JERAULD COUNTY, SOUTH DAKOTA

HAZARD MITIGATION PLAN

JULY 2025

Prepared by:

Jerauld County Hazard Mitigation Planning Team

Technical Assistance Provided By:

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CHAPTER I
PLANNING PROCESS

Background

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

This is a multi-jurisdictional plan. All the municipalities located within Jerauld County were invited to participate in the plan's development, as they had when the current plan (that is, the plan now being updated) was being developed. Following is the list of jurisdictions that participated in the plan's development by having a representative attending the planning meetings and by providing input into the plan [1]:

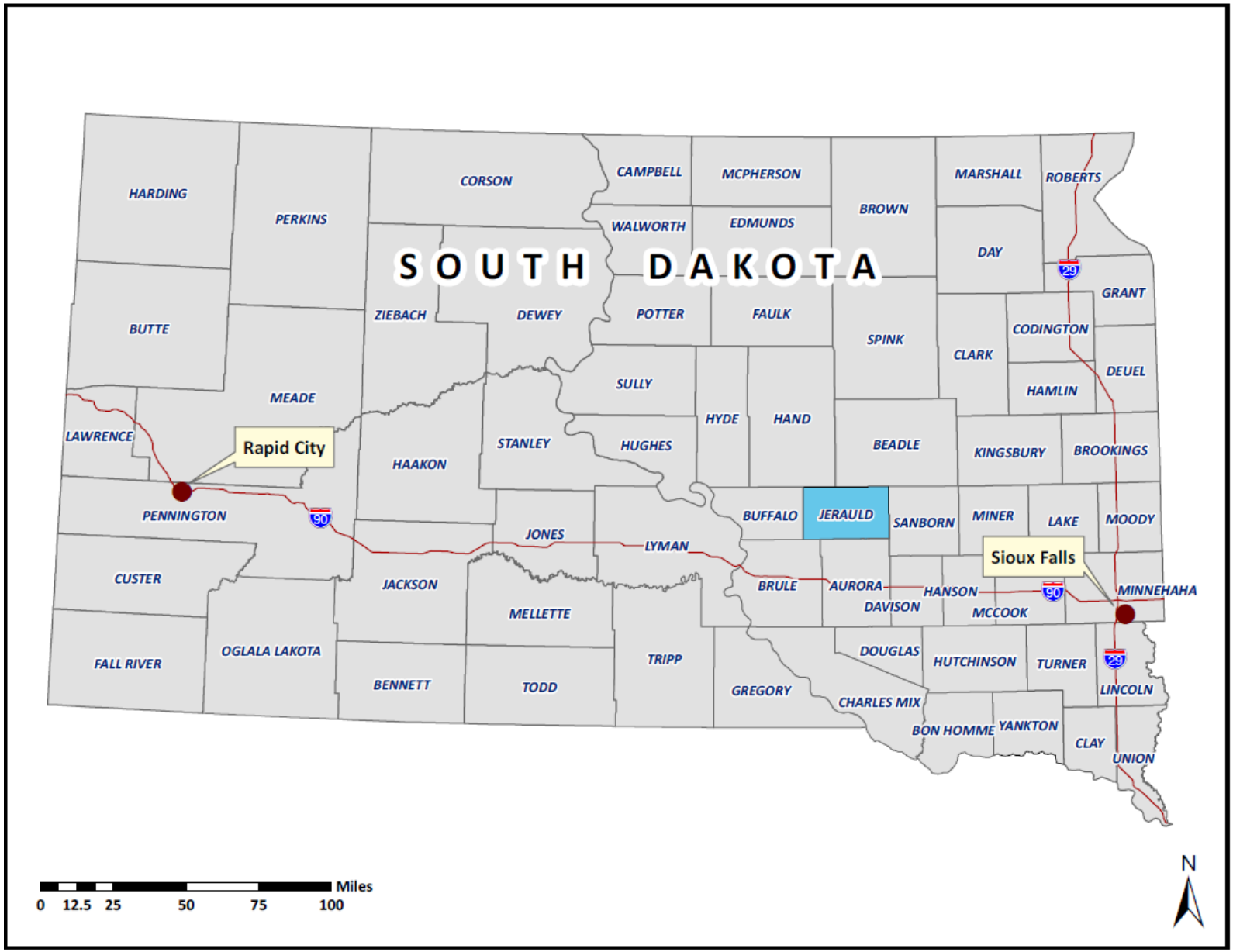
- Jerauld County
- Town of Alpena
- City of Wessington Springs

Production of the plan was the ultimate responsibility of the Jerauld 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 Jerauld County's current plan.

