON COUNTY MITIGATION ACTIVITIES FOR DAM FAILURE

Goal #1: Reduce the impact of dam failure for citizens located below the dam.

Project #1: Work with the City of Eureka to incorporate a Dam Emergency Preparedness Plan. Since the Eureka dam has a rating of "significant hazard" the County should make this a priority.

Priority:	High
Funding sources:	City, County, State, FEMA
Timeframe:	3 – 5 years
Oversight:	County, City of Eureka
Cost/Benefit:	Unknown

MITIGATION ACTIVITIES FOR WINTER STORM HAZARDS

Goal #1: Reduce the impact of severe winter storms on the citizens of McPherson County.

Project #1: Removed due to completion of projects and because FEM Electric participates in the State Hazard Mitigation planning efforts and rural electrics are covered under that plan.

Project #1: Removed due to completion of projects and because FEM Electric participates in the State Hazard Mitigation planning efforts and rural electrics are covered under that plan.

Project #2: Survey areas in need of snow shelterbelts and plant trees accordingly.

Priority:	Low-Moderate
Funding Sources:	FLEP, Tree City, County, Private
Timeframe:	5 years
Oversight:	Forestry Service/Cities
Cost:	A survey of needy areas would require minimal cost. A typical shelterbelt would cost several thousand dollars. The locations of structures and persons within the affected area should be included

in the survey and a definite cost/benefit analysis must be conducted. Shelterbelts could benefit for rural and semi-urban areas of the county.

Project #3: Replace backup generators at fire halls, storm shelters and other critical facilities as necessary to ensure vital services can continue during power outages.

Priority:	Moderate
Funding sources:	State, FEMA
Timeframe:	Replaced as necessary
Oversight:	County, Cities
Cost/Benefit:	$10,000 - $20,000 each. A more detailed benefit analysis should be run before the actual purchasing of generators, to determine sizes needed, best locations and other facilities that have a high necessity.

MITIGATION ACTIVITIES FOR WILDFIRES/DROUGHT

Goal #1: Reduce the impact of wildfires and drought

Project #1: Continue enforcement of burn ban as deemed appropriate by officials.

Project #2: Have rural fire departments locate dry fire hydrants.

Project #3: Work with the State Forester to complete a wildlife risk assessment and to create a wildlife risk map.

Priority:	Low
Funding Sources:	Undetermined
Timeframe:	T.B.D.
Oversight:	State Forester, McPherson County
Cost:	Has yet to be determined

MITIGATION ACTIVITIES FOR MAN-MADE HAZARDS

Discussion: This section of the plan was eliminated due to none of the projects being mitigation of man-made hazards.

CITY OF EUREKA MITIGATION GOALS AND ACTIONS

Goal #1: Reduce the impact flood hazard within the City of Eureka

Project #1: Pursue better understanding of NFIP and continue to stay in compliance.

Priority:	High
Funding sources:	City, State, Federal
Timeframe:	Ongoing
Oversight:	City
Cost/Benefit:	Low Cost

Project #2: Address drainage issues throughout the town by conducting a hydrology study to determine if culvert resizing and/or grade raises are necessary.

Priority: High
Funding sources: City, State, FEMA
Timeframe: 3 – 5 years
Oversight: City
Cost/Benefit: TBD

Project #3: Inspect culverts to determine if replacements are needed for proper flow.

Priority: High
Funding sources: City, State, FEMA
Timeframe: 3 – 5 years
Oversight: City
Cost/Benefit: TBD

Goal #2: Reduce the impact of severe storms in the City of Eureka

Project #1: This project has been removed due to completion.

Goal #3: Reduce the impact of severe winter storms on the citizens of Eureka

Project #1: Identify winter storm shelter and provide backup generator for power. It is possible an existing building within the city could be retrofitted to serve as a storm shelter.

Priority:	Moderate
Funding sources:	City, State, FEMA
Timeframe:	3 – 5 years
Oversight:	City
Cost/Benefit:	TBD

CITY OF LEOLA MITIGATION GOALS AND ACTIONS

Goal #1: Reduce the impact of severe storms on the community

Project #1: This project has been removed due to completion. Two existing buildings have been retrofitted as storm shelters. They are the Citizens Building and the County Courthouse.

