DAVISON COUNTY, SOUTH DAKOTA

HAZARD MITIGATION PLAN

Prepared by:

Davison County Disaster Mitigation Planning Team

Technical Assistance Provided By:

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CHAPTER I
PLANNING PROCESS

Background

This plan is an update of the Davison County Pre-Disaster Mitigation Plan, which was approved by FEMA in May 2016. The purpose of the plan is to prevent or reduce losses to people and property that may result from future hazard events in Davison County. The plan identifies and analyzes the hazards that the county is susceptible to, and proposes a mitigation strategy to minimize future damage that may be caused by those hazards. The document will serve as a strategic planning tool for use by Davison County in its efforts to mitigate against future disaster events.

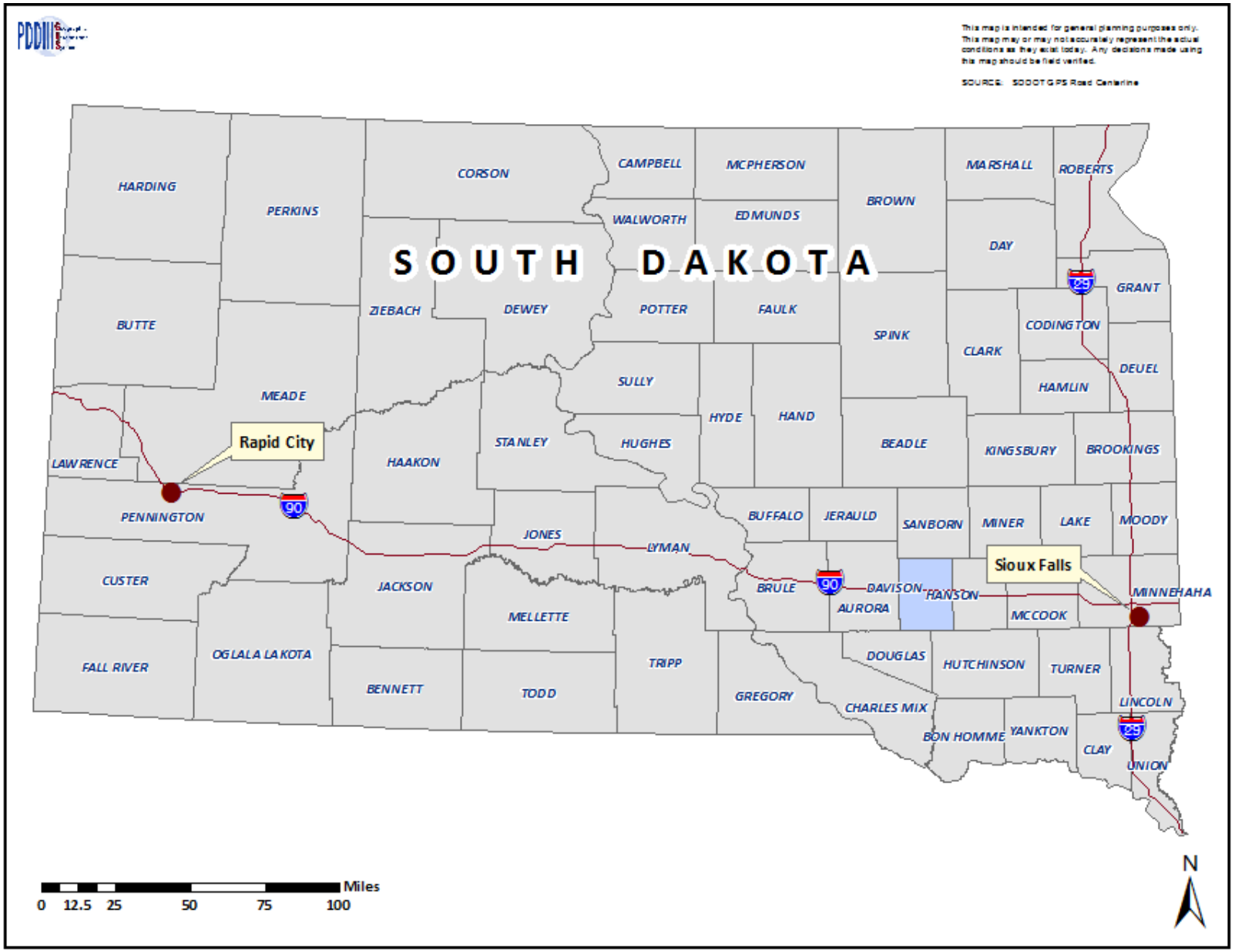
This is a multi-jurisdictional plan. All of the municipalities located within Davison County were invited to participate in the plan's development, as they had when the current plan (that is, the plan now being updated) was being developed. Following is the list of jurisdictions that participated in the plan's development by having a representative attend the planning meetings and by providing input into the plan:

- Davison County
- City of Mitchell
- Town of Ethan
- City of Mount Vernon

Production of the plan was the ultimate responsibility of the Davison County Emergency Management Director, who served as the county's point of contact for all activities associated with this plan. Input was received from a disaster mitigation planning team that was put together by the Emergency Management Director and whose members are listed in **Table 1.1** on page 4.

The plan itself was written by an outside contractor, Planning & Development District III of Yankton, South Dakota, one of the state's six regional planning entities. The office has an extensive amount of experience in producing various kinds of planning documents, including municipal ordinances, land use plans, and zoning ordinances, and it is an acknowledged leader in geographic information systems (GIS) technology in South Dakota. Furthermore, its staff has written disaster mitigation plans for all sixteen of the counties in the District's planning area, including Davison County's current plan.

Figure 1.1 – County Location



The following staff members of Planning & Development District III were involved in the production of the plan. John Clem, a Community Development Specialist, was the project manager and author of the plan. Assisting Mr. Clem was Harry Redman, a Geographic Information Systems Professional, who produced maps for the plan, directed the floodplain risk analysis (see **Chapter III**), and completed the county land cover analysis (see **Chapter II**).

Development of Planning Team

The initial planning stages for this plan update began in 2018 when an application was submitted to FEMA for Hazard Mitigation Grant Program (HMGP) funds to help pay for the update. The HMGP funds were awarded to the County in October 2019. Following this, John Clem and the Davison County Emergency Management Director began to develop the methodology and strategy to be used to update the plan.

The first step was to organize the disaster mitigation planning team, the group of individuals representing the participating jurisdictions and other stakeholders at the planning team meetings. These individuals provided information and various documents that were used to produce the plan, reviewed drafts of the plan as it was being assembled, and reviewed and approved the final version of the plan. Personnel at the county and municipal level with the authority to regulate development were a priority for inclusion on the team. Invited to participate on the planning team were representatives from the following groups:

- Davison County (county commissioners, auditor, planning/zoning officials, floodplain administrator, GIS staff, director of equalization, highway superintendent, etc.)
- Municipalities (city council members, finance officer, public works staff, etc.)
- Townships
- Health care providers, including the Avera Queen of Peace Hospital in Mitchell
- Utility providers, including the Central Electric Cooperative and the Davison Rural Water System
- James River Water Development District

Each individual on the planning team had at least one of the following attributes to contribute to the planning process:

- Significant understanding of how hazards affect the county and participating jurisdictions.
- Substantial knowledge of the county's infrastructure system.
- Resources at their disposal to assist in the planning effort, such as maps or data on past hazard events.
- The authority to help implement the mitigation strategy that was developed.

Table 1.1 lists the planning team members, including their attendance at the planning meetings that were held as the plan was being developed. Additional meetings took place in the participating jurisdictions; those meetings are not reflected in the table, but documentation is provided in Appendix B.

Table 1.1 – Participation in Plan Development

Name	Representing	Position	Meeting Attendance	
			Mtg 1 03/17/21	Mtg 2 --/--/--
John Clem	Planning District III	Plan author	X	
Mark Jenniges	Davison County	Emergency Mgmt Director	X	
Michael Koster	City of Mitchell	Police chief	X	
Dean Knippling	City of Mitchell	Police Dept	X	
Marius Larsen	City of Mitchell	Fire chief	X	
Betty Raymond	Town of Ethan	Finance officer	X	
Weston Frank	City of Mt Vernon	Mayor	X	
Ken Schlimgen	Central Electric Coop		X	
Andrew Baier	Central Electric Coop		X	
Dean Uher	Central Electric Coop		X	
John Heemstra	Mitchell Technical Institute		X	
Rebecca Giddens	Red Cross		X	
Vicki Lehrman	Avera Queen of Peace Hosp		X	
Peter Mirkovic	Firesteel Health		X	
Diane Stundon	SDOEM Region 6		X	
Randall Pratt	Ham radio		X	
Micheal Peterson	SD Hwy Patrol		X	
Sarah Blaine	POET Biorefining		X	

Outreach Effort

Throughout the plan's development, efforts were made to obtain involvement in the plan beyond just the planning team. Emails were distributed, a press release was posted on the Davison County website prior to the first planning meeting, and social media also was used to get the message out to the public. Outreach also was made to emergency management directors in nearby counties, as well as the South Dakota Office of Emergency Management. At the end of the process, the plan was posted on the Davison County website for the public to view. See **Appendix A** for documentation of the public outreach effort.

Planning Meetings

Several meetings were held to develop the plan, as described in further detail below. The primary purpose of the first meeting was to inform the planning team members about the mitigation planning process and to begin development of the risk assessment. After this

initial meeting, additional meetings were held in each participating jurisdiction to develop the mitigation strategy, including the specific mitigation actions to be included in the plan. A final meeting reconvened the planning team members at the end of the process to review a first draft of the completed plan, refine the mitigation strategy, and to discuss how the plan will be implemented.

The planning process associated with the plan's development was relaxed and informal, and free-flowing discussion was always encouraged. No subcommittees were formed, no votes were taken or motions made, and decisions were made by mutual consensus of the planning team members. Everyone's opinion was respected, and nobody was discouraged from voicing his/her opinion. Leadership and guidance at the meetings was provided by Planning & Development District III staff and the Davison County Emergency Management Director.

Planning Team Meeting 1 – Introduction and Risk Assessment [1]

The first meeting of the planning team introduced the participants to the mitigation planning process. Discussion occurred about how the plan would be developed in the coming months, and about the basic goals to be achieved with the mitigation plan.

Following this, the county's current disaster mitigation plan was reviewed, particularly the risk assessment section. Discussion occurred about how various hazards impact the county, especially the most important community assets and critical facilities in the jurisdictions. The assets are shown on the hazard vulnerability maps included at the end of **Chapter III** and are listed in **Appendix D**. Discussion also occurred regarding the existing resources and capabilities to mitigate against the hazards, and whether other risks not analyzed in the current plan should be addressed.

A review of the progress toward implementing the proposed mitigation actions included in the current plan also was made. A list summarizing progress on the actions is included in **Chapter IV**.

Discussion also occurred about how to get broader public input into the planning process, and whether any other potential stakeholders not already present should be invited to participate in the planning process.

Jurisdictional Meetings – Develop Mitigation Strategy

After the initial planning team meeting, the risk assessment was completed by the Planning & Development District III office using various methods, as discussed in **Chapter III**. The next step in the process was development of the mitigation strategy. To assist the communities in developing the strategy, the results of the risk assessment, including a summary of the textual information presented in **Chapter III**, maps showing hazard-prone areas in each jurisdiction, and tables showing the value of property at risk, were distributed to the planning

[1] Due to the ongoing Coronavirus situation, this meeting was conducted via Zoom, as was the final planning team meeting.

team members. A list of potential mitigation actions based on FEMA's guidance document *Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards* also was distributed.

Each jurisdiction was responsible for selecting the mitigation actions it wanted to include in the plan. The selection of the actions took place during city council meetings, which ensured that a broad representation of people would be present, and that the process was open to public involvement. The jurisdictions were encouraged to consider a wide range of actions, whether or not they seemed likely to be achievable in the foreseeable future. Details about the actions, such as estimated cost, the party responsible for implementation, and priority level, were discussed. The final list of actions proposed by the participating jurisdictions is presented in **Chapter IV** (see **Table 4.2**).

Planning Team Meeting 2 – Plan Review and Plan Implementation

Following the jurisdictional meetings, the Planning & Development District III office completed a first draft of the plan. After this, the planning team was brought together again to review the draft and to discuss how the plan would be implemented. Discussion also occurred about how the plan will be incorporated into the existing planning mechanisms at the county and local levels. Maintenance of the plan was another topic of discussion, specifically how the plan will be monitored, evaluated, and updated in the coming years.

After the meeting, some additional information was added to the plan based on discussion at the meeting, and the plan was posted on the Davison County website. After a short review period, the plan was submitted to the South Dakota Office of Emergency Management.

Acknowledgements

The Planning & Development District III office would like to thank the members of the Davison County Disaster Mitigation Planning team for participating in the planning meetings that were held, and for supplying information that was used to develop the plan. We would particularly like to thank Acting Emergency Management Director Mark Jenniges for arranging the planning team meetings and for coordinating with the participating jurisdictions.

Thanks also are extended to Heather Allemang, Jim Poppen, Kyle Kafka, and Marc Macy at the South Dakota Office of Emergency Management for information and guidance in developing the plan.

CHAPTER II
COMMUNITY PROFILE

Background

This chapter serves as a basic introduction of the county. Topics addressed in this chapter cover the county's physical conditions, its population and socio-economic characteristics, utilities and infrastructure, and services. Following chapters are devoted to assessing risks in the county, presenting the mitigation strategy, and discussing how the plan will be implemented.

General Description

Davison County is located in southeast South Dakota, as shown in **Figure 1.1**. The county covers about 436 square miles in area, and its population according to the 2010 Census was 19,504. There are three incorporated municipalities located within the county - Mitchell (pop 15,254), Ethan (pop 331), and Mount Vernon (pop 462). Unincorporated communities within the county include Loomis (pop 47). The county seat is located in Mitchell. **Figure 2.1** shows the county's communities and highway network.

Physical Characteristics

Outside of Mitchell, Davison County is lightly settled, with most of the land devoted to agricultural production. The landscape is mostly open, and the terrain is generally fairly level, except for undulating areas along the James River and some of the larger streams in the county, including Firesteel Creek. Prominent bodies of water in addition to the James River include Firesteel Creek, which is impounded just north of Mitchell to form Lake Mitchell.

Much of the land in the county is devoted to agricultural production, primarily row crops such as corn, soybeans, and wheat, and there is also a considerable amount of pastureland. Several feeding and farrowing hog confinement barns are located in the county.

Figure 2.1 - Political Map

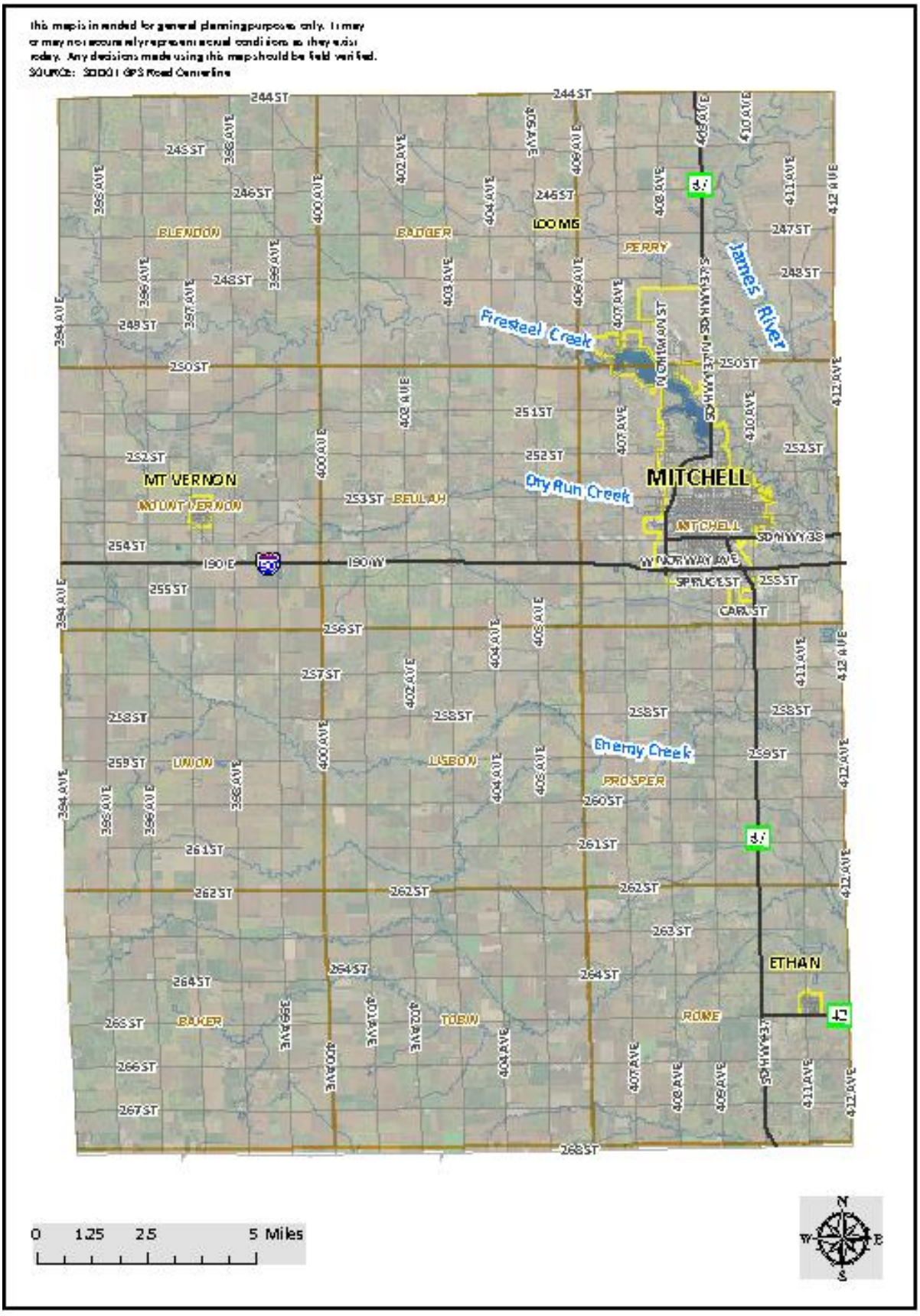


Table 2.1 provides a breakdown of the land cover in Davison County. The table is based off satellite imagery from the United States Geological Service's National Land Cover Database, which was processed using ArcGIS computer mapping software. As the table shows, the predominant types of land cover in the county are cultivated crops and pasture land, which together comprise over 80 percent of the county's area. Developed land makes up a small fraction of the land area. **Figure 2.2** is a graphic representation of the county's land cover.

Table 2.1 - Vegetative Land Cover

Cover Type	Square Miles	% of Total Area
Cultivated crops	221.6	50.8
Pasture land	140.0	32.1
Grassland and Shrub/Scrub	28.7	6.6
Developed land (open space)	19.1	4.4
Wetlands	11.8	2.7
Developed land (low to high intensity)	6.5	1.5
Forested land	6.3	1.4
Open water	2.4	0.5
Barren land	0.2	0.0
Total Area	**436.6**	**100.0**

http://www.mrlc.gov/index.php

Most soil in the county is fertile, well-drained, and conducive to agriculture, as long as soil moisture is sufficient. Excessive slopes and rocky soils are rare, except along the James River. Drainage is generally good, but there are many wetlands in the county, some of which are now used as waterfowl production areas. Others have been drained for farming.

As in most of South Dakota, the climate of Davison County is characterized as sub-humid and continental, which means that summers are often hot and winters can be very cold. There are no large bodies of water or mountain ranges to mitigate against these extremes. High temperatures in summer can exceed 100 degrees Fahrenheit [2], while winter lows can drop below -20 degrees. Precipitation averages about 22 inches per year, most of which occurs during the spring and early summer. Winter snow is not frequent, but blizzards and other types of winter storms are a definite hazard. Following is climate data in the county as reported from the Mitchell weather station.

Table 2.2 - Monthly Climate Conditions in Davison County (1893 - 2003)

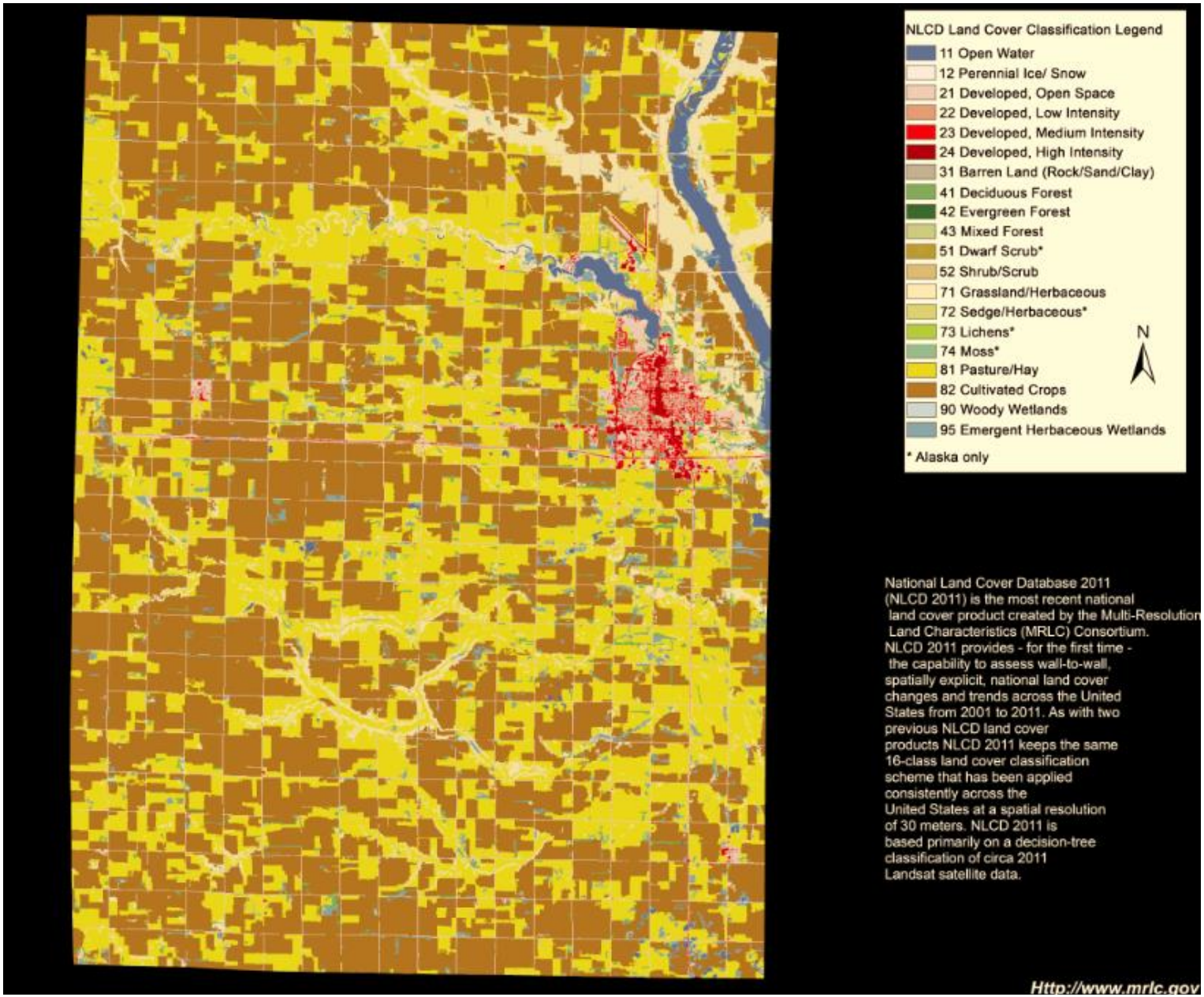
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Ave High	27.0	31.6	43.8	60.2	72.0	81.2	87.8	85.9	76.6	63.8	45.3	31.7	58.9
Ave Low	5.9	10.1	21.7	35.1	46.6	56.6	61.7	59.3	49.4	37.3	23.5	11.6	34.9
Ave Precipitation	0.5	0.7	1.3	2.5	3.1	3.8	2.8	2.6	2.2	1.5	0.8	0.5	22.3
Ave Snowfall	5.5	7.2	7.0	2.2	0.0	0.0	0.0	0.0	0.0	0.5	3.4	5.2	31.0

Source: High Plains Regional Climate Center (www.hprcc.unl.edu/data/historical/)

The average high and low are in degrees Fahrenheit; the precipitation figures are in inches

[2] According to the National Weather Service, Sioux Falls, South Dakota has averaged about two days per year of 100 degree temperatures since records began to be kept in 1893.

Figure 2.2 - County Land Cover



The impact that climate change may have on the county is difficult to predict with any certainty. The South Dakota Hazard Mitigation Plan discusses climate change in some depth, analyzing its possible impacts for each of the hazards affecting the state. According to the plan, mean temperatures have been increasing in the northern Great Plains region where South Dakota is located, especially in the winter. This trend may lead to increased evaporation and drought frequency, which will compound water scarcity problems. Across South Dakota, there is a long-term trend of increasing annual precipitation, among the highest in the country. The majority of this increase is occurring in the spring and fall seasons, and there is high confidence that precipitation extremes will increase in frequency and intensity that could exacerbate flooding.

Communities that are already the most vulnerable to weather and climate extremes will be stressed even further by more frequent extreme events occurring within an already highly variable climate system. According to the plan, increased demand for water and energy will constrain development, stress natural resources, and increase competition for water. New agricultural practices will be needed to cope with changing conditions. Still, there is no consensus as of yet on climate change science, and therefore it is difficult to make any definitive plans for climate change at this time.

Socioeconomic Description

Davison County is the 10th largest among South Dakota's 66 counties, with a 2010 Census population of 19,504. The population density is 44.7 people per square mile; in comparison, the State of South Dakota has a population density of 10.5 per square mile, and the national figure is 89.5.