[1] The Town of Lane, which has fewer than 100 residents, 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. Eric Ambroson assisted in the public outreach and risk assessment efforts and gathered some of the demographic data used in 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 and Shannon Viereck provided additional research assistance and edited the final copy of the plan.

Development of Planning Team

The initial planning stages for this plan update began in 2023 when an application was submitted to FEMA for funding to help pay for the update. The funds were awarded to the County in February 2025. Following this, Mr. Clem and the Jerauld 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 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 invited to participate in the plan's development. These stakeholders included the following:

- Central Electric Cooperative
- Mid-Dakota Rural Water System
- Wessington Springs School District
- Avera Weskota Memorial Hospital
- Wessington Springs *True Dakotan*
- Major employers, including LSI Jack Links
- Neighboring counties (Aurora, Brule, Buffalo, Davison, and Sanborn)

Each individual invited to participate in the plan's development had knowledge in one or more of the following subject areas that helped contribute to the planning process:

- Infrastructure within the county.
- Economic development activities within the county.
- Natural and cultural resources.
- Floodplain management.

- Building codes and other development regulations.
- Mapping and GIS.
- Social services, including vulnerable populations.
- Other technical expertise or specialized knowledge to assist in the planning effort.

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 4/08/25	Mtg 2 5/06/25	Mtg 3 _/__/__
John Clem	Planning District III	Planner	Plan author	X	X	
Eric Ambroson	Planning District III	Planner	Research, Support	X		
Shannon Viereck	Planning District III	Planner	Research, Support	X	X	
Eric Schroeder	Jerauld County	Emergency Mgmt Dir	Guidance, Review	X	X	
Charles Bergeleen	Jerauld County	County commission	Input, Review	X	X	
Shane Mentzer	Jerauld County	County commission	Input, Review	X	X	
Walt Hein	Jerauld County	County commission	Input, Review	X	X	
DeVonne Losing	Jerauld County	County commission	Input, Review	X	X	
Fred Krohmer	Jerauld County	County commission	Input, Review		X	
Shannon Fagerhaug	Jerauld County	Auditor	Input, Data, Review	X	X	
Jason Weber	Jerauld County	Sheriff	Input, Review	X		
Dedrich Koch	Jerauld County	States attorney	Input, Review	X	X	
Shawn Ochsner	Alpena	Finance officer	Input, Data, Review	X		
Jeff Kelsey	Alpena	Mayor	Input, Review		X	
Linda Willman	Wessington Springs	Finance officer	Input, Data, Review	X	X	
Philip Labore	Wessington Springs	Electric Superintendent	Input, Data, Review	X		
Lucas Van Engelenburg	Wessington Springs	Lineman	Input, Data, Review	X		
Mark Gran	Mid-Dakota Water System	Manager	Input, Data, Review	X	X	
Maria Howard	Weskota Hospital		Input, Review	X		
Stephanie Reasy	Weskota Hospital		Input, Review	X		
Michael Ormsmith	Wess Sprgs School Dist		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 newspaper, information posted on community websites, and social media.

New for this update, surveys were 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, as well as to other city and county staff who did not participate in the planning meetings and other stakeholders. To generate broader public input, the surveys were made available on the community websites and through social media, survey

posters with a QR code were placed in various public locations throughout the county [2], and a press release at the start of the planning process included a QR code so that 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 Jerauld 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.
Jerauld County Comprehensive Plan	The environmental constraints section of the plan was used to identify areas suitable for development in the county.
Jerauld 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.
Jerauld County Local Emergency Operations Plan (LEOP)	Many parts of the plan, including the Utilities section and the Community Recovery and Mitigation section, were reviewed.
Wessington Springs Comprehensive Plan	The environmental constraints section of the plan was used to identify areas suitable for development within the city.
Wessington Springs Housing Study	The study presents socio-economic and demographic data and outlines potential housing development strategies for the community.
Facility Plan for the Water System in Wessington Springs	This document, which was developed by the City's engineering consultant, evaluates the community's water system and outlines various projects to upgrade the system.

[2] Posters were placed at the courthouse, city offices, grocery stores and other retail locations, apartment complexes in Wessington Springs, and the Wessington Springs school. Survey forms were also distributed to residents of the independent living apartments on the Avera Weskota Memorial Hospital campus.

Facility Plan for the Wastewater System in Wessington Springs	This document, which was developed by the City's engineering consultant, evaluates the community's sewer system and outlines various projects to upgrade the system.