Project #2: Continue public awareness campaigns of appropriate measures to take during severe weather.

Goal #2: Reduce the impact flood hazard within the City of Leola

Project #1: Increase the size of the spill way at the dam to prevent flooding which occurs on the south side of town.

Priority: High
Funding Sources: School and Public Lands, City, County, State, FEMA
Timeframe: TBD
Oversight: School and Public Lands, City of Leola
Cost/Benefit: Unknown

Project #2: Address flooding and drainage issues throughout the town by conducting a hydrology study to determine if culvert resizing and/or grade raises are necessary

Priority: High
Funding sources: City, State, FEMA
Timeframe: 3 – 5 years
Oversight: City
Cost/Benefit: TBD

Project #3: Inspect culverts and determine if replacements are needed for proper flow.

Priority:	Ongoing
Funding Sources:	City, State, Federal
Timeframe:	Ongoing
Oversight:	City
Cost/Benefit:	No cost for inspection; cost for replacements will be determined at time of completion.

Goal #3: Reduce the impact of severe winter storms

Project #1: This project has been removed due to completion. A backup generator was recently installed and connected at the Citizen's Building.

Project #2: Install a backup generator at the water tower to allow pumps to continue to fill water tower in the event of a prolonged power outage caused by severe winter/summer storms.

Discussion: This project is part of a larger water line project in the City of Leola. A backup generator will be installed as part of the project.

TOWN OF LONG LAKE MITIGATION GOALS AND ACTIONS

(Did not participate in 2019 Plan Update)

The Town of Long Lake elected not to participate in the 2019 Plan Update. They did participate in the 2014 Plan Update. These were their goals at the time. They are being left in the plan as a point of reference.

Goal #1: Reduce the impact of severe winter storms

Project #1: Purchase and Install a stationary standby generator to operate the fire hall and storm shelter if power is lost.

Goal #2: Reduce the impact of severe summer storms

Project #1: Designate a specific building as storm shelter and reinforce or retrofit the building to meet FEMA standards.

Project #2: Identify nuisance properties and weak or compromised structures throughout town and work with private owners to ensure their property is not a hazard.

Goal #3: Reduce the impact of wildfires

Project #1: Install dry fire hydrants in the Town of Long Lake. The Town of Long Lake does not have any means for fire protection other than the fire trucks. The fire department does not have a place in Long Lake to fill their trucks. With a dry fire hydrant installed by the nearby lakes, the trucks could siphon from the lakes for additional water. The hydrants would be non-pressurized.

TOWN OF HILLSVIEW MITIGATION GOALS AND ACTIONS

Hillsview did not participate in the plan update and thus will not be adopting the plan at this time. Hillsview has a population of 3 people and a total of 3 residences, 1 occupied and two unoccupied as of the 2010 Census.

TOWN OF WETONKA MITIGATION GOALS AND ACTIONS

(Did not participate in 2019 Plan Update)

The Town of Wetonka elected not to participate in the 2019 Plan Update. They did participate in the 2014 Plan Update. These were their goals at the time. They are being left in the plan as a point of reference.

Goal #1: Reduce the impact of severe winter/summer storms on the community

Project #1: Purchase backup generators to be used to provide power to the residents in the event of a long term power outage.

Goal #2: Reduce the impact of flood hazard within the City

Project #1: Improve the flow of water by inspecting culverts and determining if replacements are needed for proper flow.

Goal #3: Reduce the impact of wildfire and structural fires within the City

Project #1: Improve fire protection by determining if fire hydrants can be installed throughout the City.