The county has been experiencing slow but steady population growth for the last several decades, as **Table 2.3** shows. The county has increased in population by 13% since 1990, and the population is expected to continue increasing moderately. Most of the growth is expected to occur in and around Mitchell.

Table 2.3 – Davison County Population Change

Pop 1950	Pop 1960	Pop 1970	Pop 1980	Pop 1990	Pop 2000	Pop 2010	Pop 2019 Estimate	Pop 2030 Projected
16,522	16,681	17,319	17,820	17,503	18,741	19,504	19,775	21,082

Sources: U.S. Census (factfinder.census.gov/faces/nav/jsf/pages/index.xhtml); University of South Dakota Governmental Research Bureau

Table 2.4 provides basic demographic information for the county. The table shows that an overwhelming percentage of the county's population is composed of whites. The median age of the county's population is slightly higher than the South Dakota figure, but is actually much lower than many other more rural counties in the state. This is an indication that many of the young people are able to stay in the county for jobs, rather than going elsewhere to find opportunities.

Table 2.4 - Racial and Age Characteristics (2010)

Entity	White Population	Black Population	American Indian Population	Asian Population	Other Racial Group	Population Under 20	Population 65 and Over	Median Age
Davison Co	94.4%	0.4%	3.0%	0.2%	2.0%	26.4%	16.8%	38.4
South Dakota	85.3%	1.5%	8.8%	1.1%	3.3%	27.6%	14.6%	36.8
United States	73.9%	12.6%	0.8%	5.0%	7.7%	26.3%	13.7%	37.4

Source: U.S. Census (factfinder.census.gov/faces/nav/jsf/pages/index.xhtml)

Davison County's primary economic base is manufacturing, retail, healthcare, and agriculture. Large retailers such as Cabela's attract consumers from far outside the county. Tourism also is important to the local economy, especially during the summer as people travel through Davison County on Interstate Highway 90 to visit the Black Hills and other western destinations. Many of these people stop in Mitchell to visit the Corn Palace. Davison County also is a popular destination for hunters during the fall hunting season.

The table below shows income and education statistics in the county compared to state and national figures. Because of the local availability of quality jobs, the county's favorable location along a major transportation route (Interstate 90), and other factors, economic prospects for Davison County appear to be solid.

Table 2.5 - Socioeconomic Characteristics (2010)

Entity	Median Family Income	Family Poverty Rate	High School Grad or Higher	Bachelor's Degree or Higher
Davison Co.	$64,238	10.2%	90.2%	25.9%
South Dakota	$62,967	8.7%	90.1%	26.0%
United States	$64,585	10.9%	85.7%	28.5%

Source: U.S. Census (factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml)

Infrastructure and Utilities

Transportation

The primary transportation routes in Davison County are Interstate Highway 90 and SD Highway 37. Rail freight service is provided by the Burlington Northern Railroad, which operates on the state rail line. The Dakota Southern Railroad operates on a line owned by the MRC Regional Rail Authority. Grain loading facilities are located in Mitchell, Ethan, and Mount Vernon.

The City of Mitchell owns an airport located just north of the city. It has two runways and averages about 40 flights per day; it is busiest during the fall when hunters fly in from out of state. For more information about the airport, see http://www.airnav.com/airport/KMHE.

Utilities

The Davison Rural Water System serves most rural residents of Davison County, and provides bulk water to Mount Vernon. The Hanson Rural Water System serves the eastern fringe of the county, including Ethan. The Bon Homme-Yankton Rural Water System provides water to Mitchell.

Each municipality has a wastewater collection system that stores effluent in stabilization ponds, where it is allowed to evaporate over time. Rural households must rely on individual septic tanks and drainfields. New development on the outskirts of Mitchell will require additional sewer lines extending into formerly rural areas. This new development will require advanced planning regarding the city's sewage treatment system, which at this time is not capable of handling the city's sewage in certain areas, most notably in the area just northwest of Lake Mitchell.

Each municipality has a designated rubble site. Household waste generated within the county is sent to the Mitchell Regional Landfill, located approximately two miles southeast of Mitchell.

Electric power is provided to rural county residents by the Central Electric Cooperative, while Northwestern Public Service provides power to customers in Mitchell, Ethan, and Mount Vernon. Northwestern also serves the residential areas around Lake Mitchell. NorthWestern Energy provides natural gas service to Ethan, Mitchell, and Mount Vernon.

Services

Medical Services

The major medical facility in Davison County is the Avera Queen of Peace Hospital in Mitchell, which consists of several medical facilities serving a nineteen-county area. The hospital is equipped with the region's most advanced medical technology, and it is the largest employer in Davison County, with over 700 employees.

Fire and Emergency Response

Davison County is served by six different fire departments. Ethan and Mount Vernon have volunteer fire departments. The City of Mitchell has both full-time and volunteer firemen. Ambulance services are dispatched from Mitchell. Each of the departments has basic firefighting and rescue equipment, and they all respond to structural fires, wildland fires, and to accident situations. See **Table 3.5** for more information about the departments.

Education

High schools are located in Ethan, Mount Vernon, and Mitchell. Post-secondary education is available in Mitchell at Dakota Wesleyan University and the Mitchell Technical Institute.

CHAPTER III
RISK ASSESSMENT

Background

The risk assessment process provides the foundation for the rest of the mitigation planning process. It sets the stage for identifying mitigation goals and actions to help Davison County become disaster resilient and keep county residents safe, and it answers the following questions: What are the hazards that could affect Davison County? What could happen as a result of those hazards? How likely are the possible outcomes? When the outcomes occur, what are the likely consequences and losses?

As outlined in the South Dakota Hazard Mitigation Plan, the Federal Emergency Management Agency defines risk assessment terminology as follows:

- **Hazard**—A hazard is an act or phenomenon that has the potential to produce harm or other undesirable consequences to a person or thing.
- **Vulnerability**—Vulnerability is susceptibility to physical injury, harm, damage, or economic loss. It depends on an asset's construction, contents, and economic value of its functions.
- **Exposure**—Exposure describes the people, property, systems, or functions that could be lost to a hazard. Generally, exposure includes what lies in the area the hazard could affect.
- **Risk**—Risk depends on hazards, vulnerability, and exposure. It is the estimated impact that a hazard would have on people, services, facilities, and structures in a community. It refers to the likelihood of a hazard event resulting in an adverse condition that causes injury or damage.
- **Risk Assessment**—The process of measuring the potential loss of life, personal injury, economic injury, and property damage resulting from hazards.

According to FEMA's mitigation planning guidance, the basic components of the risk assessment are: 1) identifying hazards that affect the community, 2) profiling the hazards, 3) conducting an inventory of community assets, and 4) estimating losses. This process measures the potential loss of life, personal injury, economic injury, and property damage resulting from natural hazards by assessing the vulnerability of people, buildings and other property, and infrastructure to natural hazards.

After reviewing the risk assessment section of the current plan, the planning team decided that no major changes were needed to the risk assessment, despite recent population growth and development in the county. However, many of the tables have been updated with more current information, including **Table C.2** in **Appendix C**, which lists significant hazard events

in the county. Also, it was felt that the flood risk analysis needed to be updated, because the information in the current plan was becoming dated and because of the major flooding impacts that occurred in the county in 2019. This analysis was done under the direction of Harry Redman, GIS specialist with Planning & Development District III.

Identifying Hazards

The planning team began the risk assessment by reviewing the South Dakota Hazard Mitigation Plan, focusing on the hazards identified in that plan. The team also reviewed the risk assessment section of the county's current mitigation plan, and it was decided that all of the hazards discussed in that plan should be kept for this update, with no other hazards added or deleted.

Following this, the planning participants reviewed historical records of hazard events that have occurred in the county, relying on the National Climatic Data Center's Storm Events Database. See **Table C.2** in **Appendix C** for a list of the storm events.

After reviewing these sources, the planning team settled on the hazards they wanted to address in this plan, those that they considered to pose a significant threat to the county. Following are the hazards addressed in this plan as selected by the team:

- **Winter storms (includes blizzards, heavy snow, icing, and high wind events)**
- **Summer storms (includes thunderstorms, tornados, hail, and high wind events)**
- **Flooding**
- **Drought**
- **Wildfire**

The planning team acknowledges that additional hazards could have been addressed in this plan. High wind events, for instance, are not considered separate from winter storms and summer storms. Following is a list of other hazards the team considered but chose not to include in this plan, with a justification for their omission:

- Geologic Hazards – these hazards, which include earthquakes and landslides, are given a limited level of planning analysis in the South Dakota Hazard Mitigation Plan, but the state is not particularly vulnerable to such events. For example, the plan states that earthquakes have never caused significant damage in South Dakota. A map generated through the U.S. Geological Service Earthquake Hazards Program website indicates that there is only about a one to two percent chance that a quake of at least magnitude 5 will occur in Davison County in any 100 year period, and virtually no chance of a magnitude 6 or greater earthquake [3]. Furthermore, no significant earthquake has ever occurred in recorded history in

[3] A magnitude 5 earthquake is considered moderate, potentially causing varying amounts of damage to poorly constructed buildings, but significant damage would be unlikely to occur. A magnitude 6 quake is strong, with the potential to cause damage to well-built structures.

Davison County; the largest earthquake was a magnitude 3.2 recorded in 1957. Regarding landslides, a review of the United States Geological Survey's Landslide Incidence and Susceptibility Map shows virtually no chance of a significant landslide occurring in Davison County.

- Agricultural pests and diseases - this hazard is given a moderate level of planning analysis in the South Dakota Hazard Mitigation Plan. However, the planning team considered the subject matter to be outside the intended focus of this plan.
- Hazardous materials - this hazard is given a moderate level of planning analysis in the South Dakota Hazard Mitigation Plan. But again, the planning team considered the subject matter to be outside the scope of this plan, as they wanted to focus on natural hazards. Davison County completed an update to its hazardous materials plan in 2014.
- Infectious diseases – the team considered the possibility of addressing the Coronavirus and other types of infectious diseases, but decided the subject matter was outside the focus of this plan.

Hazard Profiles

In this section, each of the hazards the planning team chose to focus on is described in terms of the hazard's ***location*** within Davison County, its ***extent***, the ***history*** of the hazard's occurrence in the county, the ***probability*** of future events, and the local ***resources and capabilities*** available to mitigate against the hazard. In addition, a background description of each hazard is presented at the beginning of each hazard's profile.

- ***Location*** is the geographic areas within the county that are affected by each of the hazards. Some hazards, such as winter storms, summer storms, and drought, do not have a geographic definition at this level of analysis, since they occur in all areas of the county more or less with equal frequency. Flooding and wildfires, however, do impact specific areas of the county more than others. The maps presented at the end of this chapter show locations vulnerable to flooding within each jurisdiction.
- ***Extent*** is the strength or magnitude of the hazard, which is described in a variety of ways depending on the type of hazard. For example, tornado strength is measured on the Fujita Scale, high wind events are measured by speed, fire is measured in terms of acres affected, and certain hazards are measured in terms of the duration of the event.
- A brief section on the ***history*** of each hazard's occurrence in the county is presented, with a description of some of the most significant events. More information about the hazard events that have impacted the county is presented in **Appendix C**, including a comprehensive list of weather-related hazard events recorded in the county since 1960, and records of hazard events that resulted in a major disaster declaration in the county.
- ***Probability*** of occurrence of a hazard impacting an area is the likelihood that such an event will occur. In this plan, a hazard with a "high" probability is one that is

expected to occur at least five times over a ten year period, a "moderate" probability hazard is expected to occur from two to five times in any given ten year period, and a "low" probability hazard would be expected to occur no more than twice per ten year period. Determination as to the probability of hazard events occurring in the future was based largely on an analysis of the frequency of past hazard events in Davison County and through discussions with members of the planning team.

- Information about the existing ***resources and capabilities*** to mitigate against each hazard is included. This includes plans and regulatory mechanisms, administrative and technical resources, financial resources, and education and outreach.

Winter Storms

Description

Winter storms historically occur from late fall to the middle of spring, varying in intensity from mild to severe. There is a long warning time associated with most winter storms, giving people time to prepare, but they still have a major impact in South Dakota, regularly destroying property and killing livestock. Such storms are generally classified into four categories - freezing rain, sleet, snow, and blizzard - with some taking the characteristics of different categories during distinct phases of the storm.

Freezing rain coats objects with ice, creating dangerous conditions. Sleet does not generally cling to objects like freezing rain, but it does make the ground very slippery, increasing the number of traffic accidents and personal injuries due to falls. Heavy snow can make travel difficult, and can collapse roofs.

Blizzards occur when snow is combined with high wind, producing blowing snow that results in low visibility. When such conditions arise, blizzard warnings are issued. These warnings take effect when wind conditions are at least 35 mph and temperatures of 20 degrees Fahrenheit or less over an extended period of time are expected. Severe blizzard conditions exist when heavy snow is accompanied by winds of at least 45 mph and temperatures of 10 degrees Fahrenheit or lower. Early blizzards in South Dakota were so devastating that the state once had the dubious distinction of being called the Blizzard State.

Winter storms can have a big impact on the power lines operated by rural electric providers, especially when they are accompanied by high winds or freezing rain. They can knock down power lines, which tend to be the most vulnerable elements of the electrical grid, and can even snap the poles.

Location

The topography of South Dakota is such that no part of the state is immune from the effects of winter storms. Farmland and grassland, which covers most of the state (including Davison County) offers little resistance to high winds and drifting snow, and there are no large bodies of water or mountain ranges to mitigate against temperature extremes. All areas of the county are equally likely to be impacted.

Extent

The extent of winter storms in Davison County can be quite substantial. In terms of snowfall, many winter storms in the county have dropped more than 10 inches of snow. In terms of duration, some winter storms in the county have resulted in power outages of over a week in some locations, although typical outages last for no more than a few hours. Regarding wind speed, **Table C.2** in **Appendix C** shows numerous records of high wind events occurring during the winter months with wind speeds in excess of 50 miles per hour.

History

Table C.2 in **Appendix C** lists many significant winter storms that have impacted the county. As **Table C.1** in **Appendix C** shows, winter storms resulting in a major disaster declaration have occurred in Davison County in 1996, 1997, 2005, and 2019.

One of the most serious winter storms to occur in the state happened between October 22 and 24, 1995, resulting in FEMA Disaster Declaration 1075, which was declared in January 1996. As the storm moved eastward across South Dakota, ice and five to 15 inches of wet snow formed on electric lines, poles, and trees. Winds associated with the storm caused lines to slap together and poles to snap, producing widespread power outages to large portions of rural South Dakota, including Davison County. The damage included broken poles, broken wires, and substation failures due to transmission line damage. The storm also forced major transportation delays because of snow accumulation on roadways and poor visibility. The combination of power outages and travel difficulty resulted in numerous cancellations and delays in school openings. Total statewide damage from the event was estimated at over $13 million, and approximately 30,290 households were affected by power outages. Crews from electric cooperatives in neighboring states assisted local cooperatives with line repairs.

Another very serious winter storm to impact Davison County occurred in late November 2005 when heavy freezing rain coated roads and power lines with ice up to three inches thick throughout much of southeast South Dakota. The storm resulted in FEMA Disaster Declaration 1620. In the affected area, a total of 9,400 power poles were damaged, leaving approximately 56,000 people without electricity for varying amounts of time. The Central Electric Cooperative received FEMA public assistance funds of well over $3 million for its infrastructure in Davison County. Some households were without power for up to a week as power lines were being repaired.

A very unusual late-season winter storm struck much of eastern South Dakota in mid-April 2013, resulting in FEMA Disaster Declaration 4115. The storm featured heavy, wet snow and icing that brought down power lines and trees in many areas. Although Davison County was not one of the counties included in the disaster declaration, the Central Electric Cooperative received over $120,000 of FEMA public assistance funds to compensate for damage to its infrastructure in Davison County.

Another late-season winter storm struck South Dakota in March 2019, resulting in FEMA Disaster Declaration 4440. The storm resulted in approximately $575,000 of public assistance funds allocated in Davison County.

Probability

Table C.2 shows numerous records of significant winter storm events in Davison County since the mid-1990s, an average of over four per year. Therefore, based on the historic evidence, the probability of a significant winter storm affecting Davison County in a given year is high. The probability of a winter storm causing substantial damage (e.g. power lines blown down) in any given year is at least moderate. It is a certainty that winter storms will continue to affect the county.

Resources and Capabilities

Following is a description of the local resources and capabilities available for dealing with winter storm events.

- The county and each of the towns has equipment for dealing with winter storms. A list of the equipment can be found in the Davison County Local Emergency Operations Plan, which is updated regularly.
- Facilities are available in each community that have been designated as a disaster relief shelter, which are available for use during a power outage or other emergency situation. The following table provides information about the facilities.

Table 3.1 – Relief Shelter Facilities

Community	Facility	Capacity	Generator	Kitchen/Feeding Capacity
Ethan	Public School	1,450	Portable	____
Mitchell	Corn Palace	2,000	Backup on site	____
Mitchell	4-H Fairgrounds Bldg	1,100	Yes	____
Mitchell	James Valley Community Ctr	625	No	____
Mitchell	Salvation Army	40	No	____
Mitchell	United Methodist Church	185	No	____
Mitchell	Mitchell Rec Center	1,000	No	____
Mt Vernon	Public School	1,050	No	____

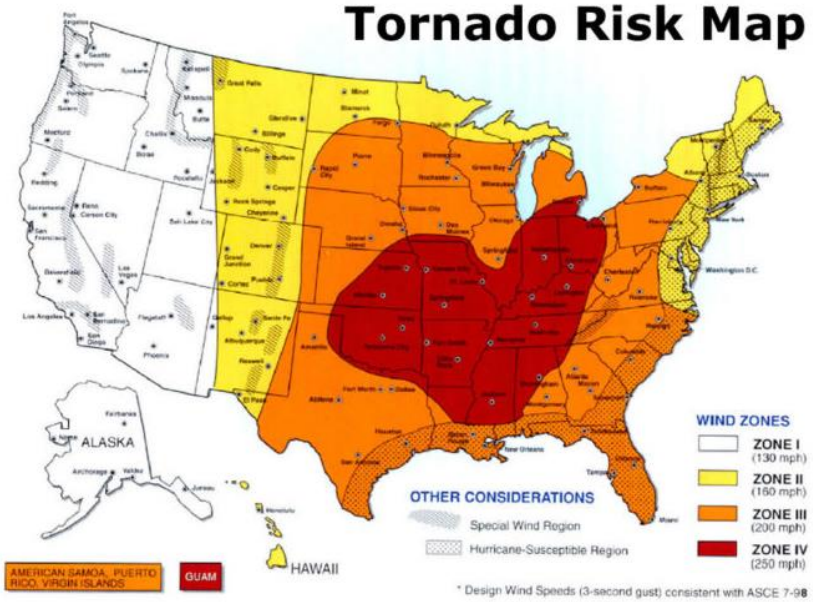
- The Central Electric Cooperative maintains a list of priority projects in its work plan. The Cooperative is a party to the South Dakota Electric Cooperatives Mutual Aid Plan, which commits participating cooperatives to come to the aid of other cooperatives in times of emergency.
- The county participates actively in public awareness campaigns in conjunction with the State Office of Emergency Management and the National Weather Service, as well as sponsoring local awareness activities.
- The county LEPC plans for winter operations annually, which helps ensure a safe and efficient response for people in need of emergency assistance.

Summer storms

Description

Summer storms can include heavy rainfall, hail, tornadoes, and thunderstorm activity. These events usually are associated with unstable weather conditions. In Davison County, most damage from summer storms occurs because of high wind events and/or hail. Hail is always closely connected with thunderstorms. Hailstones can be pea-sized, up to the size of baseballs. Large hailstones are dangerous to people and animals, but most hail damage is typically suffered by crops or structures. Almost every year someone in Davison County reports some kind of hail damage to crops or property.

Tornadoes are the most dramatic type of summer storm experienced in Davison County, and are a special source of concern. They are one of nature's most violent storms, capable of tremendous destruction with wind speeds of 250 mph or more. Damage paths can be a mile wide and can extend for more than 50 miles. Tornadoes mostly occur in South Dakota during the months of May, June, and July. The greatest period of tornado activity is between 4 PM and 6 PM. Tornadoes present a difficult mitigation challenge, since few structures can withstand the violent winds of a twister.



South Dakota is located near the northwest edge of the core area of tornado activity in the United States, as shown in this image. Often referred to as "tornado alley", this part of the country is particularly susceptible to tornadoes in part because the terrain is relatively flat, which allows warm, humid air from the Gulf of Mexico and cool, dry air from Canada to crash into each other, creating large super cells. According to the National Oceanic and Atmospheric Administration's Storm Prediction Center, South Dakota ranked eighth in the nation in the frequency of tornadoes from 1950 to 1994, with a total of 1,139 tornadoes reported in the state (an average of 25.3 per year). During this period, there were 11 deaths in the state attributed to tornadoes, and 243 injuries. South Dakota ranked 27th in the nation in tornado damage, with average annual losses of $3.8 million.

Location

Summer storms are equally likely to occur in all parts of the county.

Extent

The extent of summer storms can be measured in many ways. In terms of wind speed, **Table C.2** in **Appendix C** shows numerous records of thunderstorms that produced wind speeds over 60 miles per hour, with one estimated at over 100 miles per hour. **Table C.2** also shows many events with hail over two inches in diameter. In terms of onset, summer storms typically develop with a long warning time, although certain hazards associated with such storms, such as hail or tornadoes, can develop more suddenly.

Regarding tornadoes, **Table C.2** shows eight records of a tornado with a magnitude greater than F1, including three F3 tornadoes. The following table lists the entire range of tornado strength according to the enhanced Fujita scale.

Table 3.2 – Enhanced Fujita Scale

Scale	Wind Speed (MPH)	Potential Damage
EFO	65 to 85	Minor damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.
EF1	86 to 110	Moderate damage. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	111 to 135	Considerable damage. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF3	136 to 165	Severe damage. Entire stories of well-constructed houses destroyed; severe damage to large buildings; trains overturned; trees debarked; heavy cars lifted off ground and thrown; structures with weak foundations badly damaged.
EF4	166 to 200	Devasting damage. Well-constructed and whole-frame houses completely leveled; some frame homes may by swept away; cars and other large objects thrown and small missiles generated.
EF5	Over 200	Incredible damage. Well-built frame houses destroyed with foundations swept clean of debris; steel-reinforced concrete structures critically damaged; tall buildings collapse or have severe structural deformations; cars, trucks, and trains can be thrown approximately 1 mile.

https://en.wikipedia.org/wiki/Enhanced_Fujita_scale

History

As **Table C.1** in **Appendix C** shows, there have been several major disaster declarations involving a summer storm that have affected Davison County. **Table C.2** in **Appendix C** lists many other significant summer storms that have impacted the county. One notable summer storm occurred on August 5, 2000 when a wet microburst with winds estimated at 120 mph caused heavy damage in and around Mitchell. Apartments and several mobile homes were destroyed, vehicles were overturned, and other damage occurred to buildings and vehicles. The damage path was approximately a mile and a half long and a mile wide, extending over the southwest part of Mitchell.

Probability

Table C.2 shows that numerous significant summer storm events have occurred in Davison County, well over one per year on average. Therefore, based on the historical evidence, the probability of a summer storm occurring somewhere in the county in a given year is high. However, the probability of a storm causing significant damage (e.g. damaging hail or a tornado) in the county in a given year is low to moderate.

Regarding tornadoes, **Table C.2** shows 17 days in which a tornado was recorded in Davison County since 1960, an average of one every three or four years. It is likely that other tornadoes occurred in the county during this period, but were unnoticed or unreported.

Resources and Capabilities

Following is a description of the local resources and capabilities available for dealing with summer storms.

- Davison County, Mitchell, Ethan, and Mount Vernon all have been designated "Storm Ready" by the National Weather Service (few other communities in South Dakota have this designation).
- National Building Code standards are enforced in Mitchell. The city currently uses the 2012 International Building Code standards, and will be upgrading to the 2021 standard soon. All new structures built in the city must be constructed with a minimum level of structural integrity to withstand high winds.
- Each community in Davison County has an outdoor warning system. There are nine sirens in Mitchell and one each in Ethan and Mount Vernon. All of the sirens have battery backup systems, and all are tested monthly.
- Designated emergency storm shelters are located in Mitchell (Davison County Courthouse), Ethan (Ethan Public School), and Mount Vernon (downtown gym). Each shelter is open anytime the siren in that community is sounding.
- The National Weather Service has a NOAA weather radio transmitter located in Davison County. Davison County also utilizes a cable interrupt system as well as a tone-alert radio system for alert and warning activities.
- Davison County participates actively in public awareness campaigns in conjunction with the South Dakota Office of Emergency Management and the National Weather Service, and sponsors local awareness activities.
- As described above under the Winter Storm profile section, the Central Electric Cooperative maintains a list of priority projects in its work plan, and the Cooperative is a party to the South Dakota Electric Cooperatives Mutual Aid Plan.

Flooding

Description

Floods are among the most serious and costly disaster events. In South Dakota, there are two main climatologic causes of flooding: runoff from rainfall and runoff from melting snow. The water from rainfall or melting snow flows overland until it reaches a nearby river or lake. If the river or lake cannot hold all of the water that is entering it, some of the water will begin to overflow, causing flooding. The size of the flood is influenced by such factors as the

intensity or length of the rainfall, melting rate of the snow, and the infiltration of the water into the ground.

