2026

HAZARD MITIGATION PLAN

Charles Mix County, South Dakota



PREPARED BY:

Charles Mix County Hazard Mitigation Planning Team

TECHNICAL ASSISTANCE PROVIDED BY:

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2026 Charles Mix County (SD)
Hazard Mitigation Plan



CHAPTER I

Planning Process

PLANNING & DEVELOPMENT DISTRICT III

CHAPTER I
PLANNING PROCESS

Background

This plan is an update of the Charles Mix County Hazard Mitigation Plan, which was approved by FEMA in September 2020. The purpose of the plan is to prevent or reduce losses to people and property that may result from future hazard events in Charles Mix 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 Charles Mix County in its efforts to mitigate future disaster events.

This is a multi-jurisdictional plan. All the municipalities located within Charles Mix County were invited to participate in the plan's development. Following is the list of jurisdictions that chose to participate by sending representatives to attend the planning meetings and by providing input into the plan [1]:

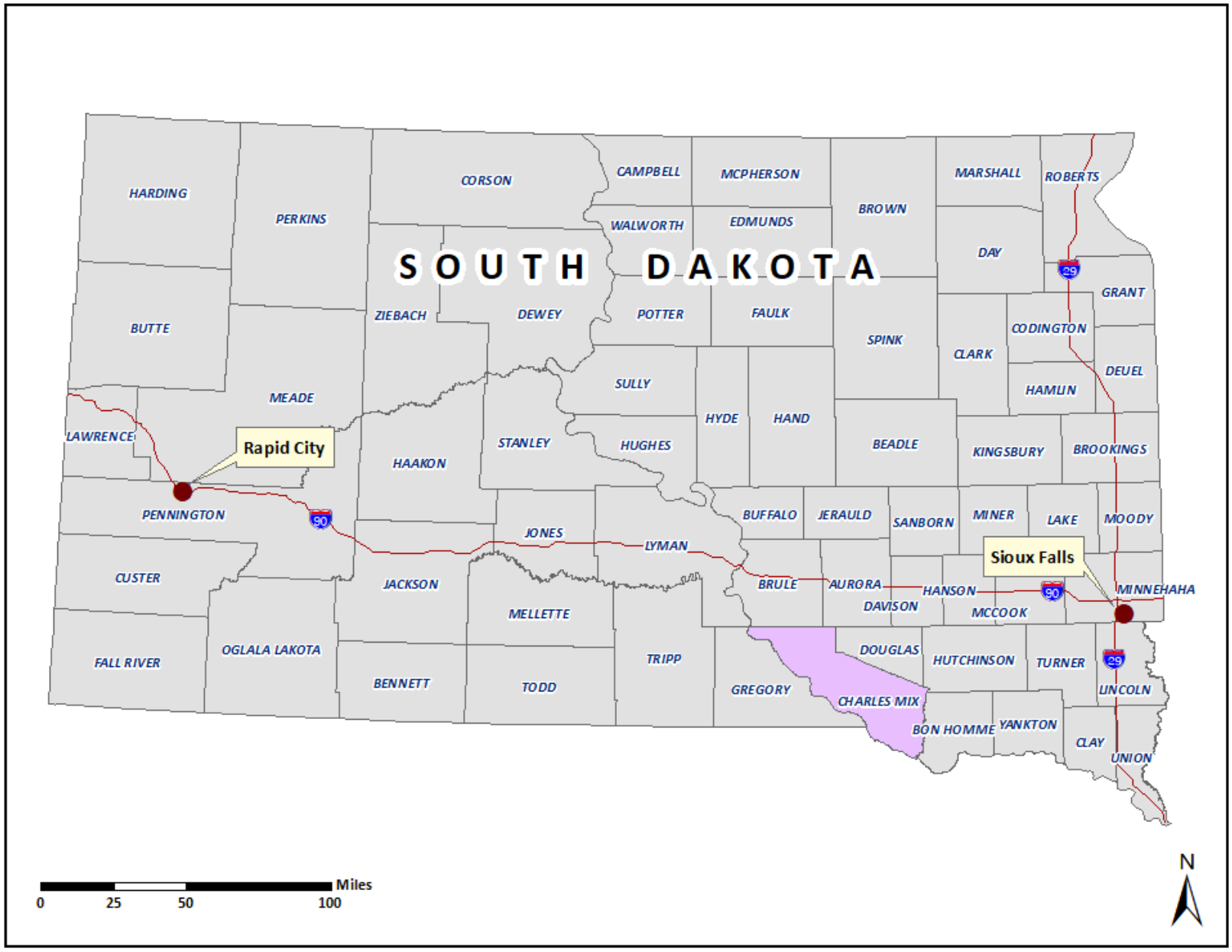
- Charles Mix County
- Town of Dante
- City of Geddes
- City of Lake Andes
- Town of Pickstown
- City of Platte
- City of Wagner

Production of the plan was the ultimate responsibility of the Charles Mix 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 hazard mitigation planning team whose members are listed in **Table 1.1**, as well as the public and other stakeholders.

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 hazard mitigation plans for all fifteen of the counties in the District's planning area, including Charles Mix County's current plan.

[1] The Town of Ravinia did not participate.

Figure 1.1 – County Location



The following staff members of Planning & Development District III were involved in producing the plan. John Clem, a Community Development Specialist, was the project manager and author of the plan. Shannon Viereck assisted in the public outreach and risk assessment efforts, provided additional research assistance, and edited the final copy of the plan. Harry Redman, a Geographic Information Systems Professional, produced maps for the plan, directed the floodplain risk analysis, and completed the county land cover analysis. Jen Moser assisted with the public outreach and survey effort.

Development of Planning Team

The initial planning stages for this plan update began in December 2025 when FEMA funds were awarded to the County. Following this, Mr. Clem and the Charles Mix County Emergency Management Director began to develop the methodology and strategy that was used to update the plan.

The first step was to organize the hazard mitigation planning team, the group of individuals representing the participating jurisdictions at the planning team meetings. People invited to participate from each jurisdiction included elected officials, finance personnel, public works staff, planning and zoning staff, code enforcement staff, floodplain management staff, and emergency response personnel. These individuals provided information that was used to develop the plan, reviewed drafts of the plan as it was being assembled, and approved the final version of the plan.

Other organizations were also contacted by email and/or telephone to participate in the plan's development. These stakeholders included:

- Charles Mix Electric Association
- Randall Community Water District
- U.S. Army Corps of Engineers
- Platte Health Center
- Wagner Community Memorial Hospital
- Lake Andes School District
- Platte School District
- Wagner School District
- Avon *Clarion* / Lake Andes *Wave* / Wagner *Post*
- Neighboring counties (Aurora, Bon Homme, Brule, Douglas, Gregory, Hutchinson)

Each individual invited to participate had knowledge in various subject areas pertinent to the plan's development. These subject areas included the following:

- Infrastructure within the county
- Economic development activities within the county
- Floodplain management
- Building codes and other development regulations

- Mapping and GIS
- Natural and cultural resources
- Social services

Table 1.1 lists the individuals who participated in the plan's development, including their contribution to the process. The columns on the right show their attendance at the planning meetings that were held. 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	Role	Mtg 1 3/12/26	Mtg 2 4/14/26	Mtg 3 7/09/26
John Clem	Planning District III	Planner	Plan author	X	X	X
Shannon Viereck	Planning District III	Planner	Research, Support	X	X	
Joel Kotab	Charles Mix County	Emergency Mgmt Dir	Guidance	X	X	X
Colin Soukup	Charles Mix County	Commissioner	Input, Review	X	X	X
Kory Standy	Charles Mix County	Commissioner	Input, Review	X		X
Nick Stotz	Charles Mix County	Commissioner	Input, Review	X	X	X
Jason Gant	Charles Mix County	Auditor	Input, Review	X	X	X
Michelle Wentland	Charles Mix County	Treasurer	Input, Review	X		
Denise Weber	Charles Mix County	Dir of Equalization	Input, Review		X	
Steve Cotton	Charles Mix County	States Attorney	Input, Review		X	
Randy Thaler	Charles Mix County	Sheriff	Input, Review	X		
Doug Cimpl	Charles Mix County	Hwy Superintendent	Input, Review			X
Donna Paulson	Geddes	Finance Officer	Input, Review	X		X
Charlotte Pesicka	Lake Andes	Finance Officer	Input, Review	X	X	X
Marcia Bierman	Pickstown	Finance Officer	Input, Review	X	X	X
Mark Fortuna	Pickstown	Public Works	Input, Review	X		
Shauna Meyerink	Platte	Finance Officer	Input, Review	X	X	X
Ashley Vargas	Platte	Development Corp	Input, Review			X
Debbra Houseman	Wagner	Finance Officer	Input, Review	X		
Kesa Alexander	Wagner	Zoning Administrator	Input, Review	X		

Public Outreach

Throughout the plan's development, efforts were made to obtain broader involvement in the plan beyond the core planning team and stakeholders. This outreach effort included press releases that were printed in the local newspapers, information posted on community websites, and social media.

Surveys were also made available to provide another way for people to contribute their thoughts and opinions on hazard mitigation. Survey forms were distributed to all planning team members and to other city and county staff who did not participate in the planning meetings. To generate broader public input, the surveys were also made available online and a press release at the start of the planning process included a QR code so the public could participate in the survey. Respondents were able to provide their opinion of which hazards have the biggest impact on the county, how those hazards have personally impacted them,

and what actions could be taken to mitigate the hazards. See **Appendix A** for documentation of the public outreach effort.

Incorporation of Other Plans

Information from various local plans, studies, and reports was incorporated into this plan. Each of the items listed in the table below was reviewed as this plan was developed, and a brief description is given of how relevant information was incorporated into this plan. In addition to these local resources, a considerable amount of information and data was incorporated into this plan from the South Dakota Hazard Mitigation Plan (both the 2019 version and the current enhanced version).

Table 1.2 – Plans, Studies, and Reports Incorporated Into Plan

Item	Notes
Planning & Development District III Comprehensive Economic Development Strategy (CEDS)	The CEDS analyzes development issues within the District III service area, which includes Charles Mix County. Economic resiliency, including the role that hazard mitigation can play in helping communities maintain economic strength, is discussed at some length. Regional development priorities and demographic data from the CEDS was incorporated into this plan.
Charles Mix County Comprehensive Plan	The environmental constraints section of the plan was used to identify areas suitable for development in the county.
Charles Mix County Comprehensive Fire Management Plan	The plan is focused on response but has sections on fire prevention and preparedness.
Charles Mix County Highway Plan	The plan includes a list of county roads scheduled for improvements within the next five years, which was useful for development of the mitigation strategy.
Dante Comprehensive Plan	The environmental constraints section of the plan was used to identify areas suitable for development within the town.
Lake Andes Comprehensive Plan	The environmental constraints section of the plan was used to identify areas suitable for development within the city.
Pickstown Comprehensive Plan	The environmental constraints section of the plan was used to identify areas suitable for development within the town.
Platte Comprehensive Plan	The environmental constraints section of the plan was used to identify areas suitable for development within the city.
Wagner Comprehensive Plan	The environmental constraints section of the plan was used to identify areas suitable for development within the city.
Charles Mix Electric Association 2025-2028 Construction Work Plan	The plan provides information about the Association's anticipated projects through 2028, during which they plan to bury about 20 miles of overhead powerline per year.

Planning Meetings

Several meetings were held to develop the plan, as described below. 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 were provided by Planning & Development District III staff and the Charles Mix County Emergency Management Director.

Prior to the first planning team meeting, the stakeholders identified earlier in this chapter were contacted and invited to participate in the planning process. A survey instrument was also developed, which was distributed to the planning team members and made available to the public as described earlier in the Public Outreach section.

First Planning Team Meeting

The first meeting began with a reintroduction to the concept of hazard mitigation for the team members, some of whom had participated in the development of the current plan, followed by a discussion about the process by which the plan would be developed over the coming months. The team then reviewed the initial results of the survey and additional hard copies of the survey were distributed. The rest of the meeting was spent reviewing the County's current mitigation plan, focusing on the hazards identified in the plan and the progress being made to implement the mitigation actions listed in the plan.

Activity between meetings

After the meeting, the Planning & Development District III office did a considerable amount of work on the risk assessment using various methods as described in **Chapter III**. The results of this work were shared with the planning team, including a summary of the textual information presented in **Chapter III**, maps showing hazard-prone areas in relation to important assets in each jurisdiction, and information about the value of property at risk to the various hazards impacting the county. Since the next meeting would focus on development of the mitigation strategy, the District III office also distributed a list of potential mitigation actions to the team, which was based on FEMA's guidance document *Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards*.

Second Planning Team Meeting

Although the second meeting focused on development of the mitigation strategy, the meeting began with a discussion about local mitigation capabilities. Key items reviewed were each of the jurisdiction's activities relating to land use regulations, enforcement of building codes, and the National Flood Insurance Program.

Discussion then turned to identification of the mitigation goals and objectives to be achieved, followed by the specific mitigation actions to include in the plan. The participants were reminded to focus on hazard mitigation, as opposed to preparedness, and they were encouraged to consider a comprehensive range of actions, regardless of whether they seemed likely to be achievable in the foreseeable future. A preliminary list of actions for each jurisdiction was developed, including such details as estimated cost, timeframe for implementation, and the party responsible for implementation.

Activity between meetings

After the second meeting, each jurisdiction discussed the mitigation actions they wanted to include in the plan. This discussion took place at an official meeting of each jurisdiction's governing body, which ensured that the public could participate in the selection process, since hazard mitigation was an agenda item. The list of mitigation actions selected by the communities is presented in **Chapter IV** (see **Table 4.5**).

Final Planning Team Meeting

Following the jurisdictional meetings, the Planning & Development District III office completed the first draft of the plan. After this, the planning team was brought together again for a final meeting to review the draft and discuss how the plan will be maintained going forward. The importance of integrating the plan into the existing planning mechanisms within the county was emphasized.

Post-meeting activity

After the final planning team meeting, some additional information was added to the plan based on discussion at the meeting, primarily involving clarification of some of the details of the proposed mitigation actions. The plan was then submitted to the South Dakota Office of Emergency Management.

Acknowledgements

The Planning & Development District III office would like to thank the members of the Charles Mix County Hazard 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 Emergency Management Director Joel Kotab and Assistant Emergency Management Director Mike Kotab for arranging the planning team meetings and for coordinating with the participating jurisdictions. Thanks also are extended to Jim Poppen, Kyle Kafka, Blaire Jonas, and Marc Macy at the South Dakota Office of Emergency Management for information and guidance that was helpful in developing the plan.

2026 Charles Mix County (SD)
Hazard Mitigation Plan



CHAPTER II

Community Profile

PLANNING & DEVELOPMENT DISTRICT III

CHAPTER II
COMMUNITY PROFILE

Background

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

General Description

Charles Mix County is located in southeast South Dakota (see **Figure 1.1**). The county covers approximately 1,098 square miles of area, and its Census 2020 population was 9,373. Its population density is only 8.5 people per square mile compared to 11.7 people per square mile in South Dakota and 93.8 people per square miles in the United States. Seven incorporated municipalities are located within the county – Dante (pop 75), Geddes (pop 156), Lake Andes (pop 710), Pickstown (pop 230), Platte (pop 1,296), Ravinia (pop 71), and Wagner (pop 1,490). The county seat is located in Lake Andes.

There are also a number of other populated places located within Charles Mix County, including the communities of Marty and Greenwood and three Hutterite colonies, each of which has approximately 125 to 150 residents [2]. There are also several recreational areas located along the Missouri River containing a mixture of permanent housing and seasonally occupied private camping areas, the two largest of which are North Point, located just northwest of Pickstown, and Platte Creek, located several miles southwest of Platte. **Figure 2.1** shows the county's communities and highway network.

Physical Characteristics

The landscape of Charles Mix County is mostly open, and the terrain is generally level, except along the Missouri River, where wooded draws are characteristic. 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 and grassland.

[2] Hutterite Colonies are rural, agriculturally based communities occupied by descendants of German people who cling to many of their traditional ways. There are over 400 Hutterite colonies in the United States and Canada.

Figure 2.1 – Charles Mix County

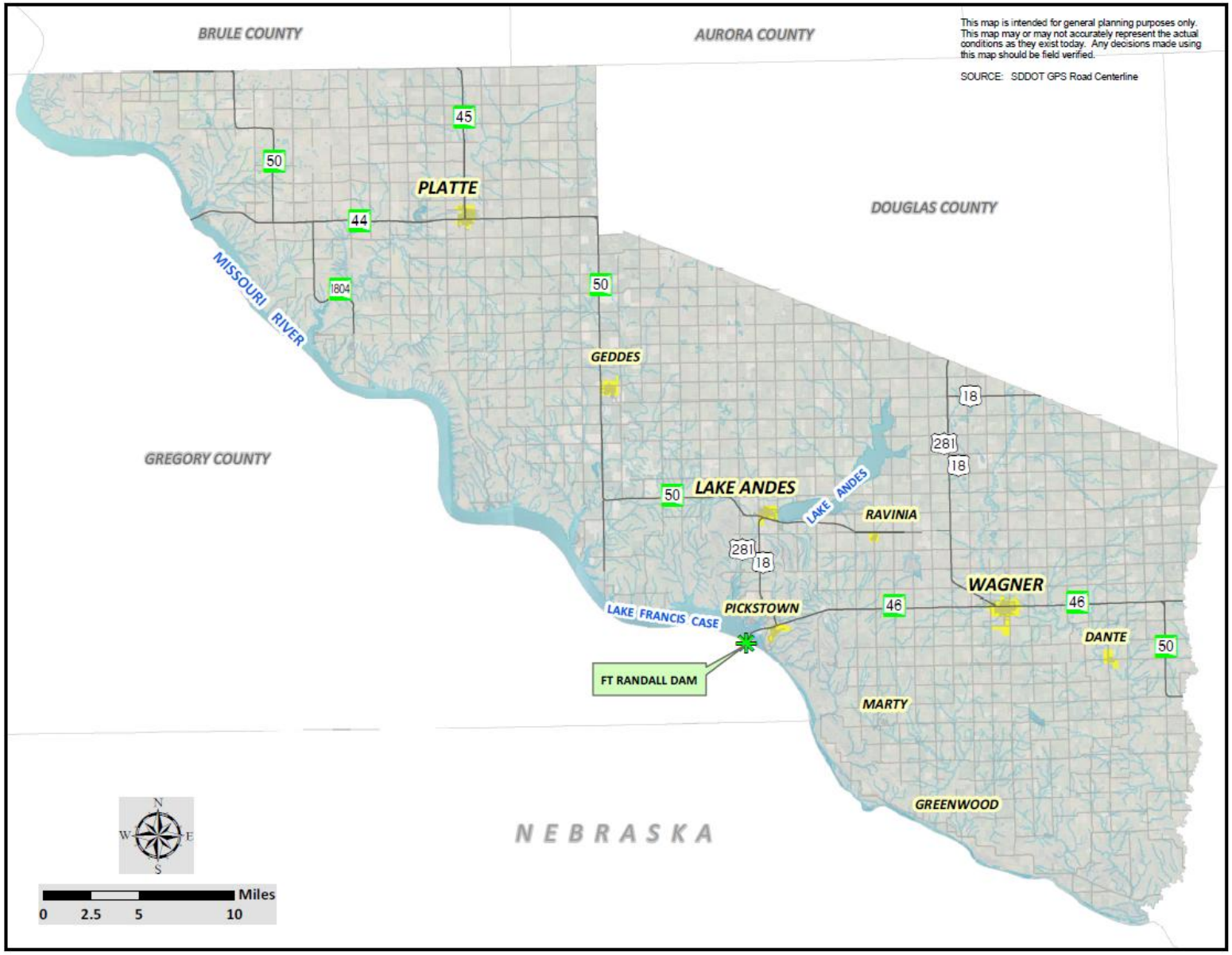


Table 2.1 provides a breakdown of the land cover in Charles Mix County, which is shown graphically in **Figure 2.2** on the following page. The table is based off satellite imagery from the United States Geological Service's National Land Cover Database. As the table shows, the predominant types of land cover in the county are cropland, pastureland, and grassland, which together comprise approximately 87 percent of the county's total land base. Developed land makes up only a very small fraction of the land area.

Table 2.1 - Vegetative Land Cover

Cover Type	Square Miles	Percent of Total Area
Cultivated crops	478.2	41.6
Pastureland	322.9	28.1
Grassland and Shrub/Scrub	197.1	17.1
Open water	58.2	5.1
Developed land (open space)	39.2	3.4
Forested land	25.8	2.2
Wetlands	24.5	2.1
Developed land (low to high intensity)	3.7	0.3
Barren land	0.5	------

Source: www.mrlc.gov/index.php

As in most of South Dakota, the climate of Charles Mix 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 the summer can exceed 100 degrees Fahrenheit [3], while winter lows can drop below -20 degrees. Precipitation averages about 23 inches per year, much of which occurs during the spring and early summer. Following is climate data reported from the Pickstown weather station.

Table 2.2 - Monthly Climate Conditions in Charles Mix County (1948 - 2016)

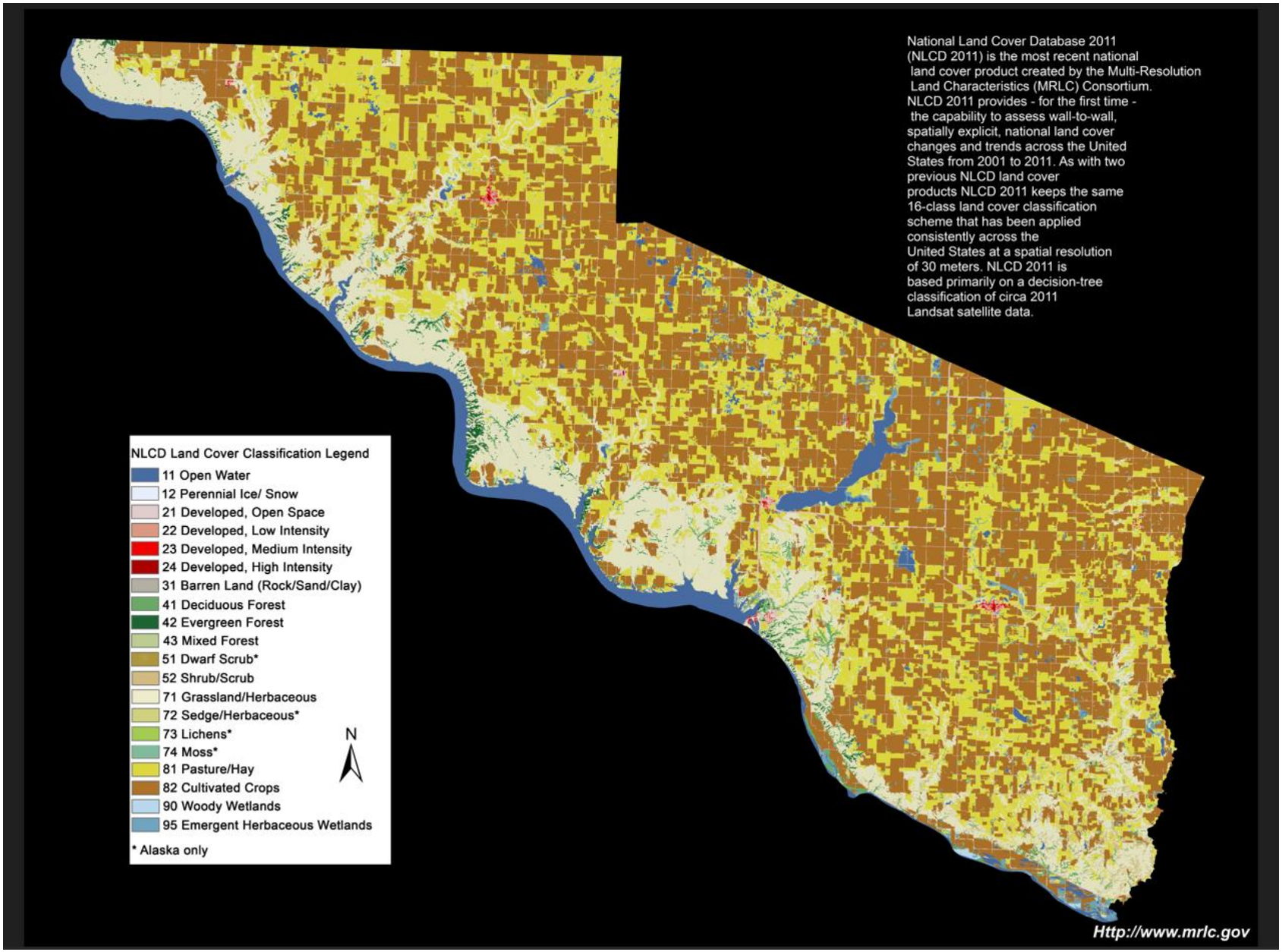
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ave High	31.4	36.7	46.6	60.9	72.2	82.1	88.4	86.8	77.3	64.6	47.9	34.9
Ave Low	9.6	14.6	23.7	36.1	47.5	57.8	63.5	61.9	51.8	39.7	26.2	14.8
Ave Precipitation	0.43	0.65	1.34	2.66	3.27	3.64	2.58	2.53	2.32	1.68	0.82	0.63

Source: www.weather.gov/wrh/climate

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

[3] 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 degree of 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 in which South Dakota is located, especially in the winter. The plan also notes a long-term trend of increasing annual precipitation across South Dakota, among the highest in the country, much of it occurring in the spring and fall seasons.

By 2050, according to research from Headwaters Economics, Charles Mix County is expected to experience 15 more days per year that reach above 95 degrees Fahrenheit (from 28 days to 43 days per year) and the average annual temperature is expected to increase from 51°F to 54°F. No significant change in average annual precipitation is expected.

There is no consensus yet on climate change science and it is difficult to make any definitive plans for climate change, but it appears likely that communities that are already vulnerable to weather and climate extremes will be stressed even further by more frequent extreme events occurring within an already highly variable climate system. Increased demand for water and energy may constrain development, stress natural resources, and increase competition for water, and new agricultural practices may be needed to cope with changing conditions.

Socioeconomic Description

Population Trends

Charles Mix County has been experiencing a steady population decline for the last several decades, although the population has stabilized since 1990. The county's Census 2020 population of 9,373 is only about 60 percent of the population that was recorded in 1950. As the table below shows, the county's population is expected to decrease slightly in the coming decades.

Table 2.3 - Charles Mix County Population

Pop 1950	Pop 1960	Pop 1970	Pop 1980	Pop 1990	Pop 2000	Pop 2010	Pop 2020	Pop 2030 Projected	Pop 2040 Projected	Pop 2050 Projected
15,558	11,785	9,994	9,680	9,131	9,350	9,129	9,373	9,176	9,238	9,162

Source: U.S. Census; Projections based on analysis of past population records and current age and sex cohorts

Race and Age

The following table shows that a relatively high proportion of Charles Mix County's population is composed of minorities, primarily Native Americans. The table also shows that the county has a relatively high percentage of young people and a low median age.

Table 2.4 - Racial and Age Characteristics

	White Pop	Black Pop	American Indian Pop	Asian Pop	Other Race	Two or More Races	Hispanic Pop	Pop Under 18	Pop 65 and Over	Median Age
Charles Mix Co.	61.4%	0.2%	33.1%	0.3%	0.7%	4.3%	2.4%	30.8%	18.2%	35.4
South Dakota	80.7%	2.0%	8.8%	1.5%	1.8%	5.3%	4.4%	24.1%	18.2%	38.5
United States	61.6%	12.4%	1.1%	6.0%	8.6%	10.2%	18.7%	21.7%	17.3%	39.0

Source: American Community Survey 2022 1-Year Estimates

Income and Education

Income levels in Charles Mix County are well below state and national figures, and poverty rates are significantly higher. Educational attainment lags behind state and national averages.