PRIORITIZATION OF MITIGATION ACTIVITIES
Requirement 201.6(c)(3)(iv) & Requirement 201.6 (c)(3)(iii)

The strategy for prioritization has always been to work with the projects that will have the greater impact and benefit for the public. These projects are currently prioritized based on a number of factors, include: 1) Feasibility, 2) Impact to the public, 3) Improvements to the systems that will provide the greatest operational flexibility, 4) Perceived Benefit to Cost ratio. As with any strategy, possibility of change exists due to the fact that some of these factors may change as newer and better information becomes available. Final cost estimates and further analysis of total benefits would need to be completed in order to do a true benefit cost analysis. After that information is completed, some of the priorities may change. Many of the projects are identified as "ongoing" and have little to no cost. These are mitigation measures that are part of typical, day to day, activities of the counties or cities and due to their ongoing nature are obviously not prioritized in the same manner as projects that will require actual construction and case in order to be realized. The plan participants were instructed that a complete Benefit Cost Analysis would be required at the time of application and the plan author advised that specific details of each project could be analyzed in closer detail during the application period.

NATIONAL FLOOD INSURANCE PROGRAM PARTICIPATION
Requirement: §201.6(c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate.

McPherson County does not participate in the National Flood Insurance Program and has not ever been mapped. There is only one community located in McPherson County that participates in NFIP, but there has never been a flood insurance policy sold in McPherson County.

5.1 MCPHERSON COUNTY NFIP PARTICIPATION	
Non-Participants	**Participants**
McPherson County	Eureka
Leola	
Long Lake	
Hillsview	
Wetonka	

Eureka is the only community in McPherson County that participates in the NFIP program, however, the level of participation is minimal. About 23 years ago the community started the process of participating in NFIP but due to lack of understanding of the program not much has been accomplished. After the designated floodplain administrator left the position, there was no follow up education for the new city management/administrative staff and new city council board members. Over the past two decades no progress has been made. While the city "participates" in NFIP, there is no record of floodplain ordinance ever being passed nor is there record of a resolution designating a floodplain administrator. The current city staff has no training on the NFIP program and therefore lacks understanding of the NFIP program. However, they have indicated in their mitigation strategy that they will pursue better knowledge of the program and determine whether or not they should even be participating. Since there has never been a flood insurance policy sold in Eureka, it may not be worth the hassle of the paperwork involved. The

area around Eureka Dam that is not already developed is owned by the City and deed restricted, so nothing will be built there. The homes and other developments around the lake that currently exist are all at least six to seven feet above elevation of the dam. When the plan author looked into the matter only two letters and two biennial reports could be found in regard to the status and compliance of Eureka as a participant in NFIP. These documents are included as Appendix E.

Since McPherson County has never been mapped and does not adopt a flood plain ordinance the development of new homes and businesses and all new construction is not regulated by a flood plain administrator. The planning and zoning department is responsible for issuing building certificates and permits.

IMPLEMENTATION OF MITIGATION ACTIONS

Requirement: §201.6(c)(3)(iii): [The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) 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.

Upon adoption of the updated McPherson County Natural Hazard Mitigation Plan, each jurisdiction will become responsible for implementing its own mitigation actions. Those who did not participate or adopt the Plan will be required to coordinate all mitigation actions with the County. The planning required for implementation is the sole responsibility of the local jurisdictions that have participated in the plan update. Jurisdictions that participated and adopted the plan can implement mitigation actions as they deem appropriate. All of the municipalities have indicated that they do not have the financial capability to move forward with projects identified in the plan at this time, however, all will consider applying for funds through the State and Federal Agencies once such funds become available. If and when the municipalities are able to secure funding for the mitigation projects, they will move forward with the projects identified. A benefit cost analysis will be conducted on an individual basis after the decision is made to move forward with a project.

VI. PLAN MAINTENANCE

CHANGES/REVISIONS TO PLAN MAINTENANCE:
The entire Monitoring section in the 2003 Plan was only two paragraphs. Both of those paragraphs are still included in the Plan Maintenance section of the updated plan; however everything else in this section is new.

MONITORING, EVALUATING, AND UPDATING THE PLAN

Requirement §201.6(c) (4)(i): [the plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

McPherson County and all of the participating local jurisdictions thereof will incorporate the findings and projects of the Plan in all planning areas as appropriate. Periodic monitoring and reporting of the plan is required to ensure that the goals and objectives for the McPherson County mitigation plan are kept current and that local mitigation efforts are being carried out.