Following is a description of the four types of flooding that have the potential of impacting Davison County, based on information in the South Dakota Hazard Mitigation Plan:

- Flash flooding, which results from several inches or more of rain falling in a very short period of time. This high intensity rainfall is commonly caused by powerful thunderstorms that cover a small geographic area. The flood that occurs as a result of this runoff happens very rapidly, and is generally very destructive, although usually only a small area is affected.
- Long-rain flooding, which results after several days or even weeks of fairly low-intensity rainfall over a widespread area. This is the most common cause of major flooding. The ground becomes "water logged," and the water can no longer infiltrate into the ground. The flooding that results is often widespread, covering hundreds of square miles, and can last for several days or many weeks.
- Flooding resulting from melting snow in the spring. This type has characteristics of both flash floods and long-rain floods. The area covered is generally not as large as that covered by the long-rain flood, but is typically larger than that covered by the flash flood. Generally, the flood lasts for several days, occurring when large amounts of snow melt rapidly due to warm temperatures. The flooding can be made worse if the ground remains frozen while the snow is melting, causing the melt water to run off to nearby rivers and lakes rather than infiltrating into the ground. Some of the largest floods in South Dakota have been the result of melting snow and ice.
- Dam failure, resulting from natural or man-made causes. Davison County is vulnerable to this type of flood primarily because of the Lake Mitchell Dam, which is classified as a high hazard dam [4].

Location

One of the main areas impacted by flooding in Davison County is along the James River, which, according to the South Dakota Hazard Mitigation Plan, is one of the most flood prone rivers in South Dakota. Draining 12,609 square miles of land in South Dakota, the James flows in a southeasterly direction through the northeast portion of Davison County. The river lacks good drainage features (the slope of the river is only .28 feet per mile), and the river's valley varies in width from a few hundred feet to three miles. Consequently, the James overruns its banks frequently during the spring snow melt, much of the drainage remaining in small swales and basins.

Extent

The extent of flooding in Davison County has rarely been truly significant. Minor, localized flooding typically occurs in the county after very heavy rain events, especially in the spring

[4] A high hazard dam is one whose loss would cause major economic loss, and in which there are anywhere from a few to hundreds of inhabited structures located in the predicted area of inundation.

following snowy winters. Floodwater depth is usually not significant. In terms of duration, flooding can cause road closures lasting from less than a day to several weeks or longer.

However, major flooding can occur when the James River overflows its banks. Given the river's large drainage basin and the fact that it moves so slowly, excess water from snowmelt and spring rains simply has nowhere to go. During these major flood events, considerable damage occurs to farmland along the river, ruining crops that have already been planted or making planting impossible. James River flooding can also impact county roads, which often remain closed for long periods of time. During the worst years of flooding along the river, the river rises so high that some bridges over the river have to be closed.

Possibly the most serious flooding the county has experienced was in 2019, when the James River gauge at Mitchell crested at 6.30 feet above flood stage in April, followed by more flooding in September. Many county and township roads were inundated, including SD Hwy 37 and Interstate 90, and a great amount of agricultural land was flooded.

History

As shown in **Table C.1** in **Appendix C**, several flood events have resulted in a major disaster declaration in Davison County. **Table C.2** in **Appendix C** shows many other flooding events that have impacted the county. Following is a summary of some of the more significant floods the county has experienced.

Serious flooding in 1984 resulted in FEMA Disaster Declaration 717, which caused almost $4.5 million of damage in the affected counties. Significant water damage occurred in Mount Vernon, with up to four feet of water in homes. Twenty homes were evacuated along Dry Run Creek in Mitchell, and sewage was five feet deep in parts of Mitchell.

Flooding in 1993 resulted in FEMA Disaster Declaration 999, which impacted 39 counties in South Dakota. The flood caused $53,427,320 in damage throughout the state, and $11,024,621 of damage to public infrastructure. At the time, the disaster was considered one of the top ten natural disasters ranked by FEMA relief costs. In Davison County, the James River inundated thousands of acres of farmland.

Flooding in 1995 resulted in FEMA Disaster Declaration 1052. All of South Dakota had above normal precipitation from January through May, with many weather stations in the central and eastern portions of the state experiencing their all-time wettest Spring. Damage was caused by ground saturation and flooding due to very high residual groundwater tables from 1994, heavy winter snow and spring rain, and rapid snowmelt. Flooding occurred along the James River from the end of March through April, and all-time record stages were reached near Mitchell on April 22. Many roads were under water due to high groundwater saturation, causing interruption of emergency services. Damage also included power transmission and distribution facilities owned by rural electric cooperatives. In the area impacted by the flood, surveys identified over 3,000 homes with some type of damage, the majority caused by groundwater seepage of one to three inches into basements. In many areas the water table rose almost to the surface, saturating septic drain fields and preventing proper treatment of

wastewater. The total damage estimate in the affected counties was over $35 million, which included $9.3 million in damage to public infrastructure.

Flooding in 1997 resulted in FEMA Disaster Declaration 1173, which was declared for all counties in South Dakota. At the time, the event was considered one of the top ten natural disasters ranked by FEMA relief costs. From November 1996 through February 1997, the weather across the eastern part of the state was cold and very wet, with record setting snowfall in many places. The persistent cold greatly limited snowmelt between storms, which caused snow to pile up from 10 to 24 inches deep. An early April blizzard added to the snow pack, and heavy rain later in the month combined to further saturate the ground. Prairie potholes turned into lakes, causing many people to be evacuated from their homes and farms, and preventing farmers from planting thousands of acres of land. The flood caused over $87 million in damage statewide, and took the lives of two people. The James River Water Development District estimated that five years of flooding had destroyed or severely damaged approximately 75 percent of the forested areas in the James River valley.

Flooding in 2010 in eastern South Dakota was the worst in a decade, resulting in FEMA Disaster Declaration 1915. The James River met or set records for highest ever flood stage at several locations along the river, including Mitchell. Farmland and low-lying areas along the river basin were inundated, and some of the bridges over the river had to be closed until floodwaters subsided, including the SD Highway 38 bridge east of Mitchell (as shown here in an article from the March 19, 2010 Mitchell *Daily Republic*). Several other locations along the James River and Enemy and Twelvemile Creek were under water. Three houses located east of Mitchell were in jeopardy of flooding, but escaped major damage.

and forum Thursday at the Mitchell Technical Institute

The legislative lineup painted a bleak budget portrait.

or the Consumer Price Index. "When you don't follow law

James River hits record level

Laura Wehde/Republic

The James River flows Thursday over state Highway 38 east of Mitchell. A portion of the river near Mitchell hit a record level of 25.46 feet, surpassing the previous record of 25.33 feet set in 2001.

Water near Mitchell rises to 25.46 feet, surpassing old record of 25.33 from 2001

By MELANIE BRANDERT
The Daily Republic

The James River southeast of Mitchell set a record crest at 25.46 feet Thursday morning, exceeding the previous record of 25.33 feet from nine years ago.

The river — the baseline flood level of which is 17 feet — is expected to continue at its crest until starting its gradual descent early next week, said Mike Gillispie, National Weather Service hydrologist.

The record-high water could affect three families on Barber Place — located off Shanard Road next to the river — if more water comes down the basin, said Jim Montgomery, Davison County's emergency management

See RIVER, Page 14

Laura Wehde/Republic

Water from the James River goes over Barber Place, near the Greg and Kathy Shroyer home, east of Mitchell on Thursday.

Flooding in 2019 had a major impact throughout the year in Davison County, starting in March when heavy rainfall fell on frozen ground, which led to considerable overland flooding of agricultural lands and inundation of numerous roads. This event resulted in FEMA Disaster Declaration 4440. The James River at Mitchell crested at 6.30 feet above flood stage in April. Flooding continued during the summer, and became even more severe when 7 to 8 inches of rainfall in the area between September 10 - 12 led to widespread flooding. Travel was significantly hampered in the county, as most county and township roads were closed, including Interstate 90 from Mitchell

west to the Aurora County line. Four county bridges over tributaries of the James River are still closed. Significant street flooding occurred in Mitchell for three days (see photo on front cover). The event resulted in FEMA Disaster Declaration 4469. The total public assistance cost in Davison County due to flooding in 2019 was over $1.5 million.

Probability

Based on the historic evidence, the probability of minor flooding occurring somewhere in the county in a given year is high. The probability of flooding causing significant property or crop damage is moderate, with damage most likely to occur along the James River corridor. It is a certainty that flooding will continue to impact the county to some degree, no matter what mitigation actions are pursued.

Resources and Capabilities

Davison County and each municipality within the county participate in the National Flood Insurance Program (NFIP). Each entity is in good standing with the program, and each has a flood ordinance designed to reduce flood risk. The City of Mitchell prohibits encroachment into identified floodways, including fill, new construction, and substantial improvements, unless certification by a registered engineer or architect is provided demonstrating that encroachments will not result in an increase in flood levels during the base flood discharge. The following table provides information on NFIP participation in the county.

Table 3.3 – National Flood Insurance Program Information

Jurisdiction	NFIP Participation Status	Program Date	FIRM Effective Date	Insurance Policies in Force	Amount of Coverage	Number of Claims	Total Claims Paid
Davison Co.	Yes	04/01/87	09/29/10	15	$3,639,900	9	$689,275
Ethan	Yes	03/08/89	(NSFHA)	0	$0	0	$0
Mitchell	Yes	02/01/79	09/29/10	62	$10,678,200	14	$151,128
Mt Vernon	Yes	06/11/76	09/29/10	1	$140,000	0	$0

Sources: www.fema.gov/policy-claim-statistics-flood-insurance; Marc Macy, SD NFIP Coordinator

Following is a description of some of the other local resources and capabilities available for mitigating damage from flooding.

- Davison County has a drainage ordinance that provides a framework for landowners in the county to help them plan and execute drainage activities that could affect their land and neighboring land. The ordinance, first established in 1987 and updated in 2013, is enforced by the Davison County Planning and Zoning Administrator, working under the Davison County Drainage Commission.
- Davison County is a member of the James River Water Development District. The Davison County Commission works with the district regarding James River management issues. Actions that have been funded by the district include removal of downed trees along the river, which has improved water flow. The City of Mitchell currently is working with the district to implement riparian corridor improvements along Firesteel Creek, which feeds into Lake Mitchell.

- The City of Mitchell enforces storm water regulations that require new developments of five acres or more to have detention ponds installed sufficient to reduce runoff from a 100-year storm to that from a five-year storm. Subdivision plans must be approved by the public works director, and must conform to the natural contour of the land. Storm sewers must be designed to carry a minimum of the 5-year storm, and the city may require holding the 100-year storm and releasing water at the 5-year pre-developed rate.
- There is an emergency preparedness plan in place for the Lake Mitchell Dam.
- Davison County and the City of Mitchell conduct periodic debris clearing operations in major drainages, including Firesteel Creek and Dry Run Creek.
- The City of Mitchell continues to make significant storm water drainage improvements. Recent projects include construction of a new detention pond to mitigate flooding in the area around Avera Queen of Peace Hospital, and storm water upgrades along Sanborn Blvd and the East Central Drainage Basin.
- The Town of Ethan has made major upgrades to its storm water drainage system, including installation of storm sewer piping and ditch cleaning.
- Davison County completed a storm bypass structure in 2000 around Mount Vernon using FEMA disaster mitigation funding.

Drought

Description

Drought is a deficiency in precipitation over an extended period of time, 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. Human factors, such as water demand and water management, can exacerbate the impact that drought has on a region.

Droughts can occur at any time of the year, but the consequences are worse during the summer growing season, especially after winters with below normal precipitation. A small departure in normal precipitation during the months of June through August can have a significantly negative impact on crop production. The demand for water for multiple uses also impacts water availability. Rural water systems that were originally designed to supply water for people are now also being used for cattle and to fight wildfires, taxing the limits of the systems.

Drought in South Dakota is often accompanied by periods of extreme heat. According to the National Weather Service, among natural hazards, only the cold of winter—not lightning, hurricanes, tornadoes, floods, or earthquakes—takes a greater toll on human life. Between 1936 and 1975, nearly 20,000 people were killed in the United States by the effects of heat and solar radiation, and in the heat wave of 1980, more than 1,250 people died. Elderly people, small children, people with certain medical conditions, and those on certain medications are particularly susceptible to heat stress.

Location

All areas of the county are equally likely to be impacted by drought.

Extent

Drought severity, the most commonly used term for measuring drought, is a combination of the magnitude and duration of the drought. In terms of magnitude, since 1960 Davison County has experienced four years of annual precipitation less than two thirds its average amount of 23 inches. Those years were 1966, 1974, 1976, and 1980. In terms of duration, it is not unusual for Davison County to experience periods of below normal precipitation that last for several months. During the 1930s, drought conditions persisted for multiple years. In an area that is so highly dependent on agriculture, the impact of a major drought can be significant. Although most agricultural producers now have crop insurance and agricultural practices today are more advanced, the impacts of drought can still be serious.

History

Davison County has experienced many significant droughts. The drought of 1976 was one of the most severe in memory, resulting in South Dakota's only drought emergency declaration to date. Under 14 inches of rain was recorded for the year at the Mitchell weather station. Drought in 1980 and 1981 affected the entire state of South Dakota, and was rated as a 10 to 25 year event. Drought in 2012 was so devastating that the State of South Dakota activated a Drought Task Force.

The most significant drought in the area's history occurred in the 1930s, the so called dust bowl years. The drought came in three waves, 1934, 1936, and 1939-1940, but some parts of the Great Plains experienced drought conditions for as many as eight consecutive years. The soil, depleted of moisture, was lifted by the wind into great clouds of dust and sand which were so thick they concealed the sun for several days at a time. The "black blizzards" were caused by sustained drought conditions, compounded by years of land management practices that left topsoil susceptible to the forces of the wind.

Probability

Table C.2 in **Appendix C** shows at least one drought record in Davison County in five of the years since 1999. Based on this, the probability of a significant drought occurring in the county in any given year is moderate. The probability of a truly severe drought impacting the county, such as occurred in 2012, is low, expected to occur no more than twice per ten years.

At the statewide level, the developers of the South Dakota Hazard Mitigation Plan cite tree ring research spanning a period of about 400 years indicating that multi-year droughts as significant as the 1930s drought occur on average every 57 years in South Dakota. Based on historical records, notable droughts have occurred somewhere in the state on average about every 12 years.

Resources and Capabilities

Resources at the local level in Davison County to mitigate the impacts of drought are available. Each of the water systems serving the county have restrictions on the amount of water they will distribute within their service area, and could take such action during extreme drought conditions. Likewise, the communities served by the systems could enact regulations restricting non-essential water use, such as for watering lawns and washing cars.

In the agricultural sector, most farmers in Davison County have crop insurance, which helps lessen the financial impact of drought. Furthermore, modern agricultural practices are more advanced (such as no-till farming and the development of more drought-tolerant crops), so farmers can better withstand years of below average rainfall.

Resources available at the state or regional level include the State Drought Task Force, which was activated during the severe drought of 2012. The goal of the task force is to monitor drought conditions by gathering the most current data available and to make sure that South Dakotans have access to that information as quickly as possible. The group coordinates the exchange of drought information among government agencies and agriculture groups, fire managers, and water-supply organizations. Another resource is the Natural Resource Conservation Service, which has information available about how to deal with droughts.

Wildfire

Description

Wildfires are uncontrolled conflagrations that spread freely through the environment. Such fires that occur near populated areas pose threats not only to natural resources, but also to human life and personal property. Wildfires are not as serious a concern in Davison County as they are in other more forested parts of the country, but the opinion of the planning team is that the hazard does warrant some attention in this plan.

Location

Wildfires in Davison County are most likely to occur in large areas of extensive brush or unmanaged vegetation, including pastures and other types of grassland. This also includes the hills and draws along the James River, which contain a significant amount of trees and thick brush. Another concern is controlled burns that get out of control, which can occur almost anywhere in the county.

Extent

Each of the fire departments in the county submits reports to the South Dakota Division of Wildland Fire about the fires they fight. The division compiles the reports and produces a comprehensive database of all the records, which the planning team was able to obtain for fires occurring in the county from 2000 through 2019. The following table summarizes this information in terms of the size of the fires that have been fought. It shows that most of the fires have been fairly small, most impacting no more than a few acres.

Table 3.4 – Wildfires in Davison County (2000 – 2019)

1 to 10 Acres	10 to 49 Acres	50 to 99 Acres	100 to 249 Acres	250 + Acres
92	38	4	4	1

Source: South Dakota Division of Wildland Fire (based on reports from the local fire departments)

According to the database, the most common specific causes of wildfires in Davison County are from debris catching fire, from equipment igniting vegetation, and from campfires, although it should be noted that the cause for many of the fires is not known. Information is not available on the dollar amount of damage caused by any of the wildfires, or whether any injuries or deaths occurred.

History

Many wildfires have occurred in Davison County, but nothing on a truly destructive scale. The largest recent fire was one that burned 250 acres in April 2015.

Probability

Wildfires affecting less than ten acres are likely to occur somewhere in Davison County most years, but large scale wildfires are much less common. **Table 3.4** shows only one wildfire over 250 acres in size between 2000 and 2019. Based on this period of analysis, the probability of a significant wildfire can be considered low. The probability of a wildfire causing serious damage also is low.

Resources and Capabilities

Various resources are available locally to mitigate wildfires. Davison County adopted an ordinance in 2012 that prohibits open burning during dry, windy, and other dangerous conditions. The county commission issues burn bans in coordination with the Davison County Emergency Management Director and the local fire chiefs. Each fire department based in the county has firefighters who have had training in fighting wildfires, and each is equipped with apparatus and equipment to handle most of the wildfires they are likely to encounter. Various mutual aid agreements are in place which helps ensure that assistance is available during particularly serious wildfires and other emergency events. A summary of the capabilities of the departments is presented in the following table.

Table 3.5 - Fire Department Resources and Capabilities

Dept	Members	Vehicles	HazMat Capability
Ethan	37	11	None
Mitchell	24	13	Operational
Mt Vernon	28	6	None

Vulnerability and Loss Potential

This section assesses the vulnerability of Davison County and the participating jurisdictions to each of the hazards just profiled. Vulnerability is defined as the extent to which people and property are exposed to harm or damages created by a hazard. The method of determining vulnerability varies by the type of hazard and the availability of data, but each methodology is based on either potential for loss or actual losses. Following is a description of each specific methodology used.

Potential Loss Methodologies

- FEMA digital Flood Insurance Rate Maps were used to identify 100-year flood zones in the county. Using GIS, these flood zones were overlaid on parcel layer data to provide estimates of loss potential at the community level.
- FEMA's HAZUS loss estimation software was used to estimate potential losses from flooding in each community. HAZUS produces a flood polygon and flood-depth grid that represents the 100-year floodplain, with losses calculated using national baseline inventories (buildings and population) at the census block level. The maps generated by HAZUS are not as accurate as FEMA's Flood Insurance Rate Maps, nor is the resulting data, but HAZUS is still a helpful planning tool for communities that have not been mapped by the National Flood Insurance Program [5].
- Data on the population living in wildfire threat zones was used to estimate potential wildfire losses.
- The value of buildings within the county was used to estimate potential losses due to winter storms and summer storms (building exposure).
- Population density within the county was used to estimate potential losses due to winter storms and summer storms.

Actual Loss Methodologies

- The National Climatic Data Center's Storm Events Database was consulted for historical information regarding weather-related events (see **Table C.2** in **Appendix C**).
- Records from FEMA were consulted for federal assistance provided to Davison County following major disaster declarations through FEMA's Public Assistance program (see **Table C.1** in **Appendix C**).
- Data from the U.S. Dept of Agriculture Risk Management Agency was used to assess crop loss due to a variety of natural hazards.

[5] A limitation of HAZUS is the inadequacies associated with its hydrologic and hydraulic modeling, especially in sparsely populated areas where census blocks - the basis of the loss calculations - are large. The software assumes the population and building inventory to be evenly distributed over the census blocks, whereas in reality flooding may occur only in a small part of the block where there are few buildings or people. Also, HAZUS uses default national databases that may not be applicable at the local level.

- Information from the National Drought Mitigation Center's Drought Impact Reporter was used to assess the local impact of droughts.
- Data from the South Dakota Division of Wildland Fire was used to assess the historical impact of wildfires in the county.

At the conclusion of the vulnerability assessment for each hazard, development trends are considered to determine whether the county's vulnerability to the hazard might increase in the future. Information on development trends in the county was obtained by analyzing population trends and projections, and through discussion with local officials about where housing development and other growth may be likely to occur. Other factors, including the possible impact of climate change, also are considered.

At the end of the chapter, the county's vulnerability to each hazard is summarized. Vulnerability is characterized as either "low", "moderate", or "high", based on the results of the risk analysis. A brief discussion of vulnerable populations within the county also is presented.

Winter Storms

All areas of South Dakota are vulnerable to winter storms, and the consequences of such storms can be great. They can disrupt the power supply when electrical lines are brought down by high winds, falling trees, or extreme ice buildup. Everyday activities can be significantly disrupted when road conditions deteriorate because of snow cover or precipitation that freezes on road pavement. In extreme situations, roads can be closed because of accumulated snow for days or even weeks. Winter storms also can kill or injure livestock, and can cause significant crop losses when they occur early in the growing season.

The rural areas of the county may be somewhat more vulnerable to winter storms than the towns. For example, transmission of electricity in rural areas is dependent on many miles of power lines located in open country that is highly susceptible to high wind events, especially when combined with freezing rain (high winds can snap power poles, and freezing rain and sleet forms ice on the lines, making them heavy and more susceptible to being blown down). Rural residents also are vulnerable if roads are blocked by snow for an extended period of time and they cannot travel into town for groceries, medical supplies, or other important items.

To assess the county's vulnerability to winter storms, the methodology that was used in the South Dakota Hazard Mitigation Plan was essentially followed for this plan. The following factors were considered:

- The number of prior winter storm events in the county
- Past damage amounts
- The county's building exposure
- Population density

Prior Events:

Table C.2 in Appendix C shows that numerous winter storms have occurred in Davison County, including blizzards, ice storms, heavy snows, and extreme cold events. The authors of the South Dakota Hazard Mitigation Plan found that there were 80 total winter storm events in the National Climatic Data Center's Storm Events Database between January 1993 and August 2016 for Davison County, ranking the county 16th among the state's counties.

Past Damage Amounts:

Winter storms have the potential to cause significant amounts of damage. For instance, the ice storm that occurred in November 2005 resulted in over $3 million of public assistance costs to the Central Electric Cooperative for its infrastructure within Davison County.

Given Davison County's agriculturally-based economy, another method to determine vulnerability is to look at the impact of winter storms on the county's agricultural producers. Farmers typically protect themselves from the impacts of adverse weather and other natural hazards by insuring their crops against losses through multi-peril crop insurance, which is underwritten by the Risk Management Agency, a part of the U.S. Dept of Agriculture. Data on indemnity payouts for crop loss in Davison County due to various types of winter weather events between 2000 and 2017 was obtained from the Risk Management Agency, and is presented in the following table. During this period of analysis, winter weather-related payouts represented about 3% of all indemnity payouts in Davison County.

Table 3.6 – Crop Loss Due to Winter Weather

Year	Frost	Freeze	Cold Winter	Cold Wet Weather
2000	$15,614	$0	$75,640	$0
2001	$5,322	$0	$176,637	$0
2002	$3,817	$2,582	$10,613	$14,543
2003	$340	$0	$2,263	$0
2004	$6,151	$1,365	$1,008	$25,563
2005	$16,920	$14,899	$0	$3,922
2006	$0	$0	$6,771	$0
2007	$1,930	$3,718	$19,963	$0
2008	$0	$0	$50,894	$2,599
2009	$0	$7,199	$441,894	$28,391
2010	$0	$0	$1,781	$59,995
2011	$0	$2,458	$115,179	$110,263
2012	$0	$0	$0	$4,589
2013	$0	$0	$49,729	$165,792
2014	$0	$2,074	$230,056	$102,217
2015	$0	$0	$505,759	$163
2016	$0	$77	$358	$128,143
2017	$0	$645	$41,211	$27,360

Source: USDA Risk Management Agency (www.rma.usda.gov/data/cause.html)

Building Exposure:

The total value of buildings in Davison County is approximately $2,033,945,000, according to the South Dakota Hazard Mitigation Plan, which ranks the county 10th among the state's 66 counties. The median figure for South Dakota counties is approximately $605,000,000. The county's building exposure can be considered high.

Population Density:

Davison County is the 10th most populous county in South Dakota. Compared to the rest of the state, Davison is densely populated, with an average of 44.7 people per square mile, much higher than the overall state figure of 10.5 people per square mile. However, this is much lower than the national average of 89.5 people per square mile. Davison County can be considered at least moderate in terms of population density.

Development Trends

Looking ahead, Davison County's vulnerability to winter storms may increase in the future as the county's population is expected to continue increasing. Most of the growth is expected to occur in and near Mitchell, especially around Lake Mitchell and in areas south of the city. A 70-unit residential development also is planned just north of the city.

Climate change also may have an impact on local vulnerability to winter storms. According to the South Dakota Hazard Mitigation Plan, the winter season is warming at a faster rate than any other season in South Dakota, but winter storms and blizzards will continue to be a severe weather hazard in the state. Warmer winter temperatures could mean more ice and freezing rain events, which would impact electrical utilities and communication systems, the transportation system, and livestock. An increase in the frequency of large snowfall events also is being experienced in the northern U.S. There remains some uncertainty in projections for the coming decades, but the rising trend of extreme precipitation events is something that needs to be considered.

Summer Storms

All areas of Davison County are vulnerable to summer storms, especially those that are accompanied by tornadoes, lightning, or large hail. Typical damage from summer storms includes blown down power lines, crop damage from hail and high wind, property damage if a populated area is struck, and flooding from heavy rain. Like the rest of the Great Plains, Davison County is especially vulnerable to summer storms accompanied by high wind because the landscape is open and there is little topographic relief to block the wind. Structures located at higher elevations are somewhat more vulnerable to high wind events.

Vulnerable populations include the elderly, the sick, those with a mobility limitation, and people who happen to be outside during a storm event. People living in mobile homes are also vulnerable, since such structures can be overturned by winds of 60 to 70 miles per hour if they are not anchored properly.