Table 2.5 – Income and Education

	Median Household Income	Poverty Rate – All People	Poverty Rate – Under 18	Poverty Rate – Over 65	High School Grad or Higher	Bachelor's Degree or Higher	Graduate Degree
Charles Mix Co.	$60,279	22.9%	30.2%	11.5%	89.4%	24.7%	6.1%
South Dakota	$69,728	12.5%	15.2%	10.9%	93.1%	31.6%	9.9%
United States	$74,755	12.6%	16.3%	10.9%	89.6%	35.7%	14.0%

Source: American Community Survey 2022 1-Year Estimates

Employment

The primary economic base of Charles Mix County is agriculture. Much of the non-ag employment for people who work in the county is in education and health care, as well as public administration. Industry and manufacturing are not significant.

Table 2.6 – Employment Sectors

	Charles Mix County	South Dakota	United States
Agriculture, Forestry, Fishing, Mining	16.4%	6.4%	1.6%
Construction	7.7%	7.4%	6.9%
Manufacturing	3.2%	9.9%	9.9%
Wholesale Trade	2.0%	2.1%	2.2%
Retail Trade	9.1%	11.4%	11.1%
Transportation, Warehousing, Utilities	4.7%	4.4%	6.0%
Information	1.3%	1.5%	1.9%
Finance, Insurance, Real Estate	5.6%	6.0%	6.7%
Professional, Scientific, Management	5.8%	6.7%	12.6%
Education, Health Care, Social Assistance	23.5%	26.3%	23.1%
Arts, Entertainment, Recreation, Accommodation, Food Service	7.8%	8.8%	8.7%
Other Services	4.4%	4.3%	4.7%
Public Administration	8.6%	4.8%	4.6%

Source: American Community Survey 2022 1-Year Estimates

Vulnerable Populations

There are certain populations and social groups within Charles Mix County that may be particularly susceptible to the adverse impacts of hazards, suffering disproportionate rates of death, injury, loss, or disruption of livelihood when hazard events occur. Various social, economic, demographic, and housing characteristics are considered here that may influence the community's ability to prepare for, respond to, cope with, recover from, and adapt to environmental hazards.

Available data indicates that Charles Mix County has a fairly high proportion of vulnerable people. The Centers for Disease Control Social Vulnerability Index shows Charles Mix County with a rating of .6777 (0 being least vulnerable and 1 being most vulnerable), which indicates a medium to high level of vulnerability. FEMA's Resilience and Planning Tool shows that the county's Income Inequality Index is .46, which is close to the state and national figures, and the Community Resilience Challenges Index (CRCI) percentile is 67 on a scale of 1 (lowest vulnerability relative to the rest of the United States) to 100 (highest). The county's top three drivers of CCRI value are Uninsured Population, Poverty, and Population Change.

Infrastructure and Utilities

Transportation

Charles Mix County's main transportation routes are SD Highway 50, US Highway 18, US Highway 281, SD Highway 44, and SD Highway 45. There are no active railroad lines in the county, although there are plans to rebuild the old Napa Rail Line that once connected the communities of Dante, Wagner, Ravinia, Lake Andes, Geddes, and Platte. The communities of Lake Andes, Platte, and Wagner each have a municipal airport suitable for small aircraft. The airport in Wagner has a runway long enough to accommodate small jets.

Utilities

Water service is provided throughout Charles Mix County by the Randall Community Water District. The water district serves rural county residents individually, including those in Dante and Ravinia, and provides bulk water to the municipalities of Geddes, Lake Andes, Pickstown, Platte, and Wagner. Each of the towns has its own wastewater collection and treatment system, except for Dante. Residents there, and in all the rural areas of the county, rely on septic systems.

Solid waste service is provided by the Southern Missouri Recycling and Waste Management District, which operates a landfill located about 1.5 miles west of Lake Andes. Most of the household waste generated within Charles Mix County ends up at the landfill. Designated rubble sites are located outside the larger towns in the county.

Electric power is provided to rural county residents by the Charles Mix Electric Association, which also supplies power to the Fort Randall Casino, a major power user. NorthWestern Energy serves all municipal users, except those in Pickstown, which has its own municipal power system. Natural gas is not available anywhere in the county.

Services

Medical Services

Basic medical service is available within Charles Mix County at medical clinics in Geddes, Lake Andes, Platte, and Wagner. More advanced service is available at the Platte Health Center and the Wagner Community Memorial Hospital, both of which are classified as critical access hospitals. The Indian Health Service operates a facility in Wagner, which is available for Native Americans. People needing serious medical attention can be transported to trauma center hospitals in Sioux Falls or elsewhere.

Fire and Emergency Response

Fire departments based in Charles Mix County are located in Academy, Dante, Geddes, Lake Andes, Platte, Ravinia, and Wagner. Each department has basic firefighting and rescue equipment, and they all respond to structural fires, wildland fires, and to accident situations. The Platte, Wagner, and Lake Andes departments, being larger than the others, have a greater array of equipment and can respond to more serious situations.

Education

High schools are located in Lake Andes, Marty, Platte, and Wagner. Post-secondary education is offered at the Yankton Sioux Tribe's Ihanktonwan Community College in Marty.

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CHAPTER III

Risk Assessment

PLANNING & DEVELOPMENT DISTRICT III

CHAPTER III
RISK ASSESSMENT

Background

The risk assessment provides the foundation for the rest of the mitigation planning process. It sets the stage for identifying mitigation goals and actions to help Charles Mix County become disaster resilient and keep county residents safe, and it answers the following questions: What are the hazards that could affect Charles Mix 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?

Risk assessment is the process of measuring the potential loss of life, personal injury, economic injury, and property damage resulting from hazards. FEMA defines risk assessment terminology as follows:

- **Natural Hazard**—A source of harm created by a meteorological, environmental, or geologic event.
- **Assets** – This includes people, structures (e.g. homes, critical facilities, and infrastructure), systems and networks, other resources important to the community, and activities important to the community.
- **Risk**—The potential for damage or loss created by the interaction of natural hazards with assets.

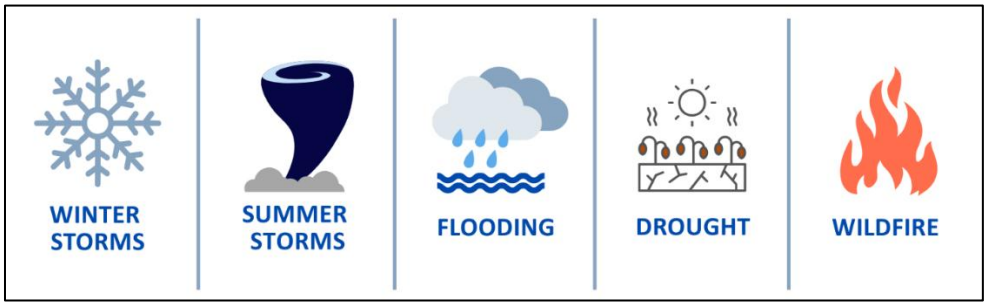
According to FEMA's mitigation planning guidance, the basic components of the risk assessment are: 1) identifying hazards that affect the community, 2) profiling the hazards, 3) conducting an inventory of community assets, and 4) analyzing impacts. This process measures the potential loss of life, personal 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. This determination was made because of the lack of population growth and development in the county and because no natural disasters have had a major impact on the county since the current plan was completed. However, many of the tables have been updated with more current information, including **Table C.2** in **Appendix C**, which lists significant hazard events that have occurred in the county through 2024.

Identifying Hazards

To determine which hazards to address in this plan, the planning team first reviewed the county's current mitigation plan. The team also considered the results of the survey that was conducted at the start of the planning process, especially the question about the hazards that most impact the county. 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**). At the end of this process, the planning team decided to focus on the following hazards:

- **Winter storms**
- **Summer storms**
- **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 – earthquakes and landslides are profiled in the South Dakota Hazard Mitigation Plan, but the overall significance of such hazards is rated as low. A map generated through the U.S. Geological Service Earthquake Hazards Program website indicates that there is only about a two percent chance that a quake of at least magnitude 5 will occur in Charles Mix County in any 100-year period, and virtually no chance of a magnitude 6 or greater earthquake [4]. No significant earthquake has ever been recorded in the county, although minor quakes have been recorded in adjacent counties. Regarding landslides, a review of the United States Geological Survey's Landslide Incidence and Susceptibility Map indicates the potential of a landslide occurring in Charles Mix County along the Missouri River, but any such event likely would be localized, minor in scale, and located far from any populated areas.

[4] 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.

- Agricultural pests and diseases - this hazard is profiled in the South Dakota Hazard Mitigation Plan. However, despite the obvious importance of agriculture to the local economy, the planning team considered the subject matter to be outside the intended focus of this plan.
- Technological and human-caused hazards – some of these hazards, including hazardous materials releases, are analyzed in the South Dakota Hazard Mitigation Plan. Again, the planning team considered the subject matter to be outside the scope 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 Charles Mix County, its ***extent***, the ***history*** of the hazard's occurrence in the county, and the ***probability*** of future events occurring. 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 of the hazards - 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 with equal frequency. Flooding and wildfires, however, do pose a greater risk in specific areas of the county than in other locations.
- ***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 winter storms can be measured by snowfall accumulation or 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**, which includes a table of the major disaster declarations in Charles Mix County, a table showing a comprehensive list of weather-related hazard events recorded in the county from the National Climatic Data Center's Storm Events Database, and tables showing crop loss to Charles Mix County farmers.
- ***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 fewer than twice per ten years. Probability for some of the hazards was determined by reviewing the frequency of past hazard events in the Storm Events Database.

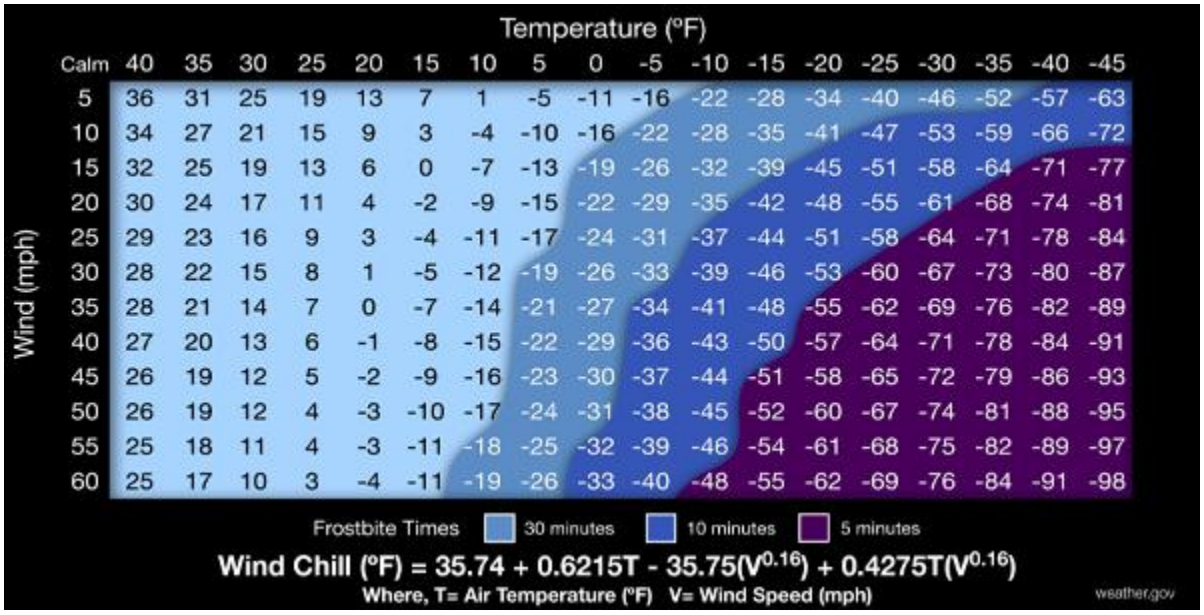
Winter Storm

Description

Winter storms include snow events, freezing rain, and sleet, with some storms taking on the characteristics of these categories during distinct phases of the storm. They typically occur from late fall to the middle of spring, varying in intensity from mild to severe. A long warning time is associated with most winter storms, giving people time to prepare, but they still have a major impact in South Dakota. They can immobilize a region by blocking transportation routes, thus disrupting emergency and medical services, hampering the flow of supplies, and isolating homes and farms. Heavy snow can collapse roofs and knock down trees and power lines. Unprotected livestock may be lost. Economic impacts of winter storms include the cost of snow removal, damage repair, and business losses. Respondents to the survey conducted for this plan considered winter storms to be the fourth most serious hazard facing the county.

The most dangerous of all winter storms are blizzards, which occur when snow is combined with winds of at least 35 mph reducing visibility to less than ¼ mile for at least three hours. 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. Freezing rain is also dangerous because it coats objects with ice and can make travel especially hazardous. Sleet does not generally cling to objects like freezing rain, but it makes the ground slippery, increasing the number of traffic accidents and injuries due to falls.

Extreme cold often accompanies winter storms or is left in their wake. Prolonged exposure to the cold can cause frostbite or hypothermia and can become life threatening. Infants and the elderly are most susceptible. Property damage is also possible when pipes freeze and burst in homes or buildings that are poorly insulated or without heat. The following chart shows how quickly frostbite can occur at a given combination of temperature and windspeed.



Winter storms can have a major 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 they 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 Charles Mix County and most of the state, 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 Charles Mix 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, blizzards and high wind events during the winter can be accompanied by winds over 50 knots (about 58 miles per hour).

History

Table C.2 in **Appendix C** lists many significant winter storms that have impacted the county. Following are details about the winter storms that resulted in a major disaster declaration (see also **Table C.1** in **Appendix C**).

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 Charles Mix 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.

Another very serious winter storm to impact Charles Mix 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 Charles Mix Electric Association lost 1,100 poles in the county due to the storm; their total damages were over $1.5 million. Many roads were shut down for extended periods, and most schools and businesses were forced to close. The southeast part of Charles Mix County suffered the

most damage from this storm, with some households out of power for up to a week as power lines were being repaired.

A late-season winter storm struck South Dakota in March 2019, resulting in FEMA Disaster Declaration 4440. The storm resulted in approximately $330,000 of public assistance funds allocated in Charles Mix County.

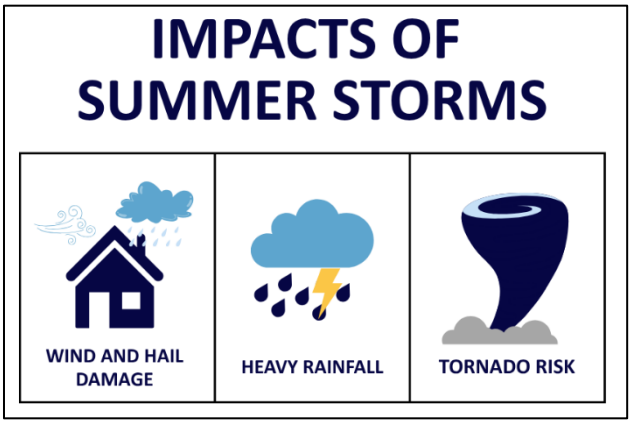
Probability

A total of 87 winter storm events, including blizzards, ice storms, heavy snow, and extreme cold events, have been recorded in Charles Mix County since the mid-1990s, an average of almost three per year (see **Table C.2 in Appendix C**). Therefore, based on the historic evidence, the probability of a significant winter storm affecting Charles Mix 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.

Summer storm

Description

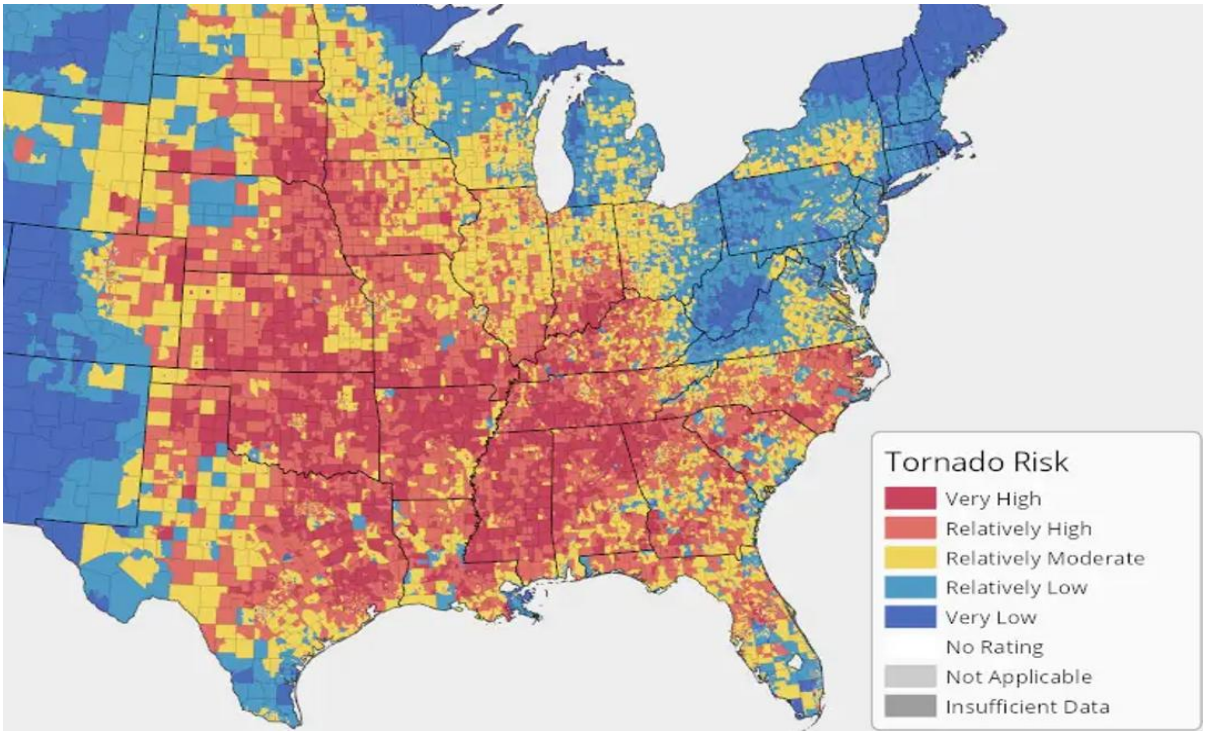
Summer storms can include heavy rainfall, hail, tornadoes, and thunderstorm activity. These events usually are associated with unstable weather conditions. In Charles Mix County, most damage from summer storms occurs because of high wind events and/or hail. Hail is always closely connected with thunderstorms. 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 Charles Mix County reports some kind of hail damage to crops or property. Survey respondents ranked hail as the second greatest hazard facing the county.



Tornadoes are the most dramatic type of summer storm experienced in Charles Mix 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. Survey respondents considered tornadoes to be the third most serious hazard facing the county.

South Dakota is located near the northern edge of the core area of tornado activity in the United States, as shown in the image on the following page (it is difficult to tell at this scale, but Charles Mix County is in the 'Very High' risk category). Often referred to as "tornado

alley", this part of the country is susceptible to the conditions that favor the formation of tornadoes: warm air from the Gulf of Mexico coming in contact with cool Canadian air fronts and dry air systems from the Rocky Mountains. 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.



Source: hazards.fema.gov/nri/tornado

Location

Summer storms are equally likely to occur in all parts of Charles Mix 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 36 thunderstorms that produced wind speeds of at least 60 knots, seven of which were over 70 knots. **Table C.2** also shows 75 events with hail at least one inch in diameter, including 20 events with hail at least two inches in diameter, and six records of a tornado with a magnitude greater than F1. 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. The following tables show classifications of hail size, wind speeds, lightning activity, and tornado strength.

Table 3.1 - Hail Size Comparison

Size (Inches)	Object Comparison
0.5 “	Marble or moth ball
1.0”	Quarter
1.5”	Walnut or ping pong ball
2.0”	Hen’s egg
2.5”	Tennis ball
3.0”	Tea cup
4.0”	Softball
4.5”	Grapefruit

Table 3.2 - Beaufort Wind Scale

Force	Wind (Knots)	WMO Classification	Appearance of Wind Effects On Land
0	Under 1	Calm	Calm, smoke rises vertically
1	1 to 3	Light Air	Smoke drift indicates wind direction, still wind vanes
2	4 to 6	Light Breeze	Wind felt on face, leaves rustle, vanes begin to move
3	7 to 10	Gentle Breeze	Leaves and small twigs constantly moving, light flags extended
4	11 to 16	Moderate Breeze	Dust, leaves, and loose paper lifted, small tree branches move
5	17 to 21	Fresh Breeze	Small trees in leaf begin to sway
6	22 to 27	Strong Breeze	Larger tree branches moving, whistling in wires
7	28 to 33	Near Gale	Whole trees moving, resistance felt walking against wind
8	34 to 40	Gale	Twigs breaking off trees, generally impedes progress
9	41 to 47	Strong Gale	Slight structural damage occurs, slate blows off roofs
10	48 to 55	Storm	Trees broken or uprooted, much structural damage (seldom experienced)
11	56 to 63	Violent Storm	
12	64 +	Hurricane	

Table 3.3 - Lightning Activity Levels

Level	Description
LAL 1	No thunderstorms.
LAL 2	Isolated thunderstorms. Light rain will occasionally reach the ground. Lightning is very infrequent, 1 to 5 cloud to ground strikes in a 5 minute period.
LAL 3	Widely scattered thunderstorms. Light to moderate rain will reach the ground. Lightning is infrequent, 6 to 10 cloud to ground strikes in a 5 minute period.
LAL 4	Scattered thunderstorms. Moderate rain is commonly produced. Lightning is frequent, 11 to 15 cloud to ground strinkes in a 5 minute period.
LAL 5	Numerous thunderstorms. Rainfall is moderate to heavy. Lightning is frequent and intense, greater than 15 cloud to ground strikes in a 5 minute period.
LAL 6	Dry lightning. This type of lightning has the potential for extreme fire activity and is normally highlighted in fire weather forecasts with Red Flag Warning.

Table 3.4 – 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 may be overturned; heavy cars lifted off ground and thrown; structures with weak foundations badly damaged.
EF4	166 to 200	Devasting damage. Frame homes are completely destroyed and some may be swept away; cars and other large objects are thrown in the air.
EF5	Over 200	Incredible damage. Nearly all buildings aside from heavily built structures are destroyed; frame houses and brick homes are swept away; cars are thrown hundreds of yards.

Source: en.wikipedia.org/wiki/Enhanced_Fujita_scale

History

As **Table C.1** in **Appendix C** shows, several major disaster declarations involving a summer storm have affected Charles Mix County. **Table C.2** in **Appendix C** lists many other significant summer storms that have impacted the county.

One of the more significant summer storms in Charles Mix County occurred in June 2003 when a storm accompanied by large hail caused severe crop damage in a 15 mile-wide area over southern and eastern parts of the county. About 60,000 acres of crops were damaged or destroyed as hail accumulated to a depth of several inches in places, with drifts as high as four feet in the Wagner area.

In August 2007 a storm accompanied by hail impacted the Dante and Wagner areas. One hailstone was measured at almost 7" in diameter.

On May 12, 2022, a highly unstable environment generated scattered storms with damaging winds. With many fields unplanted, a huge amount of dirt was lofted into the leading edge of the storms, which reduced visibility to near zero. Winds from 70 to 100 mph devastated much of southeast South Dakota, resulting in FEMA Disaster Declaration 4656. In Charles Mix County, damage was particularly severe in Dante, where numerous buildings were damaged and many trees were uprooted.

Although there are no records of a truly devastating tornado event in Charles Mix County, several tornadoes have caused significant damage. In 1962, several houses in Lake Andes were damaged by a tornado, in 1971 a tornado damaged some homes in Platte, and in 2000 a tornado damaged three homes in Wagner.

Probability

A total of 151 summer storm events, including hailstorms, thunderstorms, lightning, and tornadoes, have been recorded in Charles Mix County since 1960, an average of about 2.3 per year (see **Table C.2 in Appendix C**). Thirty-seven of these storms involved a tornado. From this information, the probability of a summer storm affecting Charles Mix County each year should be considered high, although the probability of a storm causing significant damage (e.g., damaging hail or a tornado) can be considered low to moderate.

Flooding

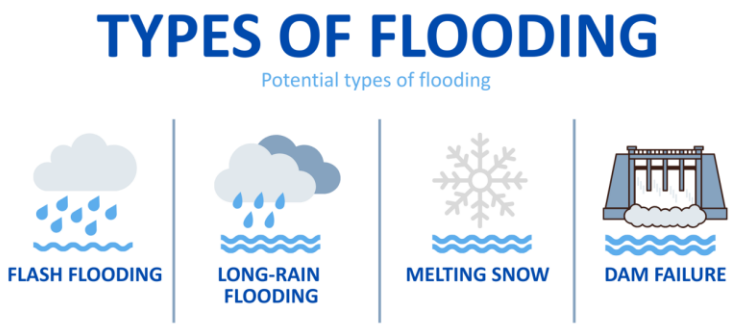
Description

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. Survey respondents considered flooding to be the fifth most serious hazard facing the county.

Following is a description of the four types of flooding that have the potential of impacting South Dakota, 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. This high intensity rainfall is commonly caused by powerful thunderstorms that cover a small geographic area. The flood that occurs because 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 "waterlogged," 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. Charles Mix County is vulnerable to this type of flood primarily because of the Fort Randall Dam, which impounds the Missouri River and is classified as a high hazard dam [5].



Location

In the past, the greatest flooding threat in Charles Mix County was along the Missouri River, which flows south/southeastward across South Dakota in a deep, wide channel, draining almost the entire state. Flooding along the river used to be an annual threat until a series of huge dams along the river, including Fort Randall, were constructed in the 1950s. Now, most of the Missouri River within South Dakota consists of a chain of reservoirs impounded by the dams. From north to south, these dams are Oahe, Big Bend, Fort Randall, and Gavins Point, which were built for flood control, to provide water for irrigation, and for the generation of hydroelectricity. The Fort Randall Dam, located near Pickstown, impounds Lake Francis Case (see **Figure 2.1**).

Because of the dams, the threat of flooding from the Missouri River has been greatly reduced, although it has not been eliminated. In 2011, significant flooding along the river did occur, with substantial damage. The primary cause of the flooding was very heavy snowmelt at the river's source in the Rocky Mountains, along with extremely high spring rains throughout much of the river's drainage basin. The complicated politics concerning river management also played a role in the disaster that unfolded over the next few months.

In addition to land adjacent to the Missouri River, other areas of the county are also vulnerable to flooding. Flood hazard zones are located along some of the Missouri River's tributary streams and in Dante, Marty, and Wagner. Other low-lying areas of the county are also vulnerable to flooding, regardless of whether they are in a designated flood zone. For instance, the community of Ravinia was significantly impacted by flooding in 2008.

Extent

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

[5] 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.

The most serious flooding the county has experienced was during the historic 2011 Missouri River flood when the river reached a record 8.8 feet above flood stage near Greenwood, inundating land along the river. The flooding that occurred in Charles Mix County in 2019 was notable both for its severity and its widespread impact throughout the county. Many areas of the county experienced water over county and township roads, with some roads closed for many months. The following table shows a description of the various stages of flooding.