During the process of implementing mitigation strategies, the county or communities within the county may experience lack of funding, budget cuts, staff turnover, and/or a general failure of projects. These scenarios are not in themselves a reason to discontinue and fail to update the Plan. A good plan needs to provide for periodic monitoring and evaluation of its successes and failures and allow for appropriate changes to be made.

ANNUAL REPORTING PROCEDURES

The plan shall be reviewed annually, as required by the County Emergency Manager, or as the situation dictates such as following a disaster declaration. The McPherson County Emergency Manager will review the plan annually in conjunction with the budgeting process and ensure the following:

1. The County Elected body will receive an annual report and/or presentation on the implementation status of the plan;
2. The report will include an evaluation of the effectiveness and appropriateness of the mitigation actions proposed in the plan; and
3. The report will recommend, as appropriate, any required changes or amendments to the plan.

FIVE YEAR PLAN REVIEW

Every five years the plan will be reviewed and a complete update will be initiated. All information in the plan will be evaluated for completeness and accuracy based on new information or data sources. New property development activities will be added to the plan and evaluated for impacts. New or improved sources of hazard related data will also be included.

In future years, if the County relies on grant dollars to hire a contractor to write the plan update, the County will initiate the process of applying for and securing such funding in the third year of the plan to ensure the funding is in place by the fourth year of the plan. The fifth year will then

be used to write the plan update, which in turn will prevent any lapse in time where the county does not have a current approved plan on file.

The goals, objectives, and mitigation strategies will be readdressed and amended as necessary based on new information, additional experience and the implementation progress of the plan. The approach to this plan update effort will be essentially the same as the one used for the original plan development.

The Emergency Manager will meet with the County Commission and Plan Participants for review and approval prior to final submission of the updated plan.

PLAN AMENDMENTS

Plan amendments will be considered by the McPherson County Emergency Manager, during the plan's annual review to take place the end of each county fiscal year. All affected local jurisdictions (cities, towns, and counties) will be required to hold a public hearing and adopt the recommended amendment by resolution prior to considerations by the steering committee.

INCORPORATION INTO EXISTING PLANNING MECHANISMS

Requirement: §201.6(c)(4)(ii): [The plan shall include 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.

Eureka is the only jurisdiction located in McPherson County that has a comprehensive or capital improvements plan. Leola has a comprehensive plan but no capital improvements plans. All of the other jurisdictions do not have the resources, staff, funding, or need for such planning mechanisms. The McPherson County Comprehensive plan includes all of the municipalities. The City of Eureka and McPherson County will consider the mitigation requirements, goals, actions, and projects when it considers and reviews the other existing planning documents such as the capital improvements plan. The Eureka mitigation projects will be considered and prioritized in conjunction with non-mitigation projects, such as water and wastewater infrastructure improvements, new construction of schools, libraries, parks, etc.

The rest of the local jurisdictions cannot incorporate the requirements of the mitigation plan into other planning mechanisms because they do not have any other planning mechanisms that currently exist. The risk assessment which was conducted for the purpose of this plan is specific to mitigation actions and projects included in the Plan and thus is not tied into any other mechanisms that would initiate conversations or actions by the city councils to move forward with actions or projects outlined in the Plan. Absence of such mechanisms creates a problem for the local jurisdictions because ideas, projects, and actions identified as a result of the Plan update process often never move forward because they are forgotten about and no mechanism exists to initiate the process of completing such projects. Thus, the local jurisdictions identified one unrelated mechanism, which could be used to remedy the problem of mitigation projects getting lost in a bookshelf. Municipalities are required by State law to prepare budgets for the upcoming year and typically consider any expenditure for the upcoming year at that time. South Dakota Codified Law 9-21-2 provides that:

> 9-21-2 The governing body of each municipality shall, no later than its first regular meeting in September of each year or within ten days thereafter, introduce the annual appropriation

ordinance for the ensuing fiscal year, in which it shall appropriate the sums of money necessary to meet all lawful expenses and liabilities of the municipality….an annual budget for these funds shall be developed and published no later than December thirty-first of each year.

7-21-2 Commissioners to adopt annual budget. It shall be the duty of the board of county commissioners of each and every county to prepare and adopt an annual budget of all of the contemplated expenditures and revenues of the county and all of its institutions and agencies for each fiscal year, save and except so much of such contemplated expenditures as are for the making or maintenance of special improvements.