As with winter storms, the methodology that was used in the South Dakota Hazard Mitigation Plan to assess vulnerability to summer storms was followed for this plan. The following factors were considered:

- The number of prior summer storm events in the county
- Past damage amounts
- The county's building exposure
- Population density

Prior events:

Table C.2 in Appendix C shows many significant summer storms that have been recorded in Davison County, including hailstorms, thunderstorms, lightning, and tornadoes. The table shows 22 recorded tornadoes, several of which were greater in magnitude than F1. The authors of the South Dakota Hazard Mitigation Plan assigned a rating of 3 (out of 10 maximum) to Davison County in terms of the frequency of tornadoes recorded between 1950 and 2016, and assigned a rating of 5 for tornadoes of magnitude F1 or greater.

Past Damage Amounts:

Summer storms have the potential to cause significant amounts of damage. A recent example was a hailstorm in July 2009 that caused several hundred thousand dollars of property and crop damage in Davison County. As shown in **Table C.2**, many summer storm events have caused property and/or crop damage in the county.

As with winter storms, another method to determine the county's vulnerability to summer storms is to look at the impact of such storms on the county's agricultural producers. Summer storms can cause a lot of damage to cropland, especially when they are accompanied by hail. Data on indemnity payouts for crop loss in Davison County due to hail as well as high wind events between 2000 and 2017 was obtained from the Risk Management Agency, and is presented in the following table. During this period of analysis, summer storm-related payouts represented about 4% of all indemnity payouts in Davison County. The high amount of hail loss in 2009 was due mostly to corn and soybeans that was destroyed in the July storm mentioned above.

Table 3.7 – Crop Loss Due to Severe Summer Weather

Year	Hail	High Wind	Tornado		Year	Hail	High Wind	Tornado
2000	$43,668	$3,872	$9,768		**2009**	$981,470	$360	$0
2001	$4,691	$303	$0		**2010**	$0	$621	$0
2002	$25,234	$0	$0		**2011**	$0	$94,960	$0
2003	$125,417	$1,490	$0		**2012**	$40,490	$0	$0
2004	$146,651	$7,092	$0		**2013**	$3,065	$0	$0
2005	$9,595	$0	$0		**2014**	$10,497	$15,836	$0
2006	$464	$83	$0		**2015**	$1,839,156	$9,761	$0
2007	$0	$197	$0		**2016**	$0	$0	$0
2008	$91,820	$39,474	$0		**2017**	$43,889	$1,772	$0

Source: USDA Risk Management Agency (www.rma.usda.gov/data/cause.html)

Building Exposure:

The total value of buildings in Davison County is approximately $2,033,945,000, according to the South Dakota Hazard Mitigation Plan, which ranks the county 10th among the state's 66 counties. The median figure for South Dakota counties is approximately $605,000,000. The county's building exposure can be considered high.

Population Density:

Davison County is the 10th most populous county in South Dakota. Compared to the rest of the state, Davison is densely populated, with an average of 44.7 people per square mile, much higher than the overall state figure of 10.5 people per square mile. However, this is much lower than the national average of 89.5 people per square mile. Davison County can be considered at least moderate in terms of population density.

Development Trends

Davison County's vulnerability to summer storms may increase as the county's population continues to rise. Climate change also may impact vulnerability. The South Dakota Hazard Mitigation Plan cites the Climate Science Special Report from 2017, which states that damages from convective weather hazards, such as severe thunderstorms and tornadoes, have undergone the greatest increase relative to other extreme weather since 1980. The plan states that the tornado season is getting longer, and that an increase in potential days for severe thunderstorms is projected for the mid to late 21st century, although the largest increases are projected for neighboring regions of the Midwest and the southern plains. There is some uncertainty in these projections, but severe thunderstorms and tornadoes will remain a hazard in South Dakota.

Flooding

Like all counties in South Dakota, Davison is vulnerable to flooding. Because of the specific nature of flooding, the county's vulnerability to flooding will be analyzed first on a general county-level basis, and then specifically for each community. Given the degree to which flooding is geographically-based, this approach made the most sense to the planning team.

General Flood Vulnerability

According to the HAZUS analysis that was run for the South Dakota Hazard Mitigation Plan (see Table 3-45 of that plan), the potential building damage loss from flooding in Davison County is $6,417,000. The median figure for all South Dakota counties is approximately $2,800,000. Overall, Davison ranks 15th among the state's 66 counties in this measure of vulnerability. The potential displaced population in the county was determined to be 530 people.

As was shown in **Table 3.3**, currently there are 78 National Flood Insurance Program policies in Davison County, with 23 claims having been paid since 1978. There are four repetitive loss properties in the county, all of which are located in Mitchell.

In addition to impacting buildings and other structures, a good deal of public infrastructure throughout the county is vulnerable to flooding. Damage often involves washed out or damaged roads and drainage culverts, often occurring in the spring, especially following winters with heavy snow. Roads and infrastructure in the vicinity of the James River typically experience the most severe flooding, but many other county roads throughout the county also are somewhat vulnerable. The threat to homes and other structures along the James is slight; even during the historic flooding of 2019 only a couple of properties in Davison County located in the James River valley reported damage.

Flooding also has a major impact on agriculture. Spring flooding can delay farmers getting into their fields to plant, and later in the growing season it can damage crops. Data on indemnity payouts for crop loss in Davison County due to flooding, as well as excess moisture/precipitation, between 2000 and 2017 was obtained from the Risk Management Agency, and is presented in the following table. During this period of analysis, flood-related payouts represented about 23% of all indemnity payouts in Davison County, second only to drought. Much of the crop loss from flooding in Davison County is due to the James River overflowing its banks onto cropland adjacent to the river.

Table 3.8 – Crop Loss Due to Flooding

Year	Flooding	Excess Moisture/ Precipitation		Year	Flooding	Excess Moisture/ Precipitation
2000	$0	$91,454		**2009**	$0	$892,510
2001	$0	$2,997,536		**2010**	$0	$2,950,729
2002	$0	$49,663		**2011**	$0	$5,974,266
2003	$0	$108,791		**2012**	$0	$348,514
2004	$11,994	$1,212,270		**2013**	$0	$173,660
2005	$0	$292,172		**2014**	$0	$52,222
2006	$0	$33,157		**2015**	$19,596	$299,494
2007	$1,073	$1,446,417		**2016**	$0	$2,149,623
2008	$1,202	$1,940,475		**2017**	$0	$40,741

Source: USDA Risk Management Agency (www.rma.usda.gov/data/cause.html)

2019 was probably the worst year ever in terms of flooding's impact on South Dakota's agricultural producers. The state ranked first in the nation with almost 4 million acres of farmland prevented from being planted due to flooding, more than double the next nearest state. Davison County ranked 16th in the state with a total of approximately 92,000 acres not planted.

Davison County also is vulnerable to flooding because of the Lake Mitchell Dam, which is located on the northern edge of Mitchell. This dam, which impounds Firesteel Creek, was built in 1928, and its spillway was repaired in 1999. Its normal storage capacity is 8,960 acre-feet, with a maximum capacity of 19,585. South Dakota Highway 37 is located just east of the dam's embankment, and the Mitchell water treatment plant is located directly across the highway from Lake Mitchell. If the dam failed, both the highway and the treatment facility

would be affected. Three downstream bridges would be in jeopardy, plus several residential properties within two miles of the dam (as measured along Firesteel Creek). Due to the short distance between the dam and the nearest homeowners, the Lake Mitchell Emergency Preparedness Plan states that floodwater would affect the properties so quickly that flood wave predictions are "immaterial" [6].

Local Flood Vulnerability

At the community level, flood vulnerability was determined by using FEMA's HAZUS loss estimation software to estimate potential losses from flooding during a 100-year flood event, and by using GIS software to determine the value of property at risk of being flooded. The following table summarizes the results of the HAZUS analysis, showing a considerable amount of risk in Mitchell. It should be noted that the HAZUS runs included some land just outside the cities' incorporated limits.

Table 3.9 – HAZUS Base Flood Loss Estimation Results

Community	Building Structural Damage	Debris Generated	Households Displaced	People Needing Shelter
Ethan	$0	1 ton	4	0
Mitchell	$6,599,000	4,761 tons	647	258
Mt Vernon	$112,820	428 tons	14	1

Source: FEMA HAZUS loss estimation software

The following table shows the amount and value of property at risk of flooding. The analysis was done by using GIS software to overlay areas of known flood risk (either the 100 year floodplain or the area identified by HAZUS as flood prone) on parcel data supplied by the county. Note that the figures reflect only those parcels on which the structure itself - not just part of the parcel - is located within the floodplain.

Table 3.10 – Property in Flood Prone Areas

Community	Number of Housing Units	Assessed Value (Residential)	Assessed Value (Commercial)
Ethan	0	$0	$0
Mitchell	27	$1,966,940	$1,562,070
Mt Vernon	23	$1,461,720	$486,375

Sources: HAZUS; FEMA Flood Insurance Rate Maps; Davison County Director of Equalization

Development Trends

Continued population growth in and around Mitchell may increase vulnerability to flooding, although development is not occurring in areas prone to flooding. A factor that is likely to increase the county's vulnerability to flooding is the continuing conversion of wetlands and other marginal land to agricultural production. Farming these marginal lands is increasing

[6] It is believed that the nearest homeowner could be in grave danger if the dam failed. According to the City of Mitchell Public Works Director, the individual was advised when he built his home in 2004 that he could lose his life and property in the event of a catastrophic flood.

the probability and severity of flooding in certain areas as the land's natural capacity to absorb excess surface water is decreased. The primary impact is on rural roads and infrastructure. Precise statistics on the amount of road damage that flooding has caused over the years in Davison County are not available, but there appears to be little doubt that county and township roads are suffering more flood-related damage than they used to. Future updates to this plan could explore this trend in more depth.

The nature and frequency of flooding also could be altered by climate change. There is no comprehensive assessment of how climate change might affect flooding in South Dakota, but regional trends for the northern Great Plains show a trend toward less frequent, but more intense, rain events. Climate projections indicate that 1-day, 20-year return events may increase in frequency by 8% to 16% in the coming decades. In the northern Great Plains region, this is compounded by an overall wetter trend of about 15% increase when comparing the years 1986-2015 to 1901-1960. The additional moisture overall can add to the increase in precipitation per extreme event.

Drought

Without question, Davison County is vulnerable to drought. As shown in **Appendix C**, there are 17 drought records for the county in the Storm Events Database just since 1999, with many more droughts known to have occurred before then. The biggest impact of drought in Davison County is in the agricultural sector. Non-irrigated cropland is most susceptible to drought, and yield reductions due to moisture shortages can be aggravated by wind-induced soil erosion.

Data on indemnity payouts for crop loss in Davison County due to drought and heat between 2000 and 2017 was obtained from the Risk Management Agency, and is presented in the following table. During this period of analysis, drought-related payouts accounted for 66% of all indemnity payouts in Davison County, far higher than any other type of payout. It is safe to say that drought is one of the costliest natural hazards facing Davison County farmers [7].

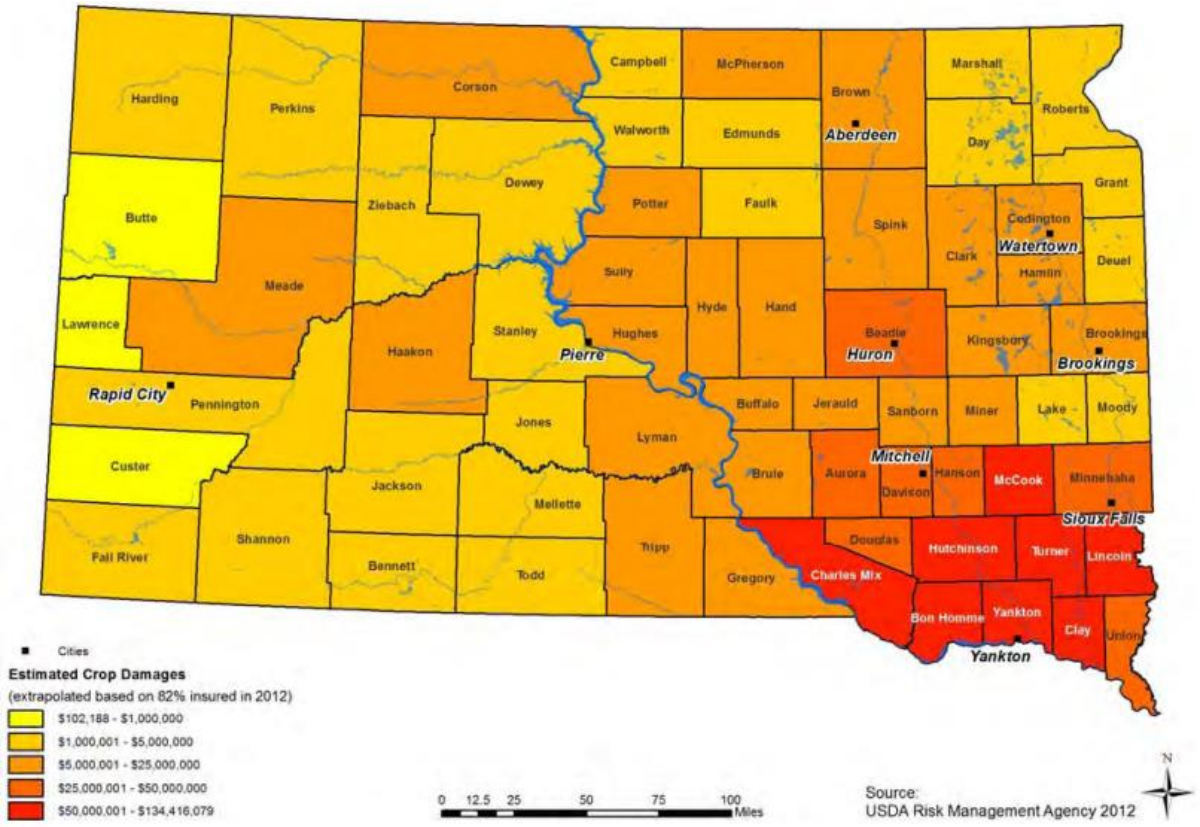
Table 3.11 – Crop Loss Due to Drought and Heat

Year	Drought	Heat		Year	Drought	Heat
2000	$626,697	$8,672		**2009**	$2,561	$0
2001	$1,365,562	$3,467		**2010**	$0	$0
2002	$7,885,578	$35,898		**2011**	$244,581	$119,391
2003	$382,096	$28,118		**2012**	$30,199,836	$845,036
2004	$319,419	$0		**2013**	$478,045	$6,849
2005	$3,012,178	$275,131		**2014**	$470,145	$9,740
2006	$7,539,421	$398,925		**2015**	$859,366	$11,415
2007	$739,937	$72,042		**2016**	$2,372,524	$40,608
2008	$1,594,127	$30,629		**2017**	$1,805,063	$29,568

Source: USDA Risk Management Agency (www.rma.usda.gov/data/cause.html)

[7] Drought also appears to be the costliest natural hazard statewide for South Dakota farmers. From 2000 through 2013, drought payouts accounted for just under 50% of all indemnity payouts in the state. The next highest type of payout was from excess moisture/precipitation, representing about 30% of payouts.

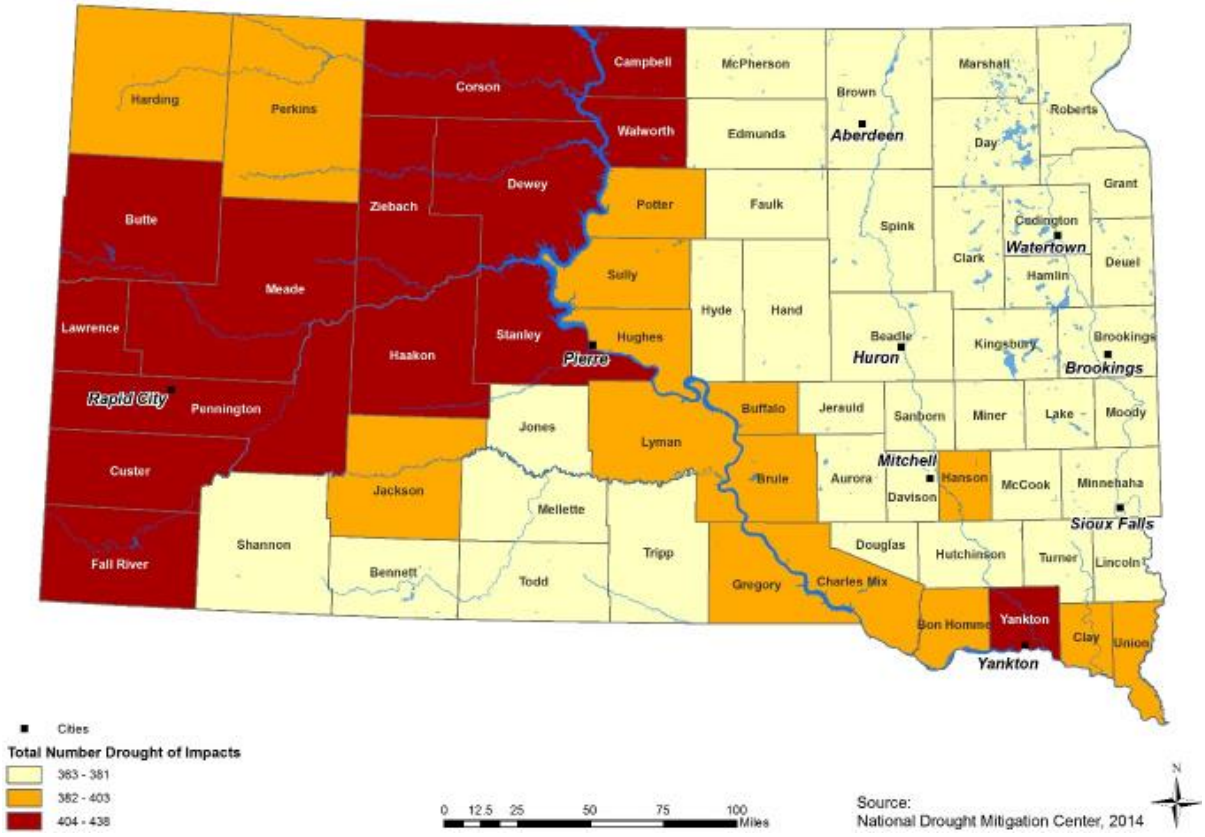
As the table shows, the 2012 drought had by far the biggest impact on the county's agricultural production, with Davison County ranking 12th among South Dakota counties in drought losses that year. The figure below, as reproduced from the South Dakota Drought Mitigation Plan, shows the 2012 drought's impact statewide.



To determine which areas of the state are most vulnerable to the agricultural impacts of drought, the authors of the South Dakota Drought Mitigation Plan analyzed crop losses in each county compared to the total value of the county's crops. Crop value was taken from the 2012 Census of Agriculture, while crop loss was based on the Risk Management Agency's crop indemnity data for the period 2000 to 2014. The resulting loss ratio is the average annual loss divided by total crop value; the higher the ratio the higher the vulnerability. Davison County's average annual loss from drought for the 2000 – 2014 period was $4,232,136, compared to a total crop value of $50,170,000, resulting in a loss ratio of 8.4%. In comparison, the average loss ratio figure for South Dakota counties was 3.1%. The authors of the South Dakota Drought Mitigation Plan assigned a "High" vulnerability rating for Davison County for this measure of drought vulnerability.

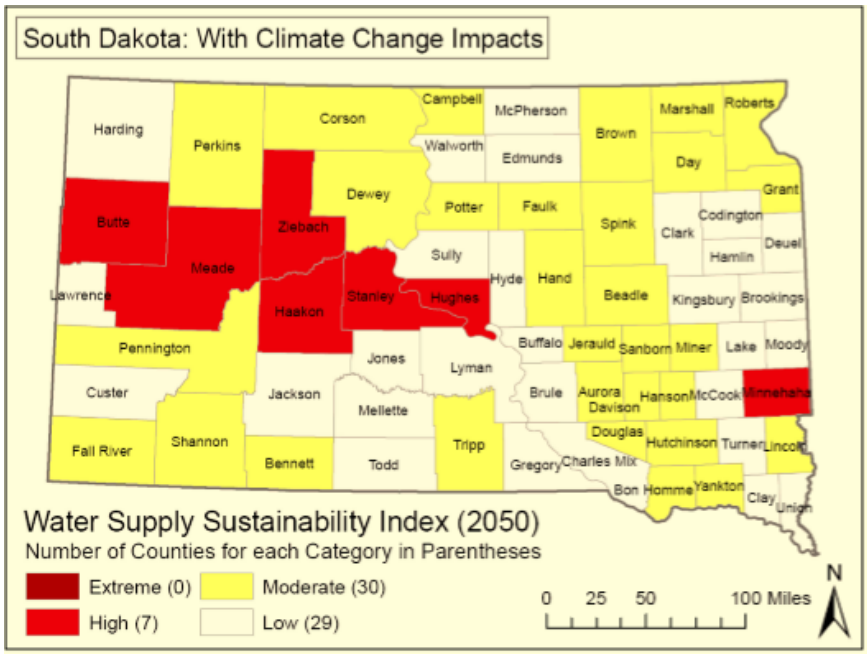
Vulnerability also was assessed by reviewing the South Dakota Drought Mitigation Plan's section on the National Drought Mitigation Center's Drought Impact Reporter. The Drought Impact Reporter analyzes drought impact information from a broad range of areas, including the social, economic, and environmental realms. As shown in the figure below from the South

Dakota Drought Mitigation Plan, Davison County is in the lower range of counties in terms of number of drought impacts.



Development Trends

Vulnerability to drought may increase in coming years if current land use trends continue and more marginal land in the county is brought into agricultural production. Climate change also may increase the frequency and severity of droughts in the future, according to many climate prediction models. As described in the South Dakota Drought Mitigation Plan, an analysis performed for the Natural Resources Defense Council examined the effects of



climate change on water supply and demand in the United States. The study found that more than 1,100 counties may face higher risks of water shortages by mid-century as a result of climate change. In South Dakota, more than half of the state's counties could face higher risks of water shortages by mid-century as a result of increasing potential for drought due to climate change impacts. The figure shown here from the Natural Resources Defense Council, as reproduced from the South Dakota Drought Mitigation Plan, shows that Davison County is one of the counties that could face moderate water shortages in the future due to climate change.

Wildfire

Wildfire risk in Davison County can be determined by analyzing historical records of actual wildfire losses in the county (see **Table 3.4**), or by estimating potential wildfire losses. To analyze potential wildfire loss in the county, information from the SILVIS Lab at the University of Wisconsin was used. The SILVIS webpage displays areas of Wildfire Interface and Wildfire Intermix, which are locations that have a combination of fairly dense housing and vegetation. Such areas are considered to be vulnerable to wildfires. The orange areas in the image at right are the Wildfire Intermix areas in Davison County. The total population and number of housing units in Davison County at risk is summarized in the table below, which is based on 2010 Census Block data.

Table 3.12 – Population in Wildfire Risk Zones in Davison County

Housing Units	Total Population	Median Home Value	Total Home Value
277	661	$108,800	$30,137,600

Source: State of South Dakota Hazard Mitigation Plan, based on data from the SILVIS Lab at the University of Wisconsin–Madison

The population of 661 living in a High or Moderate Risk threat zone ranks Davison County 34th among South Dakota counties, representing about three percent of the county's population. Putting things in perspective, in South Dakota as a whole approximately 25% of the population lives in a wildfire threat zone.

This is not to say that there is no threat. Even in areas of the county without much woody vegetation, wildfires are possible. They can occur in pastures and other types of grassland, wetlands (many of which dry out in the summer), and wildlife production areas. The loss potential from these fires is generally slight, although occasional damage has been reported. Wildfire impacts on the county's agricultural producers are insignificant; data on indemnity payouts between 2000 and 2017 showed $1,510 for crop loss due to wildfire in 2011.

Development Trends

Looking ahead, the development occurring in Davison County may marginally increase the county's vulnerability to wildfires, but probably not to any significant degree. One factor that could increase wildfire vulnerability is the continued spread of cedar trees. These trees are spreading quickly in Davison County, and efforts to control their spread have met with only limited success. The fuel load they represent could turn an otherwise routine brush fire into a very serious situation.

Climate change also may increase local wildfire vulnerability. The South Dakota Hazard Mitigation Plan cites a U.S. Forest Service study that indicates the potential for an increase in future lightning activity and a higher frequency of weather patterns conducive to surface drying. These factors, together with higher summer temperatures, will likely increase the annual window of high fire risk by 10 to 30%. The plan states that predictions past 2040 are largely speculative, but there will be an increase in the potential for drought and the number of days in any given year with flammable fuels, which may extend the fire season.

Risk Assessment Summary

In this section, the vulnerability of Davison County to each of the hazards profiled is summarized. Maps are presented at the end of the section to augment the analysis, showing areas within each community where vulnerability to flooding exists; the graphic on the previous page showed areas most vulnerable to wildfire. Vulnerability to winter storms, summer storms, and drought is not mapped, as those hazards are likely to impact all areas of the county more or less equally. A brief discussion of vulnerable populations within the county also is presented.

- **Winter Storms**

Davison County's vulnerability to winter storms can be considered high (Davison is one of only six counties in the state rated highly vulnerable to winter storms in the South Dakota Hazard Mitigation Plan). All areas of the county are highly vulnerable to winter storms, but the loss potential is much greater in Mitchell, given its concentration of population, buildings, and critical infrastructure. Major winter storms accompanied by heavy snow or freezing rain contribute to the vulnerability of county residents by making roads dangerous for travel. The isolation of residents living outside of Mitchell, Ethan, and Mount Vernon puts them at increased risk. Some of these residents are over 10 miles from the nearest place with groceries, medical service and supplies, or other important items. If roads are blocked by snow for an extended period of time, some rural residents, particularly the elderly, may be

at risk. Winter storms accompanied by high winds have the potential to damage residential and commercial property in the county, as well as infrastructure. A major concern is the vulnerability of rural electric power infrastructure. When winter storms are accompanied by high winds and freezing precipitation, ice can build up on powerlines, which can cause the lines and poles to come down. It is a certainty that the county will remain vulnerable to winter storms.