Table 3.5 – Flood Stages and Associated Impacts

Flood Stage	Impact
Minor Flood	Minimal or no property damage, but possibly some public threat (e.g. road inundation).
Moderate Flood	Some inundation of structures and roads near stream, evacuations of people and/or transfer of property to higher elevations.
Major Flood	Extensive inundation of structures and roads, significant evacuations of people and/or transfer of property to higher elevation.

The images on the following page show the current river gauge charts for the Missouri River at the Fort Randall Dam and at Greenwood, and for Platte Creek near Platte. Each chart is shown in comparison with the minor, moderate, and major flood categories.

History

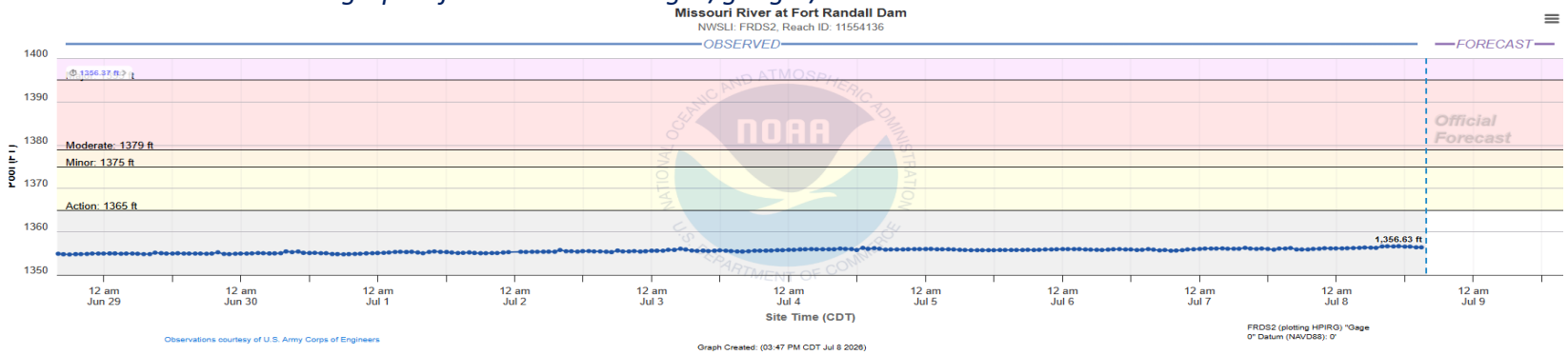
Table C.2 in **Appendix C** lists many significant flooding events that have impacted the county. Following are details about some of the most notable events that resulted in a major disaster declaration (see also **Table C.1** in **Appendix C**).

Serious flooding in 1984 resulted in FEMA Disaster Declaration 717. This event caused almost $4.5 million of damage in the affected counties.

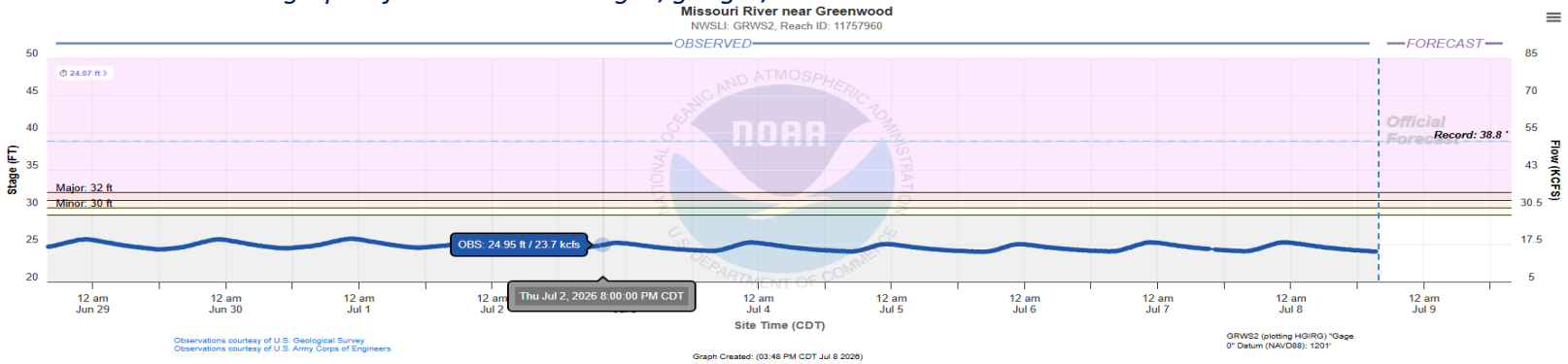
Flooding in 1995 resulted in FEMA Disaster Declaration 1052. All of South Dakota had above normal precipitation from January through May, with many weather stations in the central and eastern portions of the state experiencing their all-time wettest Spring. Damage was caused by ground saturation and flooding due to very high residual groundwater tables from 1994, heavy winter snow and spring rain, and rapid snowmelt. 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.

River Gauge Charts

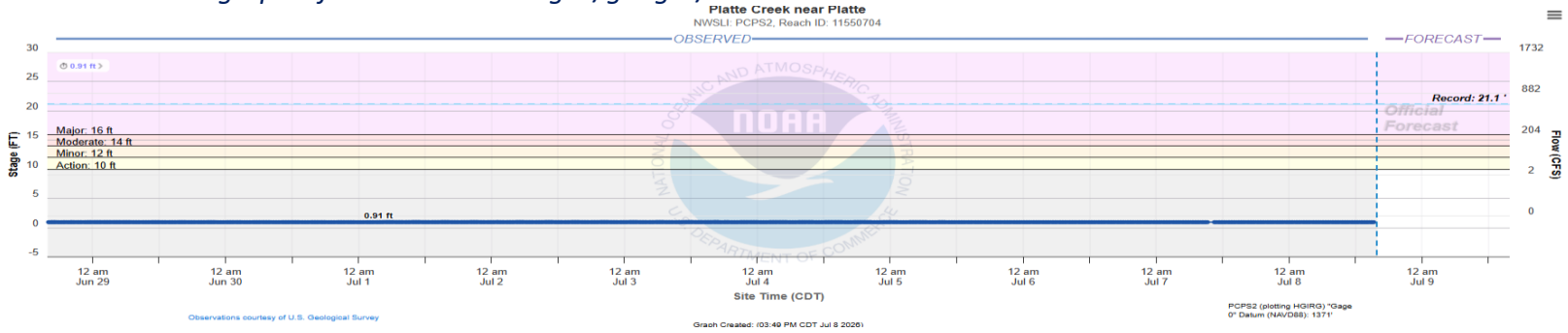
Missouri River at Ft Randall Dam - graphic from: water.noaa.gov/gauges/FRDS2



Missouri River at Greenwood - graphic from: water.noaa.gov/gauges/GRWS2



Platte Creek near Platte - graphic from: water.noaa.gov/gauges/PCPS2



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 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. In Charles Mix County, many township roads were damaged and culverts in various places were destroyed.

Flooding in 2008 resulted in FEMA Disaster Declaration 1774, which particularly affected the southeast part of the county. The community of Ravinia was especially impacted, with many of the town's roads underwater for a period of about ten days. The high water caused the town's sewage lift station to fail, which left residents without sewer service for several weeks, and some houses suffered water damage. Big pumping equipment, including some provided by the U.S. Army Corps of Engineers, had to be brought in to deal with the situation.

Flooding in the spring and summer of 2010 resulted in FEMA Disaster Declaration 1915. Heavy rainfall of up to six inches caused widespread flash flooding of many county and township roads, residences, and fields. Some residences were damaged by the floodwater, and some temporary evacuations were necessary. The former Yankton Sioux tribal administration building in Marty, which had suffered previous flood damage in 2007 and 2008, had to be abandoned.

The Missouri River flood of 2011 may have been the most notable flooding event ever to occur in the recorded history of South Dakota, resulting in FEMA Disaster Declaration 1984. Although Charles Mix County did not suffer as much damage as some other parts of the state, the county did feel the impact of the event. The flood began to develop in May and increased throughout the month as runoff from excessive upstream snowmelt and rain reached the area. Lowland areas along the river began to flood, impacting recreational facilities and some roads. By the end of June the river reached a record 8.8 feet above flood stage near Greenwood, where two households were evacuated and one house was lost to floodwaters. A newly built cabin located near the river a few miles east of the North Wheeler Recreation Area also suffered some flood damage. Many local roads in the southeastern part of the county in the vicinity of the Missouri were damaged, and a great deal of farmland along the river was flooded. A slow drop in the river began in July and by late September flooding finally ended.

Flooding in 2019 had a major impact throughout the year in Charles Mix 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. Flooding continued during the summer and became even more severe in

September after a six inch rainfall event. The heavy rainfall caused the Platte Dam to breach, temporarily washing out SD Hwy 44 until repairs could be made. South Dakota Highway 50 at Lake Andes, which had just reopened in late August after the spring flooding (see photo on front cover), was flooded again, as were many other county and township roads. This event resulted in FEMA Disaster Declaration 4469.

In June 2024, heavy rainfall across Charles Mix County on top of an already wet spring caused overland flooding, with several township roads damaged by flood waters. This event resulted in FEMA Disaster Declaration 4807.

Probability

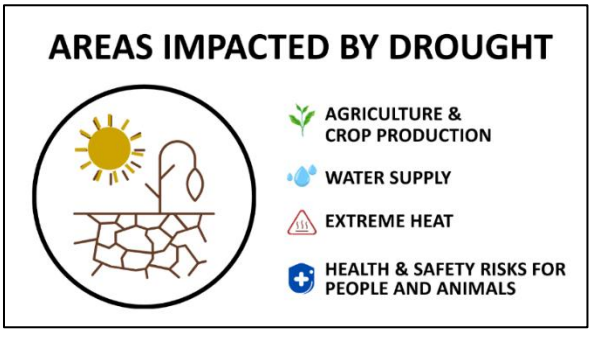
Table C.2 shows that 47 flooding events have been recorded in Charles Mix County since the mid-1990s. Excluding the events that were a recording of ongoing flood conditions, it appears there have been about 16 separate flood events in Charles Mix County since the mid-1990s, an average of about one every other year. Based on this analysis, the probability of flooding occurring somewhere in the county in a given year can be considered moderate to high. **Table C.1** shows that several floods were significant enough to result in a disaster declaration. It is certain that flooding will continue to impact the area to some degree, no matter what mitigation actions are pursued.

Drought

Description

Drought is a deficiency in precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals, and/or people. It is a normal, recurrent feature of climate that occurs in virtually all climate zones. Human factors, such as water demand and water management, can exacerbate drought. Survey respondents ranked drought as the greatest hazard facing the county [6].

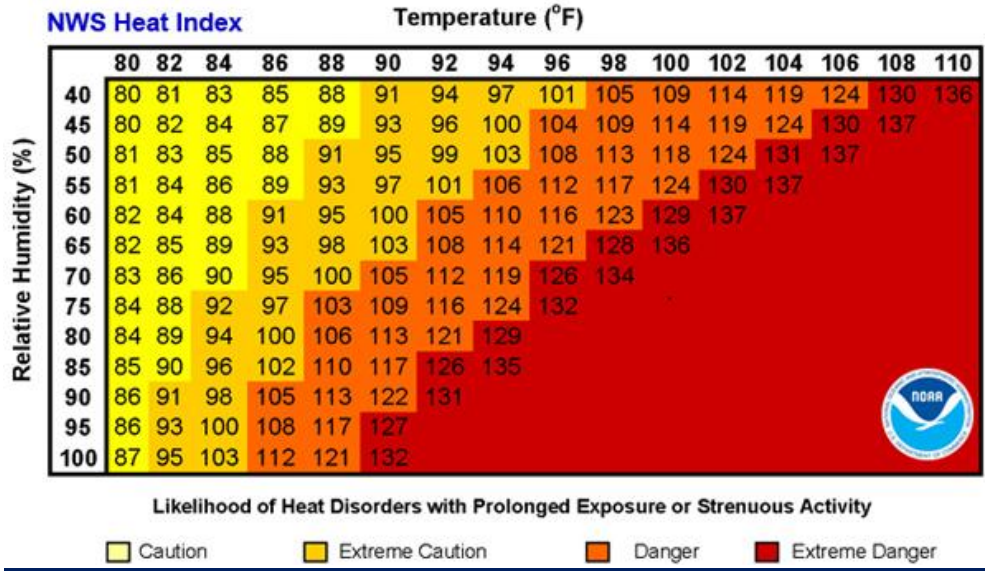
Droughts can occur at any time of the year, but the consequences are worse during the summer growing season, especially after dry winters. A small departure in normal precipitation during the months of June through August can have a significantly negative impact on crop production. The demand for water 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, which is defined by FEMA as a condition in which the air temperature hovers at least 10° Fahrenheit above

[6] It should be noted that the survey was taken during an extended regional drought, which may have influenced the results. Still, there is no doubt that drought is a serious hazard facing the county.

the average high temperature for the region and lasts for several weeks. Drought and extreme heat often exist together and compound negative effects. According to the National Weather Service, among natural hazards, only the cold of winter 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. Elderly people, small children, people with certain medical conditions, and those on certain medications are particularly susceptible to heat stress. The following table shows the likelihood of heat disorder given the combination of air temperature and relative humidity.



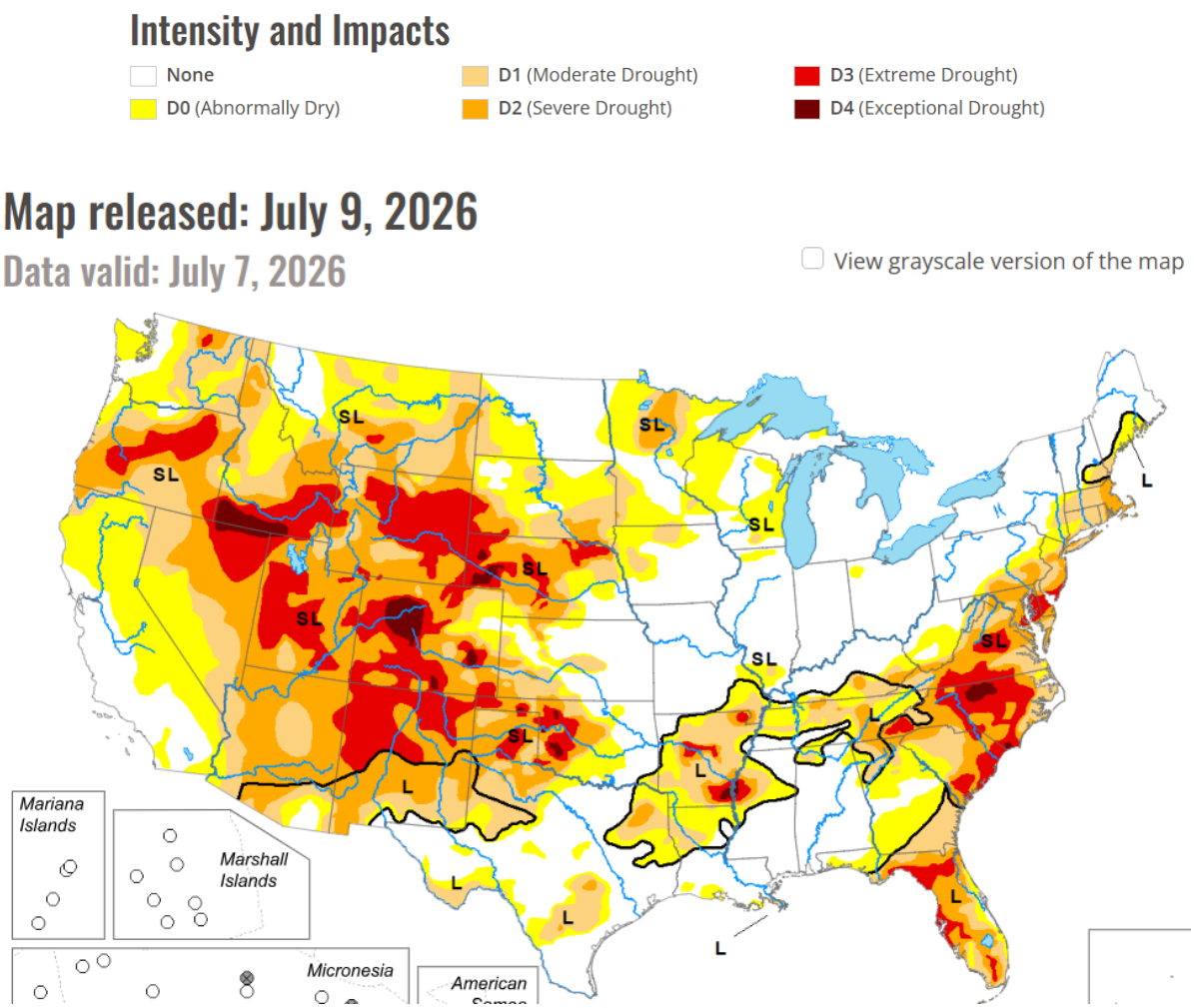
Location

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, Charles Mix County has experienced many years of below average annual precipitation, including seven years between 1948 and 2016 in which precipitation was less than two thirds of normal. In terms of duration, it is not unusual for Charles Mix 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.

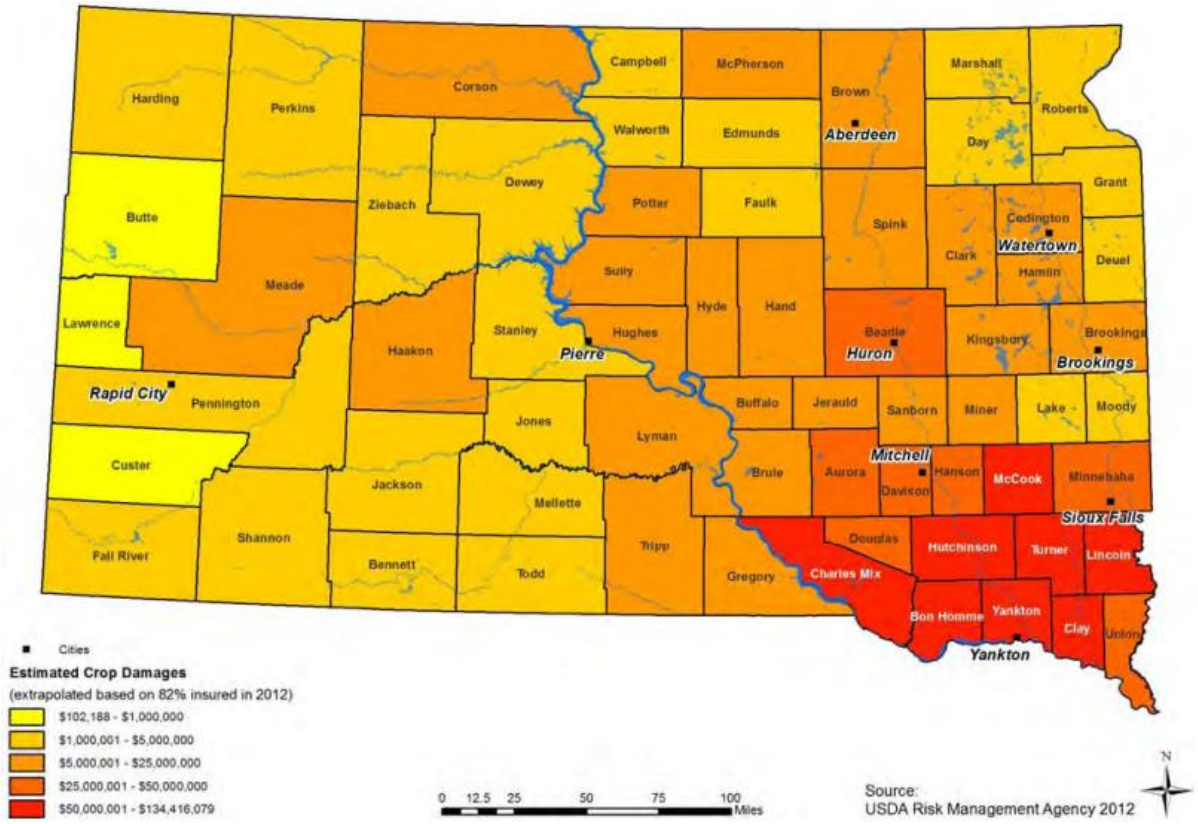
The U.S. Drought Monitor (USDM) has established the drought scale shown on the following page, which is much like those that rate hurricanes and tornadoes. The "D-scale" speaks to the "unusualness" of a drought episode, with D1 conditions expected to occur about 10 to 20 percent of the time and D4 being much rarer, expected less than 2 percent of the time. Following the scale is the current drought severity index map of the United States.



History

Charles Mix County has experienced many severe droughts, the most significant of which occurred in the 1930s, the so-called dust bowl years. 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 so thick they concealed the sun for several days at a time. The severity of the drought was compounded by years of land management practices that left topsoil susceptible to the forces of the wind.

The drought of 1976 was one of the most severe in recent years, resulting in South Dakota's only drought emergency declaration to date. Drought in 1980 and 1981 affected the entire state of South Dakota and was rated as a 10-to-25-year event. The Drought in 2012 was so devastating that the State of South Dakota activated a Drought Task Force. The statewide impact on agricultural producers was tremendous. The figure on the following page, as reproduced from the South Dakota Drought Mitigation Plan, shows the 2012 drought's impact statewide.



Probability

Table C.2 in **Appendix C** shows at least one drought record in Charles Mix County in ten 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.

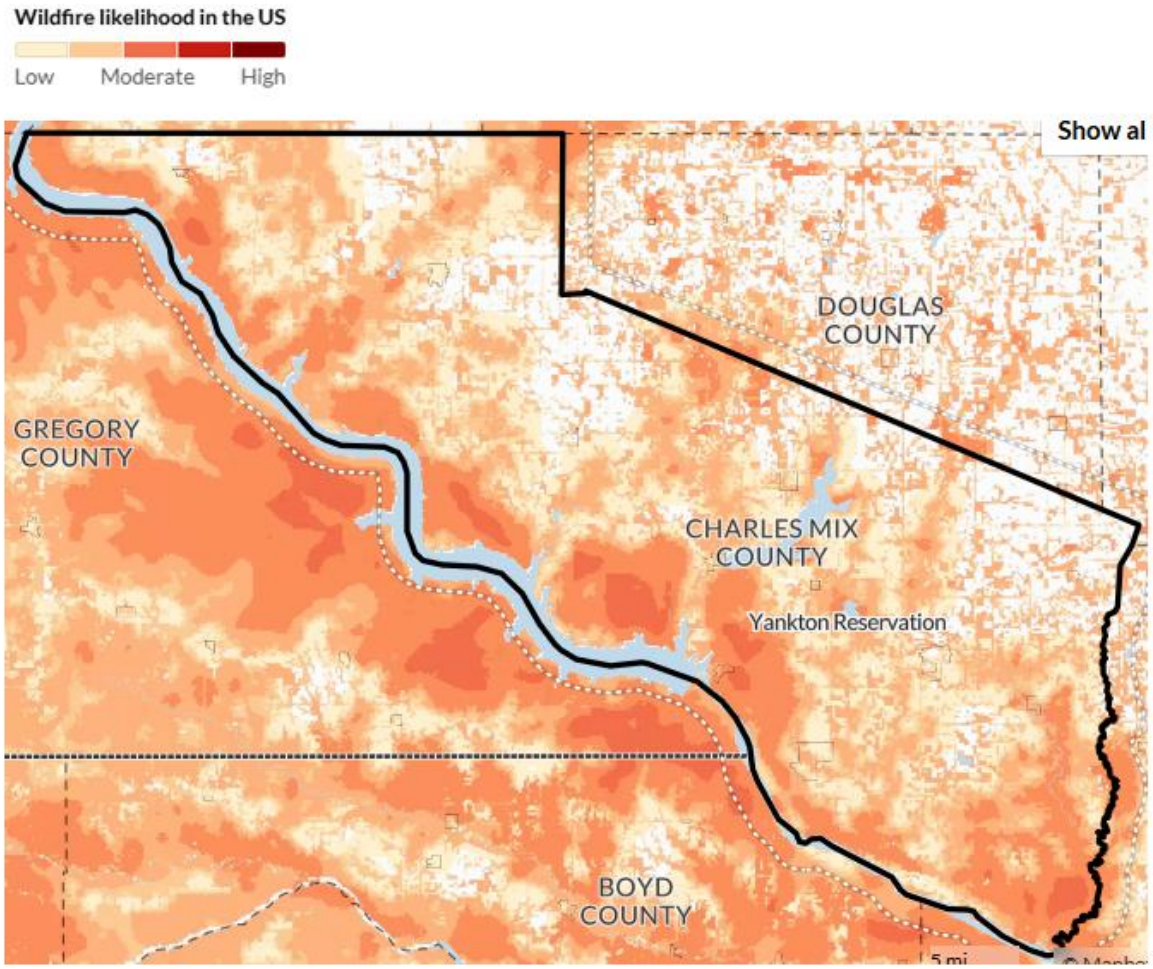
Wildfire

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. Wildfire is not as serious a concern in Charles Mix County as it is 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. Survey respondents considered wildfire to be the least serious of the eight disaster types they could choose from.

Location

Wildfires in Charles Mix County are most likely to occur in large areas of extensive brush or unmanaged vegetation, including pastureland and grassland, which together make up approximately 45 percent of the county's land base. The hills and draws along the Missouri River, which contain a significant amount of cedar trees and thick brush, experience wildfires rather frequently. Another concern is controlled burns that get out of control, which can occur almost anywhere in the county. This map, from the U.S. Forest Service's Wildfire Risk to Communities website, shows where wildfires are most likely to occur in the county (it does not reflect the intensity of fire).



Extent

The following table shows the number of wildfires according to various size classes that have occurred in Charles Mix County from 2000 through 2024 as reported to the South Dakota Department of Public Safety [7]. It shows that most of the fires have been fairly small, most impacting fewer than ten acres.

[7] Since the data is reported by volunteer fire departments, and not all wildfire incidents are reported to the Department, the table may not reflect all wildfires that have occurred in the county.

Table 3.6 – Wildfires in Charles Mix County (2000 - 2024)

1 to 9 Acres	10 to 49 Acres	50 to 99 Acres	100 to 249 Acres	250 to 499 Acres	500 Acres or More	Average Annual Acres Burned
364	132	29	22	7	2	490.4

Source: South Dakota Department of Public Safety

History

Many notable wildfires have occurred in Charles Mix County, but nothing on a truly destructive scale. The largest known fire to occur in the county was the Chalk Rock Fire of 1985, which consumed 1,800 acres. In October 2011, several wildfires broke out in Charles Mix County during a four-day period, the largest of which burned about 400 large hay bales, plus grassland (see **Appendix C**).

Probability

Wildfires affecting fewer than ten acres are likely to occur somewhere in Charles Mix County most years, but large-scale wildfires are much less common. **Table 3.6** shows only two wildfires at least 500 acres in size occurred between 2000 and 2024. Based on this period of analysis, the probability of a significant wildfire occurring each year within Charles Mix County can be considered low.

Community Assets

Hazards can affect all parts of the community, but their impact on certain community assets is particularly important to consider. In this section, the most important community assets and facilities in Charles Mix County are identified, including those that would play an important role in helping the communities prepare for and respond to a hazard event.