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 was provided by Planning & Development District III staff and the Jerauld 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 stakeholders, and which was also made available to the public as described earlier in the Public Outreach section.

First Planning Team Meeting

The first planning team meeting began with a reintroduction to the concept of hazard mitigation for the team members, many of whom participated in the development of the current plan. The county's current mitigation plan was then reviewed, focusing on the hazards identified in the plan and the progress being made to implement the mitigation actions listed in the plan. Discussion also occurred about other local plans and policies that could be incorporated into this plan.

The planning team also reviewed the initial results of the survey, which helped determine which hazards to address in the plan, and additional hard copies of the survey were distributed. The meeting ended with a discussion about the process by which the plan would be developed over the coming months.

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

Development of the mitigation strategy was the focus of the second meeting. It began with identification of the mitigation goals and objectives to be achieved, followed by a discussion about local mitigation capabilities. Discussion about the specific mitigation actions to include in the plan followed, the participants being reminded that they should focus on hazard mitigation - *sustained action* taken to reduce the long-term risk to people and property from hazards – as opposed to preparedness. They were also 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 details about the actions, such 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. The public was given another opportunity to provide input into the plan through a press release that was run in the local newspaper and posted on the community websites and social media prior to the meeting.

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 Jerauld 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 County Auditor Shannon Fagerhaug and Emergency Management Director Eric Schroeder 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.

CHAPTER II
COMMUNITY PROFILE

Background

This chapter serves as a basic introduction of Jerauld 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

Jerauld County is located in east central South Dakota (see **Figure 1.1**). The county covers 533 square miles in area, and its Census 2020 population was 1,663. Its population density is only 3.1 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. There are three incorporated municipalities located within the county - Alpena (pop 212), Lane (pop 47), and Wessington Springs (pop 771). The county seat is located in Wessington Springs. Another populated place in Jerauld County is the Spring Valley Hutterite Colony, which has approximately 125 residents [3]. **Figure 2.1** shows the county's communities and highway network.

Physical Characteristics

Jerauld County is very lightly settled, with most of the land consisting of cropland, grassland, and pastureland. The Wessington hills, which are aligned in a generally north-south direction near the center of the county, are the main natural feature of Jerauld County. The hills divide the mostly level eastern half of the county, which is where most of the crops are grown, from the rolling west, which is where almost all the grassland is located. Excessive slopes and rocky soils are rare, except along the Wessington hills and in the western half of the county.

[3] Hutterite Colonies are rural, agriculturally based communities occupied by descendants of German people who cling to many of their traditional ways. There are more than 400 Hutterite colonies located in the north-central United States and Canada.