- **Summer Storms**

Davison County's vulnerability to summer storms can be considered high. All areas of the county are vulnerable to summer storms, and are highly vulnerable to summer storms that are accompanied by tornadoes or hail. Much of the vulnerability is to crops, which are quite vulnerable to the effects of hail and other violent summer weather, but the loss potential also is high in Mitchell, given its concentration of population, buildings, and critical infrastructure. Vulnerability also may be somewhat higher in Mount Vernon, where about 10% of the housing stock consists of mobile homes, the same percentage in South Dakota as a whole. The lack of building codes in the county outside of Mitchell, where National Building Code standards are enforced, impacts the county's vulnerability to summer storms accompanied by high winds.

- **Flooding**

The overall vulnerability to flooding in Davison County can be described as high. Much of the impact is to cropland and to rural county and township roads, but the threat of property damage due to flooding also exists. Flooding impacts in 2019 were especially significant, with numerous county and township road closures. The Following is a summary of vulnerability to flooding in each of the communities:

Ethan: There appears to be little vulnerability to flooding in the community, although the HAZUS software did identify a small area prone to flooding on the northwest edge of town. Flooding in 2019 had a minor impact on the community, with the main problem being a sewer system that was overwhelmed with floodwater, resulting in sewage backing up into several homes. One and a half blocks of Sixth Street had to be replaced because of floodwater damage.

Mitchell: The city is quite vulnerable to flooding, as both the historical evidence and the potential flood loss tables (**Tables 3.9** and **3.10**) indicate. Dry Run Creek runs through the heart of the community and Firesteel Creek flows along the northern edge of the city. A total of over $3.5 million of residential and commercial property is vulnerable to flooding in Mitchell. Flooding in 2019 had a major impact in the city, with hundreds of properties suffering varying degrees of damage. Significant street flooding also occurred, especially during the September 2019 flood.

Mount Vernon: The city is definitely vulnerable to flooding, as **Table 3.9** and **Table 3.10** show. A total of over $1.9 million of residential and commercial property is at risk, or about $4,216 on a per capita basis. In addition to the many residential properties located in the flood hazard zone, several commercial properties and two public properties - the fire hall and the Mount Vernon Public School - are affected. Flooding in 2019 had a minor impact on the community, with the main problem being

a sewer system that was overwhelmed with floodwater, resulting in sewage backing up into 15 to 20 homes. Street damage also was significant, with FEMA Public Assistance money received for flood damage to Haines Street and the eastern section of Railroad Street.

- **Drought**

Davison County's vulnerability to drought can be considered high, and is certain to continue for the foreseeable future. All areas of the county are vulnerable to drought. The impact is primarily to the agricultural sector, where serious losses have occurred. Residential and commercial impacts of drought are minor, as the water supply throughout the county to residential and commercial users appears to be secure at this time.

- **Wildfire**

The overall vulnerability to wildfire in Davison County is low. Only 3% of the county's population is considered to be living in a High or Moderate Risk wildfire threat zone, well below the state figure of 25%. No truly destructive wildfire has ever been recorded in the county.

Vulnerable Populations

The issue of vulnerable populations is important to consider, because such people may be particularly vulnerable to disaster events. Vulnerable populations include the very young, the elderly, those with physical or mental disabilities, and the very poor. They can also include populations that tend to be isolated in some way from the rest of the community, such as those who are not fluent in English.

The South Dakota Hazard Mitigation Plan includes a section on social vulnerability, using the Social Vulnerability Index for the United States. This index, compiled by the University of South Carolina Hazards and Vulnerability Research Institute, measures the social vulnerability of all counties in the nation to environmental hazards. The index synthesizes 30 socioeconomic variables, which research suggests contribute to reduction in a community's ability to prepare for, respond to, and recover from hazards. The primary variables are race and class, wealth, percentage of elderly residents, Hispanic ethnicity, special needs individuals, Native American ethnicity, and service industry employment. According to the index, Davison County is not within the top 20% of the most socially vulnerable counties in the nation to environmental hazards.

In the context of this plan, a specific population of concern is the aged, who tend to be more vulnerable to the effects of hazard events because of their physical or mental condition, or other factors. Many of the aged live in nursing homes and other types of senior care facilities; within Davison County, such facilities are located in Mitchell.

Figure 3.1 - Davison County

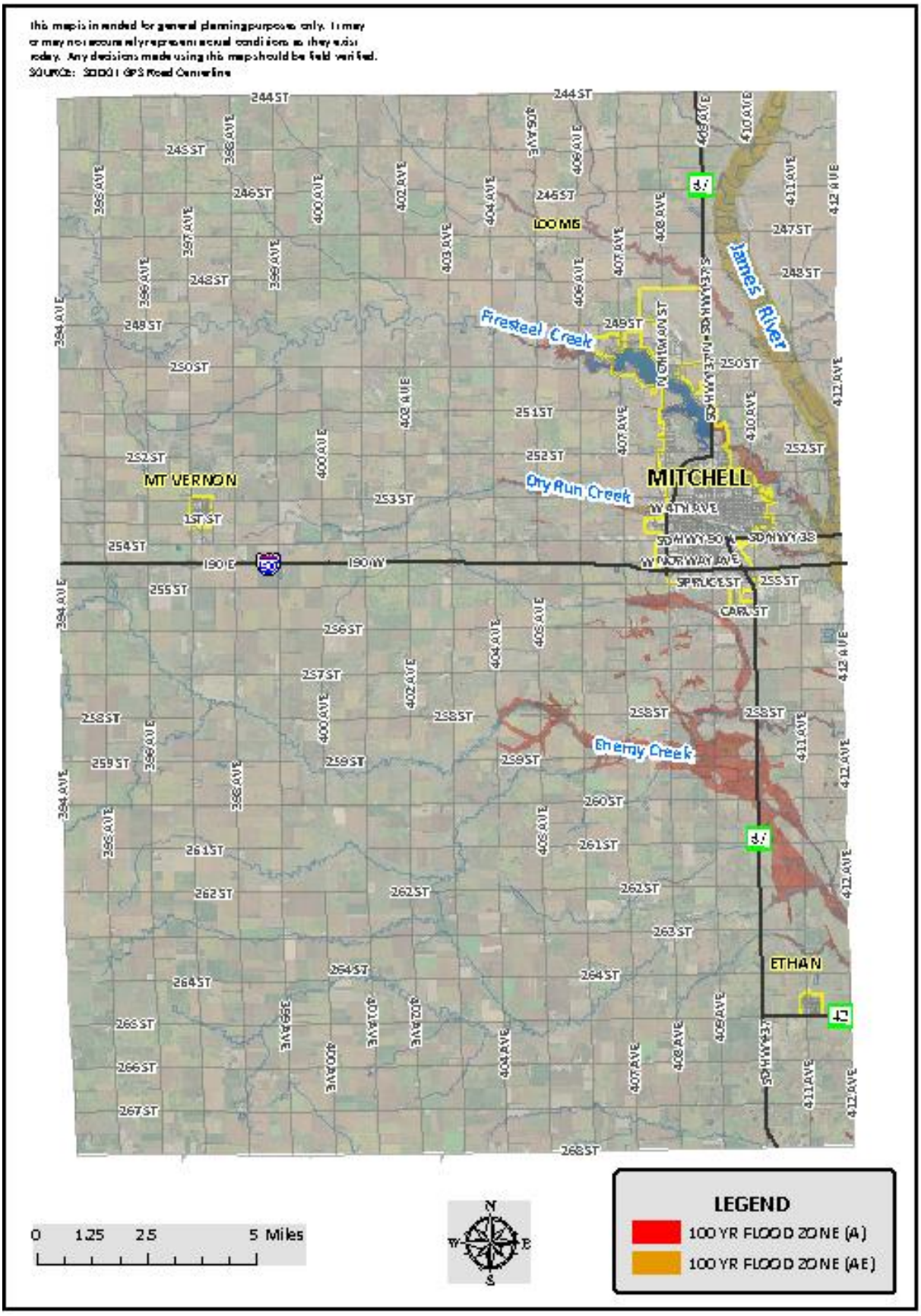


Figure 3.2 – Ethan **PLEASE REVIEW FOR ACCURACY!**

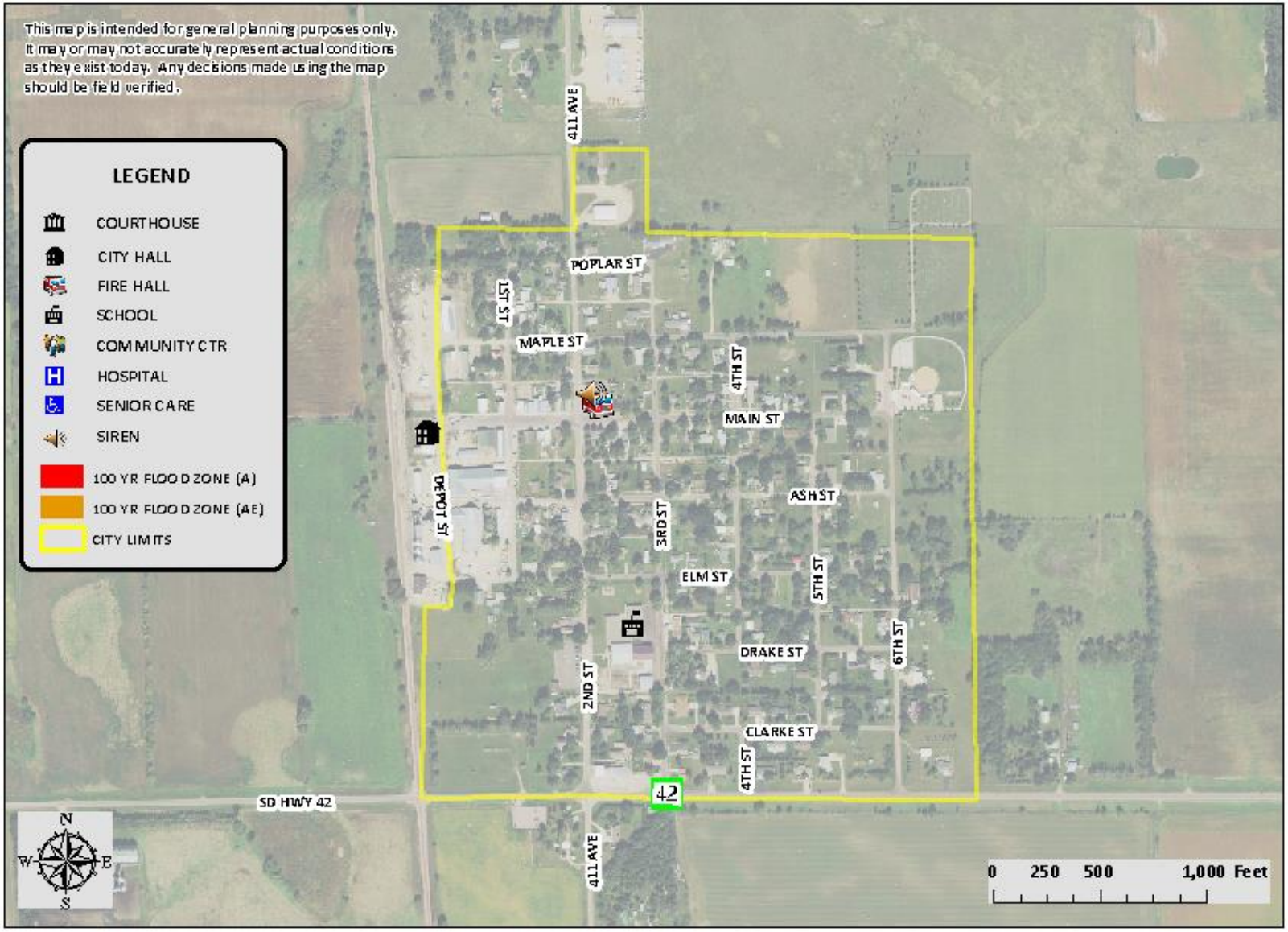


Figure 3.3 – Mitchell PLEASE REVIEW FOR ACCURACY!

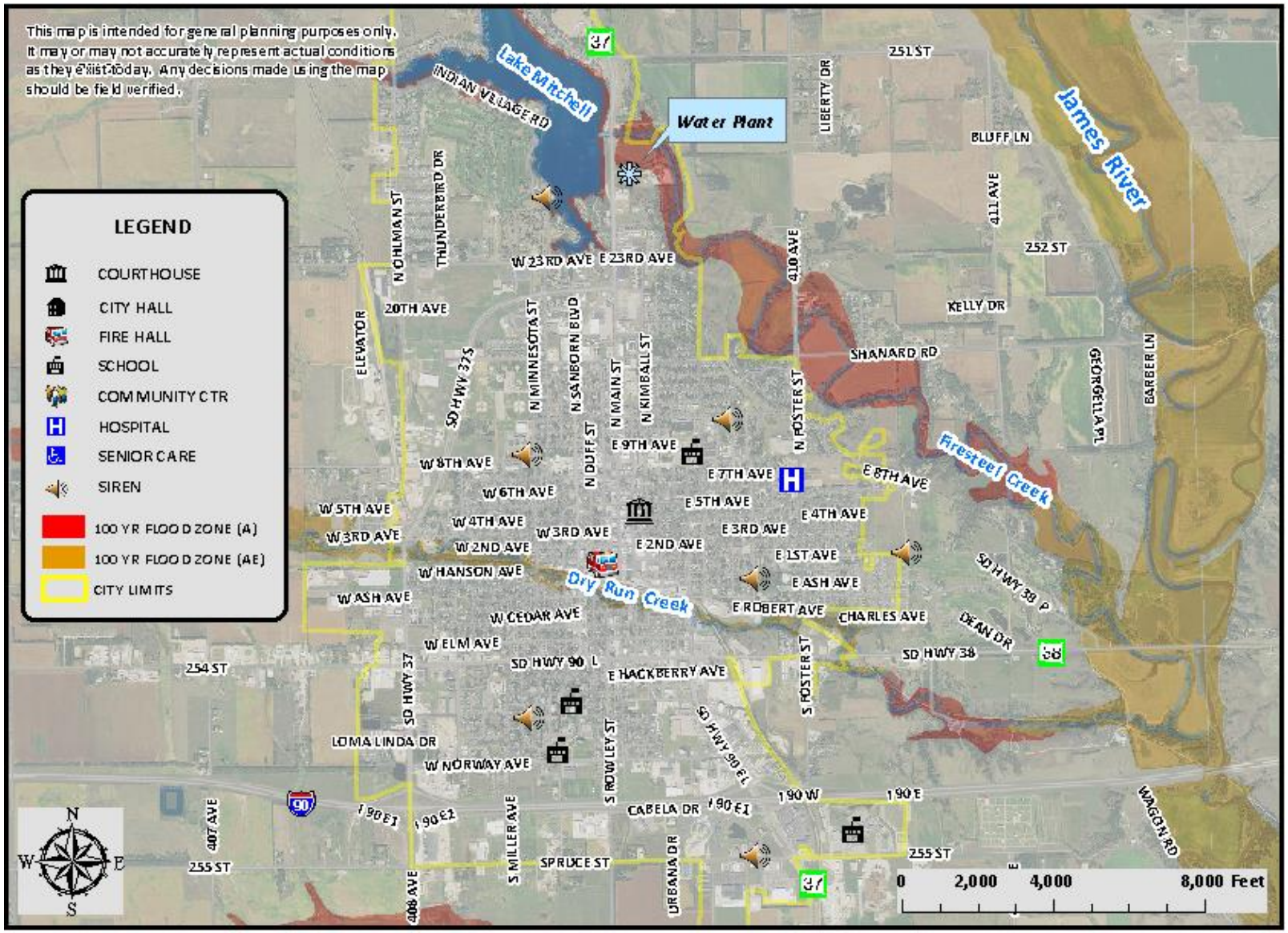
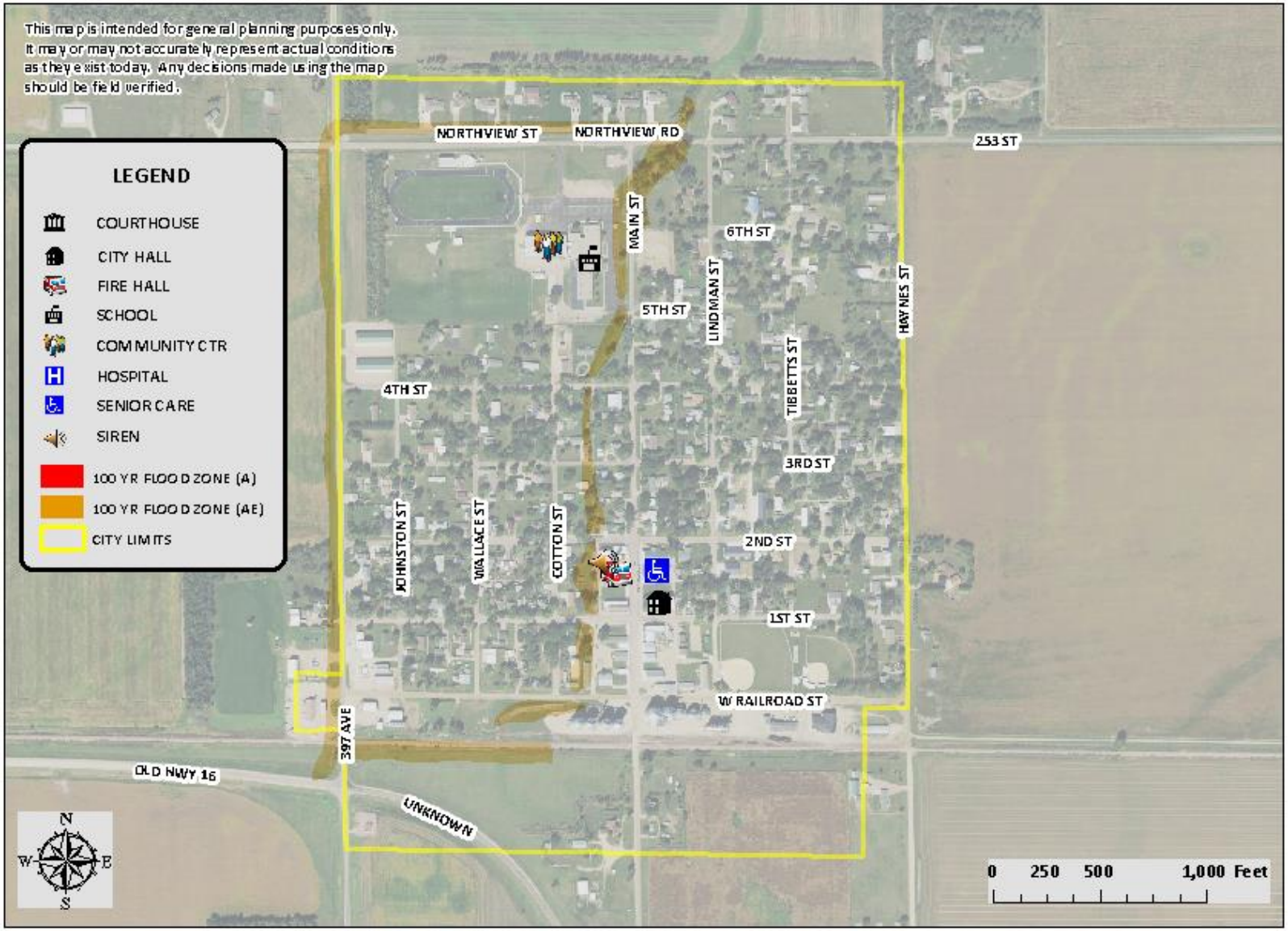


Figure 3.4 – Mt Vernon **PLEASE REVIEW FOR ACCURACY!**



CHAPTER IV
RISK MITIGATION STRATEGY

Background

The previous chapter described the types of hazards most likely to impact Davison County, and discussed the county's vulnerability to each of the hazards. This chapter identifies the hazard mitigation goals and objectives that the planning team decided upon, and then focuses on a presentation of the mitigation actions proposed to achieve the goals and objectives. A table showing all of the proposed actions is included. The chapter concludes with a discussion about how the proposed actions were prioritized.

Mitigation Goals and Objectives

At the beginning of the planning process, it was determined that the same general goals and objectives as listed in the county's current plan would be kept for this update. Among other considerations, the planning team wanted to ensure that the goals and objectives supported the priorities of the other planning documents that were reviewed as this plan was being developed. The following goals were identified:

- Minimize loss of life and injuries from hazards.
- Minimize damage to existing and future structures within hazard areas.
- Reduce losses to critical facilities, utilities, and infrastructure from hazards.
- Reduce impacts to the economy and the environment from hazards.

After the team had settled on the goals, they began to focus more narrowly on each hazard by reviewing the results of the risk assessment and analyzing each jurisdiction's vulnerability to the hazards, and the severity of the threat posed by the hazards. Much of the discussion focused on damage caused by past hazard events, and what could be done to lessen or eliminate damage from future events. The planning team also considered how future development might affect the jurisdictions' vulnerability to each of the hazards faced.

Following are the specific mitigation objectives for each of the hazards:

Winter storm

- Reduce property and infrastructure losses due to winter storms.
- Ensure that people are adequately protected from the effects of winter storms.
- Minimize disruptions to the power distribution system.

Summer storm

- Reduce property and infrastructure losses due to summer storms.

- Ensure that people are adequately protected from the effects of summer storms.
- Ensure that people have adequate warning when violent weather threatens.

Flooding

- Reduce property and infrastructure losses due to flooding.
- Minimize development in areas that are prone to flooding.
- Maintain the natural and man-made systems that protect people and property from floods.

Drought

- Reduce economic and environmental impacts due to drought.

Wildfire

- Reduce property and infrastructure losses due to wildfires.

Mitigation Actions

With the goals and objectives identified by the planning team, the participating jurisdictions began the process of selecting mitigation actions that could be taken to accomplish the goals. The process began with a review of the actions listed in the county's current disaster mitigation plan and discussion about the progress that had been made to implement the actions. A list of the actions and a summary of the implementation status of each action is shown in the following table.

Table 4.1 – Progress on Implementing Previously Proposed Actions

Mitigation Action	Hazard	Current Status
DAVISON COUNTY		
Implement building code standards.	Summer storms	No longer a priority
Siren installation at Loomis.	Summer storms	No progress – lack of funds.
Siren installation at Enemy Creek development.	Summer storms	No progress – lack of funds.
Siren installation at Davison County fairgrounds.	Summer storms	No progress – lack of funds.
Ensure continued NFIP compliance.	Flooding	Continuing
Continue working with the James River Water District.	Flooding	Continuing
Make improvements to Kibbee Ditch.	Flooding	Some work has been done
Make improvements to Firesteel Creek.	Flooding	The City of Mitchell is buying land along the creek to help mitigate against flooding
Make drainage improvements to county roads.	Flooding	Progress has been made, but flooding in 2019 has set the County back
Participate in reverse 911 emergency notification system.	All hazards	No longer a priority

Mitigation Action	Hazard	Current Status
Renew status in StormReady Program.	Summer storms	Recently renewed
Update county burning ordinance to require people doing open burns to contact authorities.	Wildfire	No longer a priority
Generator acquisition for Ethan public school.	Winter storms	No progress – lack of funds.
Generator acquisition for Mount Vernon public school.	Winter storms	No progress – lack of funds.
Install emergency storm shelter in Ethan	Summer storms	No progress – lack of funds.
Install emergency storm shelter in Mount Vernon.	Summer storms	No progress – lack of funds.
CITY OF MITCHELL		
Install emergency storm shelters at soccer complex and at city campground.	Summer storms	Progress is being made at the city campground
Ensure continued NFIP compliance.	Flooding	Continuing
Make improvements to Dry Run Creek, including lowering box culvert at Minnesota Street.	Flooding	The City is studying drainage along Dry Run Creek
Require large groups coming into Mitchell to have an emergency response plan when shelter is needed.	Summer storms	No longer a priority
Continue participation in StormReady Program.	Summer storms	Recently renewed

Following this review, a list of potential mitigation actions based on FEMA's guidance document *Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards* was reviewed. The actions on the list can be grouped into the following general categories:

- Prevention: Government administrative or regulatory actions or processes that influence building and development. Examples include:
  - Adopting zoning regulations.
  - Preserving open space.
  - Reviewing and strengthening local flood ordinances.
  - Adopting stormwater management regulations.
  - Adopting National Building Code standards.
  - Enacting measures to restrict non-essential water usage.

- Education and Outreach: Actions to inform and educate elected officials, stakeholders, property owners, and the general public about potential risks from hazards and potential ways to mitigate them. Examples include:
  - Developing a disaster mitigation public awareness program.
  - Participating in the StormReady program.
  - Participating in the Firewise Communities program.
  - Making presentations to school groups or neighborhood organizations.
  - Mailings to residents in hazard-prone areas.
  - Encouraging people to take various water-saving measures.

- Property Protection: Actions that modify existing buildings or infrastructure to protect them from a hazard or remove them from the hazard area. Examples include:

- Property acquisition, elevation, or relocation, including elevating roads in flood-prone areas.
- Making structural retrofits to facilities.
- Replacing overhead utility lines with underground lines.

- Natural Resource Protection: Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems. Examples include:
  - Using low-lying areas as natural water retention ponds.
  - Restoring and preserving wetlands.
  - Restoring stream corridors.
  - Forest and vegetation management.
  - Providing incentives for xeriscaping.