Government Offices

- Charles Mix County Courthouse, Lake Andes
- City offices in Dante, Geddes, Lake Andes, Pickstown, Platte, Ravinia, and Wagner
- Yankton Sioux Tribal Office, Wagner

Emergency preparedness and response

- Charles Mix County Emergency Management Office
- Charles Mix County Sheriff's Office, Lake Andes
- Police departments in Platte and Wagner
- Fire departments in Dante, Geddes, Lake Andes, Pickstown, Platte, and Wagner
- Charles Mix County Highway Department, Lake Andes
- Disaster relief shelters (*see p.63*)
- Emergency storm shelters (*see p.63*)

Medical facilities

- Platte Health Center
- Wagner Community Memorial Hospital
- Indian Health Service Center, Wagner

Educational facilities

- Andes Central School, Lake Andes (K-12)
- Platte Community School (K-12)
- Wagner Community School (K-12)
- Marty Indian School (K-12)
- Ihanktonwan Community College in Marty

Other important assets and businesses

- U.S. Army Corps of Engineers, Pickstown
- Charles Mix Electric Association, Lake Andes
- Randall Community Water District, Lake Andes
- Dakota Manufacturing Company, Platte
- Farmer's Cooperative Association elevator, Wagner
- Farmer's Elevator Company of Platte
- Fort Randall Casino (located between Pickstown and Wagner)
- Fousek Grain elevator, Wagner
- Lake Andes Farmer's Cooperative elevator
- Meyerink Farm Service, Platte
- Platte Livestock Market
- Wagner Building Supply

Hazard Impact Analysis

This section assesses the vulnerability of Charles Mix County and the participating jurisdictions to each of the hazards that have been profiled. Vulnerability is defined as the extent to which people and property are exposed to harm or damage 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'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.

It is an especially helpful planning tool for communities that have not been mapped by the National Flood Insurance Program [8].

- 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.
- Data on the population living in wildfire risk zones was used to estimate potential wildfire losses.

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 Charles Mix County following major disaster declarations through FEMA's Public Assistance program.
- Data from the U.S. Dept of Agriculture Risk Management Agency was used to assess crop loss from natural hazards (see **Tables C.3 through C.6** in **Appendix C**).
- Information from the National Drought Mitigation Center's Drought Impact Reporter was used to assess the local impact of droughts.

At the conclusion of the vulnerability assessment for each hazard, an attempt is made to determine how vulnerability might change in the future. Census data and population projections were used in this analysis, as well as data on the volume of building permits that have been issued in the county in recent years and discussion with local officials about general development trends within the county. Other factors, including the possible impact of climate change, were also 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.

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, trees falling, 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

[8] A limitation of HAZUS is the inadequacies associated with its hydrologic and hydraulic modeling, especially in sparsely populated areas. Also, HAZUS uses default national databases that may not be applicable at the local level.

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 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:

A total of 87 winter weather events, including blizzards, heavy snow, ice storms, and winter storms, are shown in the National Climatic Data Center's Storm Events Database for Charles Mix County (see **Table C.2 in Appendix C**). In comparison, the average for South Dakota counties is 104 winter weather events, indicating that Charles Mix County may be somewhat less prone to adverse winter weather than other counties in the state.

Past Damage Amounts:

It is not easy to determine how much damage winter storms have caused in the county. The National Climatic Data Center's Storm Events Database records winter storm damage by forecast zones, not by county, so the data does not lend itself to analysis at the county level. Nevertheless, **Table C.2** indicates that many winter storms have caused significant damage in Charles Mix County.

Winter storms can have a major impact on agricultural production. Farmers typically protect themselves from the impacts of adverse weather 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. **Table C.3** in **Appendix C** provides information on indemnity payouts for crop loss to Charles Mix County farmers due to various types of winter weather events between 2000 and 2023. During this period of analysis, winter weather-related payouts averaged approximately $597,185 per year in Charles Mix County compared to the state average of $322,350 per year.

Building Exposure:

The total value of buildings in Charles Mix County is approximately $980 million, according to the South Dakota Hazard Mitigation Plan, which ranks 19th among the state's 66 counties. The median figure for South Dakota counties is approximately $620 million. From this information, the county's building exposure can be considered moderate relative to other South Dakota counties.

Population Density:

Charles Mix County is sparsely populated, with an average of just 8.5 people per square mile, less than the state figure of 11.7 people per square mile and far below the national figure of 93.8. Charles Mix County would have to be rated low in terms of population density.

Future Vulnerability

No development has occurred anywhere in Charles Mix County since the previous plan was approved to affect any of the jurisdictions' vulnerability to winter storms. Looking ahead, vulnerability to winter storms may actually decrease if the population continues to decline as expected.

One factor that could impact vulnerability is climate change. 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 Charles Mix 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 as the result of heavy rain. Like the rest of the Great Plains, Charles Mix County is especially vulnerable to summer storms accompanied by high wind because the landscape is open and there is very little topographic relief to block the wind.

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
- Housing stock characteristics in each community

Prior Events:

A total of 151 summer storm events (tornadoes, lightning, thunderstorms with wind gusts of at least 60 knots, and hail at least one inch in diameter) are shown in the National Climatic Data Center's Storm Events Database for Charles Mix County from 1960 through 2024 (see **Table C.2 in Appendix C**). In comparison, the average for South Dakota counties is 257 summer storm events, which indicates that Charles Mix County may be somewhat less prone to summer storms than other counties in the state.

Past Damage Amounts:

Many summer storm events have caused significant damage in Charles Mix County, as shown in **Table C.2**. According to the South Dakota Hazard Mitigation Plan, whose authors researched property damage from tornadoes in the state as reported in the National Climatic Data Center's Storm Events Database, the average annual loss from tornadoes in Charles Mix County between 1950 and 2016 was $130,620. The average annual loss during this period for South Dakota counties was approximately $163,730, indicating that Charles Mix County may be somewhat less vulnerable to suffering tornado damage than other counties in the state.

Charles Mix County farmers are quite vulnerable to the impact of summer storms. **Table C.4** in **Appendix C** provides information on indemnity payouts for crop loss in Charles Mix County due to severe summer weather between 2000 and 2023. During this period of analysis, summer storm-related payouts averaged approximately $292,190 per year in Charles Mix County compared to the state average of $461,120 per year.

Building Exposure:

The total value of buildings in Charles Mix County is approximately $980 million, according to the South Dakota Hazard Mitigation Plan, which ranks 19th among the state's 66 counties. The median figure for South Dakota counties is approximately $620 million. From this information, the county's building exposure can be considered moderate relative to other South Dakota counties.

Population Density:

Charles Mix County is sparsely populated, with an average of just 8.5 people per square mile, less than the state figure of 11.7 people per square mile and far below the national figure of 93.8. Charles Mix County would have to be rated low in terms of population density.

Housing Stock Characteristics

Differences in the local housing stock were analyzed to help determine vulnerability at the local level. The table below shows that the housing stock in each of the communities except Pickstown is older than the typical house in South Dakota, and an assumption can be made that some of the older houses may not be as structurally sound as a newer home, putting the

occupants at higher risk to a powerful summer storm, such as a tornado or other high wind event. The impact on human life might be especially bad in Geddes given its high percentage of mobile homes, which are vulnerable to being overturned by tornadoes and other high wind events if not anchored properly.

Table 3.7 – Housing Stock Characteristics

Community	Houses Built Before 1940	Houses Built Since 2000	Mobile Homes
Dante	56.1%	0.0%	7.3%
Geddes	40.3%	5.6%	12.5%
Lake Andes	44.3%	0.9%	2.7%
Pickstown	6.0%	32.0%	3.0%
Platte	36.5%	6.8%	1.3%
Ravinia	38.1%	14.3%	9.5%
Wagner	27.3%	5.7%	2.8%
South Dakota	*14.6%*	*31.5%*	*6.4%*

Source: 2020 US Census (DP04 Selected Housing Characteristics)

Future Vulnerability

No development has occurred anywhere in Charles Mix County since the previous plan was approved to affect any of the jurisdictions' vulnerability to summer storms. Looking ahead, vulnerability to summer storms may in fact decrease if the population continues declining.

Regarding the impact of climate change, the South Dakota Hazard Mitigation Plan cites the Climate Science Special Report from 2017, which states that damage 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. The expected increase in the number of days above 95 degrees by midcentury could create conditions favorable to the formation of severe thunderstorms. There is some uncertainty in these projections, but severe thunderstorms and tornadoes will remain a hazard in the state.

Flooding

Like all counties in South Dakota, Charles Mix County is vulnerable to flooding. Because of the specific nature of flooding, vulnerability 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, Charles Mix County's potential building damage loss ratio from flooding (the percent of the total building inventory value that could be damaged by flooding in any given year) of 0.7 percent is slightly below the median statewide figure of 0.75 percent. Likewise, the 2.5

percent of the county's population potentially displaced by flooding is below the state figure of 4.6 percent.

In addition to impacting buildings and other structures, a good deal of public infrastructure throughout the county is vulnerable to flooding. Flood damage frequently involves washed out or damaged roads and drainage culverts, often occurring in the spring, especially following winters with heavy snow.

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. **Table C.5** in **Appendix C** provides information on indemnity payouts for crop loss in Charles Mix County due to flooding and excess moisture between 2000 and 2023. During this period of analysis, flood-related payouts averaged approximately $2,768,110 per year in Charles Mix County compared to the state average of $2,204,140 per year.

Approximately 55% of the flood-related indemnity payouts to Charles Mix County farmers were due to the severe flooding that occurred in 2019, which may have been 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. In Charles Mix County, approximately 161,800 acres of land were not planted, which was about 31% of land that would have otherwise been planted, ranking the county 15th in South Dakota.

Local Flood Vulnerability

At the community level, vulnerability was determined by using FEMA's HAZUS loss estimation software to estimate potential losses during a 100-year flood event. Vulnerability was also assessed by using GIS software to overlay areas of flood risk on parcel data to determine the assessed value of property at risk. The following table summarizes the results of the analysis (note that both analyses included some land outside the municipal boundaries).

Table 3.8 – Community Flood Loss Estimation

Community	Building Structural Damage	Debris Generated (Tons)	Displaced Households	People Needing Shelter	Assessed Value of Property at Risk
Dante	$22,500	17	2		$623,219
Geddes	*(HAZUS FAILED TO RUN)*				
Lake Andes	$120,500	72	10	3	
Pickstown	$2,000	1	0		
Platte	*(HAZUS FAILED TO RUN)*				
Ravinia	$2,000	1	1		
Wagner	$1,518,000	745	105	216	$6,530,848

Sources: FEMA HAZUS loss estimation software; Charles Mix County Director of Equalization

Flood risk was also analyzed using the RiskFactor website, which uses a probabilistic flood model that shows any location's risk of flooding from rain, rivers, tides, and storm surges.

According to the RiskFactor analysis, there is only minor flood risk in each of the communities, except in Platte, where almost 10% of residential properties are at risk.

Future Vulnerability

No development has occurred in flood prone locations or anywhere else within Charles Mix County since the previous plan was approved to affect any of the jurisdictions' vulnerability to flooding. Looking ahead, vulnerability to flooding may decrease if the population continues to decline as expected.

One factor that may increase vulnerability is the continuing conversion of wetlands and other marginal land to agricultural production. Farming these marginal lands can increase 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 Charles Mix County are not available, but future updates to this plan could explore this trend in more depth.

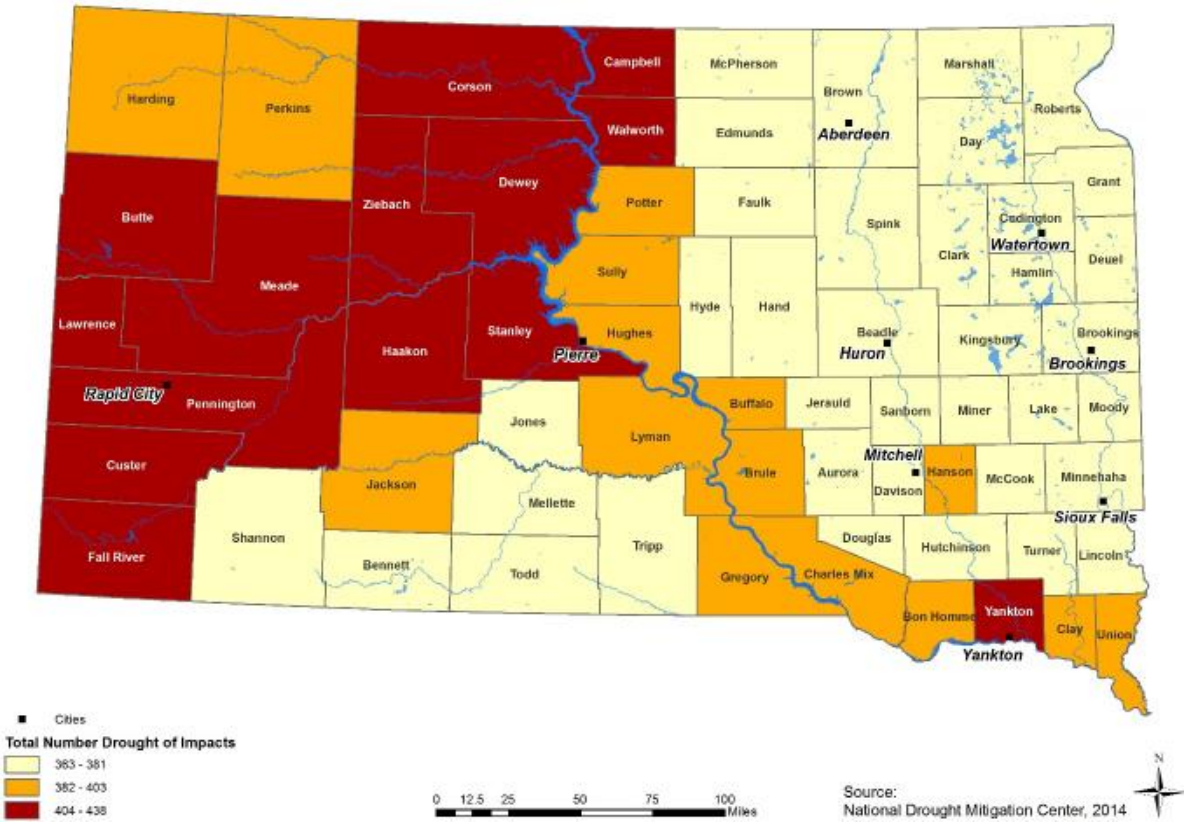
The nature and frequency of flooding also could be altered by climate change. The South Dakota Hazard Mitigation Plan notes a long-term trend of increasing annual precipitation across South Dakota, among the highest in the country, much of it occurring in the spring and fall seasons, and there is high confidence that precipitation extremes will increase in frequency and intensity that could exacerbate flooding.

Drought

Without question, Charles Mix County is vulnerable to drought, with the biggest impact being 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. Fortunately, most farmers in Charles Mix County have crop insurance, which lessens the financial impact of droughts. Modern agricultural practices, such as no-till farming and the development of drought-tolerant crops, also help farmers withstand years of low rainfall. **Table C.6** in **Appendix C** provides information on indemnity payouts for crop loss in Charles Mix County due to drought and heat between 2000 and 2023. During this period of analysis, drought-related payouts averaged approximately $7,212,160 per year in Charles Mix County compared to the state average of $2,942,115 per year. About one third of the payouts were due to the 2012 drought.

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 conducted an analysis comparing crop losses in each county 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. Charles Mix County's loss ratio of 7.9% was higher than the 3.1% average for South Dakota counties. The authors of the South Dakota Drought Mitigation Plan assigned Charles Mix County a rating of "High" 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, Charles Mix County is in the medium range of counties in terms of the number of drought impacts.



Future Vulnerability

No development has occurred anywhere within Charles Mix County since the previous plan was approved to affect any of the jurisdictions' vulnerability to drought. Looking ahead, vulnerability to drought may increase 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. The expected increase in Charles Mix County's average annual temperature and the number of days over 95 degrees may lead to increased evaporation and drought frequency, which would compound water scarcity problems.

Wildfire

Wildfire risk in Charles Mix County was analyzed using two different sources. According to the U.S. Forest Service's Wildfire Risk to Communities website, Charles Mix County's overall risk is considered medium, with homes in the county having a greater wildfire risk than 49% of South Dakota counties and 57% of counties nationwide. Information from the SILVIS Lab at the University of Wisconsin shows that 226 housing units in the county are located in the

Wildland-Urban Interface, which are locations vulnerable to wildfire because of a combination of dense housing and vegetation. The housing units at risk represent approximately 6% of the total housing stock in Charles Mix County, whereas the statewide figure is about 26%.

Future Vulnerability

No development has occurred in areas prone to wildfire or anywhere else within Charles Mix County since the previous plan was approved to affect any of the jurisdictions' vulnerability to wildfire. Looking ahead, vulnerability to wildfire may decrease if the population continues to decline as expected.

One factor that could increase wildfire vulnerability is the continued spread of cedar trees. These trees are spreading quickly in the county, especially in the hilly terrain along the Missouri River, and efforts to control their spread have met with only limited success. The fuel load they represent could turn an otherwise routine brushfire into a very serious situation.

The possible impact of climate change also needs to be considered. The South Dakota Hazard Mitigation Plan cites a U.S. Forest Service study that indicates a likely increase in 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 Charles Mix County and each of the participating jurisdictions to each of the hazards profiled is summarized. Maps are presented at the end of the section to augment the analysis, showing areas vulnerable to flooding; the graphic on page 37 showed areas where wildfire is most likely to occur. Vulnerability to winter storms, summer storms, and drought is not mapped, as those hazards are likely to impact all areas of the county equally.

- **Winter Storms**

Charles Mix County's vulnerability to winter storms can be considered high. The authors of the South Dakota Hazard Mitigation Plan assigned Charles Mix a rating of High when considering prior winter storm events in the county, building exposure, and population density. All areas of the county are vulnerable to winter storms. 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 the county's major communities, some of whom are more than 15 miles from the nearest place with groceries, medical service and supplies, and other important items, puts them at increased 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, especially when winter storms are

accompanied by high winds and freezing precipitation that can cause ice to build up on powerlines, which can then cause the lines and poles to come down. Elderly residents who rely on home medical apparatus dependent on a constant supply of power are particularly vulnerable during these times and they are often less able to withstand extreme cold events.

- **Summer Storms**

Charles Mix County's vulnerability to summer storms can be considered moderate to high. The authors of the South Dakota Hazard Mitigation Plan assigned Charles Mix a rating of High when considering prior tornado events in the county, building exposure, and population density. All areas of the county are vulnerable to summer storms. Although the county's population density is low and infrastructure development is not extensive, a large amount of cropland in the county is vulnerable to the effects of hail and other violent summer weather. Vulnerability may be somewhat higher in Geddes, which has a relatively high percentage of mobile homes.

- **Flooding**

The overall vulnerability of Charles Mix County to flooding can be described as moderate. According to the vulnerability analysis conducted for the South Dakota Hazard Mitigation Plan, the county's estimated flood loss in terms of building damage and displaced people is below the average for the state. Much of the vulnerability is to cropland and to rural county roads. Flooding in 2019 had a significant impact on the county. Following is a summary of vulnerability in each of the communities:

Dante: Flooding has been a persistent problem in the community, which was built on low-lying ground near Choteau Creek. Much of the farmland surrounding Dante has been stripped of its vegetation, which once helped slow runoff. Without the vegetation, rainwater now rushes south toward 300th Street (aka Warren Avenue), where it overwhelms the ditches and spreads onto adjacent property. Heavy rain events can cause significant damage as water overtops 300th Street and gets into basements. Drainage improvements made along 300th Street in 2016 with the assistance of HMGP funding have improved the situation. Flooding in 2019 caused some road damage here, but no significant property damage. The RiskFactor analysis found only a minor amount of residential flood risk in the community.

Geddes: There does not appear to be much vulnerability here. No significant flooding has ever occurred in the community, although small scale flooding in 2007 did cause minor damage to a county garage located on the south side of town. Flooding in 2019 caused some road damage here, but no significant property damage. The RiskFactor analysis found only a minor amount of residential flood risk in the community.

Lake Andes: No significant flood damage has ever occurred within Lake Andes itself, but there is vulnerability just outside the city. Flooding in 2019 had a major impact on the community when Lake Andes (the lake) overflowed and spilled across U.S. Highway 18 in March, closing the road for months and damaging several homes in the South Indian Housing complex. The highway finally reopened in late August, only to

be flooded again after another very heavy rain event in September. The RiskFactor analysis found only a minor amount of residential flood risk in the community.

Pickstown: Located at the top of a ridge overlooking the Missouri River, there is very little flood risk here, and no history of any significant flood damage. The RiskFactor analysis found absolutely no residential flood risk in the community.

Platte: There is some vulnerability to small-scale flooding in Platte, especially in the northeast and northwest parts of the community, where sandbagging occasionally has been necessarily to prevent more extensive flooding. The situation is better than it used to be after a large diameter storm sewer pipe was installed in the early 2000s under a natural drainageway that runs through the community. Further drainage improvements were made following minor flooding in Platte in 2011. Flooding in 2019 had a significant impact on the community, including widespread road damage and basement flooding. The RiskFactor analysis found a moderate amount of residential flood risk in the community.

Ravinia: Standing water after heavy rain events is a problem in Ravinia, because of the town's flat topography and lack of drainage infrastructure. Several homes here have been impacted by flooding, as has the town's utility infrastructure. Flooding in 2019 had a significant impact here, with several homes reporting various amounts of damage. However, the RiskFactor analysis found only a minor amount of residential flood risk in the community.

Wagner: This community is definitely vulnerable to flooding. As shown in **Table 3.8**, a considerable amount of property is at risk. The most vulnerable area is the south side of town, where several houses are in the flood zone. In 2014, the city completed a project using HMGP funding to install larger culverts under Front Avenue, which has helped reduce flooding in the area. Flooding in 2019 had a significant impact on the community, including widespread road damage and basement flooding.

- **Drought**

Charles Mix County's vulnerability to drought can be considered high and is certain to continue for the foreseeable future. The impact is primarily on the agricultural sector, where serious losses have occurred. The South Dakota Hazard Mitigation Plan assigned a vulnerability rating of High for Charles Mix County in terms of drought's impact to crops between 2000 and 2014. Residential and commercial impacts of drought are minor; even during the severe drought of 2012 there were no water use restrictions anywhere in the county.

- **Wildfire**

The overall vulnerability to wildfire in Charles Mix County can be considered low, although it may be somewhat higher in the wooded draws along the Missouri River. No truly destructive wildfire has ever occurred in the county, and only about 6% of the county's population lives in a location considered to be vulnerable to wildfire, well below the statewide figure of 26%.