Since all of the local jurisdictions lack planning mechanisms in which to incorporate the mitigation actions identified in this plan, it was determined that each year when the budget is prepared the municipalities will also consider the mitigation actions at that time. The local jurisdictions will post a permanent memo to their files as a reminder for them to incorporate their annual review of the mitigation actions identified into the budget preparation process. This does not require the projects be included in the budget, it merely serves as a reminder to the City and County officials that they have identified mitigation projects in the plan that should be considered if the budget allows for it.

POTENTIAL FUNDING SOURCES

Although all mitigation techniques will likely save money by avoiding losses, many projects are costly to implement. None of the local jurisdictions have the funds available to more forward with mitigation projects at this time, thus, the Potential Funding Sources section was included so that the local jurisdictions can work towards securing funding for the projects. Inevitably, due to the small tax base and small population most of the local jurisdictions do not have the ability to generate enough revenue to support anything beyond the basic needs of the community. Thus mitigation projects will not be completed without a large amount of funding support from State or Federal programs.

The McPherson County jurisdictions will continue to seek outside funding assistance for mitigation projects in both the pre- and post-disaster environment. Primary Federal and State grant programs have been identified and briefly discussed, along with local and non-governmental funding sources, as a resource for the local jurisdictions.

Federal

The following federal grant programs have been identified as funding sources which specifically target hazard mitigation projects:

Title: Pre-Disaster Mitigation Program Agency: Federal Emergency Management Agency
Through the Disaster Mitigation Act of 2000, Congress approved the creation of a national program to provide a funding mechanism that is not dependent on a Presidential Disaster Declaration. The Pre-Disaster Mitigation (PDM) program provides funding to states and communities for cost-effective hazard mitigation activities that complement a comprehensive mitigation program and reduce injuries, loss of life, and damage and destruction of property. The funding is based upon a 75% Federal share and 25% non-Federal share. The non-Federal match can be fully in-kind or cash, or a combination. Special accommodations will be made for

small and impoverished communities who will be eligible for 90% Federal share/10% non-Federal.

FEMA provides PDM grants to states that, in turn, can provide sub-grants to local governments for accomplishing the following eligible mitigation activities: State and local hazard mitigation planning, Technical assistance (e.g. risk assessments, project development), Mitigation Projects, Acquisition or relocation of vulnerable properties, Hazard retrofits, Minor structural hazard control or protection projects, Community outreach and education (up to 10% of State allocation)

Title: Flood Mitigation Assistance Program
Agency: Federal Emergency Management Agency

FEMA's Flood Mitigation Assistance program (FMA) provides funding to assist states and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes and other structures insurable under the National Flood Insurance Program (NFIP). FMA was created as part of the National Flood Insurance Reform Act of 1994 (42 USC 4101) with the goal of reducing or eliminating claims under the NFIP.

FMA is a pre-disaster grant program, and is available to states on an annual basis. This funding is available for mitigation planning and implementation of mitigation measures only, and is based upon a 75% Federal share/25% non-Federal share. States administer the FMA program and are responsible for selecting projects for funding from the applications submitted by all communities within the state. The state then forwards selected applications to FEMA for an eligibility determination. Although individuals cannot apply directly for FMA funds, their local government may submit an application on their behalf.

Title: Hazard Mitigation Grant Program
Agency: Federal Emergency Management Agency

The Hazard Mitigation Grant Program (HMGP) was created in November 1988 through Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistant Act. The HMGP assists states and local communities in implementing long-term mitigation measures following a Presidential disaster declaration.

To meet these objectives, FEMA can fund up to 75% of the eligible costs of each project. The state or local cost-share match does not need to be cash; in-kind services or materials may also be used. With the passage of the Hazard Mitigation and Relocation Assistance Act of 1993, federal funding under the HMGP is now based on 15% of the federal funds spent on the Public and Individual Assistance programs (minus administrative expenses) for each disaster.