- Structural Projects: Actions that involve the construction of new structures to reduce the impact of a hazard. Examples include:
  - Upgrading stormwater infrastructure, such as culverts and storm sewer piping.
  - Building floodwalls.
  - Building tornado safe rooms.

It was explained that hazard mitigation is defined as *sustained action* taken to reduce or eliminate the long-term risk to people and property from hazards, as opposed to preparedness planning. Still, some actions to enhance disaster preparedness were discussed. Actions considered in this category included installing warning sirens in areas currently not well served and acquiring emergency power generators for critical facilities.

The final list of mitigation actions identified by the jurisdictions is shown in **Table 4.2**, which contains the following information for each action:

- The local priority rating – either High or Medium.
- The individual (party) primarily responsible for implementing the action.
- The estimated time frame needed to accomplish the action. Short term actions are those that can be completed within a few years, while Long term actions may take several years or more to accomplish due to cost or other factors.
- The estimated cost to implement the action.
- Resources that may be available to help fund the action.

Prioritizing the actions is important because it is unlikely that all of them can be pursued simultaneously, especially when costly projects are being considered. Those actions providing the most overall benefit in terms of cost are likely to be pursued first, while some lower priority actions may never be implemented. The prioritization process was informal and somewhat subjective, but a methodology did help guide the process. This framework, which was suggested by the Planning & Development District III office, is based on the following criteria:

- Overall benefit - how many lives or how much property will be protected, and how much disruption will be prevented? Are there any critical facilities or important public infrastructure that will be protected?
- Financial feasibility - how expensive will the action be? Could the action qualify for grant or loan funding?
- Political feasibility – will the public support the action? Are there any groups or interests that may be opposed to the action and thus prevent it from being implemented?
- Technical feasibility – does the technology exist for the action to be implemented? Is the action likely to function as intended?
- Environmental feasibility - does the action have the potential to have an adverse impact on the environment?
- Legal feasibility – are there any legal issues that might prevent the action from being implemented?

Guesswork was kept to a minimum during the prioritization process. For instance, in determining the potential benefit of a given action, the amount of property that would be protected by the action could in some cases be estimated with a fair amount of certainty. Assessing the proposed actions in relation to the other criteria was sometimes more difficult. Determining the political feasibility of the actions may have been the most subjective part of the process, but the jurisdiction representatives generally had a good idea of how the public and vested interests would support the actions.

Funding considerations also are critical, because neither Davison County nor any of the other participating jurisdictions have much discretionary money available to fund mitigation activities. Given this reality, it is unlikely that any mitigation action requiring substantial financial resources could be implemented locally without grant assistance. Following are potential sources of outside funding to help the jurisdictions accomplish mitigation projects:

<u>FEMA grant programs</u>

- Hazard Mitigation Grant Program (HMGP)
- Pre-Disaster Mitigation (PDM)
- Flood Mitigation Assistance (FMA)
- Rehabilitation of High Hazard Potential Dams (HHPD)

<u>Other grant and loan programs/sources</u>

- US Economic Development Administration
- US Department of Agriculture Rural Development grant/loan program
- South Dakota Community Development Block Grant program
- South Dakota State Homeland Security Program
- South Dakota Dept. of Environment and Natural Resources
- South Dakota Dept. of Transportation
- James River Water Development District

Table 4.2 - Proposed Mitigation Actions PLEASE REVIEW FOR ACCURACY!

For NFIP participation, we need to describe how the county and each town will maintain National Flood Insurance Program (NFIP) compliance. Some suggestions include:

- **Review their NFIP regulations**
- **Enforce their existing regulations more diligently (regs in building in flood zones such as first floor elevation above flood level, no basements, etc.)**
- **Request to identify and map flood zones**
- **Do more assistance and outreach to the public**
- **Request more training and info from state NFIP coordinator (Mark Macy)**

DAVISON COUNTY ACTIONS	HAZARD	PRIORITY	PROJECT LEAD	TIME	COST	FUNDING	STATUS
Ensure continued NFIP compliance. More training and program information will be requested from state NFIP coordinator.	Flooding	HIGH	County commission	SHORT	N/A	N/A	County will make this a priority.
Make drainage improvements to county roads.	Flooding	HIGH	Hwy Superinten-dent	LONG	Unknown	FEMA; DOT	This is still a high priority, but 2019 flooding has set the County back
Powerline burial.	Winter storm	HIGH	Central Electric Coop	Ongoing	Unknown	FEMA	The Coop has plans to continue burying lines in the county.
Warning siren acquisitions.	Summer storm	HIGH	Emer Mgmt Director	SHORT	$40,000 (each)	FEMA	County plans to apply for funding.
Make improvements to Kibbee Ditch.	Flooding	HIGH	County commission	SHORT	Unknown	FEMA; JRWDD	Some work has been done
Make improvements to Firesteel Creek.	Flooding	HIGH	County commission	SHORT	Unknown	FEMA; JRWDD, DENR	The City of Mitchell has been acquiring land along the creek to help mitigate against flooding
Generator acquisition for Ethan public school (facility is a storm shelter).	Winter storm	MED	Emer Mgmt Director	SHORT	$50,000	FEMA	Emergency Mgmt Director will contact Ethan.
Generator acquisition for Mount Vernon public school (facility is a storm shelter).	Winter storm	MED	Emer Mgmt Director	SHORT	$50,000	FEMA	Emergency Mgmt Director will contact Mt Vernon.
ETHAN ACTIONS	**HAZARD**	**PRIORITY**	**PROJECT LEAD**	**TIME**	**COST**	**FUNDING**	**STATUS**
Ensure continued NFIP compliance. More training and program information will be requested from state NFIP coordinator.	Flooding	HIGH	City council	SHORT	N/A	N/A	City will make this a priority.

Storm drainage improvements in the 1st Street/ Elm Street area, including construction of a detention pond.	Flooding	HIGH	Public Works Director	LONG	Unknown	FEMA; DENR	Project is in early planning phase.
Storm shelter construction at city park	Summer storm	HIGH	City council	MID	Unknown	FEMA	Project is in early planning phase.
MITCHELL ACTIONS	**HAZARD**	**PRIORITY**	**PROJECT LEAD**	**TIME**	**COST**	**FUNDING**	**STATUS**
Ensure continued NFIP compliance. More training and program information will be requested from state NFIP coordinator.	Flooding	HIGH	City council	SHORT	N/A	N/A	City will make this a priority.
Wise Mobile Home Park property acquisition.	Flooding	HIGH	City engineer	SHORT	$175,000	FEMA	City has applied for funding. City will pursue additional buyouts as opportunities present themselves.
Dry Run Creek flood control project(s).	Flooding	HIGH	City engineer	MID	Unknown	FEMA	Stormwater evaluation is ongoing to determine projects City can pursue.
Sunnyside and University Additions flood control project(s).	Flooding	HIGH	City engineer	MID	Unknown	FEMA	Stormwater evaluation is ongoing to determine projects City can pursue.
Northwest Drainage flood control project(s).	Flooding	HIGH	City engineer	MID	Unknown	FEMA	Stormwater evaluation is ongoing to determine projects City can pursue.
Install emergency storm shelters at soccer complex and at city campground.	Summer storm	HIGH	City council	MID	$675,000 (each)	FEMA	Project is in planning phase. City may apply for funding.
Warning siren acquisitions.	Summer storm	HIGH	City council	SHORT	$40,000 (each)	FEMA	Three sites have been identified. City plans to apply for funding.
Detention pond south of Main St and Norway Ave.	Flooding	HIGH	City engineer	LONG	$450,000	FEMA	Project is in early planning phase. City is considering other locations for additional detention ponds.
MT VERNON ACTIONS	**HAZARD**	**PRIORITY**	**PROJECT LEAD**	**TIME**	**COST**	**FUNDING**	**STATUS**
Ensure continued NFIP compliance. More training and program information will be requested from state NFIP coordinator.	Flooding	HIGH	City council	SHORT	N/A	N/A	City will make this a priority.
Implement drainage improvements in the city.	Flooding	HIGH	Public Works Director	LONG	Unknown	FEMA; DENR	Project is in early planning phase.

Potential Resources for Funding Assistance:

FEMA	FEMA Hazard Mitigation Assistance Programs	CDBG	Community Development Block Grant
DENR	South Dakota Dept. of Environment and Natural Resources	DOT	South Dakota Department of Transportation
EDA	Economic Development Administration	OEM	SD Office of Emergency Management
USDA RD	US Department of Agriculture Rural Development	JRWDD	James River Water Development District

Mitigation Action Plan

The Davison County Hazard Mitigation Plan is the backbone for disaster mitigation planning within the county. To remain useful, the plan cannot exist in a vacuum – it is designed to work with other local planning and development tools and mechanisms, and local officials and policy makers need to be familiar with it. This section first describes how the mitigation plan will be incorporated into existing planning mechanisms, and concludes by describing how the mitigation strategy will be implemented.

Plan Incorporation

It is important that the goals and actions included in this plan be integrated with the other plans and policies within the county that may affect land use and development. Neither this plan nor any of the others will work effectively if they contain contrary goals or policy recommendations. The following table shows the planning-related technical documents that currently exist within the county, each of which was reviewed as this plan was being developed. Looking ahead, future updates of this plan should not be made without reviewing these planning tools.

Table 4.3 – Local Planning Mechanisms

	Capital Improvement Plan	Comprehensive Land Use Plan	Zoning ordinance	Building codes	Electrical Construction Plan	Housing Plan	Flood damage prevention ordinance	Drainage ordinance	Transportation Plan / Hwy Improvement Plan
Davison County		X [8]	X				X	X	X
Ethan									
Mitchell	X	X	X	X		X	X		X
Mt Vernon							X		

Hazard mitigation concepts should be incorporated where appropriate into the policy documents listed in the table. It is also important that major development projects within the jurisdictions be undertaken based on sound hazard mitigation planning.

Hazard mitigation also is discussed in the 2019 Comprehensive Economic Development Strategy (CEDS) for the Planning & Development District III region, which includes Davison County. The CEDS, which is produced for the Economic Development Administration, analyzes development issues, opportunities, and challenges from a regional perspective. It is being

[8] The Davison County Comprehensive Plan was completed in 2020, incorporating information from this plan to help guide where future development may be most suitable

updated at this time with a greater emphasis on the subject of economic resiliency, including the role that hazard mitigation can play in helping communities maintain their economic wellbeing. Information from this plan will be used as the CEDS is updated.

Plan Implementation

The Davison County Emergency Management Director is ultimately responsible for ensuring that the plan's mitigation strategy is implemented effectively. The director will work under the authority of the county commission to implement the strategy, and will coordinate his/her activities with other county departments and other agencies as needed. Each jurisdiction participating in this plan also will play a critical role in carrying out the action plan by identifying and prioritizing the actions they want to pursue, allocating resources for their implementation, and applying for funding assistance as needed. If and when they are able to secure funding, they will move forward with implementing their actions.

The availability of funding is critical to the success of this plan, and therefore the mitigation actions listed in **Table 4.2** should be considered when the jurisdictions begin the process of working on their annual budgets. In this way, the plan will not become a mere "wish list" of ideas for which there is no practical funding mechanism. For those jurisdictions that lack any other planning tools and mechanisms, this may be the only practical way for the plan to be implemented. To help ensure that this happens, the Emergency Management Director will attend at least one city council meeting annually in each community to discuss hazard mitigation, including the possibility of obtaining funds through FEMA or other sources for the projects they have identified.

If FEMA mitigation funds are awarded for a project, grant administration will be the responsibility of the local jurisdiction, which will appoint an individual who will be responsible for ensuring that the project is completed as proposed and that all grant award conditions and requirements are followed. A resource that can help the jurisdictions meet the FEMA grant requirements, and help develop grant applications, is the Planning & Development District III office. District III staff have decades of experience working on various planning and community development activities within Davison County, and many years of experience working with the county's emergency management office.

CHAPTER V
PLAN MAINTENANCE

Background

Plan maintenance is a continuous process, which involves monitoring, evaluating, and updating the plan. It provides the foundation for an ongoing mitigation program and helps ensure that the plan remains relevant and effective. This chapter addresses how Davison County officials intend to ensure that the plan will remain a dynamic, useful tool for mitigating against the impact of future disaster events.

Plan Monitoring and Evaluation

Ultimate responsibility for monitoring the plan and evaluating its effectiveness lies with the Davison County Emergency Management Director. The director will work with the support of the Davison County Local Emergency Planning Committee (LEPC), which meets quarterly and includes representation from each jurisdiction participating in this plan.

The LEPC will review the plan annually. Major points of discussion will include whether the risk assessment remains valid because of new development or other factors that may impact vulnerability to hazards, whether the mitigation goals and objectives identified in the plan remain sound, and whether progress is being made on implementing the mitigation actions identified in the plan. An opportunity also will be provided to add additional mitigation actions to the plan as needed. If any new projects are identified, the South Dakota Office of Emergency Management will be notified so that the project will be eligible for hazard mitigation assistance in the next funding cycle.

After the LEPC's plan review meeting, the Emergency Management Director will meet with the Davison County commission and the other participating jurisdictions to discuss the progress being made to implement the plan. At this time, a determination will be made about whether the implementation strategy needs to be revised or the plan itself needs to be updated.

Plan evaluation must be an ongoing process. This will help ensure that the plan remains relevant and able to meet local conditions and priorities, which can change. Following are some of the factors that can have a major impact on mitigation planning:

- Occurrence of a significant disaster event – Serious events can reveal flaws in local jurisdictions' disaster preparedness plans. The 9/11 terrorist strikes are a dramatic example of this type of event.
- Change in the nature or magnitude of risks – Changing environmental conditions, increased development in sensitive areas, and other factors can be significant

enough to cause localities to rethink their mitigation strategies. As discussed earlier, climate change may increase the county's vulnerability to drought, and possibly other hazards.

- Change in funding availability – The availability of money often determines whether an action can be implemented. For example, local budget cuts can delay, or prevent altogether, a mitigation project's implementation. On the other hand, grant opportunities for specific types of mitigation actions may argue for their implementation.
- Change in local priorities – Local priorities regarding mitigation projects can change for a number of reasons. Regular meetings between the Davison County commission and the local township boards are one way in which the county stays current on the townships' needs regarding their roads, bridges, and other infrastructure.
- Legal factors – Laws and regulatory requirements may change, which may make certain mitigation actions more or less feasible or desirable.
- Technological change – Advances in technology may make it possible in the future to address certain types of hazards more effectively or at lower cost.
- Other factors – There are many other factors that can have an impact on local disaster mitigation priorities and strategies. For example, a detailed engineering analysis may indicate that a proposed mitigation action may be much costlier than first estimated, which could make the action unpractical to pursue.

Updating the Plan

Updating the plan may occur at any time in response to the factors identified above. Otherwise, it is expected that the County will begin the process of updating the plan approximately two years prior to the plan's expiration date. Plan updates will reflect changes in growth and development, changing mitigation priorities, and progress in implementing the plan. Led by the Emergency Management Director, the process will consist of the following general steps:

- Obtain funding assistance
- Hire contractor to write the plan
- Organize planning team
- Begin soliciting public participation and input
- Hold meetings of planning team and within jurisdictions to develop the plan
- Make draft of the plan available for public review and comment
- Submit plan for State review
- Revise plan as needed based on reviewer comments
- Plan submitted by State to FEMA
- Revise plan as needed based on reviewer comments
- Jurisdictional adoption of approved plan

Public Involvement

Throughout the development of this plan update, a sustained effort was made to involve the general public in the plan. Outreach included press releases that were posted on the Davison County website, as well as social media posts. Looking forward, the outreach strategy will evolve over time as different methods are used to get greater public participation in the mitigation planning process. Once approved, the plan will be available for the public to see at the county courthouse and in each city office. It also will be made available on the community websites. Other outreach activities may include:

- Community visits by the Emergency Management Director to discuss the plan (local schools, civic meetings, etc.)
- Press releases and articles about the plan published in the Mitchell *Daily Republic*.
- Information about the plan included with utility billing statements.

Another way for the public to participate in the mitigation planning process will be through the mitigation plan review meeting of the Davison County LEPC. The meeting will be made known to the public through a notice in the Mitchell *Daily Republic* stating that the plan will be reviewed at the meeting and that comments from the public are encouraged.

All comments and suggestions received from the public through any of the forums described above will be included in a public comment section in the plan's appendix.

APPENDICES

Appendix A	Outreach Effort
Appendix B	Documentation of Meetings
Appendix C	History of Previous Hazard Occurrences
Appendix D	Community Assets
Appendix E	References

APPENDIX A: Outreach Effort

This section documents the outreach effort that was used to solicit input into the plan.

Meeting #1 - Email to Planning Team:

From: Mark Jenniges <markj@davisoncounty.org>
Sent: Saturday, March 6, 2021 11:22 AM
To: Andy Mentele <andy@mentele.net>; Becky Pitz <becky.pitz@poet.com>; Bill Middendorp <bill.middendorp@usc.salvationarmy.org>; Dale Wilson <dale.wilson@chsinc.com>; Dave Duba <ethanshop@santel.net>; David Beintema <davidb@davisoncounty.org>; dawnn@mitchelldps.com; deank@mitchelldps.com; Denny Kiner Sr. <kinerdr@santel.net>; Don Huber (hansoncoe-m@triotel.net) <hansoncoe-m@triotel.net>; dpschmidt@santel.net; genodeinert@yahoo.com; Giddens, Rebecca <rebecca.giddens@redcross.org>; J. P. Skelly (kornnews@kornq107.com) <kornnews@kornq107.com>; Jackie Horton <casaed@mitchelltelecom.net>; Jeff Bathke <jeffb@davisoncounty.org>; Jenna Auch <jenna.auch@state.sd.us>; John Heemstra <John.Heemstra@mitchelltech.edu>; John Sieverding <john.Sieverding@k12.sd.us>; Kyle Croce <kcroce@cityofmitchell.org>; Marius Laursen <mariusl@mitchelldps.com>; Mark Jenniges <markj@davisoncounty.org>; Micheal Peterson (micheal.peterson@state.sd.us) <micheal.peterson@state.sd.us>; Michelle Carpenter (m.carpenter@dakotacounseling.net) <m.carpenter@dakotacounseling.net>; Mike Koster <mikek@mitchelldps.com>; Pastor Adam Kjerstad (pastorkjerstad@hotmail.com) <pastorkjerstad@hotmail.com>; Petar Mirkovic <petar.mirkovic@empres.com>; r.konz@dakotacounseling.net; Ragels, Ruth E CTR NG SDARNG (US) <ruth.e.ragels.ctr@mail.mil>; Randy Pratt <rpratt@mit.midco.net>; Rusty Weinberg <rusty@davisoncounty.org>; shannons@mitchelldps.com; Stephanie Ellwein (sellwein@cityofmitchell.org) <sellwein@cityofmitchell.org>; Steve Brink <steve.brink@davisoncountysheriff.com>; Stundon, Diane <Diane.Stundon@state.sd.us>; Susan Kiepke <susank@davisoncounty.org>; vicki lehrman (vicki.lehrman@avera.org) <vicki.lehrman@avera.org>
Cc: Bathke, Michelle <mbathke@cityofmitchell.org>; Betty Raymond <ethancity@santel.net>; Laura Mayclin <mtvernoncity@santel.net>; Weston Frank <weston.m.frank@gmail.com>; kens@centralec.coop; Allemang, Heather <Heather.Allemang@state.sd.us>; Poppen, Jim <Jim.Poppen@state.sd.us>; Kafka, Kyle <Kyle.Kafka@state.sd.us>; John Clem <John.Clem@districtiii.org>; Fergen, Craig <craig.fergen@northwestern.com>; 'Dan Schroeder' <davhanrw@santel.net>
Subject: March 17 LEPC & Pre-Disaster Mitigation Meeting

LEPC Members and Pre-Disaster Mitigation Planning Members, the next LEPC meeting will be **March 17, 2021 @ 10:30 A.M.** in the EOC of the courthouse or by zoom . The link to the meeting is below. This meeting will last about a half hour.

The Pre-Disaster Mitigation meeting will follow on **March 17, 2021** 11:00 A.M. and will be held in the EOC or via zoom and will be directed by John Clem of District III who has been contracted by Davison County to assist with the update. The last update was finalized in 2016 and is updated every 5 years. The plan was developed to prevent or reduce the cost incurred by businesses, property owners, and governmental entities from disasters that may occur in Davison County. The plan identifies and analyzes the hazards that occur in the count, and proposes a mitigation strategy to minimize future damage caused by those hazards.

Representation from Davison County, Mitchell, Mt. Vernon and Ethan must be represented at the meeting or viz zoom or else FEMA will consider your community as not participating in the plan and therefore ineligible to apply for hazard mitigation funding. One of the things we'll be discussing during the call is the status of the projects listed in Table 4.2 on pages 64 and 65 of the current plan, which is attached. We'll also discuss how hazards like summer storms, winter storms, and flooding impact the county and each community.

Topic: Davison County PDM Plan
Time: Mar 17, 2021 10:30 AM Central Time (US and Canada)

Join Zoom Meeting https://zoom.us/j/96359418250?pwd=bVB4allWbnA4UkFrSGFvNHlUL1VKQT09
Meeting ID: 963 5941 8250
Passcode: 038797

Meeting #1 - Email to Emergency Management Directors in Other Counties:

From: John Clem
Sent: Monday, March 8, 2021 10:28 AM
To: Allemang, Heather <Heather.Allemang@state.sd.us>; Poppen, Jim <Jim.Poppen@state.sd.us>; Kafka, Kyle <Kyle.Kafka@state.sd.us>
Cc: Mark Jenniges <markj@davisoncounty.org>
Subject: FW: PDM Meeting

Good morning folks –

This is just an FYI that **Davison County** is beginning the process of updating its current Pre-Disaster Mitigation Plan, and you are all invited to participate. Below is the Zoom info for the meeting next week. (We were going to have the first meeting last month, but had to postpone)

John Clem
Planning & Development District III
PO Box 687
Yankton, SD 57078
800 952-3562
John.Clem@districtiii.org

Post on Davison County Website Prior to Meeting #1:

Davison County Emergency Management
200 E. 4th Ave.
Mitchell, SD 57301-2631
Phone (605) 995-8615
Fax (605) 995-8642

TO: The Public of Davison County

DISASTER MITIGATION MEETING

Blizzards, tornadoes, and floods are a few of the natural hazards that strike this part of the country. Events like this have the potential of causing thousands of dollars annually in damage to property. To lessen the impact of these disasters in the future, Davison County is beginning the process of updating its current Disaster Mitigation Plan.

A series of meetings will be held to obtain input as the plan is developed. These meetings are open to everyone. If you have an idea about what can be done to prepare for future disaster events occurring in Davison County, you are urged to attend the meetings.

The first meeting will be held via Zoom meeting on March 17, 2021 at 11:00 AM. Agenda items for the initial meeting include a discussion of hazard mitigation concepts, a review of the county's current disaster mitigation plan, and identification and profiling of the hazards that impact the county.

Directions about how to access the meeting can be obtained by contacting the Davison County Emergency Management Office at markj@davisoncounty.org or by calling 605 995-8640. You can also contact John Clem at 800-952-3562 or by email at John.Clem@districtiii.org.

Dated this 1st day of March 2021.

Mark Jenniges

Mark Jenniges
Acting Director of Emergency Management

APPENDIX B: Documentation of Meetings

This appendix includes the following items:

- Minutes from each of the participating jurisdictions' meetings as they discussed the mitigation actions they wanted to include in the plan.
- Zoomlogs from the planning team meetings.

ZOOM LOG – PLANNING TEAM MEETING #1:

Name	User Email	Join Time	Leave Time	Duration (Minutes)
District III (Host)	districtiii@districtiii.org	3/17/2021 10:22	3/17/2021 11:34	72
Betty Raymond		3/17/2021 10:22	3/17/2021 11:34	72
Mark Jenniges		3/17/2021 10:22	3/17/2021 11:34	72
Dean Uher	deanu@centralec.coop	3/17/2021 10:23	3/17/2021 11:34	71
16059958640		3/17/2021 10:24	3/17/2021 11:34	70
Weston Frank	weston@jwmarketingsd.com	3/17/2021 10:25	3/17/2021 11:34	69
16059952261		3/17/2021 10:26	3/17/2021 11:34	68
John Heemstra	john.heemstra@mitchelltech.edu	3/17/2021 10:27	3/17/2021 11:34	67
Rebecca Giddens		3/17/2021 10:29	3/17/2021 11:34	66
Andrew Beier		3/17/2021 10:30	3/17/2021 11:34	65
Michael Koster	mikek@mitchelldps.com	3/17/2021 10:30	3/17/2021 11:34	64
Marius l		3/17/2021 10:31	3/17/2021 11:34	63
Heather Allemang		3/17/2021 10:58	3/17/2021 11:34	37
Ken Schlimgen		3/17/2021 11:00	3/17/2021 11:34	34
Petar Mirkovic	petar.mirkovic@empres.com	3/17/2021 11:01	3/17/2021 11:22	21

(EXCERPT FROM CITY OF MITCHELL MEETING MINUTES)

REGULAR MEETING OF THE CITY COUNCIL
COUNCIL CHAMBERS, CITY HALL
MITCHELL, SOUTH DAKOTA

April 5, 2021
6:00 P.M.

PRESENT: Dan Allen, Marty Barington, John Doescher, Kevin McCardle, Steve Rice, Dan Sabers, Jeffrey Smith, Susan Tjarks

ABSENT:

PRESIDING: Mayor Bob Everson

UPDATE:

City Engineer Joe Schroeder gave a project update for the Davison County Pre-Disaster Mitigation Plan. The plan is updated every five years. The following projects are considered as potential future Pre-Disaster Mitigation improvements and will be included in the plan.