Figure 3.1 – Dante

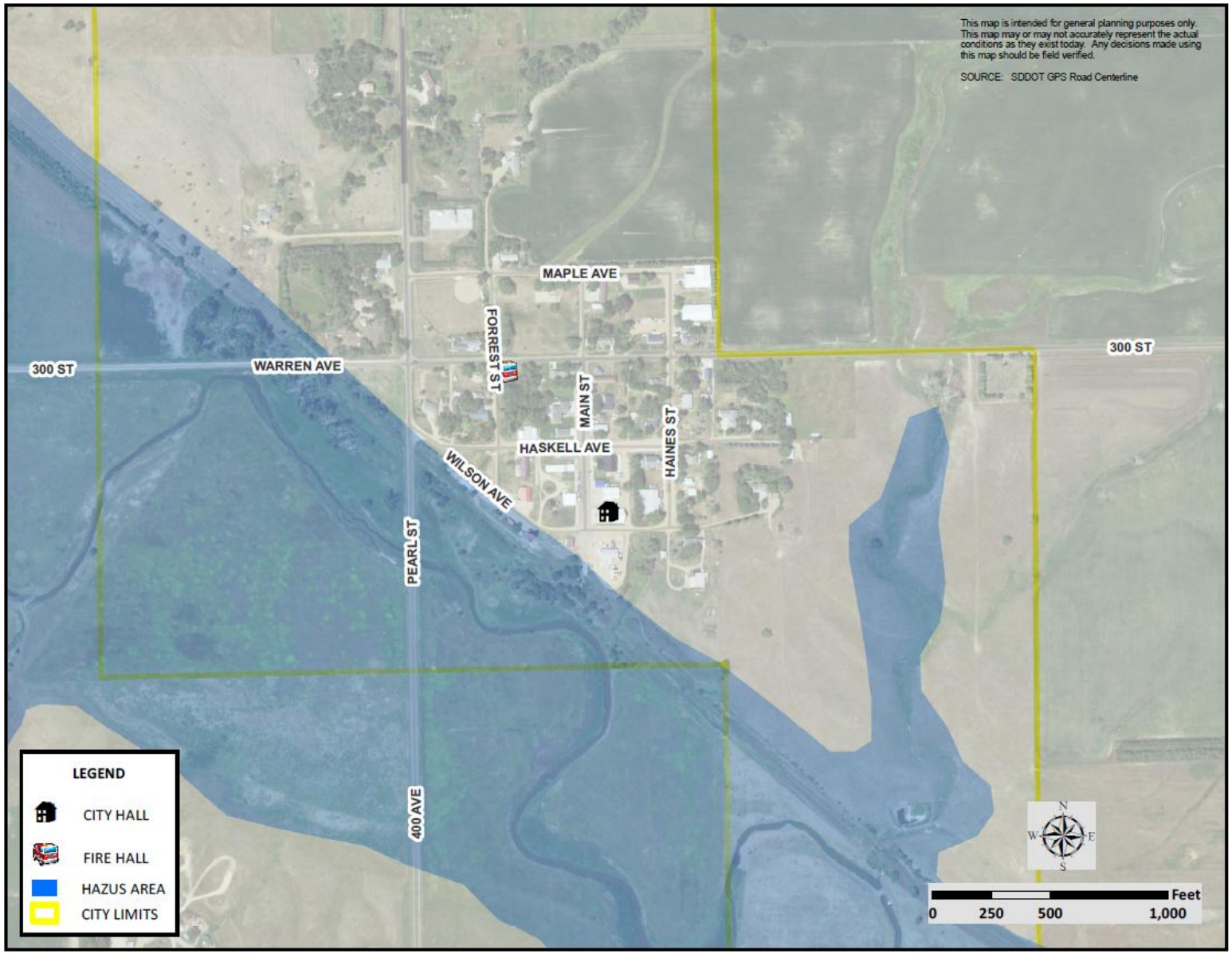


Figure 3.2 – Geddes

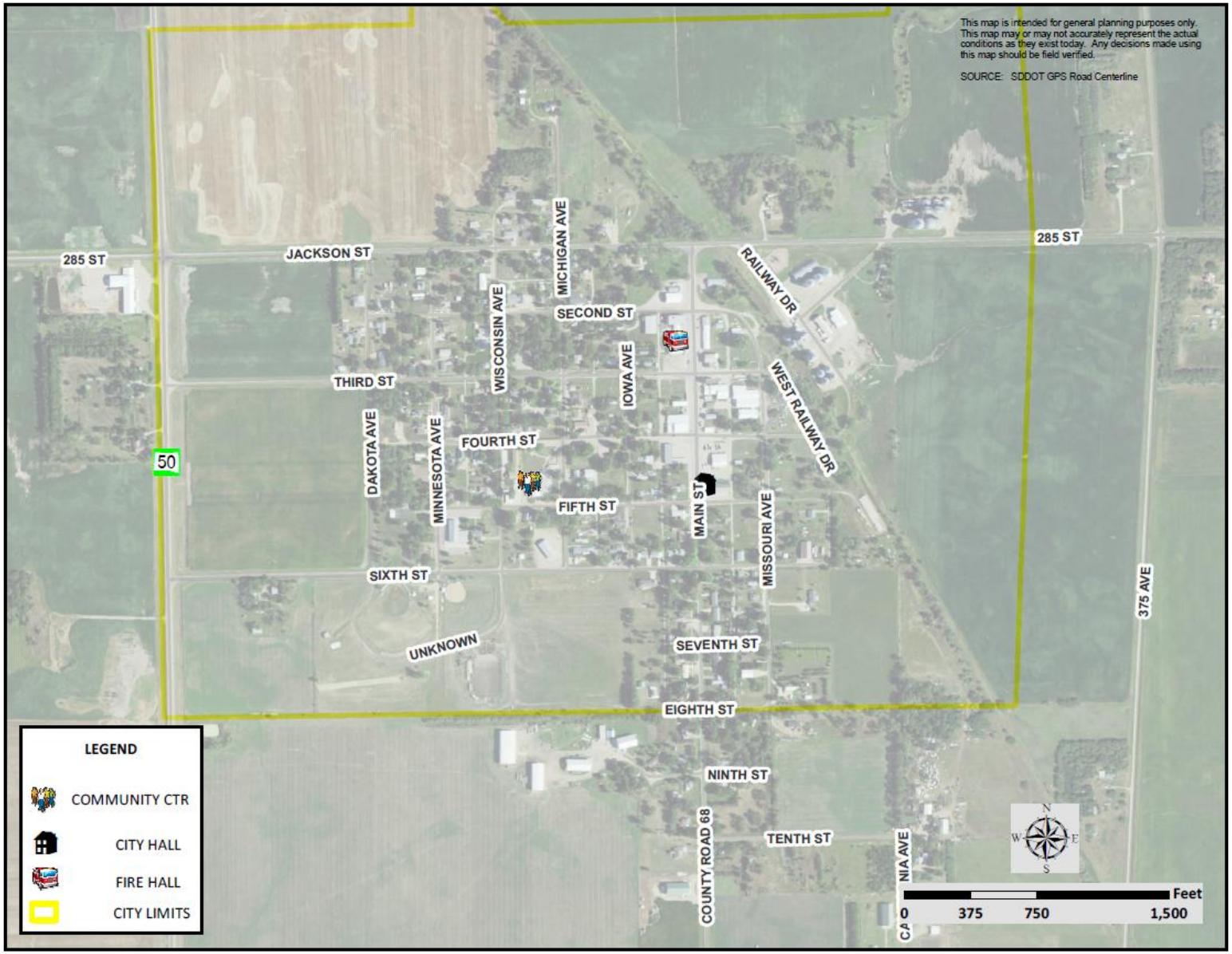


Figure 3.3 – Lake Andes

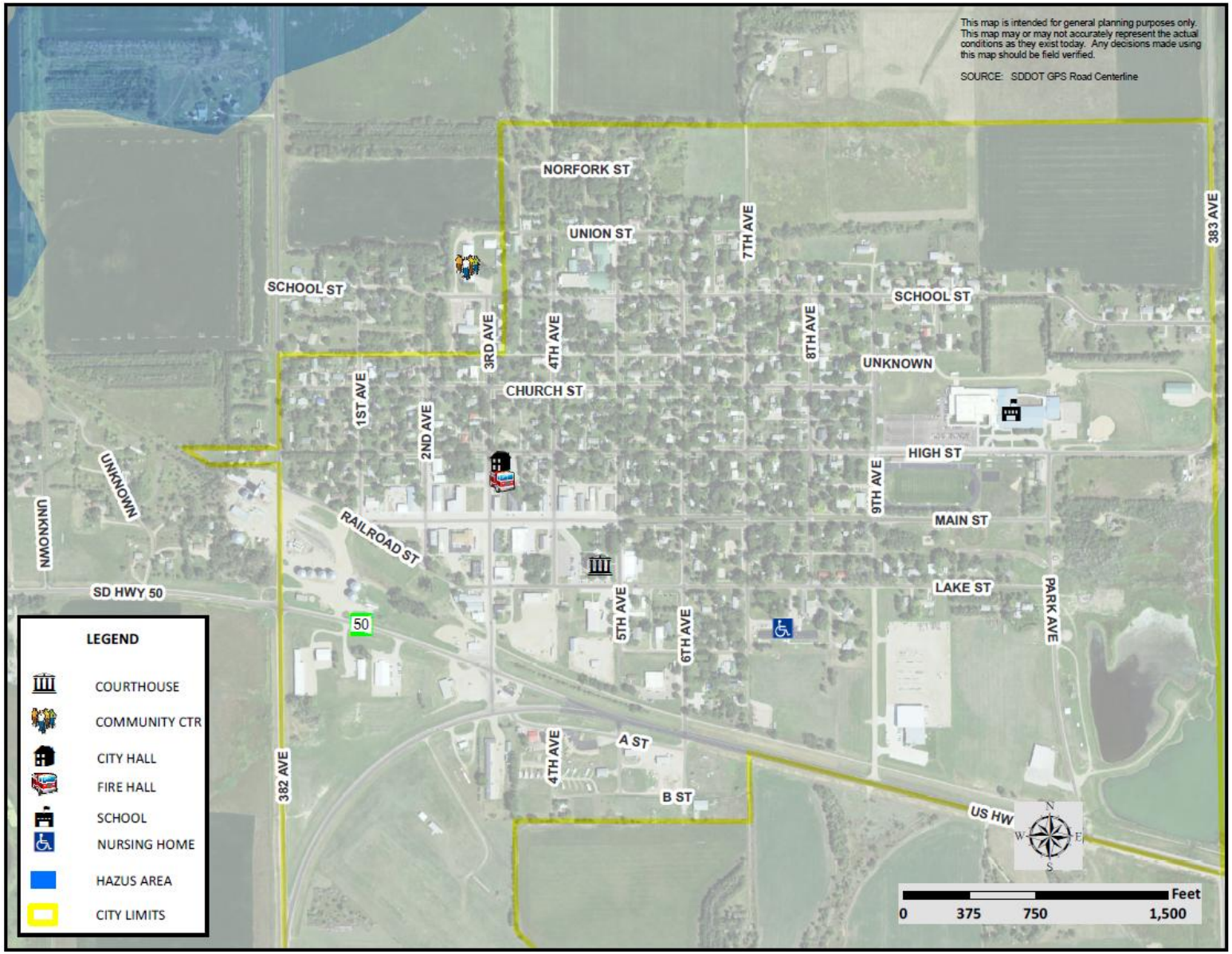


Figure 3.4 – Pickstown

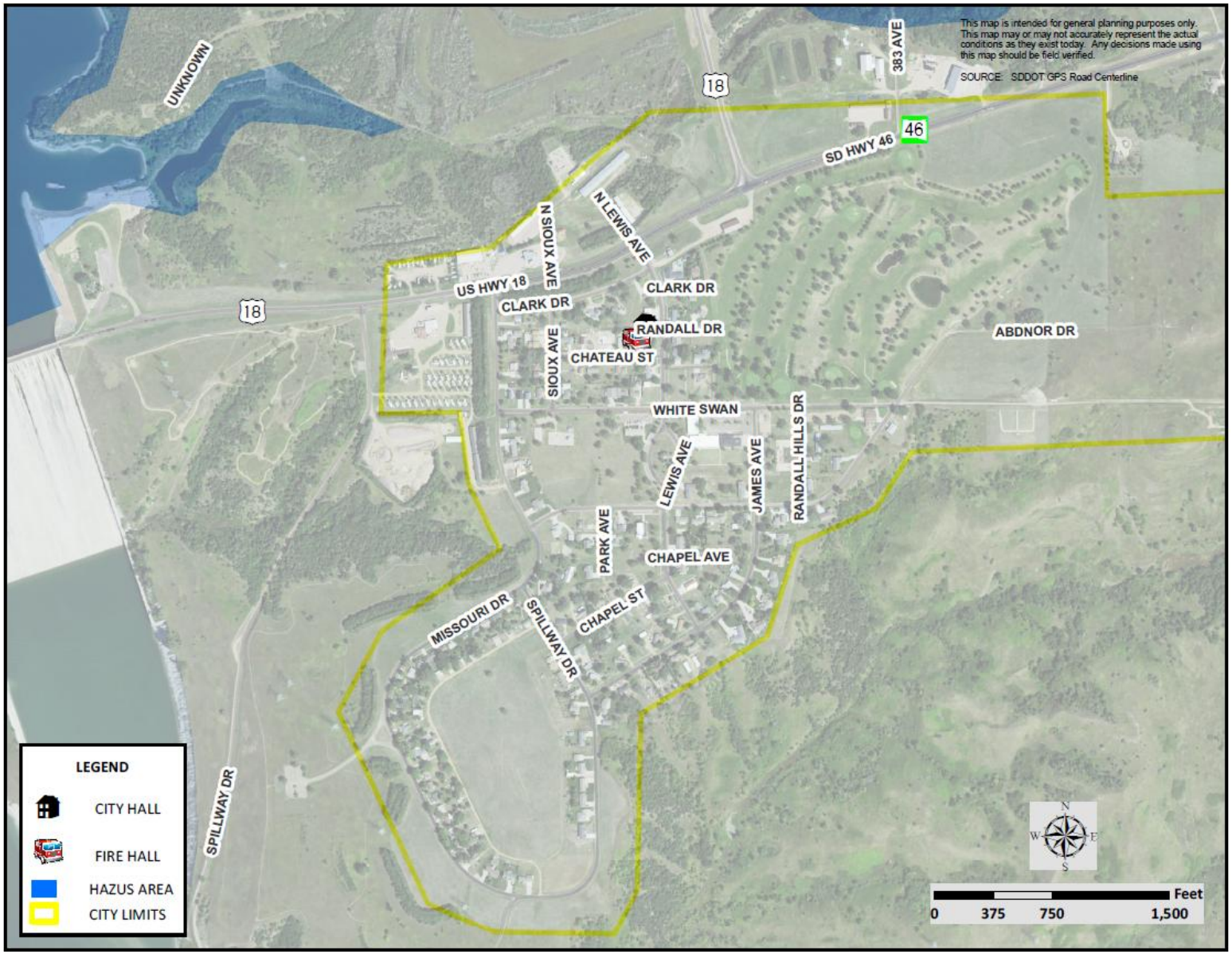


Figure 3.5 – Platte

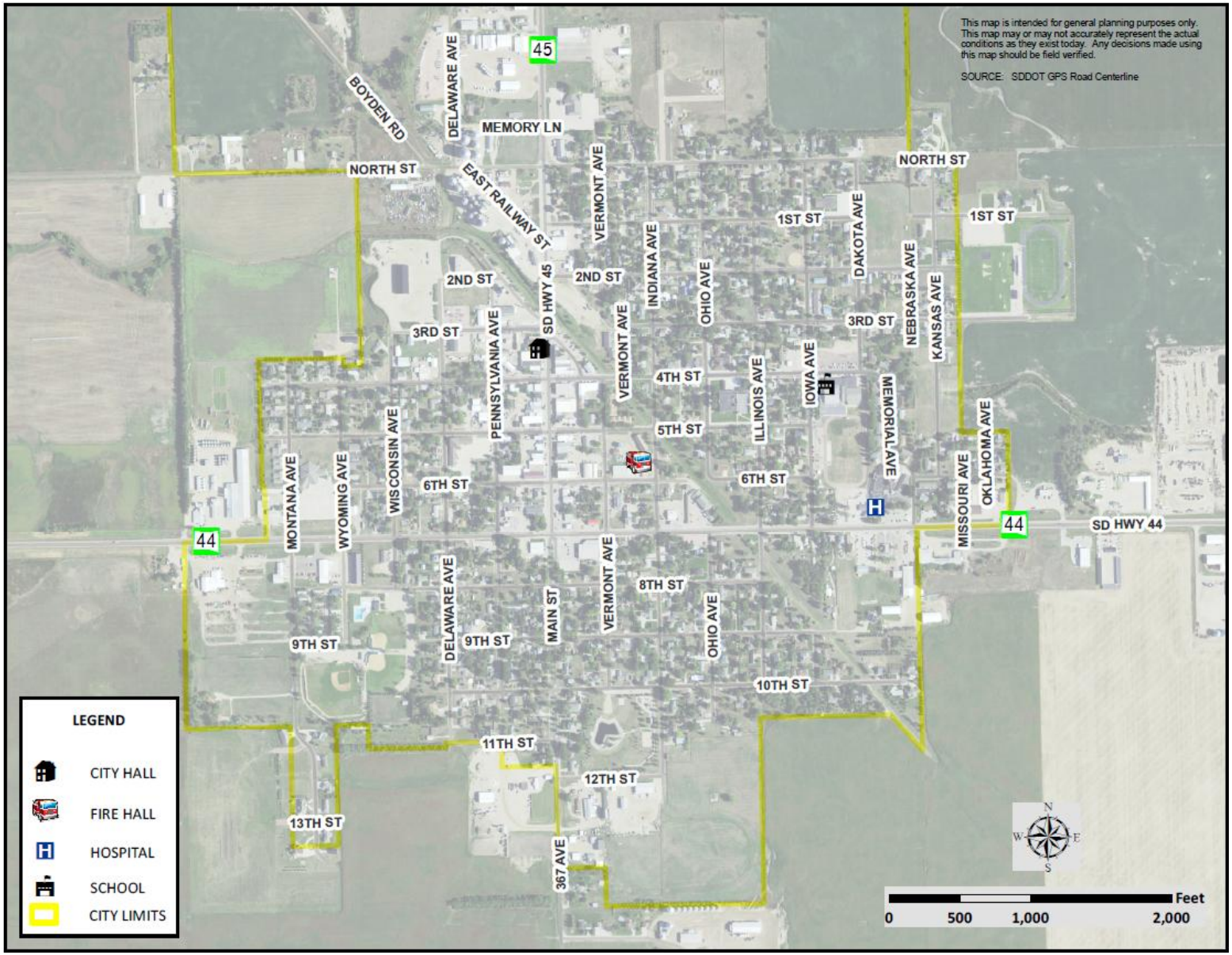


Figure 3.6 – Ravinia

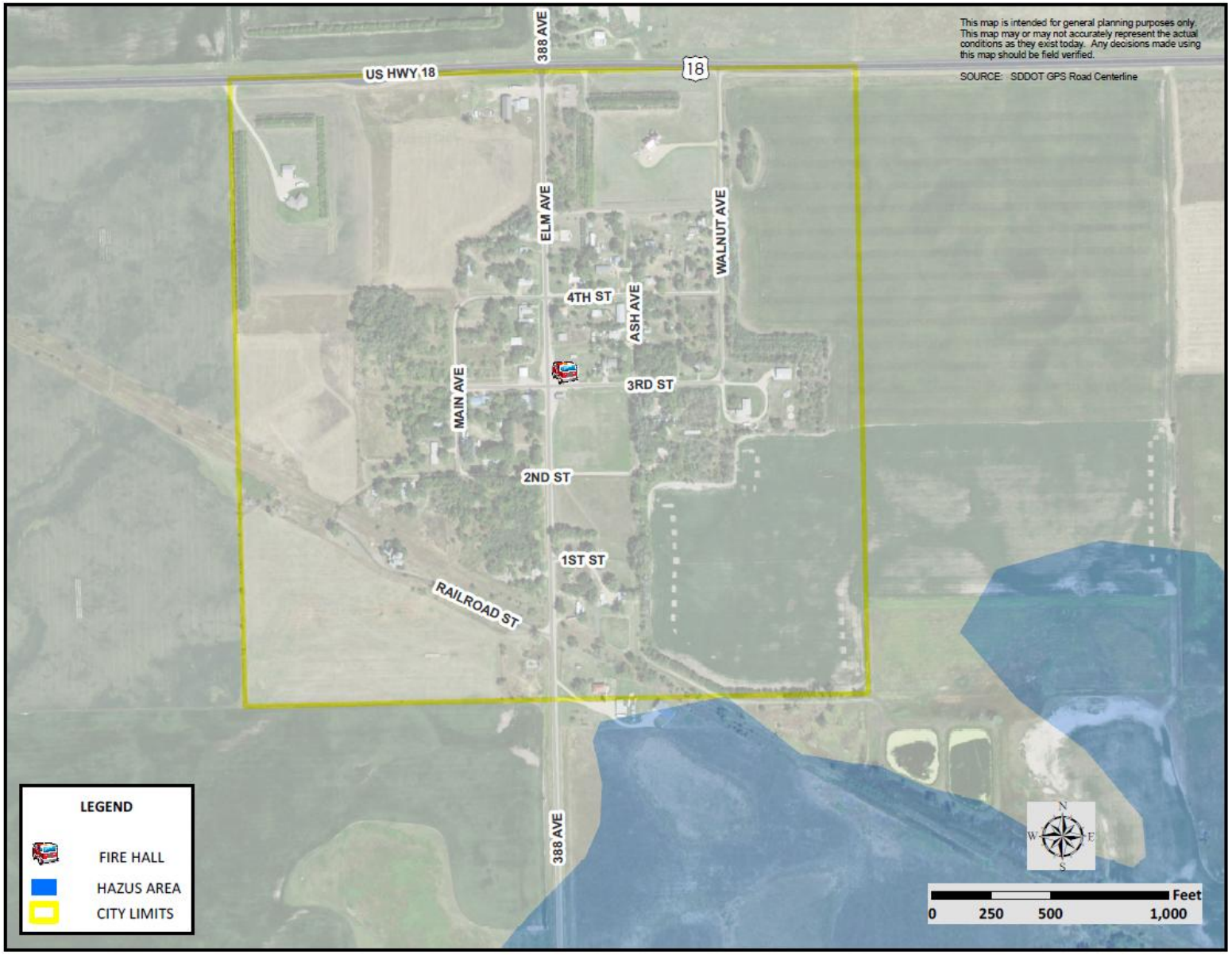
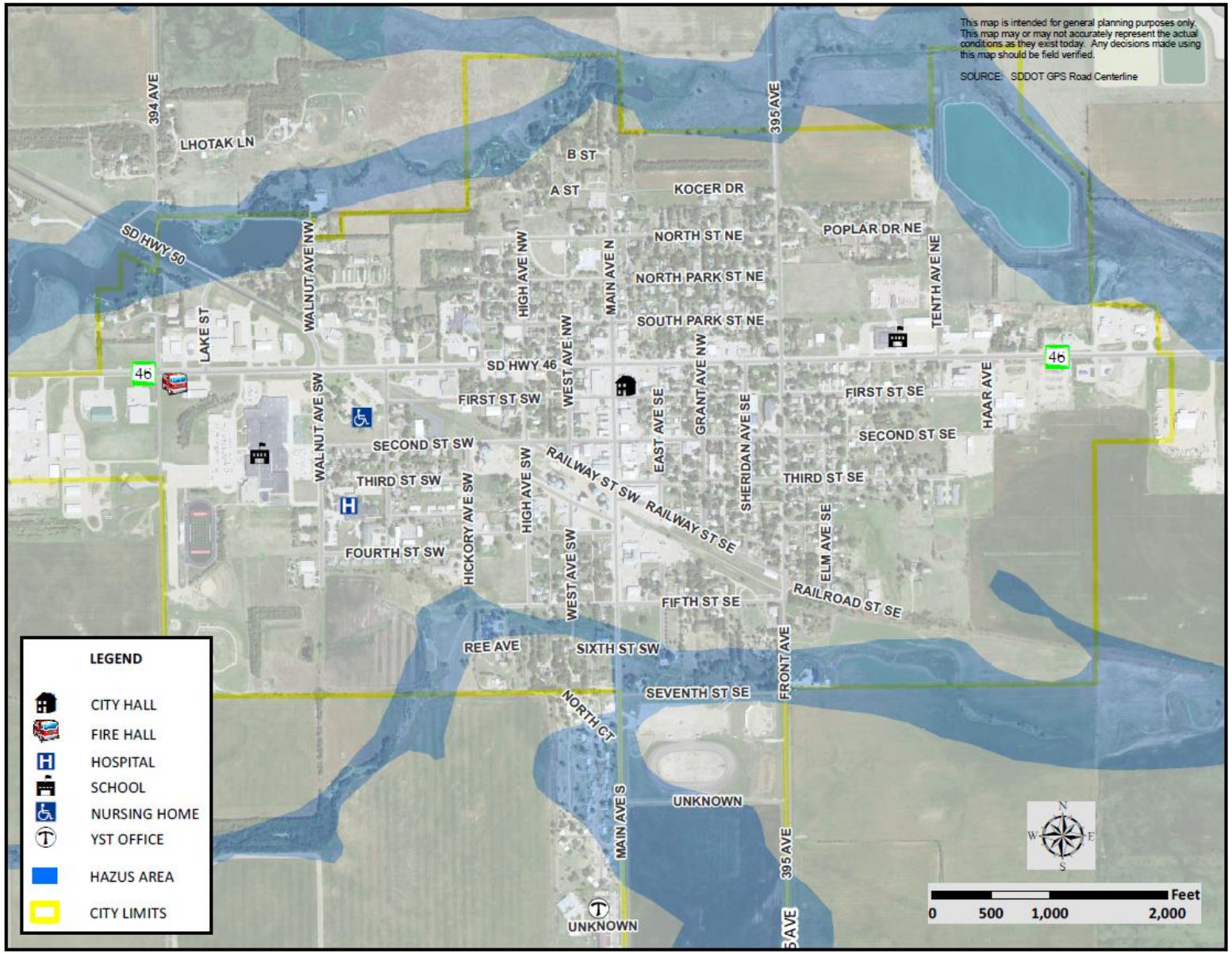


Figure 3.7 – Wagner



2026 Charles Mix County (SD)
Hazard Mitigation Plan



CHAPTER IV

Risk Mitigation Strategy

PLANNING & DEVELOPMENT DISTRICT III

CHAPTER IV
RISK MITIGATION STRATEGY

Background

The previous chapter described the types of hazards most likely to impact Charles Mix County and discussed the county's vulnerability to each of the hazards. This chapter describes the local resources and capabilities available to support hazard mitigation, 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. **Table 4.5** at the end of the chapter provides information about each of the proposed actions.

Community Capabilities

Resources are available at the local level to support mitigation activities and efforts in Charles Mix County. For the purposes of this plan, these resources are divided into regulatory mechanisms and other capabilities.

Regulatory Mechanisms

Regulatory mechanisms and authorities to mitigate the various hazards that impact Charles Mix County are limited. For instance, none of the jurisdictions except Platte and Wagner have adopted a building code ordinance. By South Dakota state law, any local unit of government that has not adopted building codes is required to follow the most recent edition of the International Building Code, but there is no local enforcement mechanism in any of the jurisdictions except Platte and Wagner. The following table summarizes the formal regulatory policies within Charles Mix County that can support the local mitigation strategy.

Table 4.1 – Regulatory Mechanisms

Item	Notes
Charles Mix County Zoning Ordinance	The ordinance, which is based on the County's comprehensive Plan, controls where growth and development can occur within the county.
Charles Mix County Flood Ordinance	Regulates development within flood hazard areas (see **Table 4.2**).
Charles Mix County Burn Ban Ordinance	Burn bans automatically go into effect following NOAA alerts.
Dante Zoning Ordinance	The ordinance, which is based on the Town's comprehensive plan, controls where growth and development can occur in the community.
Dante Flood Ordinance	Regulates development within flood hazard areas (see **Table 4.2**).
Lake Andes Zoning Ordinance	The ordinance, which is based on the City's comprehensive plan, controls where growth and development can occur in the community.
Lake Andes Flood Ordinance	Regulates development within flood hazard areas (see **Table 4.2**).

Pickstown Zoning Ordinance	The ordinance, which is based on the Town's comprehensive plan, controls where growth and development can occur in the community.
Pickstown Flood Ordinance	Regulates development within flood hazard areas (see **Table 4.2**).
Platte Zoning Ordinance	The ordinance, which is based on the City's comprehensive plan, controls where growth and development can occur in the community.
Platte Flood Ordinance	Regulates development within flood hazard areas (see **Table 4.2**).
Platte Building Code	The City enforces the current version of the Uniform Building Code as published by the International Conference of Zoning Administrators. The code regulates how new residential and commercial buildings are built.
Wagner Zoning Ordinance	The ordinance, which is based on the City's comprehensive plan, controls where growth and development can occur in the community.
Wagner Flood Ordinance	Regulates development within flood hazard areas (see **Table 4.2**).
Wagner Building Code	The City enforces the current version of the Uniform Building Code as published by the International Conference of Zoning Administrators. The code regulates how new residential and commercial buildings are built.

Regulatory authority also exists within Charles Mix County to mitigate the impact of other hazards. For example, during times of severe drought, each community can enact regulations limiting residential and commercial water usage. None of the communities have ever enacted such regulations due to drought conditions, although requests have been made for residents to temporarily limit water use for other reasons.

As shown in the following table, most of the jurisdictions participate in the National Flood Insurance Program (NFIP) and many have been mapped. Lake Andes and Platte do not have a Flood Insurance Rate Map and therefore do not promote and enforce NFIP requirements since there is nothing to enforce or regulate. Furthermore, since there are no Special Flood Hazard Areas for these jurisdictions, they have no areas to regulate for substantial damage and improvement provisions. Training and information on NFIP for some of the jurisdictions has not been passed down over the years as positions have turned over, which has resulted in a situation where current staff have little knowledge about the NFIP program. To address this issue, each jurisdiction has committed to improving its knowledge of and capacity to implement the NFIP program.

Table 4.2 – National Flood Insurance Program Participation

Jurisdiction	Current Effective Map Date	Reg-Emer Date	Appointed Designee	Floodplain Regulation Enforcement	Substantial Improvements Provisions
Charles Mix Co.	6/02/2004	07/01/1998	Auditor	Requires floodplain development permit and floodproofing certificate.	Residential construction and substantial improvements in areas of special flood hazard must have lowest floor elevated to base flood elevation. Non-residential buildings have the option of being built so that below BFE the structure is watertight.

Dante	6/02/2004	01/30/2013	Town Board President	Requires floodplain development permit and floodproofing certificate.	Residential construction and substantial improvements in areas of special flood hazard must have lowest floor elevated to one foot above base flood elevation. Non-residential buildings have the option of being built so that below BFE the structure is watertight.
Geddes	*(The community does not participate in the NFIP program)*				
Lake Andes	(NSFHA)	12/09/1985	Finance Officer	There are no floodplain regulations to administer	Not applicable
Pickstown	6/02/2004	03/27/2012	Finance Officer	Requires floodplain development permit and floodproofing certificate.	Residential construction and substantial improvements in areas of special flood hazard must have lowest floor elevated to one foot above base flood elevation. Non-residential buildings have the option of being built so that below BFE the structure is watertight.
Platte	(NSFHA)	06/08/1998	Finance Officer	There are no floodplain regulations to administer	Not applicable
Ravinia	*(The community does not participate in the NFIP program)*				
Wagner	6/02/2004	03/12/2009	Planning and Zoning Board	All development permits are reviewed to determine if development might adversely affect the flood carrying capacity of the special flood hazard area.	All construction and substantial improvements must have lowest floor elevated to base flood elevation or be built so that below BFE the structure is watertight.

There are three active National Flood Insurance Program policies in Charles Mix County:

- Charles Mix County: 1 policy providing $62,000 of coverage
- Wagner: 1 policy providing $126,000 of coverage
- Yankton Sioux Tribe: 1 policy providing $350,000 of coverage

A total of 11 losses have been recorded with $504,260 in claims. Two repetitive loss properties are located within the county, a residential property in Platte and a commercial property on the Yankton Sioux Reservation. No severe repetitive losses have ever been recorded in the county.