Figure 2.1 – Jerauld County

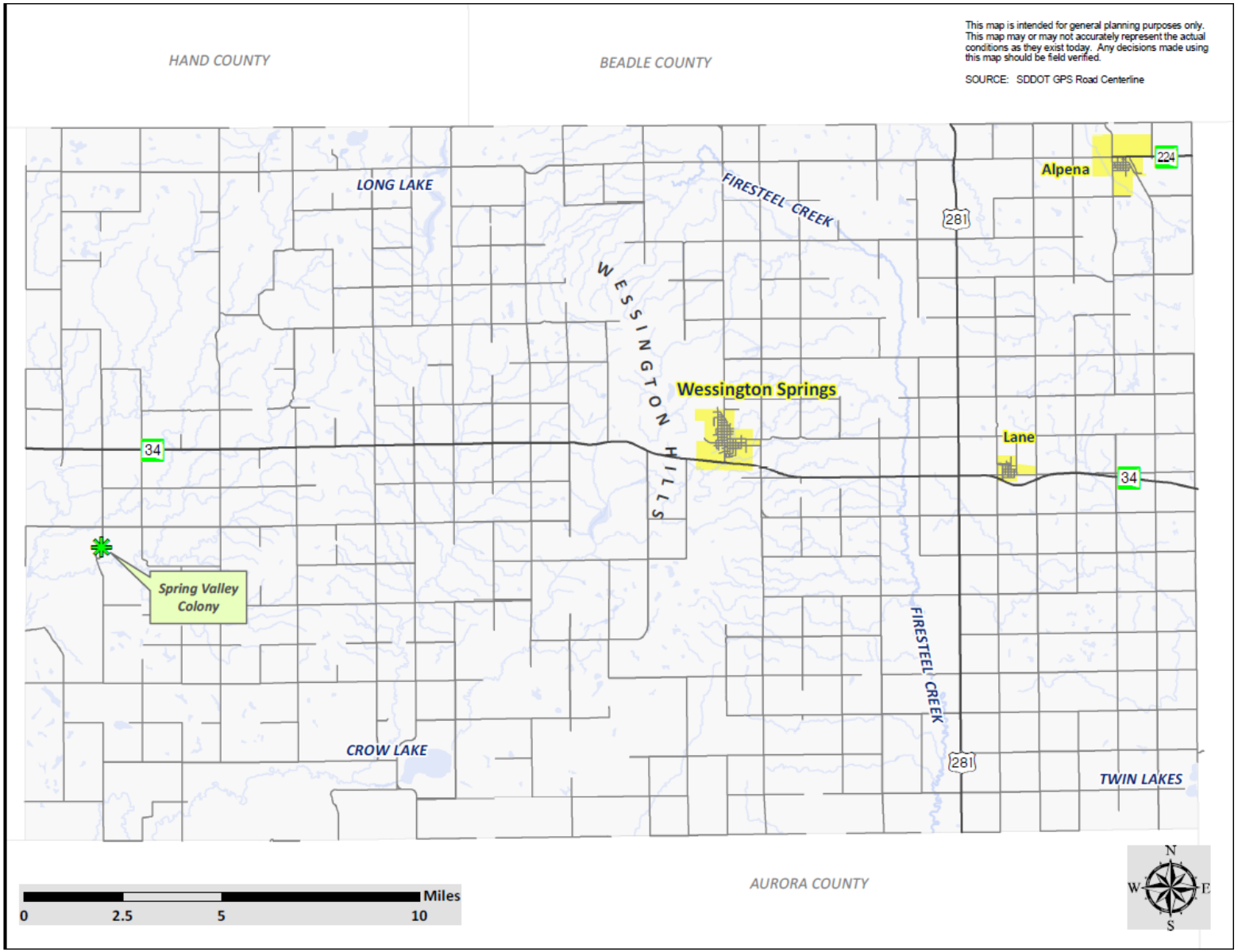


Table 2.1 provides a breakdown of the land cover in Jerauld County, which is shown graphically in **Figure 2.2**. The table is based off satellite imagery from the United States Geological Service's National Land Cover Database. As the table shows, the predominant types of land cover in the county are cropland, grassland, and pastureland, which together comprise over 90 percent of the county's area. Developed land makes up only a very small fraction of the land area. The table also tracks the change over time in land cover since 1985; cropland has had the greatest absolute increase, while developed land has shown the most relative growth.

Table 2.1 - Vegetative Land Cover

Cover Type	Sq Miles (1985)	Sq Miles (2023)	% Change	% Total Area
Cultivated Crops	185.8	205.9	10.8%	38.7%
Grassland	184.7	158.0	-14.5%	29.7%
Pasture/Hay	117.3	121.9	3.9%	22.9%
Wetlands	22.9	22.1	-3.7%	4.1%
Developed, Open Space	14.6	15.9	9.1%	3.0%
Developed Land (Low to High Intensity)	2.9	4.1	42.9%	0.8%
Open Water	2.4	2.7	10.4%	0.5%
Forested Land	2.1	2.2	3.8%	0.4%

Source: www.mrlc.gov/index.php

As in most of South Dakota, the climate of Jerauld 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 [4], while winter lows can drop below -20 degrees. Precipitation averages about 22 inches per year, much of which occurs during the spring and early summer. Following is climate data reported from the Wessington Springs weather station.

Table 2.2 - Monthly Climate Conditions in Jerauld County (1893 - 2013)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ave High	25.9	30.9	42.8	58.8	70.5	79.7	86.4	84.7	75.4	61.1	43.4	30.2
Ave Low	7.0	11.5	22.4	36.0	47.3	57.1	62.7	60.4	50.9	38.8	24.5	12.6
Ave Precipitation	0.4	0.6	1.5	2.7	3.4	3.7	2.9	2.3	1.9	1.7	0.8	0.5

Source: www.weather.gov/wrh/climate

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

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

[4] 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.

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, Jerauld County is expected to experience 14 more days per year that reach above 95 degrees Fahrenheit (from 21 days to 35 days per year) and the average annual temperature is expected to increase from 49°F to 52°F. No significant change in average annual precipitation is expected.