1. Wise Mobile Home Park Buy-Out - $175,000
2. Dry Run Creek Evaluation – The evaluation is ongoing and project costs are to be determined after the evaluation is complete.
3. Sunnyside and University Additions – Storm Water Evaluation - The evaluation is ongoing and project costs are to be determined after the evaluation is complete.
4. Northwest Drainage Storm Water Evaluation - The evaluation is ongoing and project costs are to be determined after the evaluation is complete.
5. City Campground Storm Shelter - $675,000
6. Soccer Field Storm Shelter - $675,000
7. Storm Siren Northwest of Lake Mitchell – 249th St and 406th Ave - $40,000
8. Storm Siren at Highway 37 and 256th St – New Ground Storage Tank Site - $40,000
9. Storm Siren at Highway 37 and N Harmon - $40,000
10. Detention Pond South of Main Street and Norway Avenue - $450,000
11. The City is also reviewing additional locations for potential detention ponds.
12. The City accepts buy outs for any properties in the flood plain willing to participate in the FEMA program.

(EXCERPT FROM DAVISON COUNTY MEETING MINUTES)

April 6, 2021

CALL TO ORDER

Chairperson Bode called the regular meeting of the Davison County Board of Commissioners to order at 9:00 a.m. All members of the Board were present. Also present was Auditor Kiepke.

PLEDGE

The Pledge of Allegiance was led by Chairperson Bode.

APPROVE MINUTES

Motion by Kiner, second by Claggett to approve the minutes of the March 30, 2021 meeting. All members voted aye. Motion carried.

PUBLIC INPUT

Chairperson Bode stated that a rural resident was wondering about the procedure to keep people from planting in the right-of-ways.

Highway Superintendent Weinberg responded by saying that the County can only do something about it if it is on a County road. If it is a township road, the township is responsible for the right-of-ways.

BOARD OF EQUALIZATION INFORMATION

DOE Love presented information to the Board regarding the upcoming Board of Equalization as well as a couple of other informational items. The items covered were appeal deadlines, board structure, appeal schedule, appeal process, 2021 assessment changes and 2022 assessment plans.

DOE SOFTWARE UPDATE

After reviewing information presented by DOE Love regarding Orion Appraisal System software and Vanguard Appraisal, Inc. software, motion by Reider, second by Kiner to authorize Love to move forward with negotiations with Vanguard Appraisals, Inc. regarding new software for the DOE office. All members voted aye. Motion carried.

ACCEPT NOTICE OF RETIREMENT

At the request of Highway Superintendent Weinberg, motion by Reider, second by Claggett to accept the notice of retirement for Weed Supervisor Greg Geppert as of June 4, 2021 after 5 ½ years of service to Davison County. All members voted aye. Motion carried.

AUTHORIZE PURCHASE

At the request of Highway Superintendent Weinberg, motion by Weitala, second by Kiner to authorize the purchase of five buckets of blades at a cost of $2,400. All members voted aye. Motion carried.

PRE-DISASTER MITIGATION PLAN

Acting Emergency Management Director Jenniges presented an overview of the process for updating the Pre-Disaster Mitigation Plan. He explained that the plan is to be updated every five years. However, the update was delayed a year due to Covid-19. The Pre-Disaster Mitigation team held its first meeting in March and will hold its second meeting in May. There has been great participation from all entities within the County. Each entity is holding discussions as to what they feel is important for mitigation plans in their jurisdiction. These plans will be discussed at our next meeting.

Jenniges gave an update on the current proposed mitigation actions in the plan. He suggested adding a storm siren around the intersection of Bluff Ln and 409th Ave. as well as one around the intersection of 256th St. and 408th Ave. Each siren project would cost approximately $40,000. He said they will continue to look at making improvements to Kibbee Ditch and Firesteel Creek. Generators or generator switches need to be installed in Ethan and Mt. Vernon for storm shelter purposes.

Highway Superintendent Weinberg suggested that not only County bridges be looked at for installing rip-wrap but also township bridges. The flooding over the past years has taken a toll on our bridges. Commissioner Claggett reiterated the fact that we need to stay in conversation with neighboring counties that have dams, to make sure they are taking care of their infrastructure so it doesn't cause a ripple effect downstream.

The rest of the plan may be found on file in the Emergency Management office.

Regular Meeting, Ethan Town Board, 4-12-2021

The Town of Ethan board met in regular session on April 12, 2021, at 6:00 pm in the Ethan City Hall. Trustees present were Jason Koch, Gregg Thibodeau, Megan Perry and Bob Riggs. Lisa Hjellum was absent. City personnel present: Betty Raymond and Dave Duba. Chairman Thibodeau called the meeting to order and led the Pledge of Allegiance. All motions were unanimously voted as aye unless stated otherwise.

APPROVAL OF AGENDA: Agenda approved on motion by Riggs, second by Perry.

APPROVAL OF MINUTES:
Minutes from the March 15th meeting were approved on motion by Riggs, second by Koch. There were no Community Center minutes.

APPROVAL OF CLAIMS:
Motion by Riggs, second by Perry, to approve claims. (DELETED)

FINANCIAL REPORTS:
Finance Officer reviewed the financial reports from March and briefed the council on the change in SlickText registration from a 5-digit text number to a toll-free number. This has been published on the website. Also informed the council of a walk for diabetes scheduled for May 23rd.

PUBLIC WORKS REPORT: Discussed water loss report. Dave informed the council that the street sign project has been rescheduled to 2023. Also discussed a Poker Run event in Ethan. Council is in favor if the event is requested and more information is received. Dave had a request from someone for the city truck to haul trees/branches to the dump. Council had no objections as long as city personnel drives the truck and the property owner does the loading. Dave will be having the mosquito fogger calibrated on April 22nd and will be going to a sewer training meeting in Wagner on April 19th.

CITIZEN INPUT: none

OLD BUSINESS:

Community Center: Still waiting for quotes for gutters and awning. Front door lock was repaired and Interstate Glass was contacted about a broken window. It is a large hole and looks to be from vandalism.

Ordinance Review: Still waiting for completed ordinances from American Legal.

Security Cameras: Gregg is still reviewing, but has found a possible new system. Will continue to research.

Surplus Items: Finance Officer advised that the city should keep the old copier and fax as backup, but to have the Belarus tractor declared as surplus. Motion by Riggs, second by Koch to declare as surplus and to advertise for sale by sealed bids.

City Clean Up: Dumpsters have been scheduled for May 21, 22 and 23. Announcements will go out in the May 1st water billing.

NEW BUSINESS

Mitigation Project Ideas:District III asked the council for some needs for the city. Several ideas were discussed and will be submitted to District III.

Camper Ordinance: First reading the following camper ordinance was approved on motion by Riggs, second by Perry.
No campers or motor homes may park overnight on city property, except for in an emergency situation or in designated camping locations.

Campers or motor home maybe parked on city streets for up to three day for the purpose of loading and unloading. Campers or motor homes may also be used to house family members up to fourteen (14) days, but shall not be used as rental property or to house employees, nor used as long-term housing.

A conditional use permit may be granted by the city council on a case-by-case basis.

Building Permits: Two permits were submitted to the finance officer for garages and approved on motion by Riggs, second by Koch.

Malt Beverage License: Motion was made by Perry, second by Riggs, to approve the renewal of the license for The Ammo Box.

Finance Officer Position: Betty Raymond submitted her resignation as finance officer. The position will be advertised.

School Project: The school asked for ways the students could do a community service project on May 5th. Several ideas were discussed with the school.

Lots for Housing: Discussed trying to get a housing project going using existing city property. More information will be needed and will be discussed next month.

ELO agreement: Discussed renewing the support agreement with ELO. Finance Officer recommended continuing having them for support especially with a new finance officer starting. Approved on motion by Riggs, second by Koch, with Perry abstaining.

Executive Session: At 7:50 motion was made by Thibodeau, second by Riggs, to enter executive session for the purpose of discussing personnel issues per SDCL 1-25-1 (1&4). At 7:55 the session was declared ended by Thibodeau. Motion by Riggs, second by Koch, to accept the resignation of Lisa Hjellum as Trustee. Koch, who did not run for re-election this year, volunteered to complete the final year of Hjellum's term. He will be sworn in at the May meeting along with the other Trustees.

The next board meeting is scheduled for Monday, May 10th at 6:00 pm.

Motion by Riggs, second by Perry, to adjourn at 8:00 pm.

_____	_____
Betty Raymond	Gregg Thibodeau
Finance Officer	Chairman

(EXCERPT FROM MT VERNON MEETING MINUTES)

MT. VERNON CITY COUNCIL
Council Minutes
April 12, 2021

The regular meeting of the Mt. Vernon City Council was called to order at 7:00 pm by Mayor Weston Frank, with the following council members present: B. Hohbach, D. Anderson, C. Powell, D. Renken, D. London and D. Maltsberger. Also present: Maint. Officer G. Deinert. Present for public participation: Tracy Berk, Darcy Deinert, Becky Klooz, Michael Churchill, Skyler Peterson, Jeff McCormick, Jennifer Booth, Eric Denning, and Justin Meyer.
Pledge of Allegiance was recited to begin the meeting. All motions are unanimously approved unless otherwise stated.
D. Deinert and Klooz attended the meeting to discuss Baseball Association items. There are some items that need attention at the field, including the concession stand door, serving window and back stop. The Association would like to help with repairs/improvements. Denning questioned who to work with at the City to approve changes. Councilman Powell is Park Council Representative, so he will be the person to approve the work. G. Deinert, City Maintenance Officer, will work with them regarding equipment. The plan is to complete the changes in phases, with phase one addressing dugouts and concrete work. The road west of the baseball field was abandoned by a previous council, and it is being considered to replace the gravel with dirt and plant grass in the area west of the field.
Booth mentioned that the Punk Ladies would like to host a beanbag tournament on the City lot between the old gym and Senior Building. She inquired about the process for doing so, and was informed L. Mayclin would assist her in acquiring insurance, and she will be on the agenda at the next meeting for approval. A tentative date for the event is September 11, 2021. The Fire Department is looking into special permit to serve beer. Booth also asked about dust control on Haynes. G. Deinert will let her know when dust control is scheduled.
Meyer discussed his plan to extend his driveway this summer, and the need to have a sign moved, in order to do so. G. Deinert will work with the county to get the sign relocated. Council informed Meyer that he does not need a building permit to install a concrete slab.
Motion by Renken, second by London to approve consent items for March: Financial Statement, Council Minutes, General Fund Balances, Credits Report/Bank Statement and Payment of Bills.

OLD BUSINESS

1. Usage of The Hall is growing. Jacey Jira has been acquired to clean it. The floor needs to be stripped and polished – Renken is looking into that. The table and chair storage is still being researched, in case we rent the space to another tenant. Council is considering keeping a deposit on file for repeat renters.
2. Motion by Anderson, second by Powell for our Code Enforcement Officer to move forward with sending letters and abatement as noted on his list. Code Enforcement does not require council approval in the future before sending out letters. Powell, London, and Frank are interested in attending the upcoming code enforcement meeting in Pierre. Council also discussed Davison County giving tickets for code violations.
3. Council discussed the Northeast Development. Jeff McCormick, with SPN, gave an estimate of $182,000 for infrastructure for the 6 lots. The cost per lot, according to McCormick, is in line with the same in other places. The timing of the project would be likely spring of 2022, as contractors are already booked this year. One possible method of recovering cost that some cities are using is a connection fee to connect to the water and sanitary sewer. Methods of financing and grants were discussed, including the USDA Rural Development. The City and Mt. Vernon Economic Development Group will work together to come up with a plan.
4. Garbage bids from Petrik and L&L were opened. Motion by Renken, second by Maltsberger to accept Petrik as the lowest bidder.

NEW BUSINESS

1. Maintenance Officer report. Deinert brought up chip, fog seal bid and paving. Council discussed costs and the need to amend the budget to include additional costs. Deinert will contact the engineering company to include paving repairs as well as chip seal and fog seal. Deinert will be at wastewater conference April 27-29. Council discussed emergency snow removal.
2. The Mt. Vernon Economic Development Group is looking into housing development possibilities, with a desire to provide 20 1-acre lots. MVEDG is contacting adjacent property owners to see if anyone is willing to sell property for a housing development. MVEDG is also looking at building a business incubator on Main Street.
3. McCormick and council discussed drainage improvement for Mt. Vernon, relating to Hazard Mitigation. McCormick said SPN is open to engineering drainage in Mt. Vernon. Council discussed tiling, which does not improve flooding, but improves areas that are constantly wet. Frank and McCormick will get together to get estimates on cost of planning.
4. Motion by London, second by Renken to approve Resolution for LWCF grant application.
5. Spring Clean Up is set for May 22nd with the rain date of June 12th. Hours are 8 a.m. to noon. No tires will be accepted.
6. Motion by Anderson, second by Renken for the city to donate $1,000 each to MV Baseball Association, Senior Citizens and American Legion.
7. Councilman Hohbach submitted his resignation to the City Council. A replacement will be appointed at the May meeting.
8. No Executive Session for personnel and legal SDCL 1-25-2.1 and 2.3 was needed.

Motion by London, second by Maltsberger to adjourn at 9:50 p.m.

Weston Frank
Mayor

Laura Mayclin
Finance Officer

Published once at the approximate cost of _____

APPENDIX C: History of Previous Hazard Occurrences

This appendix provides details about hazard events that have impacted Davison County in the past. **Table C.1** below lists all of the events since 1970 that resulted in a major disaster declaration in which Davison County was part of the designated area. Records from FEMA were consulted for federal assistance provided to the county following each disaster through FEMA's Public Assistance program.

Table C.1 – Major Disaster Declarations Affecting Davison County

Dec #	Date Disaster Declared	Type	Primary Damage Impact	Public Assistance To County
3015	Jun 1976	Drought		
717	Jul 1984	Severe storms; Flooding		
999	Jul 1993	Severe storms; Tornado		
1052	May 1995	Severe storms; Flooding		
1075	Jan 1996	Ice storm		
1156	Feb 1997	Severe winter storm; Blizzard		
1173	Apr 1997	Severe storms; Flooding		
1620	Dec 2005	Severe winter storm		≈$255,000
1702	May 2007	Severe storms; Tornado; Flooding		
4440	Jun 2019	Severe winter storm; Flooding	Roads, bridges	≈$575,000
4469	Nov 2019	Severe storms; Flooding	Roads, bridges	≈$1,070,000

Sources: www.fema.gov/disasters/grid/state-tribal-government/72; www.fema.gov/data-feeds/openfema-dataset-public-assistance-funded-projects-summaries-v1

Table C.2 is a comprehensive list of the most significant hazard events reported for Davison County from 1960 through 2020, as recorded in the National Climatic Data Center's Storm Events Database. The National Climatic Data Center receives storm data from the National Weather Service, which gets its information from a variety of sources, including county, state and federal emergency management officials, local law enforcement officials, National Weather Service damage surveys, the insurance industry, and the general public.

The Storm Events Database is useful, but it does have limitations. One problem is that records for certain hazard events, including winter storms and blizzards, only go back to the 1990s. Another issue is that damage amounts in most cases are estimates, especially for events that impacted multiple counties. Also note that the database contains a preponderance of records from recent times. This is due to an inconsistency in data reporting over the years, and does not indicate an increase in the frequency of events affecting the county.

The table includes the following information about the events:

- Date - multiple events may be shown for a single day because a storm system may contain many specific storm events affecting different locations.

- Type of event.
- Descriptive information - details are provided for some of the more noteworthy events back to the 1990s.
- Magnitude - the magnitude of tornadoes, hail, thunderstorm winds, and high wind events is given. For events occurring since 2000 the speed is represented by either the highest measured wind gust (M) or the highest estimated wind gust (E). Note that speeds are shown in knots - multiply figure by 1.15 to get approximate speed in miles per hour.
- Property and crop damage - the National Weather Service uses all available data from the sources identified above in compiling the damage amounts, but the figures should be considered as broad estimates. In many cases, damage amounts are unknown.

Table C.2 – History of Significant Hazard Events in Davison County

DATE	EVENT TYPE	DESCRIPTION	MAG	PROP DAMAGE ($1,000s)	CROP DAMAGE ($1,000s)
7/14/1961	Thunderstorm Wind		60 kts.		
4/26/1962	Tornado		F2	25	
5/14/1962	Tornado		F3		
5/14/1962	Hail		4.00 in.		
5/21/1962	Tornado		F3	2500	
6/20/1968	Tornado		F3		
8/8/1969	Tornado		F2	25	
7/18/1970	Thunderstorm Wind		85 kts.		
7/9/1971	Thunderstorm Wind		62 kts.		
7/1/1973	Thunderstorm Wind		65 kts.		
6/21/1974	Hail		1.75 in.		
6/21/1974	Thunderstorm Wind		61 kts.		
5/22/1975	Thunderstorm Wind		65 kts.		
6/19/1975	Thunderstorm Wind		69 kts.		
6/21/1975	Tornado		F0		
8/11/1975	Thunderstorm Wind		65 kts.		
8/10/1976	Thunderstorm Wind		61 kts.		
6/10/1977	Thunderstorm Wind		62 kts.		
7/29/1979	Hail		1.50 in.		
8/31/1979	Thunderstorm Wind		61 kts.		
8/18/1980	Thunderstorm Wind		68 kts.		
7/2/1982	Thunderstorm Wind		61 kts.		
7/20/1982	Thunderstorm Wind		61 kts.		
7/21/1982	Thunderstorm Wind		61 kts.		

DATE	EVENT TYPE	DESCRIPTION	MAG	PROP DAMAGE ($1,000s)	CROP DAMAGE ($1,000s)
6/30/1983	Thunderstorm Wind		61 kts.		
7/18/1983	Thunderstorm Wind		69 kts.		
4/19/1985	Tornado		F1	25	
4/19/1985	Thunderstorm Wind		65 kts.		
5/11/1985	Tornado		F0		
5/11/1985	Tornado		F0		
5/11/1985	Hail		1.50 in.		
6/29/1986	Tornado		F0		
5/28/1989	Thunderstorm Wind		0 kts.		
5/12/1991	Tornado		F0		
6/16/1992	Tornado		F2	2.5	
6/16/1992	Tornado		F2	2.5	
6/16/1992	Hail		1.75 in.		
6/7/1995	Thunderstorm Wind		60 kts.	50	30
1/17/1996	Blizzard	A blizzard spread across the area from the west. Snow 3 to 12 inches deep was accompanied by 50 to 60 mph winds and very cold temperatures. The wind chill dropped to around -70. Roads and many businesses and schools were shut down. The total destruction of at least 3 homes by fire was due in part to the inability of firefighters to travel across blocked roads. Several accidents occurred and other vehicles slid into ditches or became stranded.			
1/24/1996	Heavy Snow				
1/29/1996	Extreme cold	Wind chill readings as cold as 80 below zero occurred as winds over 30 mph combined with temperatures of 10 below to 30 below zero. Many vehicles failed to start, but the main impact was financial with greatly increased heating energy use, and purchase of supplies and services to ensure furnace operation.			
2/10/1996	High Wind		58 kts.	30	
3/24/1996	Blizzard	Snow accumulating 3 to 8 inches was accompanied by winds over 50 mph at times, producing widespread whiteout conditions. Numerous vehicles slid into ditches and many people were stranded in vehicles. There were some rollovers and other accidents.		20	
4/25/1996	High Wind		62 kts.	10	
5/24/1996	High Wind		50 kts.		
6/20/1996	Hail		2.00 in.		
6/20/1996	Hail		1.75 in.		
10/29/1996	High Wind		57 kts.	30	
11/14/1996	Ice Storm	Several periods of freezing rain caused widespread damage and paralyzed travel. Widespread damage occurred to electrical poles and lines, leaving thousands without power for up to four days. Numerous accidents occurred. Tree damage was widespread with tree debris blocking several roads and siedwalks. Some farm buildings and other small structures were damaged by the weight of ice and snow on roofs.		100	
12/14/1996	Heavy Snow				

DATE	EVENT TYPE	DESCRIPTION	MAG	PROP DAMAGE ($1,000s)	CROP DAMAGE ($1,000s)
12/16/1996	Blizzard				
1/4/1997	Blizzard				
1/9/1997	Blizzard				
1/15/1997	Extreme cold	Temperatures a few degrees below zero accompanied by wind gusts over 40 mph created wind chills as cold as 70 below zero. Drifting snow and areas of low visibility in blowing snow also occurred in open areas.			
2/3/1997	Heavy Snow				
3/12/1997	Flood	Widespread snowmelt flooding began in March and continued through the end of the month. Record flooding occurred on the James River. Widespread flooding of farmland and other lowlands occurred, both near and away from major river basins. Many roads, farm buildings, and some homes and businesses were flooded. Many basements were flooded just from groundwater seepage. Travel was severely hampered by flooded roads in some areas. Farmland flooding was severe and widespread.			
4/1/1997	Flood				
4/6/1997	High Wind		63 kts.	10	
4/9/1997	Heavy Snow				
5/1/1997	Flood				
6/20/1997	Thunderstorm Wind	Thunderstorm winds caused widespread damage to trees, power lines, farm structures, and homes. Five people were injured at Ethan when a mobile home was destroyed.	78 kts.	500	
7/16/1997	Lightning			1	
7/24/1997	Hail		1.75 in.		
7/24/1997	Lightning			4	
12/30/1997	High Wind		50 kts.	3	
3/31/1998	Heavy Snow	Snowfall of 6 to 16 inches occurred over a large area, causing some damage to power lines resulting in power outages.		100	
5/14/1998	Hail		1.75 in.		
5/23/1998	Flood				
7/6/1998	Hail		1.75 in.		
7/18/1998	Thunderstorm Wind		52 kts.	10	
8/24/1998	Hail		1.75 in.		
11/10/1998	Blizzard	Up to 14 inches of snow combined with winds as high as 60 mph caused damage to trees and power lines. Power outages of up to 2 days resulted. Many roads were closed.		20	
1/1/1999	Winter Storm				
1/20/1999	Winter Weather				
5/12/1999	Flood				
6/7/1999	Tornado		F0		
11/1/1999	Drought	Generally dry weather that began in August continued through November. Dry surface and soil conditions became quite pronounced in November. Water levels fell, especially in small streams and lakes. Damage to winter wheat crops was feared. The area experienced the third driest fall (September through			

DATE	EVENT TYPE	DESCRIPTION	MAG	PROP DAMAGE ($1,000s)	CROP DAMAGE ($1,000s)
		November) period on record. Unusually warm weather during the month contributed to the drying. The most noticeable manifestation of the dry conditions was the large number of grass fires across the area. While damage was mainly limited to the grasslands, considerable manpower and expense was needed to fight the fires.			
12/1/1999	Drought				
1/10/2000	High Wind		52 kts. M	3	
2/1/2000	Drought	Dry weather that prevailed during the fall continued in February, Dry surface and soil conditions remained quite pronounced. Water levels continued to fall slowly. especially in wetlands, small streams, and lakes. Above normal temperatures contributed to further drying. Grass fires were again a problem in some areas.			
3/1/2000	Drought				
4/1/2000	Drought				
4/5/2000	High Wind		56 kts. M	30	
4/19/2000	Hail		1.75 in.		
6/9/2000	Thunderstorm Wind		61 kts. M	60	
8/5/2000	Tornado	A brief tornado damaged several structures.	F1	100	
8/5/2000	Thunderstorm Wind	A wet microburst with winds estimated at 120 mph caused heavy damage in and around Mitchell. Apartments and several mobile homes were destroyed, vehicles were overturned, and other damage occurred to buildings and vehicles. Widespread tree and power line damage also occurred. Ten people were injured, although most of the injuries were minor. The damage path was approximately a mile and a half long and a mile wide, extending over the southwest part of Mitchell.	104 kts. E	8000	
8/7/2000	Tornado	An F1 tornado damaged several farm buildings, caused tree damage, and blew down at least one power line.	F1	30	
11/6/2000	Winter Storm				
11/11/2000	Winter Storm				
12/16/2000	Blizzard				
12/28/2000	High Wind		52 kts. E		
1/29/2001	Blizzard	Over 10 inches of snow with winds up to 45 mph produced widespread blizzard conditions. Visibilities were often near zero, and roads were blocked by the falling and drifting snow. Travel became impossible as many roads were closed to travel, including Interstate 90. Many businesses, government offices, and schools were closed. During the storm, the roof of a dairy barn collapsed north of Mt. Vernon, killing at least 10 cows, and injuring several others.		50	
2/7/2001	Winter Storm				
2/24/2001	Winter Storm				
4/1/2001	Flood				
4/29/2001	High Wind		53 kts. M	10	
5/1/2001	Flood				
6/13/2001	Hail		1.75 in.		

DATE	EVENT TYPE	DESCRIPTION	MAG	PROP DAMAGE ($1,000s)	CROP DAMAGE ($1,000s)
11/26/2001	Heavy Snow	Most areas of southeast South Dakota received at least 8 inches of snow, with Mitchell receiving 16 inches. The snowfall closed many schools and businesses, closed some government offices, and severely hampered transportation. The wet and heavy nature of the snow made it difficult to clear away.			
2/11/2002	High Wind		50 kts. M		
3/14/2002	Winter Storm				
7/24/2002	Hail	Large hail caused severe damage to numerous vehicles, including many at car dealerships. Damage also occurred to windows, siding, and shingles on buildings. The hail caused damage to greens at a municipal golf course.	2.50 in.	3000	
7/24/2002	Hail		1.75 in.		
8/6/2002	Flash Flood				
8/11/2002	Thunderstorm Wind		58 kts. M	30	
8/20/2002	Hail		1.75 in.		
8/20/2002	Flash Flood				
2/11/2003	High Wind		50 kts. M		
2/14/2003	Winter Weather				
4/6/2003	Winter Weather				
6/24/2003	Tornado	A tornado damaged crops, trees, and numerous buildings on several farms. On one farm the northeast corner of a home was heavily damaged, and several buildings including a barn, a granary, and a machine shed were destroyed. Large trees were blown down.	F2	500	
6/24/2003	Tornado		F0		
6/24/2003	Hail		1.75 in.		
6/24/2003	Hail		1.75 in.		
6/24/2003	Thunderstorm Wind		61 kts. E	10	
6/24/2003	Thunderstorm Wind		61 kts. E	10	
6/24/2003	Thunderstorm Wind		61 kts. E		
7/4/2003	Hail		1.75 in.		
7/4/2003	Thunderstorm Wind		61 kts. E	20	
7/4/2003	Thunderstorm Wind		65 kts. E		
11/3/2003	Winter Weather				
11/22/2003	Winter Storm				
12/2/2003	Winter Weather				
12/8/2003	Winter Weather				
2/11/2004	Winter Weather				
3/15/2004	Winter Weather				
5/16/2004	Flash Flood				
7/20/2004	Hail		1.75 in.	50	
7/20/2004	Hail		1.75 in.		