Other Capabilities

Other resources and capabilities exist within Charles Mix County to support the mitigation strategy. This includes administrative and technical resources, financial resources, and

education and outreach efforts, as well as physical assets, which are summarized in the table on the following page and discussed in further detail below.

Table 4.3 – Other Local Capabilities to Support Hazard Mitigation

	Charles Mix Co.	Dante	Geddes	Lake Andes	Pickstown	Platte	Ravinia	Wagner
ADMINISTRATIVE & TECHNICAL								
Emergency management	X							
Land use planning		X			X	X		X
Public works			X	X	X	X		X
Municipal electric system					X			
Floodplain management		X		X	X	X		X
Wildfire management	X							
Building code enforcement						X		X
FINANCIAL								
Budgeting process	X	X	X	X	X	X	X	X
Levy/Project surcharge for specific purposes				X	X	X		X
EDUCATION AND OUTREACH								
Severe Weather Awareness Week	X							
Social media				X		X		X
PHYSICAL ASSETS								
Relief shelter		X	X	X	X	X		X
Storm shelter				X				
Warning siren	X	X	X	X	X	X	X	X

Administrative and technical expertise to support hazard mitigation efforts in the county is limited. For instance, the Charles Mix County emergency management position is less than full-time and there are no other support staff. However, the current emergency manager has taken a more proactive approach toward hazard mitigation than previous individuals in the position. He has been working with the South Central Prescribed Burn Association to promote prescribed fire as a rangeland management tool, which helps to control the spread of eastern red cedar trees, and has encouraged landowners with pastureland to join the association.

The availability of financial resources is critical to the success of this plan. Since there are no specific local funding sources available to support hazard mitigation in Charles Mix County, the budgeting process is where the "rubber meets the road" if hazard mitigation is to be achieved. Therefore, the mitigation actions listed in **Table 4.5** should be considered when the jurisdictions begin developing 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. To help ensure this happens, the Emergency Management Director will continue reaching out to each

community at least annually to discuss hazard mitigation, including the possibility of obtaining funds through FEMA or other sources for the projects they have identified.

Education and outreach to support hazard mitigation in Charles Mix County is limited, but efforts are being made. The Charles Mix County Emergency Management office participates in severe weather public awareness campaigns in conjunction with the State Office of Emergency Management and the National Weather Service and communicates regularly with local officials regarding severe weather awareness and training opportunities. Hazard mitigation information is also available on the Charles Mix County Emergency Management Facebook page.

There are many physical assets in Charles Mix County that can help protect people prior to, during, or after a disaster event or other emergency situation. Outdoor sirens to warn people of impending severe weather are located in each community. Public facilities that can serve as emergency shelter from a tornado or other severe weather include the basement of the Charles Mix County Courthouse in Lake Andes. Facilities that can provide short-term relief following a disaster include:

- Dante Community Center
- Geddes Community Center
- Lake Andes Community Center
- Andes Central School (Lake Andes)
- Pickstown Community Center
- Platte Public School
- Platte Health Center
- Wagner Fire Department
- Wagner Good Samaritan Center
- Wagner National Guard Armory

The ability of Charles Mix County and the other jurisdictions to enhance their mitigation capabilities is limited. For instance, none of the jurisdictions have the financial resources to hire specialized staff such as engineers to develop hydrology studies or do precise elevation measurements or grant writers to develop applications for hazard mitigation funds. However, through their membership in Planning & Development District III, each of these jurisdictions has become more familiar with hazard mitigation concepts, and their continued participation as this plan is updated in future years will allow them to further develop their knowledge and capabilities. District III staff, which have decades of experience working on various planning and community development activities within Charles Mix County, wrote the county's current hazard mitigation plan and helped develop applications to fund several hazard mitigation projects within the county.

Mitigation Goals and Objectives

For this plan update, there are no significant changes in Charles Mix County's hazard mitigation strategy. The community priorities have not changed, and the planning team

decided to keep all the goals and objectives from the current mitigation plan. This decision was based in part on the results of the survey, but even more so on the fact that there has been no significant development anywhere in the county since the current plan was adopted and no changes in community vulnerability [9]. The following goals were identified:

- Minimize loss of life and injuries from hazards.
- Minimize damage to existing and future structures within hazard prone 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 turned their focus to each of the hazards facing the County. Following are the specific mitigation objectives identified 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, crop, and infrastructure losses due to wildfires.

Mitigation Action Plan

With the mitigation capabilities, goals, and objectives identified, the planning team began the process of selecting mitigation actions to accomplish the mitigation strategy. This followed up and built upon the earlier review of the progress being made to implement the actions

[9] The lack of development is shown by the fact that a total of only 209 building permits were issued throughout Charles Mix County between 2010 and 2022, an average of about 16 per year.

listed in the county's current hazard mitigation plan. A list of the actions and a summary of the implementation status of each action is shown in the following table.

Table 4.4 – Progress on Implementing Previously Proposed Actions

Mitigation Action	Hazard	Current Status
CHARLES MIX COUNTY		
Update NFIP floodplain mapping after 2019 floods.	Flooding	No progress – lack of funds.
Comprehensive watershed study of the county.	Flooding	Completed in 2023 with FEMA hazard mitigation funding.
Replace bridge on 301 St at Bon Homme County Line in Lone Tree Township.	Flooding	Project is no longer a priority.
Improve county/township roads to mitigate against damage from flooding.	Flooding	Some progress has been made, but more work is needed.
Replace bridge on 396th Ave in Carrol Township.	Flooding	Project is no longer a priority.
Water drainage project south of Platte between City and 277th St near county shop.	Flooding	No progress – lack of funds.
Lake Andes Lake Drainage – discharge.	Flooding	Action has been completed.
Acquire generator for County admin building/EOC.	Winter storm	No progress – lack of funds.
Clean out Choteau Creek from Wagner to Dante.	Flooding	No progress – lack of funds.
Formalize mutual aid agreements between fire departments.	Wildfire	Action has been completed.
Partner with 211 Helpline Center.	*(Multiple)*	Action is in progress.
Improve Repeat Tower Rd on 379th Ave	*(Multiple)*	Action has been completed.
TOWN OF GEDDES		
Implement drainage improvements.	Flooding	Action has been completed.
Acquire generator for community center.	Winter storm	Completed in 2026 with FEMA hazard mitigation funding.
Acquire additional warning siren.	Summer storm	No progress – lack of funds.
CITY OF LAKE ANDES		
Raise the East Sewage Lift Station.	Flooding	No progress – lack of funds.
Replace warning siren on east side of town.	Summer storm	No progress – lack of funds.
Install generator on North Sewage Lift Station	Winter storm	No progress – lack of funds.
Upgrade the storm water drainage system.	Flooding	No progress – lack of funds.
TOWN OF PICKSTOWN		
Upgrade warning siren.	Summer storm	Action has been completed.
Install generator in Pickstown Community Center.	Winter storm	No progress – lack of funds.
Bury overhead power lines from substation.	Winter storm	Action is in progress.

Mitigation Action	Hazard	Current Status
Drainage study for area west of Missouri Drive.	Flooding	Action has been completed.
CITY OF PLATTE		
Hydrology study for east and south sides of town.	Flooding	Action has been completed.
Acquire backup generators for city hall.	Winter storm	No progress – lack of funds.
Acquire backup generators for pumphouse.	Winter storm	Action has been completed.
Storm sewer system improvements, including drainage ditch through town.	Flooding	Improvements have been made to the ditch, but additional work on the rest of the system is needed.
Upgrade city's warning siren system.	Summer storm	No progress – lack of funds.
CITY OF WAGNER		
Acquire generator for city hall/police department.	Winter storm	No progress – lack of funds.
Clean out creek on south side of town.	Flooding	Action has been completed.
Relocate east side siren farther north; acquire new siren to serve south side of community.	Summer storm	Action is in progress.

The participants were encouraged to consider a broad range of mitigation actions, including measures designed to avoid, avert, or adapt to the hazards they face. To guide the jurisdictions in this process, a list of potential mitigation actions based on FEMA guidance was distributed to the team and they were reminded that they should focus on hazard mitigation as opposed to preparedness. The actions discussed and considered can be grouped into the following general categories:

- Plans and regulations: Government authorities, policies, or codes 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.

- Structure and Infrastructure Projects: Modifying existing infrastructure to remove it from a hazard area or construction of new structures to reduce impacts of hazards. Examples include:
  - Upgrading stormwater infrastructure, such as culverts and storm sewer piping.
  - Replacing overhead utility lines with underground lines.
  - Building tornado safe rooms.

- Natural Systems Protection: Actions that minimize damage and losses and also preserve or restore the functions of natural systems. Examples include:

- Using low-lying areas as natural water retention ponds.
- Restoring and preserving wetlands and stream corridors.
- Forest and vegetation management.
- Providing incentives for xeriscaping.

- Education and Awareness Programs: Programs to educate the public and decision makers about hazard risks and community mitigation programs. Examples include:
  - Developing a hazard 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 conserve water during droughts.

The final list of mitigation actions identified by the jurisdictions is shown in **Table 4.5**. The table contains the following information for each action:

- The local priority rating.
- The project lead primarily responsible for implementing the action.
- The estimated time frame needed to accomplish the action. Short-term actions can be completed within two years, Mid-term actions from two to five years, and Long-term actions will take more than five years to implement.
- The estimated cost to implement the action.
- Resources that may be available to help fund the action.
- Notes and details about the proposed action.

Prioritizing the actions is important because not all of them can be pursued simultaneously, especially when costly projects are considered. Actions providing the most 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 based on the following criteria helped guide the process:

- 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?

Of these criteria, financial considerations are especially important, because neither Charles Mix 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:

FEMA grant programs

- Hazard Mitigation Grant Program (HMGP)
- Flood Mitigation Assistance (FMA)
- Public Assistance Section 406 funds

Other grant and loan programs/sources

- US Economic Development Administration
- US Department of Agriculture Rural Development grant/loan program
- US Bureau of Reclamation WaterSMART program
- South Dakota Community Development Block Grant program
- South Dakota State Homeland Security Program
- South Dakota Dept. of Agriculture and Natural Resources
- South Dakota Dept. of Transportation
- Natural Resource Conservation Service
- Western States Wildland Urban Interface Grant Program

Table 4.5 - Proposed Mitigation Actions

CHARLES MIX COUNTY ACTIONS	HAZARD	PRIORITY	PROJECT LEAD	TIME	COST	FUNDING	NOTES
Continue participation in the National Flood Insurance Program.	Flooding	High	Auditor	Ongoing	Minimal	Staff time	The auditor will contact the state floodplain coordinator to learn more about the NFIP program and participate in future training sessions.
Improve county/township roads to mitigate against flood damage.	Flooding	High	Highway Dept	Ongoing	≈$500,000	SDDOT; Highway fund	Work is needed in various locations.
Implement water drainage projects in the vicinity of Platte.	Flooding	High	County Drainage Board & Platte City Council	Long	Unknown	County Highway fund; Platte general fund; DANR	Areas south and east of the city are a priority for drainage improvement work. City and County staff will coordinate their efforts to plan the project and pursue funding.
Acquire generator for County admin building / EOC.	Winter storm	High	Emergency Mgmt Director	Mid	$50,000	FEMA; General fund	The facility is the center of Charles Mix County's emergency response activities and power must be available at all times. The County intends to pursue grant funding.
Bury powerlines.	Winter storm	High	Charles Mix Electric Association; Emergency Mgmt Director	Ongoing	≈$1 mil to $2 mil	FEMA; Charles Mix Electric Association	The Charles Mix Electric Association may work with Charles Mix County to apply for mitigation funds as they become available and would be the lead in the development of any application for mitigation funds.
Develop a prescribed burning plan with landowners.	Wildfire	High	Emergency Mgmt Director	Mid	≈$25,000	WUIGP; General fund	This is to reduce the spread of cedar trees, which are spreading rapidly and increasing wildfire risk. The County will work with the towns in this effort.
Clean out Choteau Creek from Wagner to Dante to improve flow.	Flooding	Medium	County Drainage Board		≈$1 mil	SCWDD; General fund	The County may pursue grant funding to work on certain sections of the creek.
Participate in the Storm Ready Program.	Summer storm	Medium	Emergency Mgmt Director	Short	Minimal	Staff time	The Emergency Management Director will look into the program and would work with the towns to implement it.
Participate in the Firewise Program.	Wildfire	Medium	Emergency Mgmt Director	Short	Minimal	Staff time	The Emergency Management Director will look into the program and would work with the towns to implement it.
Conduct outreach to educate people about water conservation.	Drought	Medium	Emergency Mgmt Director	Short	Minimal	Staff time	The Emergency Management Director will work with the towns on public outreach, including school groups.
Educate farmers on soil and water conservation practices.	Drought	Medium	Emergency Mgmt Director	Short	Minimal	Staff time	The Emergency Management Director will work with the county extension office on outreach to local farmers.

DANTE ACTIONS	HAZARD	PRIORITY	PROJECT LEAD	TIME	COST	FUNDING	NOTES
Continue participation in the National Flood Insurance Program.	Flooding	High	Mayor	Ongoing	Minimal	Staff time	The mayor will contact the state floodplain coordinator to learn more about the NFIP program and participate in future training sessions.
Implement flood mitigation project near the fire hall.	Flooding	High	Town board	Mid	$40,000	FEMA; SCWDD; General fund	The Town obtained a quote for the project in April 2026 and intends to pursue grant funding.
Acquire generator for the Dante Community Center.	Winter storm	High	Town board	Mid	≈$35,000	FEMA; General fund	The facility is Dante's designated relief shelter and power must be available at all times. The Town intends to pursue grant funding.
Participate in the Storm Ready Program.	Summer storm	Medium	Town board	Short	Minimal	Staff time	The Town would work with the County emergency manager to implement the program.
Conduct outreach to educate people about water conservation.	Drought	Medium	Town board	Short	Minimal	Staff time	The Town will work with the County emergency manager on outreach to the public, including school groups.
Participate in the Firewise Program.	Wildfire	Medium	Fire dept chief	Short	Minimal	Staff time	The Town would work with the County emergency manager to implement this program.
GEDDES ACTIONS	**HAZARD**	**PRIORITY**	**PROJECT LEAD**	**TIME**	**COST**	**FUNDING**	**NOTES**
Consider participation in the National Flood Insurance Program.	Flooding	High	Finance officer	Short	Minimal	Staff time	The finance officer will contact the state floodplain coordinator to learn more about the NFIP program.
Acquire additional warning siren.	Summer storm	High	Public works dept	Mid	$30,000	FEMA; General fund	The City may pursue grant funding.
Acquire a larger generator for the fire hall.	Winter storm	Medium	Public works dept	Mid	$50,000	FEMA; General fund	The facility is the center of Geddes' emergency response activities and can also serve as a relief shelter. Power must be available at all times. The City may pursue grant funding to acquire a larger generator since the current generator is undersized.
Participate in the Storm Ready Program.	Summer storm	Medium	City council	Short	Minimal	Staff time	The City would work with the County emergency manager to implement the program.
Conduct outreach to educate people about water conservation.	Drought	Medium	City council	Short	Minimal	Staff time	The City will work with the County emergency manager on outreach to the public, including school groups.

Participate in the Firewise Program.	Wildfire	Medium	Fire dept chief	Short	Minimal	Staff time	The City would work with the County emergency manager to implement this program.
LAKE ANDES ACTIONS	**HAZARD**	**PRIORITY**	**PROJECT LEAD**	**TIME**	**COST**	**FUNDING**	**NOTES**
Continue participation in the National Flood Insurance Program.	Flooding	High	Finance officer	Ongoing	Minimal	Staff time	The finance officer will contact the state floodplain coordinator to learn more about the NFIP program and participate in future training sessions.
Upgrade the storm water drainage system.	Flooding	High	Public works dept	Long	Unknown	CDBG; DANR; General fund	The City intends to pursue grant funding.
Replace warning siren on east side of town.	Summer storm	High	Public works dept	Mid	$25,000	FEMA; General fund	The City intends to pursue grant funding.
Acquire generator for North Sewage Lift Station.	Winter storm	High	Public works dept	Mid	$40,000	FEMA; General fund	This lift station is a critical component of the City's sewage system. If power is unavailable, raw sewage will begin backing up into homes. The City intends to pursue grant funding.
Raise the East Sewage Lift Station.	Flooding	Medium	Public works dept	Mid	$50,000	FEMA; DANR; General fund	The City may pursue grant funding.
Participate in the Storm Ready Program.	Summer storm	Medium	City council	Short	Minimal	Staff time	The City would work with the County emergency manager to implement the program.
Conduct outreach to educate people about water conservation.	Drought	Medium	City council	Short	Minimal	Staff time	The City will work with the County emergency manager on outreach to the public, including school groups.
Participate in the Firewise Program.	Wildfire	Medium	Fire dept chief	Short	Minimal	Staff time	The City would work with the County emergency manager to implement this program.
PICKSTOWN ACTIONS	**HAZARD**	**PRIORITY**	**PROJECT LEAD**	**TIME**	**COST**	**FUNDING**	**NOTES**
Continue participation in the National Flood Insurance Program.	Flooding	High	Finance officer	Ongoing	Minimal	Staff time	The finance officer will contact the state floodplain coordinator to learn more about the NFIP program and participate in future training sessions.
Acquire generator for the Pickstown Community Center.	Winter storm	High	Public works dept	Mid	$35,000	FEMA; General fund	The facility is Pickstown's designated relief shelter and power must be available at all times. The Town intends to pursue grant funding.
Bury overhead power lines leading from substation into town.	Winter storm	High	Public works dept	Mid	≈$500,000	FEMA; Electric fund	The Town will work with its electrical consulting firm and may pursue grant funding.

Reestablish the Pickstown fire district.	Wildfire	High	Town board	Short	Minimal	Staff time	The Town is considering reestablishing a fire district to provide coverage to local residents. Currently Pickstown coops with the Lake Andes Fire Dept.
Participate in the Storm Ready Program.	Summer storm	Medium	Town board	Short	Minimal	Staff time	The Town would work with the County emergency manager to implement the program.
Conduct outreach to educate people about water conservation.	Drought	Medium	Town board	Short	Minimal	Staff time	The Town will work with the County emergency manager on outreach to the public, including school groups.
Participate in the Firewise Program.	Wildfire	Medium	Fire dept chief	Short	Minimal	Staff time	The Town would work with the County emergency manager to implement this program.
PLATTE ACTIONS	**HAZARD**	**PRIORITY**	**PROJECT LEAD**	**TIME**	**COST**	**FUNDING**	**NOTES**
Continue participation in the National Flood Insurance Program.	Flooding	High	Finance officer	Ongoing	Minimal	Staff time	The finance officer will contact the state floodplain coordinator to learn more about the NFIP program and participate in future training sessions.
Acquire generator for the city hall.	Winter storm	High	Finance officer	Mid	$35,000	FEMA; General fund	The City intends to pursue grant funding.
Acquire generators for water system infrastructure.	Winter storm	High	Public works dept	Mid	$50,000 (each)	FEMA; General fund	The generators will ensure that Platte's water system can continue to operate during extended power outages. The City intends to pursue grant funding.
Implement storm sewer system improvements.	Flooding	High	Public works dept	Long	≈$1 mil	DANR; FEMA; General fund	The City intends to pursue grant funding for the work left to do.
Upgrade the city's warning siren system.	Summer storm	Medium	Fire dept chief	Mid	$50,000	FEMA; General fund	The City may pursue grant funding.
Participate in the Storm Ready Program.	Summer storm	Medium	City council	Short	Minimal	Staff time	The City would work with the County emergency manager to implement the program.
Conduct outreach to educate people about water conservation.	Drought	Medium	City council	Short	Minimal	Staff time	The City will work with the County emergency manager on outreach to the public, including school groups.
Participate in the Firewise Program.	Wildfire	Medium	Fire dept chief	Short	Minimal	Staff time	The City would work with the Charles Mix County emergency manager to implement this program.
WAGNER ACTIONS	**HAZARD**	**PRIORITY**	**PROJECT LEAD**	**TIME**	**COST**	**FUNDING**	**NOTES**
Continue participation in the National Flood Insurance Program.	Flooding	High	Zoning administrator	Ongoing	Minimal	Staff time	The zoning administrator will contact the state floodplain coordinator to learn more about the NFIP program and participate in future training sessions.

Acquire generator for city hall/ police department.	Winter storm	High	Finance officer	Short	$50,000	FEMA; General fund	The facility is a key center for Wagner's emergency response activities and power must be available at all times. The City intends to pursue grant funding.
Construct tornado safe room in McCormick Park.	Summer storm	High	Finance officer	Short	$1,400,000	FEMA; General fund	The City has submitted an application for funding.
Relocate east side siren farther north and acquire a new siren to serve south side of community.	Summer storm	Medium	Public works dept	Mid	$30,000	FEMA; General fund	The City may pursue grant funding.
Participate in the Storm Ready Program.	Summer storm	Medium	City council	Short	Minimal	Staff time	The City would work with the County emergency manager to implement the program.
Conduct outreach to educate people about water conservation.	Drought	Medium	City council	Short	Minimal	Staff time	The City will work with the County emergency manager on outreach to the public, including school groups.
Participate in the Firewise Program.	Wildfire	Medium	Fire dept chief	Short	Minimal	Staff time	The City would work with the County emergency manager to implement this program.

Potential Resources for Funding Assistance:

DANR South Dakota Dept of Agriculture and Natural Resources
FEMA FEMA Hazard Mitigation Assistance (BRIC or HMGP)
SCWDD South Central Water Development District
SDDOT South Dakota Dept of Transportation
WUIGP Wildland Urban Interface Grant Program

2026 Charles Mix County (SD)
Hazard Mitigation Plan



CHAPTER V

Plan Maintenance

PLANNING & DEVELOPMENT DISTRICT III

CHAPTER V
PLAN MAINTENANCE

Background

Plan maintenance is a continuous process that requires long-term commitment and focused effort. The process involves evaluating the plan's effectiveness at achieving its goals, updating the plan as needed to keep it current, and making sure it is integrated into other local planning mechanisms. These activities provide the foundation for an ongoing mitigation program and will ensure that the plan remains relevant and effective. This chapter addresses how Charles Mix County officials intend to implement the plan so that it remains a dynamic, useful tool for mitigating against the impacts of future hazard events.

Public Participation

The plan can be accessed on the Charles Mix County, Platte, and Wagner websites, and a copy is also available for review at the Charles Mix County courthouse and in the finance office of each participating jurisdiction. Going forward, Charles Mix County and each of the jurisdictions will continue their efforts to make the public more informed about the plan. Outreach efforts will likely evolve over time as different methods are used to get greater public participation in the mitigation planning process. Activities may include any of the following:

- Meetings of the Charles Mix County Local Emergency Planning Committee.
- Press releases and social media posts.
- Surveys to get feedback from the public about mitigation priorities.
- Community visits by the Charles Mix County Emergency Management Director to discuss mitigation planning (local schools, civic meetings, etc.).

Any comments and suggestions received from the public through any of the forums described above will be included in the public outreach section of the plan.

Monitoring, Evaluating, and Updating the Plan

The Charles Mix County Emergency Management Director is ultimately responsible for implementing this plan. The director will work under the direction of the Charles Mix County Commission and with the support of the Charles Mix County Local Emergency Planning Committee (LEPC) to ensure that the plan's mitigation strategy is carried out, coordinating his/her activities with other county departments or the other participating jurisdictions as needed. The jurisdictions will also 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.

An important part of implementing the plan is plan monitoring and evaluation, which will be performed by the Charles Mix County Emergency Management Director with the support of the LEPC. The plan will be evaluated at least annually by the LEPC, and it may also be reviewed at other times as the need arises, such as following a significant hazard event or as federal funding for hazard mitigation becomes available.

All major elements of the plan – the planning process, the risk assessment, and the mitigation strategy - will be evaluated. Following are the specific criteria that will be used to measure whether the plan is achieving its goals:

Planning Process

- Could anything from the initial planning process be done more efficiently?
- Has the public become more aware of the plan? How can public participation improve?
- Have there been any public outreach activities to promote awareness of the plan?

Risk Assessment

- Have any recent disaster events impacted any of the jurisdictions?
- Should any hazards be added or removed from the plan?
- Have there been any changes in the nature or magnitude of risks?
- Has any new development occurred that might impact risk?
- Are new data sources for any of the hazards available?
- Do any new critical facilities or infrastructure need to be added to the community asset list?

Mitigation Strategy

- Is the mitigation strategy being carried out as expected? How many of the proposed mitigation actions have been completed or are in progress?
- Have there been any changes in mitigation priorities in any of the jurisdictions?
- Are there any new mitigation actions to consider? Should existing actions be revised or removed from the plan?
- Have parts of the plan been integrated into other planning mechanisms?
- Have any jurisdictions adopted new policies, plans, or regulations that could support the plan?
- Has NFIP participation changed in the participating jurisdictions?
- Is progress being made in education and outreach? How many outreach events have taken place?

Future updates to this plan may occur at any time in response to a change in any of the criteria identified above. However, barring a significant change in any of these factors, Charles Mix

County will begin the process of updating this plan approximately two years prior to the plan's expiration date. Led by the Emergency Management Director, the process will consist of the following general steps:

- Apply for funding assistance to update the plan
- Funding assistance obtained
- Hire contractor to write the plan
- Organize planning team
- Begin soliciting public participation and input
- Hold meetings of planning team 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

Plan Integration

The Charles Mix County Hazard Mitigation Plan is the backbone for hazard mitigation planning within the county, but to remain useful the plan cannot exist in a vacuum. It is designed to work with the planning mechanisms and development regulations that exist within the county, and local officials and policy makers should therefore be familiar with this plan. Neither this plan nor any of the others will work effectively if they contain contrary goals or policy recommendations. Following is a description of the process by which integration will occur into the local planning mechanisms [10].

- Charles Mix County Comprehensive Plan and Zoning Ordinance – the Planning & Development District III office developed the comprehensive plan and zoning ordinance working with the Charles Mix County planning commission. The County and District III will integrate relevant information acquired through the development of this plan into the environmental constraints section of the comprehensive plan when it is next updated. The zoning ordinance will also be modified if needed. For example, if this plan identifies certain areas as unsuitable for development due to environmental hazards, this should be reflected in the zoning ordinance.
- Charles Mix County Highway Plan – the highway plan is developed by the Charles Mix County Highway Superintendent. It includes a table of significant county road projects scheduled to occur for the next five years. The South Dakota Dept of Transportation requires that the highway plan be updated annually and approved by the county commission. The highway superintendent will be able to utilize information learned during the development of this plan to identify and plan for road projects that may be

[10] Nothing is shown for Geddes or Ravinia because they have no planning mechanisms or policies.

eligible for FEMA funding, such as those that involve drainage improvements to mitigate flooding.