The HMGP can be used to fund projects to protect either public or private property, so long as the projects in question fit within the state and local governments overall mitigation strategy for the disaster area, and comply with program guidelines. Examples of projects that may be funded include the acquisition or relocation of structures from hazard-prone areas, the retrofitting of existing structures to protect them from future damages; and the development of state or local standards designed to protect buildings from future damages.

Eligibility for funding under the HMGP is limited to state and local governments, certain private nonprofit organizations or institutions that serve a public function, Indian tribes and authorized tribal organizations. These organizations must apply for HMPG project funding on behalf of their citizens. In turn, applicants must work through their state, since the state is responsible for setting priorities for funding and administering the program.

Title: Public Assistance (Infrastructure) Program, Section 406
Agency: Federal Emergency Management Agency

FEMA's Public Assistance Program, through Section 406 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, provides funding to local governments following a Presidential Disaster Declaration for mitigation measures in conjunction with the repair of damaged public facilities and infrastructure. The mitigation measures must be related to eligible disaster related damages and must directly reduce the potential for future, similar disaster damages to the eligible facility. These opportunities usually present themselves during the repair/replacement efforts.

Proposed projects must be approved by FEMA prior to funding. They will be evaluated for cost effectiveness, technical feasibility and compliance with statutory, regulatory and executive order requirements. In addition, the evaluation must ensure that the mitigation measures do not negatively impact a facility's operation or risk from another hazard.

Public facilities are operated by state and local governments, Indian tribes or authorized tribal organizations and include:

*Roads, bridges & culverts
*Water, power & sanitary systems
*Draining & irrigation channels
*Airports & parks
*Schools, city halls & other buildings

Private nonprofit organizations are groups that own or operate facilities that provide services otherwise performed by a government agency and include, but are not limited to the following:

*Universities and other schools
*Power cooperatives & other utilities
*Hospitals & clinics
*Custodial care & retirement facilities
*Volunteer fire & ambulance
*Museums & community centers

Title: SBA Disaster Assistance Program
Agency: US Small Business Administration

The SBA Disaster Assistance Program provides low-interest loans to businesses following a Presidential disaster declaration. The loans target businesses to repair or replace uninsured disaster damages to property owned by the business, including real estate, machinery and equipment, inventory and supplies. Businesses of any size are eligible, along with non-profit organizations.SBA loans can be utilized by their recipients to incorporate mitigation techniques into the repair and restoration of their business.

Title: Community Development Block Grants
Agency: US Department of Housing and Urban Development

The community Development Block Grant (CDBG) program provides grants to local governments for community and economic development projects that primarily benefit low- and moderate-income people. The CDBG program also provides grants for post-disaster hazard mitigation and recovery following a Presidential disaster declaration. Funds can be used for activities such as acquisition, rehabilitation or reconstruction of damaged properties and facilities and for the redevelopment of disaster areas.

Local
Local governments depend upon local property taxes as their primary source of revenue. These taxes are typically used to finance services that must be available and delivered on a routine and regular basis to the general public. If local budgets allow, these funds are used to match Federal or State grant programs when required for large-scale projects.

Non-Governmental
Another potential source of revenue for implementing local mitigation projects are monetary contributions from non-governmental organizations, such as private sector companies, churches, charities, community relief funds, the Red Cross, hospitals, Land Trusts and other non-profit organizations.

CONTINUED PUBLIC PARTICIPATION/INVOLVEMENT

Requirement: §201.6(c)(4)(iii): [the plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.

During interim periods between the five year update, efforts will be continued to encourage and facilitate public involvement and input. The plan will be available for public view and comment at the McPherson County Emergency Management Office located in the McPherson County Courthouse and in the NECOG office. Comments will always be received whether orally, written or by e-mail.

All ongoing workshops and trainings will be open to the public and appropriately advertised. Ongoing press releases and interviews will help disseminate information to the general public and encourage participation.

As implementation of the mitigation strategies continues in each local jurisdiction, the primary means of public involvement will be the jurisdiction's own public comment and hearing process. State law as it applies to municipalities and counties requires this as a minimum for many of the proposed implementation measures. Effort will be made to encourage cities, towns and counties to go beyond the minimum required to receive public input and engage stakeholders.