DATE	EVENT TYPE	DESCRIPTION	MAG	PROP DAMAGE ($1,000s)	CROP DAMAGE ($1,000s)
7/21/2004	Thunderstorm Wind		61 kts. E		
8/31/2004	Lightning	Lightning struck and damaged the brick chimney at the public safety building.		10	
9/4/2004	Lightning			2	
1/4/2005	Heavy Snow				
3/10/2005	High Wind		54 kts. M	100	
3/17/2005	Winter Weather				
6/4/2005	Flash Flood	Heavy rainfall of up to four inches caused widespread street flooding, especially on the west side of Mitchell. At least 10 vehicles stalled in high water. At least 12 homes and businesses were flooded, as well as several lower level apartments. The basement of one apartment building was flooded by 10 feet of water, knocking out boilers and a hot water heater.		20	
6/9/2005	Flash Flood				
6/12/2005	Flood				
6/20/2005	Flash Flood	Heavy rain caused flooding of streets.			
6/24/2005	Thunderstorm Wind		63 kts. M		
8/3/2005	Hail		2.50 in.		
8/3/2005	Hail		1.75 in.		
11/8/2005	High Wind		52 kts. E	5	
11/27/2005	Ice Storm	Heavy freezing rain coated roads, and power lines with ice up to 3 inches thick throughout SE South Dakota. Many roads were shut down for extended periods. Most schools and businesses were forced to close. Many miles of power lines and thousands of poles were brought down, resulting in power outages to thousands of households. In some rural areas, power was out for more than two weeks. Many people took shelter wherever they could. Damage to power poles and lines was so great that repairs required assistance from crews from eight states.		1000	
11/28/2005	Blizzard	Snowfall from 4 to 15 inches combined with winds gusting over 50 mph to produce blizzard conditions. Heaviest snowfall was near and west of the James River, in the area where a severe ice storm immediately preceded the blizzard. Several reports of 6 to 8 foot drifts were received. Travel was made impossible in many areas as roads were closed for extended periods. Most schools and businesses not already closed because of the ice storm were forced to close. The winds during the blizzard continued to bring down power lines and poles, most of which had been coated and weighted down by ice in the area hit by the ice storm.		100	
11/30/2005	Winter Weather				
1/1/2006	Winter Weather				
3/12/2006	Winter Storm				
7/18/2006	Drought				
8/1/2006	Drought				
12/20/2006	Winter Weather				
12/29/2006	Winter Storm	Freezing rain caused heavy icing of roads, trees, and power lines, and was accompanied by 2 to 5 inches of snow, with most of the snow preceding the freezing rain. Travel was brought to a standstill at places. Many vehicles slid off roads, and 13 were		100	

DATE	EVENT TYPE	DESCRIPTION	MAG	PROP DAMAGE ($1,000s)	CROP DAMAGE ($1,000s)
		injured in 3 accidents. Ice accumulation was a quarter to a half inch over much of the area. The ice brought down tree branches and power lines, causing power outages.			
1/8/2007	High Wind		52 kts. M		
2/12/2007	Winter Weather				
2/24/2007	Winter Storm	Rain changed to freezing rain, causing light icing before the precipitation quickly changed to snow. Snow accumulated 5 to 7 inches. The icing and subsequent snow accumulation made travel very difficult, with several vehicle accidents and numerous vehicles sliding into ditches.			
2/28/2007	Heavy Snow				
3/1/2007	Blizzard				
3/12/2007	Flood				
4/10/2007	Winter Weather				
5/5/2007	Tornado		EF0		
5/5/2007	Tornado		EF0		
5/5/2007	Hail		1.75 in.		
5/5/2007	Flood	Heavy rainfall caused flooding of low areas including fields, homes, businesses, schools, roads, streams, and bridges. The flooding was a longer term event than flash flooding. Long term major flooding of the James River also resulted, with the river peaking at 7.4 feet above flood stage near Mitchell on May 10th. Some parks and other recreation areas were affected, especially in and near Mitchell. A few roads and bridges were washed out by the high water. The flooding delayed planting of crops in some areas.		200	
5/22/2007	Flash Flood				
6/1/2007	Flood				
8/10/2007	High Wind		56 kts. M		
12/1/2007	Winter Weather				
2/11/2008	Winter Weather				
3/31/2008	Winter Weather				
4/10/2008	Blizzard				
4/25/2008	Heavy Snow				
6/5/2008	Thunderstorm Wind		61 kts. E		
6/5/2008	Flash Flood				
6/6/2008	Flood				
7/6/2008	Flash Flood				
7/27/2008	Hail		2.75 in.		
7/27/2008	Hail		2.00 in.		
7/27/2008	Hail		1.75 in.		
7/27/2008	Hail		1.75 in.		
11/6/2008	Blizzard				
11/7/2008	Winter Weather				

DATE	EVENT TYPE	DESCRIPTION	MAG	PROP DAMAGE ($1,000s)	CROP DAMAGE ($1,000s)
12/14/2008	Blizzard				
12/20/2008	Winter Weather				
1/12/2009	Winter Weather				
2/26/2009	Winter Weather				
3/24/2009	Flood				
3/31/2009	Blizzard				
4/1/2009	Flood				
4/4/2009	Blizzard				
5/1/2009	Flood				
6/1/2009	Flood				
6/16/2009	Tornado		EF0		
6/16/2009	Hail		1.75 in.		
6/16/2009	Hail		1.75 in.		
7/1/2009	Flood				
7/9/2009	Hail		2.50 in.		
7/9/2009	Hail		1.75 in.		
7/9/2009	Hail		1.75 in.		
7/9/2009	Thunderstorm Wind		61 kts. E		
7/9/2009	Thunderstorm Wind		65 kts. M		
7/13/2009	Hail		1.75 in.		
8/1/2009	Flood				
8/2/2009	Thunderstorm Wind		61 kts. E	10	
8/2/2009	Thunderstorm Wind		61 kts. E		
8/8/2009	Hail		4.00 in.		
12/8/2009	Winter Weather				
12/23/2009	Blizzard	Prolonged snowfall produced heavy accumulations over southeast South Dakota, ranging up to over 20 inches in several areas. The snowfall took place from two days before to the day after Christmas. The snowfall was accompanied by increasing north to northwest winds which caused widespread blizzard conditions on Christmas day and the start of the next day.			
1/6/2010	Blizzard	Snowfall of 3 to 6 inches, previously existing snow cover, and northwest winds gusting to over 40 mph produced widespread blizzard conditions, with visibilities less than a quarter mile. New snowfall included 5 inches at Mitchell. Schools and businesses were closed, and travel became impossible in much of the area. The wind combined with cold temperatures to produce wind chills colder than 35 below zero during the latter part of the storm. This extreme cold continued into the next day, Friday, January 8th.			
1/7/2010	Extreme cold	Persistent north/northwest winds combined with very cold air to produce wind chill values that dropped to 35 below zero.			
1/25/2010	Winter Weather				
2/13/2010	Winter Weather				

DATE	EVENT TYPE	DESCRIPTION	MAG	PROP DAMAGE ($1,000s)	CROP DAMAGE ($1,000s)
3/11/2010	Flood				
3/12/2010	Flood				
4/1/2010	Flood				
5/1/2010	Flood				
6/1/2010	Flash Flood				
6/1/2010	Flood				
6/5/2010	Flood				
6/11/2010	Thunderstorm Wind		52 kts. E	5	
6/11/2010	Flash Flood	Heavy rainfall of at least 3 inches caused Enemy Creek to overflow and flood nearby roads. The rainfall also caused flooding of roads and basements in Mitchell. A motorcycle business was flooded, resulting in damage to merchandise, although little damage to the motorcycles was reported.		75	
6/12/2010	Flash Flood	Heavy rain caused flash flooding of several roads, including Interstate 90.			
7/1/2010	Flood				
7/10/2010	Hail		1.25 in.		
7/10/2010	Thunderstorm Wind		56 kts. E	10	
7/10/2010	Flash Flood				
7/21/2010	Flash Flood	Heavy rainfall of over 4 inches caused widespread flash flooding of streets, yards, basements, and some homes and businesses in and near Mitchell. Water was up to two feet deep in some streets. Flooded businesses included the Queen of Peace Hospital, where flooding was reported in the emergency department and in a corridor.		100	
7/23/2010	Thunderstorm Wind		61 kts. E	25	
7/23/2010	Thunderstorm Wind		61 kts. E	10	
7/23/2010	Thunderstorm Wind		61 kts. E	10	
7/23/2010	Thunderstorm Wind		61 kts. E		
7/31/2010	Flood				
8/1/2010	Flood				
8/1/2010	Flood				
8/30/2010	Thunderstorm Wind		61 kts. E		
9/20/2010	Flood				
10/26/2010	High Wind		52 kts. E		
11/20/2010	Winter Weather				
12/10/2010	Blizzard				
12/20/2010	Winter Weather				
12/31/2010	Blizzard	Snowfall of 6 to 10 inches and winds gusting to over 40 mph produced widespread blizzard conditions. Roads were closed and many businesses were forced to close as travel became difficult to impossible.			
1/1/2011	Blizzard				

DATE	EVENT TYPE	DESCRIPTION	MAG	PROP DAMAGE ($1,000s)	CROP DAMAGE ($1,000s)
1/9/2011	Winter Weather				
1/31/2011	Winter Weather				
2/1/2011	Extreme cold	North/northwest winds averaging 15 to 30 mph combined with temperatures dropping below zero to produce wind chills of 35 to 40 below zero.			
2/20/2011	Heavy Snow				
3/16/2011	Flood				
4/1/2011	Flood	Major flooding of the James River, as well as flooding of small streams and lakes in the county, continued through April. Much farmland remained flooded, both near to and away from the James River. The James River was 6.7 feet above flood stage near Mitchell on April 1st, and fell very slowly during the month. A large area of land and numerous roads were flooded at the start of the month. Water was running over other roads, from flooded streams, creeks, and fields as well as from the James River. Many roads were heavily damaged. Some homes and businesses were also flooded, with the flooding of these places slowly alleviating through the month. High water and groundwater levels from record precipitation in the year 2010, a main reason the flooding onset was so fast in March, was also a main reason that the flooding subsided so slowly during April.		1000	
5/1/2011	Flood				
6/1/2011	Flood	Moderate to major flooding of the James River, ongoing since the snowmelt season in March, continued through June. Farmland and other lowlands near the river remained flooded, with the water level first falling slowly, then rising due to runoff from heavy rain. The highest stage near Mitchell was 4.9 feet above flood stage at the end of the month, though this was still almost a foot below the peak stage in May.			
6/13/2011	Hail		1.75 in.		
6/13/2011	Flash Flood	Heavy rainfall produced flash flooding which flooded fields, a few roads, and washed out a bridge.		30	
6/21/2011	Flood				
7/1/2011	Flood	Moderate to major flooding of the James River, ongoing since the snowmelt season in March, continued through July. Farmland and other lowlands near the river remained flooded, with the water level varying slightly up and down due to sporadic heavy rainfall. The highest stage near Mitchell was 4.9 feet above flood stage on July 3rd, slightly higher than the peak stage of June, but not as high as peak levels earlier in the Spring.			
7/15/2011	Excessive Heat				
8/1/2011	Flood	Moderate to major flooding of the James River, ongoing since the snowmelt season in March, continued into early August, with the flooding continuing but very slowly abating through the month. Flooding of farmland and other lowlands near the river very slowly abated. The highest stage near Mitchell was 4.6 feet above flood stage on August 1st.			
8/11/2011	Thunderstorm Wind		61 kts. E	10	
9/1/2011	Flood	Flooding of the James River, ongoing since the snowmelt season in March, abated very slowly through September. Flooding of farmland and other lowlands steadily decreased, and very few roads continued to be affected. The highest stage near Mitchell was 2.3 feet above flood stage on September 2nd.			
2/13/2012	Winter Weather				

DATE	EVENT TYPE	DESCRIPTION	MAG	PROP DAMAGE ($1,000s)	CROP DAMAGE ($1,000s)
2/29/2012	Winter Weather				
4/15/2012	High Wind		53 kts. M		
5/5/2012	Hail	Large hail caused widespread damage to vehicles, buildings, and structures in and near Mitchell. In addition to dented vehicles and broken windows, the hail damaged the roofs and siding of homes and businesses. Two of the highest individual damage amounts included $175,000 to the Corn Palace, the roof of which needed replacing, and $100,000 damage to the roof of the Central Electric Cooperative Building. The roofs of numerous homes suffered lesser damages, and siding was also damaged. Damaged vehicles included several law enforcement and other city and county government vehicles.	2.50 in.	2000	
5/5/2012	Hail		2.50 in.		
5/5/2012	Thunderstorm Wind		68 kts. M	1	
5/6/2012	Flood				
6/26/2012	Excessive Heat				
7/1/2012	Drought	Drought conditions became established over the area. Stress on crops increased with no relief during the month. Hot weather added to the stress. Crop damage became certain. Severe non-ag water supply problems were not observed, but the long term dry conditions raised fears for the future.			
7/2/2012	Excessive Heat				
7/15/2012	Excessive Heat				
7/18/2012	Excessive Heat				
8/1/2012	Excessive Heat				
8/1/2012	Drought	Drought was generally listed as severe to extreme for the area, and was being compared to the worst of the dust bowl years, though not yet over as long a time period. Stress on crops continued, even though August was less hot than July. Crop damage was quite evident. Many local governments had water use restrictions in place.			
8/3/2012	Thunderstorm Wind		69 kts. M	15	
9/1/2012	Drought	Drought continued over southeast South Dakota. Rainfall for the month varied from around half to less than a quarter of normal. Stress on crops that prevailed over the growing season became more evident with the start of harvest. Local governments continued to use water use restrictions.			
10/1/2012	Drought	Drought conditions continued over all of southeast South Dakota in October with well below normal rainfall keeping soil and vegetation dry.			
10/17/2012	High Wind		53 kts. M		
11/1/2012	Drought	Drought conditions continued over all of southeast South Dakota in November.			
12/1/2012	Drought	Drought conditions continued over all of southeast South Dakota in December. Although precipitation was generally normal to above normal, the amount of excess over the low winter normals was not enough to relieve the dry conditions. The effects of the drought on farmers and ranchers continued. Hunting was also affected, with low pheasant numbers, and disease in the deer population.			
12/9/2012	Blizzard				
12/18/2012	Winter Weather				

DATE	EVENT TYPE	DESCRIPTION	MAG	PROP DAMAGE ($1,000s)	CROP DAMAGE ($1,000s)
12/27/2012	Winter Weather				
1/1/2013	Drought				
2/1/2013	Drought				
2/10/2013	Blizzard	Variable snowfall of 2 to 8 inches, northwest winds gusting to 45 mph, and snow cover existing before the storm in part of the area, produced blizzard conditions with visibilities below a quarter mile in blowing snow in many areas. The low visibilities and drifting snow forced some businesses to close, and also forced several school closings on Monday February 11th.			
3/1/2013	Drought				
4/1/2013	Drought				
4/9/2013	Winter Storm	An extended period of precipitation began with freezing rain and freezing drizzle producing light to moderate ice accumulations, then changing to sleet and then snow, with sleet and snow accumulations reaching 10 inches near Mitchell. Several branches and power lines were downed by the weight of ice and accompanying wind. The winter precipitation made travel very difficult to impossible, resulting in schools and businesses being forced to close.			
12/3/2013	Winter Storm	Snow, heavy in areas, accumulated up to 8 inches from the evening of December 3rd through the afternoon of December 4th. Difficult travel conditions forced delayed openings or early closings of some schools and businesses on December 4th.			
1/16/2014	High Wind		56 kts. MG		
3/18/2014	Heavy Snow				
8/23/2014	Thunderstorm Wind		61 kts. EG	20	
11/15/2014	Winter Weather				
12/15/2014	Winter Storm				
1/5/2015	Winter Weather				
1/8/2015	Winter Weather				
1/31/2015	Winter Weather				
3/3/2015	Winter Weather				
4/24/2015	Hail		1.75 in.		
5/10/2015	Tornado		EF0		
6/27/2015	Hail		1.00 in.		
6/27/2015	Thunderstorm Wind	Thunderstorm winds destroyed a small outbuilding, and damaged a house.	61 kts. EG	3	
7/5/2015	Heavy Rain				
7/6/2015	Flash Flood				
8/9/2015	Thunderstorm Wind		53 kts. MG		
11/20/2015	Winter Weather				
11/30/2015	Winter Storm				
12/25/2015	Winter Storm				

DATE	EVENT TYPE	DESCRIPTION	MAG	PROP DAMAGE ($1,000s)	CROP DAMAGE ($1,000s)
1/16/2016	Extreme Cold				
1/25/2016	Winter Weather				
2/2/2016	Winter Weather				
2/19/2016	High Wind	High winds measured up to 76 mph at the Mitchell Airport destroyed a grain dryer, and caused power line and traffic light damage.	66 kts. MG	15	
2/29/2016	Winter Weather				
3/23/2016	Winter Weather				
6/10/2016	Excessive Heat				
7/6/2016	Thunderstorm Wind		50 kts. MG		
7/19/2016	Excessive Heat				
11/17/2016	Winter Storm				
12/16/2016	Winter Storm				
12/17/2016	Cold/wind Chill				
12/24/2016	Winter Weather				
1/24/2017	Winter Storm				
6/13/2017	Hail		1.50 in.		
7/11/2017	Hail		1.00 in.		
7/25/2017	Thunderstorm Wind		53 kts. MG		
9/19/2017	Thunderstorm Wind		50 kts. MG		
9/22/2017	Hail		1.00 in.		
12/21/2017	Winter Weather				
12/25/2017	Cold/wind Chill				
12/31/2017	Extreme Cold	Low temperature at Mitchell was -22.			
1/11/2018	Cold/wind Chill				
1/15/2018	Cold/wind Chill				
1/21/2018	Winter Weather				
2/5/2018	Winter Weather				
2/8/2018	Winter Weather				
2/10/2018	Cold/wind Chill				
2/19/2018	Winter Weather				
2/22/2018	Winter Weather				
2/24/2018	Winter Weather				
3/5/2018	Blizzard				
3/16/2018	Flood				
3/16/2018	Winter Weather				
4/2/2018	Winter Weather				
4/13/2018	Blizzard	Life threatening conditions developed, as a mix of rain, sleet and snow changed to all snow. Brutal winds gusting as high as			

DATE	EVENT TYPE	DESCRIPTION	MAG	PROP DAMAGE ($1,000s)	CROP DAMAGE ($1,000s)
		60 mph whipped visibility to less than a quarter mile at times. Businesses and schools were closed. Travel was not recommended for a two day period. I-90 was closed from Chamberlain to Sioux Falls for two days. Total snowfall of 16 inches was measured at Mitchell.			
4/18/2018	Winter Weather				
4/23/2018	Flood	Snow melt and runoff from periods of heavy rainfall produced minor flooding which impacted lowland agricultural areas. The James River reached 2.6 ft above flood level at Mitchell.			
7/3/2018	Heat				
7/8/2018	Heat				
7/11/2018	Heat				
8/5/2018	Thunderstorm Wind		58 kts. MG		
9/18/2018	Thunderstorm Wind		53 kts. MG		
1/1/2019	Extreme Cold				
3/1/2019	Winter Weather				
3/3/2019	Extreme Cold				
3/9/2019	Winter Weather				
4/11/2019	Blizzard				
6/28/2019	Extreme Heat				
6/29/2019	Extreme Heat				
6/30/2019	Heat				
3/13/2019	Flood	Rainfall of one to three inches on frozen ground and into a snow pack with between 2 and 5 inches of liquid water equivalent resulted in considerable overland flooding. Widespread flooding damage to county and township roads was reported.		600	
3/14/2019	Flood				
3/16/2019	Flood				
4/1/2019	Flood				
4/5/2019	Lightning			50	
4/17/2019	Flood				
5/1/2019	Flood				
5/20/2019	Flood				
6/1/2019	Flood				
6/27/2019	Hail		1.00 in.		
7/1/2019	Flood				
7/12/2019	Hail		1.00 in.		
7/20/2019	Thunderstorm Wind		61 kts. MG		
7/28/2019	Thunderstorm Wind		55 kts. MG		
8/1/2019	Flood				
8/17/2019	Thunderstorm Wind		53 kts. MG		

DATE	EVENT TYPE	DESCRIPTION	MAG	PROP DAMAGE ($1,000s)	CROP DAMAGE ($1,000s)
9/1/2019	Flood			50	
9/11/2019	Flood			25	
9/11/2019	Flash Flood			75	
9/12/2019	Flood			800	
9/12/2019	Flash Flood	Heavy rainfall from September 10-12 totaling 7 to 8 inches near Mitchell led to widespread flooding. Travel was significantly hampered across most of the county, including the closure of I-90. Smaller creeks and ponding resulted in the closure of most township and county roads. Five miles south of Mitchell, a bridge over Enemy Creek was washed out, requiring a swift water rescue of one person who was overwhelmed by the current. Three residents located one-half mile east of this bridge were also evacuated. This bridge was one of nine damaged across the county. A no-wake order was placed on Lake Mitchell due to extremely high water. Significant street flooding occurred around Mitchell for three days.		250	
10/1/2019	Flood	A continuation of flooding from September, as the James River near Mitchell spent most of the month at minor flood stage. Significant amounts of agricultural land remained flooded.		5	
11/1/2019	Flood	A continuation of flooding from October, as the James River near Mitchell spent the entire month at minor flood stage, cresting at 2.64 ft above flood stage on November 27. Significant amounts of agricultural land remained flooded.			
11/5/2019	Winter Weather				
11/26/2019	Winter Weather				
11/29/2019	Winter Weather				
12/1/2019	Flood	A continuation of flooding from November, as the James River near Mitchell spent the entire month in minor flood stage, with a brief period in moderate flood state from December 10 to 16. Significant amounts of agricultural land remained flooded.			
12/1/2019	Winter Weather				
12/28/2019	Blizzard	**Light mixed precipitation resulted in a minor glaze of ice accumulation, then heavy snowfall (15 inches in Mitchell) and high wind resulted in white out conditions . I-90 was closed in Davison County for almost two days. Snow drifts to several feet were common.**			
1/1/2020	Flood				
1/17/2020	Blizzard	Wind and snow reduced visibility. Interstate 90 was closed from 19:00 January 17 through 13:00 January 18, with travel not recommended on other roadways. Sowfall reached 6.8 inches at Mitchell..			
2/1/2020	Flood				
2/12/2020	Blizzard	High wind and snow reduced visibility for several hours.			
2/26/2020	Flood				
3/1/2020	Flood				
3/19/2020	Winter Weather				
4/1/2020	Flood				
4/11/2020	Winter Storm				
5/1/2020	Flood				

DATE	EVENT TYPE	DESCRIPTION	MAG	PROP DAMAGE ($1,000s)	CROP DAMAGE ($1,000s)
6/1/2020	Flood				
6/8/2020	Hail		1.75 in.		300
6/9/2020	Thunderstorm Wind		78 kts. EG	80	
6/9/2020	Flood	After heavy rainfall, Firesteel Creek near M Vernon crested 2.6 feet above flood stage on June 13. Main impact was to ag land.			
6/25/2020	Thunderstorm Wind		57 kts. MG		
7/1/2020	Flood				
7/3/2020	Thunderstorm Wind		54 kts. MG		
8/8/2020	Thunderstorm Wind		63 kts. MG		
8/10/2020	Thunderstorm Wind		52 kts. EG	1	
10/22/2020	Winter Weather				

Source: National Climatic Data Center's Storm Events Database

APPENDIX D: Community Assets

Following is a list of important community facilities and assets within the county, including those that would play a critical role in helping the community prepare for and respond to a hazard event.

Government Offices

- Davison County Courthouse, Mitchell
- City offices in Ethan, Mitchell, and Mount Vernon

Emergency Response

- Davison County Emergency Management Office, Mitchell
- Davison County Sheriff's Office, Mitchell
- Mitchell Police Department
- Mitchell Fire Department
- Davison County Highway Department, Mitchell

Medical facilities

- Avera Queen of Peace Hospital

Educational Facilities

- Ethan Public School (K-12)
- Mount Vernon Public School (K-12)
- Mitchell Christian School (K-12)
- Mitchell High School (9-12)
- Elementary schools in Mitchell (four total)
- Dakota Wesleyan University
- Mitchell Technical Institute

Other Important Facilities and Businesses ***ANY OTHERS TO ADD?***

- Corn Palace (also serves as Mitchell City Hall)
- Trail King
- AKG
- Graphic Packaging
- Twin City Fan
- POET Biorefining Ethanol Plant

Shelters

- Disaster relief shelters are located in each community.

- Public facilities that can provide emergency shelter from a tornado or other severe storm are located in each community.

Notification

- A warning siren is located in each community. Mitchell has several sirens, including some in the Lake Mitchell area, and Ethan and Mount Vernon have one each.

APPENDIX E: References

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