- Charles Mix County Comprehensive Fire Management Plan – this plan, which was developed in 2005 with the assistance of the SD Dept of Agriculture, is focused primarily on response, but has sections on fire prevention and preparedness. The plan will be modified if needed. For example, if this plan identifies certain areas as unsuitable for development due to wildfire risk, this should be reflected in the fire management plan.
- Dante Comprehensive Plan and Zoning Ordinance – the Planning & Development District III office developed the comprehensive plan and zoning ordinance working with the town planning board. The Town and District III will integrate relevant information acquired through the development of this plan into the environmental constraints section of the comprehensive plan when it is next updated. The zoning ordinance will also be modified if needed. For example, if this plan identifies certain areas as unsuitable for development due to environmental hazards, this should be reflected in the zoning ordinance.
- Lake Andes Comprehensive Plan and Zoning Ordinance – the Planning & Development District III office developed the comprehensive plan and zoning ordinance working with the city planning board. The City and District III will integrate relevant information acquired through the development of this plan into the environmental constraints section of the comprehensive plan when it is next updated. The zoning ordinance will also be modified if needed. For example, if this plan identifies certain areas as unsuitable for development due to environmental hazards, this should be reflected in the zoning ordinance.
- Pickstown Comprehensive Plan and Zoning Ordinance – the Planning & Development District III office developed the comprehensive plan and zoning ordinance working with the town planning board. The Town and District III will integrate relevant information acquired through the development of this plan into the environmental constraints section of the comprehensive plan when it is next updated. The zoning ordinance will also be modified if needed. For example, if this plan identifies certain areas as unsuitable for development due to environmental hazards, this should be reflected in the zoning ordinance.
- Platte Comprehensive Plan and Zoning Ordinance – the Planning & Development District III office developed the comprehensive plan and zoning ordinance working with the city planning board. The City and District III will integrate relevant information acquired through the development of this plan into the environmental constraints section of the comprehensive plan when it is next updated. The zoning ordinance will also be modified if needed. For example, if this plan identifies certain areas as unsuitable for development due to environmental hazards, this should be reflected in the zoning ordinance.
- Wagner Comprehensive Plan and Zoning Ordinance – the Planning & Development District III office developed the comprehensive plan and zoning ordinance working with the city planning board. The City and District III will integrate relevant

information acquired through the development of this plan into the environmental constraints section of the comprehensive plan when it is next updated. The zoning ordinance will also be modified if needed. For example, if this plan identifies certain areas as unsuitable for development due to environmental hazards, this should be reflected in the zoning ordinance.

Perhaps the best example to date of the county's current mitigation plan being incorporated into other planning mechanisms occurred during the 2024 update of the Comprehensive Economic Development Strategy (CEDS) for the Planning & Development District III region, which includes Charles Mix County. In particular, the risk analysis and mitigation strategy of the plan were reviewed as the CEDS was being updated.

Each jurisdiction will use this plan to help them as they prepare their annual budget each year. The process will be essentially the same in each jurisdiction, beginning with a review of the plan at the outset of the budgeting process, which typically begins in the summer. Each jurisdiction will especially note their list of proposed mitigation actions in **Table 4.5**. Those that are interested in seeking funds for a specific project listed in the table will be able to utilize knowledge gained during the development of this plan, including FEMA grant deadlines and the grant eligibility of specific types of mitigation projects, as they develop their budgets.

To expand on these efforts, each community should continue to participate in future updates to this plan. This will continue to expose them to the basic concepts of hazard mitigation, which may be the only practical way for some of the jurisdictions to expand their capabilities. An important part in this process will be played by the Charles Mix County Emergency Management Director, who will continue to reach out to each community at least annually to review their hazard mitigation needs and priorities.

2026 Charles Mix County (SD)
Hazard Mitigation Plan



APPENDICES

- Appendix A: Outreach Effort
- Appendix B: Documentation of Meetings
- Appendix C: History of Previous Hazard Occurrences
- Appendix D: References

PLANNING & DEVELOPMENT DISTRICT III

APPENDIX A: Outreach Effort

A major effort was made to solicit input into this plan. Outreach included a press release that was printed in the local newspapers, information posted online, and surveys that were made available to the public.

Posting on Avon *Clarion*/Lake Andes *Wave*/Wagner *Post* Prior to Meeting 1:

Pechous Publications, LLC

AVON CLARION | LAKE ANDES WAVE | WAGNER POST | ANNOUNCER

Home News Sports Opinion Lifestyle Obituaries Classifieds Public Notices

Prev article
CATHOLIC DAUGHTERS TO HOST SOUP LUNCHEON

Next article
Yesterdays

HOME / PUBLIC INVITED TO ATTEND HAZARD MITIGATION MEETING



PUBLIC INVITED TO ATTEND HAZARD MITIGATION MEETING

Posted in: COMMUNITY LIFESTYLE

Blizzards, tornadoes, and floods are a few of the natural ...





Survey Poster

PUBLIC PARTICIPATION NEEDED!

CHARLES MIX COUNTY



HAZARD MITIGATION PLAN PUBLIC SURVEY

The Charles Mix County Office of Emergency Management is in the process of updating the County's Hazard Mitigation Plan. Hazard mitigation planning helps local leaders better understand risks from natural hazards, promoting the development of long-term strategies to reduce the effects of disaster-related events and their negative impact on people, property, and environment. Charles Mix County is seeking feedback from stakeholders and the public to incorporate into the plan.

WHAT IS A HAZARD MITIGATION PLAN & WHY IS IT IMPORTANT?

The hazard mitigation plan represents Charles Mix County's commitment to reduce risks from natural hazards, such as flooding, severe summer and winter weather, drought, and wildfires. The plan serves as a guide for local decision makers as they commit resources to reducing the effects of natural hazards, and it creates a framework for Charles Mix County to reduce negative impacts from future disasters on lives, property, and the local economy.

TAKE THE SURVEY

www.districtiii.org

PUBLIC PARTICIPATION IN HAZARD MITIGATION PLANNING

Public participation in the Charles Mix County Hazard Mitigation Plan is an opportunity for county residents to evaluate a variety of potential hazards affecting the county and it is important to the overall success of the plan. Once approved, the plan will make Charles Mix County and the participating municipalities eligible to apply for FEMA hazard mitigation funding.

PHONE: (605) 491-3134
EMAIL: MKOTAB@CHARLESMIXCOUNTY.GOV

Survey Form with Responses

CHARLES MIX COUNTY HAZARD MITIGATION SURVEY (*RESPONSES IN RED TYPE*)

The Charles Mix County Office of Emergency Management is in the process of updating the County's Hazard Mitigation Plan. Hazard mitigation planning helps local leaders better understand risks from natural hazards and promotes the development of long-term strategies to reduce the effects of disaster-related events. Charles Mix County is seeking feedback from stakeholders and the public to incorporate into the plan. We would greatly appreciate it if you would complete the survey. Participation is voluntary and anonymous.

GENERAL HOUSEHOLD INFORMATION

First, we would appreciate any information you are willing to share with us about your household. This information will remain confidential and is for survey use only.

1. What county do you live in? **CHARLES MIX COUNTY (ALL)**

2. What town do you live in? **DANTE: 2; GEDDES: 9; LAKE ANDES: 5; PLATTE: 4; WAGNER: 1**

3. How long have you lived in South Dakota?

   Less than 1 year: **0**
   1-5 years: **0**
   6-10 years: **0**
   More than 10 years: **21**

4. Before receiving this survey, were you aware of the county's hazard mitigation plan?

Yes: 12 **No: 9**

5. During the past 5 years, in the county you currently reside in, have you or someone in your household directly experienced a natural disaster? This could be a flood, severe windstorm, wildfire, or other type of natural disaster. **Yes: 9** **No: 12**

6. How concerned are you about the following natural disasters affecting your county? (Check the corresponding box for each hazard)

Natural Disaster	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	Not Concerned	Weighted Results
Drought	8	11	2	0	0	27
Extreme Heat	3	8	6	3	1	9
Flood	8	3	7	1	2	14
Hail	6	9	5	1	0	20
Tornado	6	9	4	2	0	19
Wildfire	1	12	3	3	2	7
Winsdstorm	2	13	3	1	2	12
Winter storm/Blizzard	5	10	4	1	1	17

7. Which of the following community assets do you see as being vulnerable in your community? (*You may check more than one*)

Human (Loss of life and/or injuries) **10**
Economic (Business closures and/or job losses) **11**
Infrastructure (Damage or loss of bridges, utilities, schools, etc.) **12**
Environmental (Damage or loss of forests, rangeland, waterways, etc.) **1**
Government (Ability to maintain order and/or provide public amenities and services) **6**

8. Please check the box that best matches your opinion of the following strategies to reduce risk and loss associated with natural disasters.

Community- wide Strategies	Strongly Agree	Agree	Neutral/ Not Sure	Disagree	Strongly Disagree	Weighted Results
I support implementing government rules and regulations to reduce risk	1	9	8	3	0	8
I support policies to prohibit development in areas subject to natural hazards	2	8	8	3	0	9
I support enhancing the function of natural systems (e.g., streams, wetlands)	1	16	4	0	0	18
I support the use of tax dollars to compensate landowners for not developing in areas subject to natural hazards	0	4	10	7	0	-3
I support the use of tax dollars to reduce risks and losses from natural disasters	1	12	8	0	0	14
I support the disclosure of natural hazard risks during real estate transactions	1	11	8	1	0	12

9. How important are each of these priorities to you in planning for natural hazards?

Statements	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important	Weighted Results
Protecting private property	7	6	2	0	0	20
Protecting critical facilities (e.g., transportation networks, hospitals, fire stations)	16	4	1	0	0	36
Protecting utilities and infrastructure	14	6	1	0	0	34
Protecting historic and cultural landmarks	4	10	2	0	0	18
Strengthening emergency services (fire, police, etc.)	16	4	1	0	0	36

APPENDIX B: Documentation of Meetings

This appendix includes the following items:

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

SIGNUP SHEET – FIRST PLANNING TEAM MEETING:

Charles Mix County Hazard Mitigation Planning Meeting

March 12, 2026

NAME	REPRESENTING
Joni Cowman	District #1
Seel Kotab	Emergency Management
Randy Thaler	Sheriff - Co
John Clay	District III
Donna Paulson	City of Geddes
Shannon Viereck	District III
Jason Gant	Charles Mix Co
Colin Sontup	Charles Mix Co
Shauna Muderink	City of Platte
Charlotte Desicker	City of Lake Andes
Marcia Bierman	Town of Pickstown
Aaron Gregor	USACE - Pickstown / Fort Randall
Kelsey Knutson	USACE - Pickstown / Fort Randall
Nick Stotz	Charles Mix County
Mark Fortuna	Town of Pickstown
Debbie Hausmer	Wagner
Keeley Lynn	City of Wagner
Ray [illegible]	Charles Mix

SIGNUP SHEET – SECOND PLANNING TEAM MEETING:

Charles Mix County Hazard Mitigation Planning Meeting

April 14, 2026

NAME	REPRESENTING
John Clem	Planning District III
Shannon Viereck	District III
Charlotte Desiata	City of Lake Andes
Marcia Bierman	Town of Pickstown
Shawna Mayerink	City of Platte
Chris Sorge	
JASON GANT	Charles Mix Co
Joel Kotab	Charles Mix Co
Rick Fogarty	Charles Mix
Denise Wilbert	Director of Equalization
NICK STOTZ	CHARLES MIX CO.
Steve Cotton	CMC

SIGNUP SHEET – FINAL PLANNING TEAM MEETING:

Charles Mix County Hazard Mitigation Planning Meeting

July 9, 2026

NAME	REPRESENTING
John Clem	Planning District III
NICK SPOTZ	CHAS MIX COUNTY
JASON GRANT	Charles Mix
CHANOTTE PESICKA	City of Lake Andes
Marcia Bierman	Town of Pickstown
Joel Kostal	Chas Mix EM
Doug Cimpl	Chas Mix Highway
Colin Soukup	Commissioner
Ray Todd	Commissioner
Bill Olson	Forbes Township
Shawna Meyerink	City of Platte
Donna Paulson	City of Geddes
Jolene Stewart	Self
ASHLEY MARCUS	PLATTE DEVELOPMENT CORP
Jeff Stewart	Self

CHARLES MIX COUNTY MINUTES (EXCERPTS)



Charles Mix County Commission

Colin Soukup, Chairman
Kory Standy, Vice Chairman
Nick Stotz, Commissioner

400 East Main Street • PO Box 70 • Lake Andes, SD 57356
Phone: (605) 487-6000 • Fax: (605) 487-7221
www.charlesmixcounty.gov

CHARLES MIX COUNTY
Board of Commissioners
Regular Session – May 14, 2026

The Charles Mix County Board of Commissioners met in Regular Session at the County Courthouse on Thursday, May 14, 2026, in the Commission Room. Chairman Colin Soukup opened the meeting with the Pledge of Allegiance and called the meeting to order at 10:00 am with Vice Chairman Kory Standy, Commissioner Nick Stotz, State's Attorney Steve Cotton, and Auditor Jason Gant present.

Agenda:

A motion by Stotz and second by Standy to approve the agenda. All in favor, motion carried.

Emergency Management:

Emergency Management Director Joel Kotab reviewed fire preparedness plans, conference update, and hazard mitigation project selection.

A motion by Stotz and second by Standy to approve the following Hazard Mitigation Project Selections:

- Continue participation in the National Flood Insurance Program.
- Improve county/township roads to mitigate against flood damage.
- Implement water drainage projects in the vicinity of Platte
- Generator acquisition for County admin building / EOC.
- Develop a prescribed burning plan with landowners.
- Participate in the Storm Ready Program.
- Clean out Choteau Creek from Wagner to Dante to improve flow.
- Participate in the Firewise Program.
- Conduct outreach to educate people about water conservation.
- Educate farmers on soil and water conservation practices.

All in favor, motion carried.

Next Meetings:

The next Board of Commissioners meetings are at 10:00 am on Thursday, May 28th at the Courthouse and at 10:00 am on Thursday, June 4th at the Courthouse.

Adjourn:

A motion by Stotz and second by Standy to adjourn at 12:05 pm until the next Regular Session Thursday, May 28th, at 10:00 am at the Courthouse. All in favor, motion carried.

Colin Soukup, Chairman

Jason Gant, Auditor

DANTE MINUTES

Dante May Minutes

May 4, 2026

Regular City Council meeting of Dante was held this May 4, 2026, in the City Hall at 8:00 pm. Rysavy, Beeson & Koupal were present. Rysavy called the meeting to order. Minutes from the previous meeting were read and by motion of Beeson, seconded by Koupal, approved. Financial Officer gave the financial report and by motion of Koupal, seconded by Beeson was approved. The following bills were read and by motion of Beeson, seconded by Koupal, ordered paid:

#9664 $576.05 Northwestern-Lights

#9665 11.76 Dante Ag & Tire LLC-Diesel

#9666 20.48 Pechous Publications LLC-Legal Ads

Warrants for Auditorium auto debits: Randall Water-$42.00, Powers San.-$40.00, Northwestern-$618.53, Doll Distr.-$256.65, Jerome Beverage-$437.20, IRS-Tax-$10.00, Check issued to FNBO-$ $825.95-Supplies, Ethan Knoll-$138.52, $138.52-Police Work, CHS-$228.20-Propane (Garage), Dick Rysavy-$332.46-May Cleanings.

Finance Officer presented the annual audit report for 2025. Beeson made a motion, seconded by Koupal, to approve the report. Motion carried. The report will be published in the Wagner Post and also sent to the Dept. of Legislative Audit.

Koupal made a motion, seconded by Beeson to accept the Hazard Mitigation Projects Selection. Projects were accepted and everyone voted in favor. Motion carried.

Discussion was held on the unfinished drainage project. All board members agreed that a culvert should be placed where the old one was removed earlier. Rysavy has been contacting WBS to have the work completed soon.

There being no further business before the Board, Beeson motioned to adjourn, seconded by Koupal. Motion carried. Meeting adjourned.

Finance Officer

Ann Rysavy

GEDDES MINUTES

Geddes City Council Meeting
Monday, May 11, 2026

The monthly meeting of the Geddes City Council was held at the City Finance Office in Geddes, SD. The meeting was called to order by Mayor, Mike Krietlow, at 7:30 p.m. with the following council members present: Carol Oberbroekling, Monica Vander Pol, Andy Kok, Sue Schulte, Travis Gant and Amy Rolland. Also present was Amanda Vasek and Donna Paulson, Finance Officer.

Established change to the agenda was chip sealing.

Public input = Amanda Vasek met before the council to reserve the city park for Arts in the Park on July 10, 11 and 12 and August 7, 8 and 9.

Andy Kok made a motion to approve the April, 2026 minutes. Monica Vander Pol seconded the motion. Motion carried unanimously.

April, 2026 financial reports were presented. A motion was made by Sue Schulte and seconded by Carol Oberbroekling to approve these reports. Motion carried unanimously.

May, 2026 disbursements were presented. Monica Vander Pol made a motion to approve the May, 2026 disbursements and Travis Gant seconded the motion. Motion carried unanimously. Bills as followed were paid: (*deleted*)

Old Business:

Donna informed the council that Eric Prunty, Brosz Engineering, called and asked if Geddes was ready for Astec to come in and chip seal. One block of the 35 blocks will need to be repaired.

Discussion was held on the RASDAK bike event coming through Geddes on June 5, 2026. Signs will be made and the bikers will be informed to stop at the city park for water, snacks and restrooms.

New Business:

Two sealed bids were received on the hay land. Jordan Pavel for $500.81 and Seth Stluka for $751.00. Carol Oberbroekling made a motion to approve the hay bid of Seth Stluka. Sue Schulte seconded the motion. Motion carried unanimously.

The renewal application for the 2026-2027 Alcoholic Beverage License was received from Platte Creek Brewery. Travis Gant made a motion to approve the renewal application. Amy Rolland seconded the motion. Motion carried unanimously.

John Clem, Planning and Development District III, emailed a list of mitigation projects that we had discussed for the Charles Mix County hazard mitigation plan. Carol Oberbroekling made a motion to approve the list, including participating in the storm ready program. Andy Kok seconded the motion. Motion carried unanimously.

Follow up reports from the code enforcement specialist were received and presented to the council. Sue Schulte made a motion to send 5 individuals a letter. Amy Rolland seconded the motion. Motion carried unanimously.

Andy Kok made a motion to adjourn the meeting at 8:17 p.m. Amy Rolland seconded the motion. Motion carried unanimously.

_____ _____

Mike Krietlow, Mayor Donna Paulson, Finance Officer

"This institution is an equal opportunity provider."

LAKE ANDES MINUTES (EXCERPTS)

Regular Meeting of the Lake Andes City Council, Monday, May 4, 2026 at 6:00 pm at the City Hall

The governing board of the City of Lake Andes met Monday, Mary 4, 2026 at 6:00 pm at City Hall. Present were Mayor Ryan Frederick; Councilman: Kevin Wells, Ricky Bergin, Patrick Pesicka, Kevin Tschumper, Connor Florey, and Steven Nielsen. Others present were City Finance Officer Charlotte Pesicka, City Librarian Mary Jo Parker, and Maintenance Supt. Tim Medicine Horn. Absent: City Attorney Tim Whalen and Charles Mix County Sheriff Randy Thaler.

Mayor Frederick called the meeting to order at 6:00pm.

The Council stood and recited the Pledge of Allegiance.

The agenda was reviewed and discussed. Motion by Bergin, second by Pesicka to approve the agenda with the addition of Sewer Rate Adjustment for Diane Eldridge, and Discussion of Additional Bleacher for Baseball under Mayor's List. Voting Aye: Tschumper, Pesicka, Nielsen, Florey, Wells, Bergin. Voting Nay: None. Absent: None. Motion carried.

Mayor Frederick opened the floor for Public Comment. No one was present for Public Comment.

A list of Hazard Mitigations was reviewed and discussed amongst City Council. Motion by Pesicka, second by Florey to approve the list of Hazard Mitigations projects. Voting Aye: Tschumper, Pesicka, Nielsen, Florey, Wells, Bergin. Voting Nay: None. Absent: None. Motion carried.

Motion by Florey, second by Pesicka to adjourn at 7:33PM. Voting Aye: Tschumper, Pesicka, Nielsen, Florey, Wells. Voting Nay: None. Absent: Bergin. Motion carried.

_____

Ryan Frederick, Mayor

ATTEST:

_____

Charlotte Pesicka, City Finance Officer

PICKSTOWN MINUTES (EXCERPTS)

The May 13, 2026, Regular Trustee Meeting was called to order by President Cindy Broyhill at 7:00 PM in the City Office at Pickstown, SD.

Present: Cindy Broyhill, Craig Hibbs, Ryan Kocer, Robert Thompson, Finance Officer Marcia Bierman, Maintenance Mark Fortuna Also Present: Larrene Hibbs, Karen Schneider, Kami Guthmiller, Mark & Kim Soukup, Dick Fuchs, Jade Shoultz, and Ranae Stimpson. Absent: Jeremiah Freidel

The conflict-of-interest statement was read. The city of Pickstown follows the provisions of SD Codified Law, Chapter 6-1, as well as the provisions of 5-18A and other applicable laws regarding conflict of interest for municipal officials.

Motion by Hibbs, seconded by Thompson to approve the agenda. All voted aye, motion carried.

New Business:

Bierman presented the Hazard Mitigation Project Selection. Motion by Broyhill, seconded by Kocer to approve the Hazard Mitigation Project Selection. All voted aye, motion carried.

Discussion on golf cart permits was held. Motion by Thompson, seconded by Kocer to not require golf cart permits. All voted aye, motion carried.

Extend the terms of Robert Thompson, Ryan Kocer, and Criag Hibbs until the primary election. Motion by Broyhill, seconded by Hibbs to extend terms. All voted aye, motion carried.

Motion by Broyhill, seconded by Hibbs to approve signing the MOU Elections agreement with the County. All voted aye, motion carried.

Motion by Thompson, seconded by Hibbs to approve Malt Beverage Renewal for Knotheads contingent to pay all past bills. All voted aye, motion carried.

Open seal bids for hay ground. Motion by Thompson, second by Kocer to approve Cody Shoultz for the hay ground bid at $1,025 for 5-year lease. All voted aye, motion carried.

Motion by Hibbs, seconded by Kocer to adjourn. All voted aye. Motion carried.

The meeting adjourned at 8:40 pm.

Next regular meeting will be June 17, 2026, at 7:00 pm at the City Office.

_____
Cindy Broyhill
President, Board of Trustees

_____
Marcia Bierman
Finance Officer
Publish once at the total approximate cost of $_____

PLATTE MINUTES (EXCERPTS)

CITY OF PLATTE
CITY COUNCIL PROCEEDINGS
UNAPPROVED REGULAR MEETING MINUTES
May 4, 2026

Mayor Boltjes called the meeting to order at the Platte Community Building at 7:00 p.m. Those present for roll call were: Paul Baas, Jerome Bentz, Tom Boltes, Dave Carter, Kevin Kuiper, and Kenneth VanZee. Councilmember Andrew Samuelson was absent. Others present were: Shauna Meyerink, Jacy Finney, Jason Huizenga, Richard Sternberg, Brandon Semmler, Tim Whalen, Ashley Vargas, and Randall Brumbaugh.

AGENDA. Councilmember VanZee moved and Bentz seconded to approve the agenda as presented. Motion carried on voice vote of 5-0.

MINUTES. Councilmember VanZee moved and Kuiper seconded to approve the April 20th regular meeting minutes as presented. Motion carried on voice vote of 5-0.

REPORTS.

Hazard Mitigation Plan Selection: Finance Officer Meyerink presented the proposed list of projects for the Charles Mix County Hazard Mitigation plan:

PLATTE

- Continue participation in the National Flood Insurance Program.
- Acquire backup generator for city hall.
- Acquire backup generators for water system infrastructure.
- Implement storm sewer system improvements.
- Upgrade city's warning siren system.
- Participate in the Storm Ready Program.
- Conduct outreach to educate people about water conservation.
- Participate in the Firewise Program.

Councilmember Carter moved and Baas seconded to approve the proposed project list for the Charles Mix County Hazard Mitigation Plan as presented. Motion carried on a voice vote of 5-0.

COUNCIL COMMENTS. There being no further business before the City Council, **Councilmember VanZee moved and Kuiper seconded to adjourn the meeting at 7:50 p.m. Motion carried on voice vote of 5-0.**

DATED: _____

By: _____
Tom Boltjes
Mayor

ATTEST:

_____
Shauna Meyerink
City Finance Officer

WAGNER MINUTES (EXCERPTS)

REGULAR MEETING OF THE COMMON COUNCIL OF THE CITY OF WAGNER, CHARLES MIX COUNTY, SOUTH DAKOTA, May 4 ,2026, DIRECTLY FOLLOWING BOARD OF ADJUSTMENTS SCHEDULED FOR 5:30 pm

PURSUANT TO DUE CALL AND NOTICE THEREOF, the Regular Meeting Monday, May 4, 2026, at City Hall directly following the Board of Adjustments scheduled for 5:30 pm. Present were Vice President Dan Cimpl, City Administrator/Finance Officer Debbra Houseman, City Attorney Patrick Glover, Councilmen: Tom Abdouch, Charlene Soukup, George Langdeaux and Gene Niehus. Also present throughout the meeting were Public Works Director Mike Kazena, Matt Williams-IT Administrator, Anne Podhrardsky-Librarian, Kesa Alexander-Planning and Zoning Administrator, Marilee Krcil, Sharon Haar, Kelsey Kniffen, Nicki Zephier, Randy Rysavy, Patti Frei, Marisa Joseph, Erika Kotab, and John Flying Horse.

Vice President Cimpl called the meeting to order at 6:01 pm.

Vice President Cimpl asked if there were any conflicts of interest. No conflicts were stated.

The agenda was reviewed. Vice President Cimpl called for a motion to approve the agenda as presented. Motion by Langdeaux, second by Abdouch, to approve the agenda as presented. All in favor, motion carried.

Vice President Cimpl opened the floor for public comment. There was no one present for public comment.

- A list of Hazard Mitigation Projects for the City of Wagner was reviewed. The Following [projects were Presented :
- Continue participation in the National Flood Insurance Program.

    - Acquire generator for city hall/ police department.
    - Construct tornado shelter in McCormick Park.
    - Relocate east side siren farther north and acquire a new siren to serve south side of community.
    - Participate in the Storm Ready Program.
    - Conduct outreach to educate people about water conservation.
    - Participate in the Firewise Program.

Motion by Soukup, second by Abdouch to approve the above projects for the Hazard Mitigation Project Selection. All in favor, motion carried.

Motion by Niehus, second by Cimpl to adjourn at 7:47 pm. All in favor, meeting adjourned.

_____

Dan Cimpl, Vice President

ATTEST:

_____

Debbra Houseman, City Administrator/Finance Officer

APPENDIX C: History of Previous Hazard Occurrences

This section provides details about hazard events that have impacted Charles Mix County in the past, beginning with a table showing the major disaster declarations in which Charles Mix County was part of the designated disaster area. The next several pages are a comprehensive list of weather-related hazard events recorded in the county from the National Climatic Data Center's Storm Events Database. The section ends with several tables showing crop loss to Charles Mix County farmers.

Major Disasters

Table C.1 lists all the events since 1970 that resulted in a major disaster declaration in which Charles Mix County was part of the designated area.