There is no consensus yet on climate change science, but it seems likely that communities that are already vulnerable to weather and climate extremes will be further stressed by more frequent extreme events. 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

Like many other rural counties in the Midwest, Jerauld County has been experiencing a steady population decline over the last several decades. The county's Census 2020 population of 1,663 is only 37 percent of the population that was recorded in 1950. As the table below shows, Jerauld County's population is expected to continue decreasing. The projections are based on an analysis of past population records and current age and sex cohorts in the county.

Table 2.3 - Jerauld 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
4,476	4,048	3,310	2,929	2,425	2,295	2,071	1,663	1,612	1,453	1,324

Source: U.S. Census

Race and Age

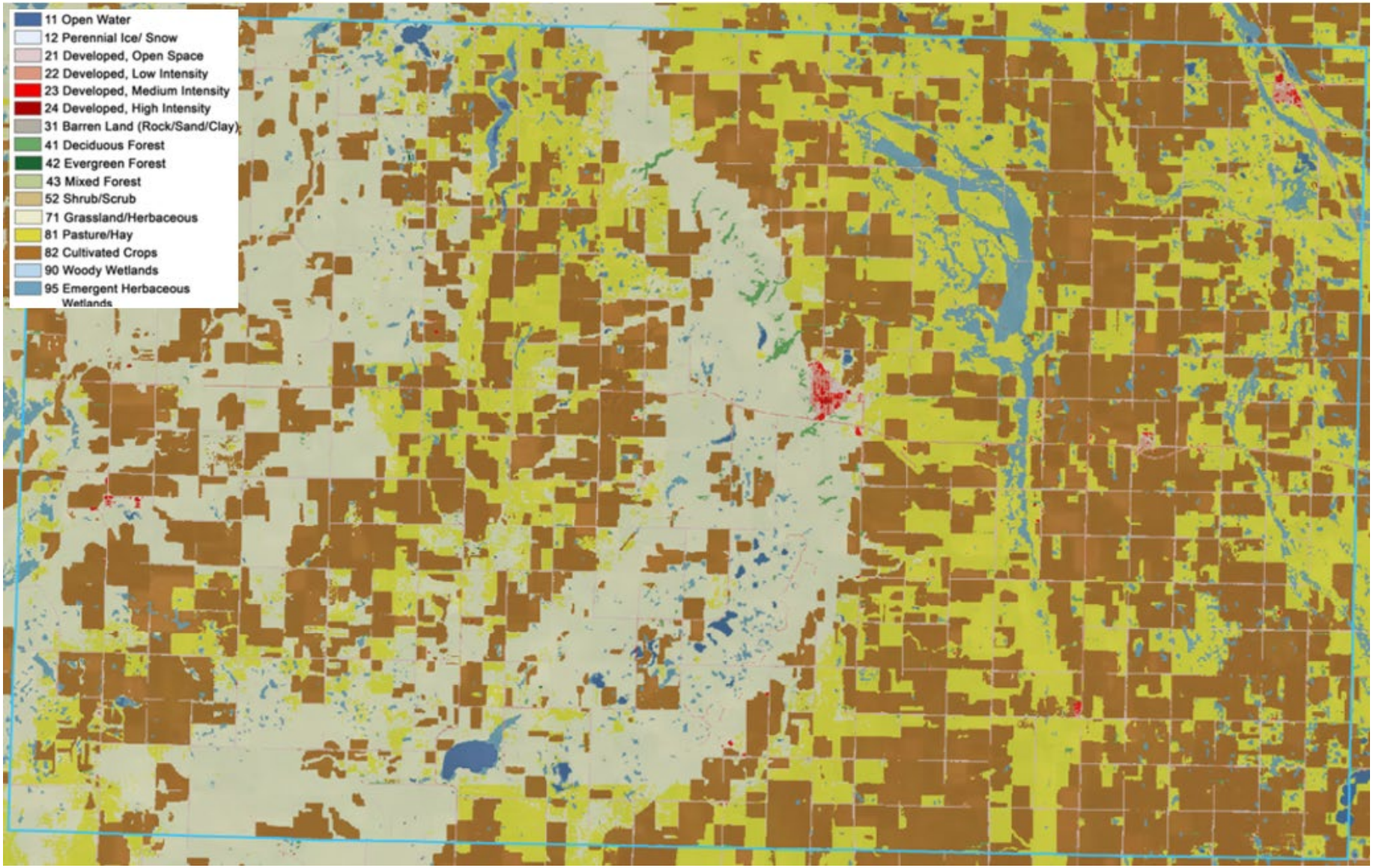
The population of Jerauld County is quite homogenous in terms of race. The current 17.5% representation of American Indians in the county is a significant increase over the 2010 figure of 13.2%. The population is also quite old, which indicates that many of the young people are forced to leave the county to look for jobs and opportunities elsewhere.

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
Jerauld County	93.6%	0.1%	0.8%	0.5%	3.0%	0.0%	4.4%	20.9%	30.9%	50.5
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

Figure 2.2 - County Land Cover (2023)



Income and Education

Income levels in Jerauld County are slightly below state and national figures, but poverty rates are somewhat lower. 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
Jerauld County	$66,607	9.1%	10.7%	10.5%	91.7%	16.8%	4.9%
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 Jerauld 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 retail trade. Industry and manufacturing are not significant, with the notable exception of the LSI Jack Links plant, which produces beef jerky and other meat products. The plant, located in Alpena, currently has approximately 1,200 workers, many of whom commute to work from outside the county. Tourism is significant during the fall hunting season when many people from outside the state come to hunt pheasants and other game.

Table 2.6 – Employment Sectors

	Jerauld County	South Dakota	United States
Agriculture, Forestry, Fishing, Mining	18.0%	6.4%	1.6%
Construction	2.2%	7.4%	6.9%
Manufacturing	8.8%	9.9%	9.9%
Wholesale Trade	4.5%	2.1%	2.2%
Retail Trade	12.8%	11.4%	11.1%
Transportation, Warehousing, Utilities	6.9%	4.4%	6.0%
Information	2.5%	1.5%	1.9%
Finance, Insurance, Real Estate	2.8%	6.0%	6.7%
Professional, Scientific, Management	5.7%	6.7%	12.6%
Education, Health Care, Social Assistance	22.7%	26.3%	23.1%
Arts, Entertainment, Recreation, Accommodation, Food Service	3.6%	8.8%	8.7%
Other Services	5.3%	4.3%	4.7%
Public Administration	4.2%	4.8%	4.6%

Source: American Community Survey 2022 1-Year Estimates

Vulnerable Populations

There are certain populations and social groups within Jerauld 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 Jerauld County has a low proportion of vulnerable people. The Centers for Disease Control Social Vulnerability Index shows Jerauld County with a rating of .1976 (0 being least vulnerable and 1 being most vulnerable), which indicates a low level of vulnerability. FEMA's Resilience and Planning Tool shows that the county's Community Resilience Challenges Index (CRCI) percentile is 26 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 Age, GINI (a measure of income inequality), and Lack of Civic Organizations.

The following table shows the percentage of the population in Jerauld County and each of the municipalities that fall into key metrics of social vulnerability, which is compared to the state and national average. One of the things that stand out is the high percentage of people over the age of 65 in the county, and especially in Wessington Springs. The high percentage of elderly people in Wessington Springs is presumed to be due to the Avera Weskota Memorial Hospital, which includes a large independent living apartment complex. The presence of this facility would also explain the high percentage of disabled people in Wessington Springs.

Table 2.7 – Social Vulnerability Indicators

Characteristic	Jerauld County	Alpena	Lane	Wessington Springs	South Dakota	United States
People living in poverty	9.1%	14.5%	0.0%	12.7%	12.5%	12.6%
People with a disability	16.0%	14.0%	19.0%	30.5%	13.2%	13.4%
People without health insurance	5.4%	7.9%	28.6%	1.8%	8.1%	8.0%
Adults without high school diploma	8.3%	12.0%	11.9%	8.2%	6.9%	10.4%
Population under 18	20.9%	30.0%	19.0%	15.2%	24.1%	21.7%
Population over 65	30.9%	21.1%	19.0%	43.0%	18.2%	17.3%
People with limited English proficiency	1.2%	5.3%	0.0%	0.0%	2.1%	8.4%
Households without internet subscription	15.4%	8.2%	37.5%	24.1%	13.0%	11.5%
Households without a vehicle	4.0%	1.2%	0.0%	9.2%	4.5%	7.5%

Source: American Community Survey 2022 1-Year Estimates

The margin of error for Alpena and Lane is well over 10% in some instances, due to their small size.

Infrastructure and Utilities

Transportation

Jerauld County's main transportation routes are US Highway 281 and SD Highway 34. There is one active railroad line in the county, which runs through the northeast corner of the

county past Alpena. Wessington Springs opened a local airport southeast of the City in the fall of 2003; its asphalt runway is approximately 3,600 feet in length.