Table C.1 – Major Disaster Declarations Affecting Charles Mix County

Dec #	Declaration Date	Type	Primary Damage Impact
717	Jul 1984	Severe Storms and Flooding	
999	Jul 1993	Severe Storms, Tornadoes	
1052	May 1995	Severe Storms, Flooding	
1075	Jan1996	Severe Winter Storm	
1156	Jan 1997	Severe Winter Storm	
1173	Apr 1997	Severe Flooding	
1620	Dec 2005	Severe Winter Storm	
1774	Jul 2008	Severe Storms and Flooding	Roads, bridges
1915	May 2010	Flooding	Roads, bridges
1984	May 2011	Severe Storms and Flooding	Roads
4440	Jun 2019	Severe Winter Storm; Flooding	Roads, bridges
4469	Nov 2019	Severe Storm; Tornado; Flooding	Roads, bridges
4807	Aug 2024	Severe Storms; Straight line Winds; Flooding	

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

Significant Hazard Events

Table C.2 is a list of significant hazard events reported for Charles Mix County from 1960 through 2024, 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 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 hazards, including winter weather and drought, only go back to the 1990s. Another issue is that damage amounts in some cases are estimates and for certain types of events, such as winter storms, the data is tracked by forecast zone and thus does not lend itself to analysis at the county level. The database also contains a preponderance of records from the last few decades. 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:

- 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 thunderstorms and high wind events, only events with wind speeds of at least 60 knots are included in the table and only hail of at least one inch diameter is shown. 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 Charles Mix County

Date	Event Type	Event Description	Mag	Prop Damage ($1,000s)	Crop Damage ($1,000s)
7/17/1961	Hail		2.00 in.		
5/14/1962	Tornado		F3		
5/14/1962	Tornado		F1		
5/16/1962	Tornado		F3		
5/21/1962	Tornado		F3		
6/22/1964	Tornado		F1		
6/1/1965	Tornado		F0		

Date	Event Type	Event Description	Mag	Prop Damage ($1,000s)	Crop Damage ($1,000s)
6/1/1965	Tornado		F0		
8/17/1967	Hail		3.50 in.		
6/20/1968	Tornado		F2		
6/15/1970	Tornado		F1		
6/4/1971	Tornado		F2	25	
6/4/1971	Tornado		F1	2.5	
6/5/1971	Tornado		F0		
6/24/1973	Tornado		F2	25	
6/3/1975	Tornado		F1		
6/3/1975	Tornado		F1		
6/3/1975	Tornado		F1		
8/20/1975	Hail		1.25 in.		
8/9/1976	Hail		1.75 in.		
7/25/1978	Hail		2.00 in.		
6/19/1979	Tornado		F1	2,500	
5/26/1980	Hail		1.75 in.		
6/6/1980	Hail		1.75 in.		
6/26/1980	Thunderstorm Wind		70 kts.		
7/19/1981	Tornado		F1		
5/8/1982	Hail		1.75 in.		
7/18/1982	Tornado		F0		
7/18/1982	Tornado		F0		
6/12/1983	Tornado		F0		
6/26/1983	Tornado		F1	2.5	
6/5/1984	Thunderstorm Wind		61 kts.		
5/11/1985	Tornado		F0		
5/11/1985	Tornado		F0		
9/2/1985	Hail		1.75 in.		
4/26/1986	Hail		2.75 in.		
7/11/1987	Thunderstorm Wind		70 kts.		
8/15/1987	Hail		3.00 in.		
9/4/1987	Hail		1.75 in.		
9/18/1988	Hail		2.00 in.		
7/17/1989	Hail		1.75 in.		
5/22/1990	Hail		1.75 in.		
5/22/1990	Thunderstorm Wind		60 kts.		
5/12/1991	Tornado		F0		

Date	Event Type	Event Description	Mag	Prop Damage ($1,000s)	Crop Damage ($1,000s)
5/28/1991	Thunderstorm Wind		80 kts.		
7/20/1991	Hail		1.75 in.		
5/15/1992	Hail		3.00 in.		
6/16/1992	Tornado		F0		
7/21/1992	Thunderstorm Wind		65 kts.		
5/7/1993	Hail		2.50 in.	50	
6/24/1994	Hail		2.75 in.	500	500
7/4/1994	Hail		1.75 in.		
8/18/1994	Hail		2.75 in.	100	800
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.		20	
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.			
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.		10	
4/12/1996	Heavy Snow				
4/25/1996	High Wind		62 kts.	10	
6/19/1996	Hail		2.75 in.		
7/7/1996	Hail		2.50 in.		
8/6/1996	Hail		1.75 in.		500
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.		20	
12/16/1996	Blizzard				
12/25/1996	Heavy Snow				
1/4/1997	Blizzard				
1/9/1997	Blizzard				
1/15/1997	Extreme cold				
2/3/1997	Heavy Snow				
3/12/1997	Flood				
4/1/1997	Flood				

Date	Event Type	Event Description	Mag	Prop Damage ($1,000s)	Crop Damage ($1,000s)
4/6/1997	High Wind		63 kts.	10	
4/9/1997	Heavy Snow				
6/11/1997	Flash Flood			30	
6/20/1997	Thunderstorm Wind		61 kts.	50	
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.		10	
7/6/1998	Hail		1.75 in.	1,000	2,200
7/6/1998	Thunderstorm Wind		61 kts.	5	
8/19/1998	Hail		1.75 in.		
11/10/1998	Blizzard	Snow accumulating 4 to 14 inches combined with winds gusting as high as 60 mph caused zero visibilities in snow and blowing snow, drifting snow, and damage to trees and power lines with resultant power outages. Some of the power outages lasted over 2 days. Most roads were closed and many people were stranded in vehicles after the sudden onset of the heavy snow.		20	
5/3/1999	Thunderstorm Wind		61 kts.	2	
5/3/1999	Tornado		F0		
6/4/1999	Hail		1.50 in.		
6/7/1999	Hail		1.75 in.		
7/2/1999	Thunderstorm Wind		70 kts.	120	
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 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				
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				
8/7/2000	Hail		1.75 in.		
8/7/2000	Tornado		F1	100	
11/11/2000	Winter Storm				
12/16/2000	Blizzard				
1/29/2001	Blizzard				
2/7/2001	Winter Storm				
2/24/2001	Winter Storm				

Date	Event Type	Event Description	Mag	Prop Damage ($1,000s)	Crop Damage ($1,000s)
6/9/2001	Thunderstorm Wind		61 kts. E	20	
7/7/2001	Lightning			1	
7/21/2001	Thunderstorm Wind		61 kts. E	100	
7/30/2001	Thunderstorm Wind		75 kts. M	50	
8/29/2001	Hail		2.75 in.		
8/29/2001	Thunderstorm Wind		61 kts. E	100	
10/9/2001	Hail		1.50 in.		
11/26/2001	Heavy Snow	Most areas of southeast South Dakota received at least 8 inches of snow. 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.			
3/14/2002	Winter Storm				
7/9/2002	Hail		1.50 in.		
7/24/2002	Hail		1.75 in.		
8/9/2002	Thunderstorm Wind		61 kts. E	100	
1/15/2003	Heavy Snow				
4/6/2003	Heavy Snow				
6/5/2003	Hail		1.75 in.	10	
6/24/2003	Tornado	A tornado damaged or destroyed several buildings at an abandoned farm, and also caused tree damage.	F1	50	
6/24/2003	Tornado	A tornado destroyed four grain bins and two sheds on a farm.	F1		
6/24/2003	Tornado		F0		
11/22/2003	Winter Storm				
12/8/2003	Winter Storm				
3/15/2004	Heavy Snow				
5/29/2004	Hail		1.75 in.		
7/12/2004	Hail		2.50 in.		
7/15/2004	Thunderstorm Wind		69 kts. E	10	
7/15/2004	Tornado		F0		5
1/4/2005	Heavy Snow				
6/20/2005	Thunderstorm Wind		61 kts. E		
6/21/2005	Flash Flood				
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.		1,000	
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		100	

Date	Event Type	Event Description	Mag	Prop Damage ($1,000s)	Crop Damage ($1,000s)
		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.			
3/19/2006	Winter Storm				
7/18/2006	Drought				
8/1/2006	Drought				
9/16/2006	Hail		1.75 in.		
12/20/2006	Winter Storm			40	
12/29/2006	Winter Storm				
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				
4/21/2007	Hail		2.50 in.		
5/5/2007	Hail		1.75 in.		
5/5/2007	Tornado		EF0		
5/22/2007	Flash Flood				
6/21/2007	Thunderstorm Wind		61 kts. E		
6/21/2007	Flash Flood				
8/3/2007	Thunderstorm Wind		61 kts. E		
8/21/2007	Hail		6.88 in.		
9/29/2007	High Wind		61 kts. E	10	
3/31/2008	Heavy Snow				
4/10/2008	Blizzard				
4/25/2008	Heavy Snow				
6/2/2008	Hail		1.75 in.	200	
6/2/2008	Thunderstorm Wind		61 kts. E	10	
6/3/2008	Hail		1.75 in.		
6/4/2008	Flash Flood				
6/5/2008	Hail		1.75 in.		
6/5/2008	Thunderstorm Wind		61 kts. E	50	
6/5/2008	Tornado		EF1	100	
6/5/2008	Flash Flood				
11/6/2008	Blizzard				

Date	Event Type	Event Description	Mag	Prop Damage ($1,000s)	Crop Damage ($1,000s)
12/14/2008	Blizzard				
3/30/2009	Blizzard				
4/4/2009	Blizzard				
8/8/2009	Hail		2.00 in.		
9/2/2009	Thunderstorm Wind		61 kts. E	5	
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 and winds gusting over 40 mph produced widespread blizzard conditions, with visibilities less than a quarter mile. New snowfall included 6 inches at Pickstown. 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.			
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.			
6/12/2010	Flash Flood			1,000	
7/10/2010	Flash Flood				
8/30/2010	Thunderstorm Wind		61 kts. E	5	
9/22/2010	Flash Flood				
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				
1/9/2011	Heavy Snow				
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				
4/15/2011	Heavy Snow				
5/20/2011	Flood	Flooding along the Missouri River developed in May, increasing throughout the month as runoff from excessive upstream snowmelt and rain reached the area. Lowland areas along the river began to flood, impacting recreational facilities and some roads. The river reached 3.2 feet above flood stage near Greenwood at the end of the month.			
5/30/2011	Hail		1.75 in.		
5/30/2011	Thunderstorm Wind		70 kts. E		
5/30/2011	Tornado		EF0		
6/1/2011	Flood	Flooding along the Missouri River from upstream spring snowmelt and heavy rain worsened in June. Lowland areas along the river, including many roads and recreational areas and a few homes, were flooded. The river reached a record 8.8 feet above flood stage near Greenwood at the end of the month.			
6/20/2011	Flood				

Date	Event Type	Event Description	Mag	Prop Damage ($1,000s)	Crop Damage ($1,000s)
7/1/2011	Flood	Record Missouri River flooding continued in July. Populated areas evacuated before the month remained evacuated, with a few additional evacuations made. Damage continued to many homes, businesses, recreation areas, and low lying areas. A very slow drop in the river began before the end of the month. Runoff from heavy rain caused continued record flooding of Platte Creek, with several roads under water. The creek crested at a record 2.7 feet above flood stage near Platte on July 8th.			
7/15/2011	Extreme heat				
8/1/2011	Flood	Major impacts from Missouri River flooding continued into August, with flooding varying from minor to major, and evacuated areas remaining evacuated. Water levels receded very slowly during the month, and effects of the flooding slowly began to abate, but in many places the extent of damage to homes, businesses, and lowlands was beginning to become evident.			
8/5/2011	Flash Flood	Thunderstorms produced heavy rainfall which resulted in flash flooding east of Platte on the late morning and early afternoon of August 5th.			
9/1/2011	Flood	Missouri River flooding decreased steadily in September, and ended along most of the river by late in the month. As the water retreated, additional damage continued to be revealed.			
10/4/2011	Wildfire	Several wildfires damaged grassland and crops. The largest fire started just south of Lake Andes and burned about 400 hay bales in addition to grassland. One firefighter suffered smoke inhalation. Firefighters were called to the same site the next day as flames sparked up again. No other injuries were reported to humans or livestock. The amount of crop damage was not known.			
5/5/2012	Hail		1.50 in.		
6/1/2012	Drought	Well below normal rainfall aggravated long term dry soil conditions, producing stress on crops which had been planted unusually early due to a warm late winter and early spring. The crops had begun their growth with ample mid spring rains, but the stress quickly developed with the return to dry conditions which had existed generally since the previous fall.			
6/13/2012	Hail		1.75 in.		
6/26/2012	Extreme 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	Extreme heat				
7/15/2012	Extreme heat				
7/18/2012	Extreme 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.			
8/1/2012	Extreme heat				
9/1/2012	Drought	Drought conditions continued over all of 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 even more evident with the start of harvest. Local			

Date	Event Type	Event Description	Mag	Prop Damage ($1,000s)	Crop Damage ($1,000s)
		governments continued to use water use restrictions in an effort to prevent serious water supply problems.			
10/1/2012	Drought				
11/1/2012	Drought				
12/1/2012	Drought	Drought conditions continued over all of southeast South Dakota in December. 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				
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				
5/1/2013	Drought				
7/7/2013	Thunderstorm Wind		61 kts. M	10	
7/7/2013	Flash Flood				
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.			
8/2/2014	Hail		3.00 in.		
12/15/2014	Winter Storm				
1/31/2015	Winter Storm				
5/10/2015	Tornado	A tornado formed and moved over fields, damaging some trees, before crossing into Douglas County.	EF0		
5/25/2015	Hail		1.75 in.		
6/6/2015	Hail		1.50 in.		
9/7/2015	Hail		1.25 in.		
9/22/2015	Heavy Rain				
11/20/2015	Heavy Snow				
11/30/2015	Winter Storm				
12/25/2015	Winter Storm				
2/19/2016	High Wind		60 kts. MG		
3/23/2016	Winter Storm				
5/22/2016	Hail		1.00 in.		
5/23/2016	Flash Flood				
5/25/2016	Hail		1.75 in.		

Date	Event Type	Event Description	Mag	Prop Damage ($1,000s)	Crop Damage ($1,000s)
5/30/2016	Hail		1.00 in.		
5/30/2016	Flash Flood				
6/10/2016	Extreme heat				
7/19/2016	Extreme heat				
11/17/2016	Winter Storm				
12/17/2016	Extreme cold				
1/24/2017	Winter Storm				
2/23/2017	Winter Storm				
6/13/2017	Hail		1.25 in.		
6/29/2017	Hail		1.25 in.		
7/9/2017	Hail		1.00 in.		
8/13/2017	Hail		1.25 in.		
12/26/2017	Extreme Cold				
12/31/2017	Extreme Cold	Record low high temperature of -9 near Academy.			
1/15/2018	Extreme cold				
1/21/2018	Winter Storm				
2/10/2018	Extreme cold				
2/22/2018	Winter Storm				
3/5/2018	Blizzard				
4/13/2018	Blizzard	Life threatening conditions developed, as a mix of rain, sleet and snow changed to all snow. Brutal winds gusting over 50 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. Total snowfall of 12 inches was measured at Platte and 15 inces at Wagner.			
4/18/2018	Winter Storm				
4/30/2018	Hail		1.00 in.		
5/24/2018	Hail		1.25 in.		
6/1/2018	Thunderstorm Wind		70 kts. EG		
7/3/2018	Extreme heat				
7/8/2018	Extreme heat				
7/11/2018	Extreme heat				
7/12/2018	Flood				
7/18/2018	Hail		1.75 in.		
7/21/2018	Flood				
8/1/2018	Flood				
8/28/2018	Hail		1.00 in.		
9/1/2018	Flood				
9/20/2018	Flash Flood				

Date	Event Type	Event Description	Mag	Prop Damage ($1,000s)	Crop Damage ($1,000s)
1/1/2019	Extreme Cold				
3/3/2019	Extreme Cold				
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. SD Hwy 46 was closed both east and west of Wagner due to water flowing over the roadway.			
3/14/2019	Blizzard				
4/11/2019	Blizzard				
5/29/2019	Flood				
6/1/2019	Flood				
6/28/2019	Heat				
6/29/2019	Excessive Heat				
6/30/2019	Hail		1.00 in.		
6/30/2019	Heat				
7/1/2019	Flood				
7/5/2019	Flood				
7/17/2019	Thunderstorm Wind	Significant tree damage occurred at the Snake Creek Campground. Injuries occurred when tree branches fell on tents. Several campers rolled by high winds.	100 kts. MG	50	
7/28/2019	Tornado		EFU		
8/1/2019	Flood			50	
8/6/2019	Lightning				5
8/6/2019	Flash Flood			10	
8/9/2019	Flood			10	
8/17/2019	Hail		2.00 in.		
8/31/2019	Flood			25	
9/1/2019	Flood				
9/10/2019	Hail		1.00 in.		
9/10/2019	Thunderstorm Wind		62 kts. MG		
9/12/2019	Flood	Widespread areal flooding resulted after excessive rainfall from September 10-12, which brought 6.40 inches to Platte and 6.31 inches 2 miles northeast of Academy. Numerous county and township roads were damaged by floodwater.		150	
9/18/2019	Flood			10	
9/30/2019	Hail		1.00 in.		
10/1/2019	Flood			5	
11/1/2019	Flood				
11/29/2019	Winter Storm				
12/1/2019	Winter Storm				
12/1/2019	Flood				

Date	Event Type	Event Description	Mag	Prop Damage ($1,000s)	Crop Damage ($1,000s)
12/28/2019	Blizzard	Light mixed precipitation resulted in a minor glaze of ice accumulation, then heavy snowfall (up to 16 inches in the sourthern areas of the county) and high wind resulted in white out conditions. Snow drifts to several feet were common.			
1/17/2020	Blizzard				
1/18/2020	Flood				
1/18/2020	Cold/wind Chill				
1/21/2020	Flood				
2/12/2020	Cold/wind Chill				
4/12/2020	Winter Storm				
5/5/2020	Hail		1.25 in.		9
6/6/2020	Hail		1.00 in.		
6/8/2020	Hail		2.50 in.		213
6/8/2020	Flash Flood	Rainfall over just a few hours totaled 3 inches near Platte and 2.75 inches near Pickstown. Some residents of Marty were evacuated due to flood waters.		50	
6/9/2020	Flash Flood			5	
6/20/2020	Hail		1.50 in.		14
6/25/2020	Hail		1.00 in.		
7/7/2020	Thunderstorm Wind		63 kts. MG		
8/10/2020	Thunderstorm Wind		61 kts. EG	13	
11/10/2020	Drought				62
12/1/2020	Drought				
12/23/2020	Blizzard				
12/29/2020	Winter Storm				
1/1/2021	Drought				
1/14/2021	High Wind		70 kts. MG		
2/14/2021	Extreme cold				
3/14/2021	Winter Storm				
6/1/2021	Drought				806
7/1/2021	Drought				2,070
7/3/2021	Wildfire	A fire started just north of Pickstown along U.S. Highway 18, which quickly spread northward into tree-covered hillsides, forcing the evacuation of several residences, a campground, and a swimming beach. The fire caused sparking along powerlines, which started another 50-acre fire about three miles from the earlier ignition point. The fire caused a power, water, and cellular service outage in the Pickstown area for up to three hours.			
8/1/2021	Drought				400
9/1/2021	Drought				14
10/1/2021	Drought				65
11/1/2021	Drought				1

Date	Event Type	Event Description	Mag	Prop Damage ($1,000s)	Crop Damage ($1,000s)
11/11/2021	High Wind		63 kts. MG		
12/1/2021	Drought				
12/10/2021	Winter Storm				
12/15/2021	High Wind		60 kts. MG		
12/31/2021	Cold/wind Chill				
1/1/2022	Cold/wind Chill				
1/4/2022	High Wind		67 kts. MG		
1/6/2022	Extreme cold				
2/22/2022	Cold/wind Chill				
3/5/2022	Winter Storm				
4/1/2022	Drought				
4/12/2022	High Wind		61 kts. MG		
4/22/2022	High Wind		60 kts. MG		
5/1/2022	Drought				
5/9/2022	Thunderstorm Wind		52 kts. MG		
5/12/2022	Thunderstorm Wind	A highly unstable environment generated scattered storms with damaging winds. With many fields unplanted, a huge amount of dirt was lofted into the leading edge of the storms, which took on the characteristics of a haboob reducing visibility to near zero. Winds from 70 to 100 mph devastated much of southeast South Dakota, causing extensive tree and structural damage and many injuries. Vehicles were blown off several roads, shutting down traffic on Interstates 29 and 90. Power was disrupted in a widespread area, with estimates of over 45,000 customers impacted at one time. Many schools were closed due to damage and power issues. The storm resulted in a Presidential Disaster Declaration for damage to public infrastructure at an estimated cost of 6.7 million dollars across 20 counties and two reservations.	83 kts. EG		
5/29/2022	Thunderstorm Wind		65 kts. EG		
5/30/2022	High Wind		63 kts. MG		6
6/1/2022	Drought				
6/12/2022	Thunderstorm Wind		60 kts. EG		
6/20/2022	Thunderstorm Wind		61 kts. EG		
6/25/2022	Hail		1.00 in.		
7/1/2022	Drought				
8/1/2022	Drought				
8/5/2022	Excessive Heat				
9/1/2022	Drought				
10/1/2022	Drought				
11/1/2022	Drought				
12/1/2022	Drought				
12/14/2022	Blizzard				

Date	Event Type	Event Description	Mag	Prop Damage ($1,000s)	Crop Damage ($1,000s)
12/21/2022	Blizzard/Extreme Cold				
1/1/2023	Drought				
1/2/2023	Winter Storm				
1/18/2023	Winter Storm				
1/27/2023	Winter Storm				
2/1/2023	Drought				
2/21/2023	Blizzard				
2/23/2023	Extreme cold				
4/4/2023	Ice Storm				
6/6/2023	Drought				
6/24/2023	Hail		1.50 in.		28
7/1/2023	Drought				14,710
7/10/2023	Hail		1.75 in.		27
7/25/2023	Excessive Heat				
8/19/2023	Heat				
8/21/2023	Excessive Heat				
9/2/2023	Heat				
12/25/2023	Blizzard				
1/12/2024	Extreme cold				
1/13/2024	Blizzard				
1/20/2024	Cold/wind Chill				
3/24/2024	Winter Storm				
5/21/2024	High Wind		62 kts. MG		4
6/20/2024	Flood			3,000	
7/13/2024	Excessive Heat				
7/14/2024	Thunderstorm Wind		65 kts. MG		
7/31/2024	Heat				
8/2/2024	Heat				
8/25/2024	Hail		1.00 in.		
8/25/2024	Thunderstorm Wind		62 kts. MG		
8/25/2024	Flash Flood				
8/25/2024	Excessive Heat				
10/8/2024	Drought				
11/1/2024	Drought				

Source: National Climatic Data Center Storm Events Database (www.ncdc.noaa.gov/stormevents)

Crop Loss

As described in **Chapter III**, farmers typically protect themselves from the impacts of adverse weather by insuring their crops against losses through multi-peril crop insurance, which is underwritten by the Risk Management Agency. The tables on the next few pages provide data on indemnity payouts to Charles Mix County farmers for crop loss due to natural hazard events from 2000 through 2023.

Table C.3 shows indemnity payouts due to winter weather events. During the 2000 – 2023 period of analysis, winter weather-related payouts represented approximately 5% of all indemnity payouts in Charles Mix County.

Table C.3 – Crop Loss Due to Winter Weather

Year	Frost	Freeze	Cold Winter	Cold Wet Weather
2000			$39,746	
2001			$2,153,449	$69,357
2002	$9,043	$6,871	$49,019	$4,429
2003			$318	
2004	$46,546	$37,281	$11,405	$1,438
2005	$9,643	$557	$7,339	
2006		$572	$1,744	
2007	$14,625	$2,612	$113,639	$33,727
2008			$70,469	$7,695
2009			$490,004	$12,636
2010			$1,904	$66,952
2011		$12,901	$15,099	$242,264
2012	$5,694			$5,008
2013		$29,734	$2,877,250	$57,147
2014		$16,284	$1,321,878	$22,777
2015	$12,947	$17,473	$1,660,250	$9,388
2016				$7,501
2017		$124,215	$91,920	$57,132
2018		$30,033	$49,053	$15,625
2019			$140,394	$1,050,112
2020			$28,408	$46,487
2021		$2,928	$8,693	$27,575
2022	$29,088	$25,120	$132,454	$2,266
2023			$2,889,940	$4,433
Ave Payout =	**$5,316**	**$12,774**	**$506,432**	**$72,665**

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

Table C.4 shows indemnity payouts due to severe summer weather. During the 2000 – 2023 period of analysis, summer storm-related payouts represented approximately 3% of all indemnity payouts in Charles Mix County.

Table C.4 – Crop Loss Due to Severe Summer Weather

Year	Hail	High Wind	Tornado
2000	$413,489	$214	
2001	$375,561		
2002	$64,077		
2003	$226,745		
2004	$3,200	$13,485	
2005	$111,209	$3,481	
2006	$14,582	$6,572	
2007	$80,854	$89,411	
2008	$62,213	$27,452	
2009	$35,303	$3,066	
2010	$87,868	$10,940	
2011	$42,087	$4,093	
2012		$138,964	
2013		$484,012	
2014	$31,102	$82,230	
2015	$62,879	$4,171	$2,593
2016	$35,411	$4,629	
2017	$1,887,521	$42,386	
2018	$122,016	$9,649	
2019	$1,457,609	$11,516	
2020	$319,181		
2021		$108,163	
2022	$132,244	$92,281	
2023	$242,214	$65,929	
Ave Payout =	**$241,974**	**$50,110**	**$108**

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

Table C.5 shows indemnity payouts due to flooding and excess moisture. During the 2000 – 2023 period of analysis, flood-related payouts represented approximately 24% of all indemnity payouts in Charles Mix County.

Table C.5 – Crop Loss Due to Flooding and Excess Moisture

Year	Flooding	Excess Moisture
2000		$82,550
2001	$5,245	$974,871
2002		$73,376
2003	$2,569	$51,353
2004	$6,865	$33,176
2005		$199,489
2006		$33,175
2007	$602	$825,566
2008	$48,996	$2,187,792
2009	$3,201	$239,729
2010	$38,809	$2,372,014
2011	$793,062	$2,641,241
2012		$64,080
2013	$59,443	
2014		$61,456
2015		$168,686
2016		$3,950,870
2017	$3,519	$271,776
2018		$5,392,792
2019	$14,164	$36,531,255
2020		$8,708,926
2021		$282,295
2022		$260,357
2023	$51,404	
Ave Payout =	**$42,828**	**$2,725,284**

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

Table C.6 shows indemnity payouts due to drought and heat. During the 2000 – 2023 period of analysis, drought-related payouts accounted for approximately 63% of all indemnity payouts in Charles Mix County, far more than any other type of hazard [11].

Table C.6 – Crop Loss Due to Drought and Heat

Year	Drought	Heat
2000	$3,975,006	$172,324
2001	$1,025,123	$40,178
2002	$14,953,511	$275,651
2003	$5,502,026	$485,110
2004	$6,066,001	$69,579
2005	$3,845,588	$498,974
2006	$6,728,369	$499,665
2007	$264,170	$122,117
2008	$713,654	$10,413
2009	$114,384	$12,252
2010	$177,754	
2011	$27,809	$104,207
2012	$57,689,233	$1,513,245
2013	$4,499,216	$123,371
2014	$3,164,076	
2015	$2,626,064	$1,460
2016	$674,150	$16,510
2017	$4,767,970	$67,171
2018	$29,734	
2019		
2020	$73,451	$9,768
2021	$4,980,877	$286,492
2022	$28,323,373	$341,602
2023	$17,716,598	$503,778
Ave Payout =	**$6,997,422**	**$214,744**

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

[11] Drought is the costliest natural hazard statewide for South Dakota farmers. From 2000 through 2017, drought payouts accounted for approximately 50% of all indemnity payouts in the state.

APPENDIX D: References

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