Utilities

Water service is provided throughout most of rural Jerauld County by the Mid-Dakota Rural Water System, which also serves the towns of Alpena and Lane. Wessington Springs currently has its own municipal water system, which is supplied by water from local artesian wells, but will be switching over to Mid-Dakota in 2026. Alpena and Wessington Springs operate their own wastewater collection and treatment systems, while all other residences in the county use individual septic tanks and drainfields.

Solid waste service is provided by the Tri-County Landfill, which operates a landfill located in Brule County. Most of the household waste generated within Jerauld County ends up at the landfill. Designated rubble sites are located outside Alpena and Wessington Springs.

Electric power is provided to rural county residents by the Central Electric Cooperative. NorthWestern Energy serves residents of Alpena and Lane, while Wessington Springs operates its only municipal system. Natural gas services are not available anywhere in the county, except for the LSI Jack Links plant in Alpena.

Services

Medical Services

The only medical facility in Jerauld County is the Avera Weskota Memorial Hospital in Wessington Springs. Its campus features a hospital, clinic, nursing home, and independent living apartments. The hospital has a generator for backup power. People needing serious medical attention can be transported to trauma-center hospitals in Sioux Falls or elsewhere.

Fire and Emergency Response

Fire departments are based in Alpena and Wessington Springs, each in conjunction with an ambulance service, and the Spring Valley Colony also has firefighting capabilities. The departments have basic firefighting and rescue equipment, and they respond to structural fires, wildland fires, and to accident situations. The departments also have some capabilities regarding hazardous material (hazmat) response, but a serious incident likely would require assistance from outside the county.

Education

The only school in Jerauld County is located in Wessington Springs. Education through the high school level is available for children living at the Spring Valley Hutterite Colony. Post-secondary education is not available in the county.

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 Jerauld County become disaster resilient and keep county residents safe, and it answers the following questions: What are the hazards that could affect Jerauld 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 [5]. Following this, the planning participants reviewed historical records of hazard events that have occurred in the county, relying on the National Climatic Data Center's Storm Events Database. See **Table C.2** in **Appendix C** for a list of the storm events. 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 – these hazards, which include earthquakes, landslides, and expansive soils, are profiled in the South Dakota Hazard Mitigation Plan, but the overall significance of such hazards is rated as low, and the state does not appear to be particularly vulnerable to such events. 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 Jerauld County in any 100-year period, and virtually no chance of a magnitude 6 or greater earthquake [6]. The largest magnitude earthquake recorded in the county was a 4.2 magnitude quake, which occurred in July 1946. Regarding landslides, a review of the United States Geological Survey's Landslide Incidence and Susceptibility Map shows virtually no chance of a significant landslide occurring in Jerauld County. Earthquakes and landslides were the two lowest ranking hazards facing the county, according to the survey conducted for this plan.
- 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.

[5] Although Flooding did not rank highly among the concerns of survey respondents, the planning team felt it was important to consider this hazard.

[6] 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.

- 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 Jerauld 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 more or less 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 comprehensive list of weather-related hazard events recorded in the county from the National Climatic Data Center's Storm Events Database and records of hazard events that resulted in a major disaster declaration in the county.
- ***Probability*** of occurrence of a hazard impacting an area is the likelihood that such an event will occur. In this plan, a hazard with a "high" probability is one that is expected to occur at least five times over a ten-year period, a "moderate" probability hazard is expected to occur from two to five times in any given ten-year period, and a "low" probability hazard would be expected to occur no more than twice per ten-year period. 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 historically occur from late fall to the middle of spring, varying in intensity from mild to severe. There is a long warning time associated with most winter storms, giving people time to prepare, but they

still have a major impact in South Dakota, regularly destroying property and killing livestock. These storms can immobilize a region by blocking transportation routes, which can disrupt emergency and medical services, hamper the flow of supplies, and isolate homes and farms, sometimes for days. 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. According to the survey conducted for this plan, winter storms are the 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 that reduces 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 does make the ground very slippery, increasing the number of traffic accidents and personal 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.

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

In January 1995, an ice storm caused damage to electric power lines in 21 counties in South Dakota, resulting in FEMA Disaster Declaration 1045. Unusual foggy January weather resulted in a heavy crust of ice forming on many of the power lines in central South Dakota, including Jerauld County. The fog crust was three to five inches in diameter. The addition of high winds caused power poles to snap. Deep drifts of snow made it difficult for power company repairers to gain access to the damaged power lines, and in many areas county snow removal equipment was required to provide access. In the affected counties, at least 13,435 households were without electric power for varying periods of time, with some homes without power for 12 days. Statewide, more than 1,700 power poles had to be replaced, and the damage estimate was over $3.8 million.

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 Jerauld 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.

A winter storm in 2001 resulted in FEMA Disaster Declaration 1375. Statewide, the event caused over $10,000,000 in estimated damages. In Jerauld County, there was approximately $30,000 in public assistance costs (including $12,370 in Wessington Springs), and over $25,000 in damage to rural electric infrastructure.

Another very serious winter storm to impact Jerauld 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. In Jerauld County, the storm resulted in over $20,000 in public assistance costs in Wessington Springs and Alpena, and $696,415 of reported damage to electric utility infrastructure. Alpena and Wessington Springs were without power for five days.

A very damaging ice storm struck the area in January 2010, resulting in FEMA Disaster Declaration 1887. This event caused approximately $600,000 of damage to the Central Electric Cooperative's infrastructure in Jerauld County.

A late-season winter storm struck South Dakota in March 2019, resulting in FEMA Disaster Declaration 4440. The storm resulted in approximately $250,000 of public assistance funds allocated in Jerauld County.

Probability

A total of 70 winter storm events, including blizzards, ice storms, heavy snow, and extreme cold events, have been recorded in Jerauld County since the mid-1990s, an average of over two per year (see **Table C.2 in Appendix C**). Therefore, based on the historic evidence, the probability of a significant winter storm affecting Jerauld 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.

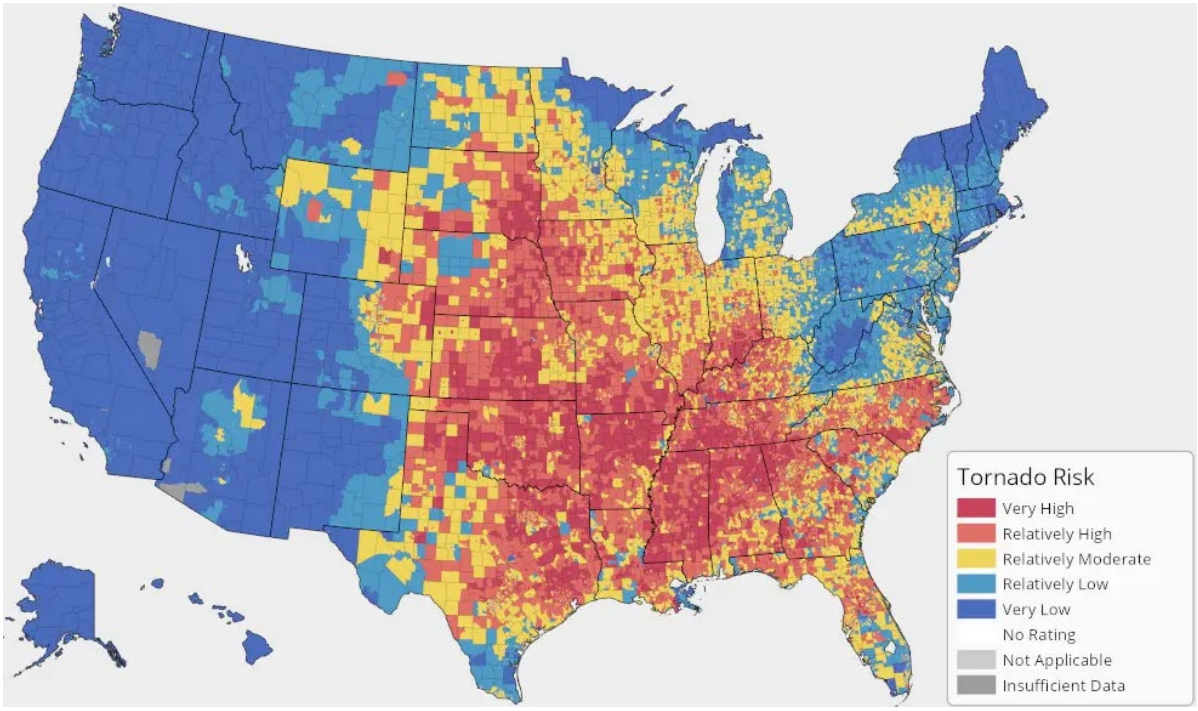
Summer storm

Description

Summer storms can include heavy rainfall, hail, tornadoes, and thunderstorm activity. These events usually are associated with unstable weather conditions. In Jerauld 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 Jerauld County reports some kind of hail damage to crops or property.

Tornadoes are the most dramatic type of summer storm experienced in Jerauld 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. According to the survey, tornadoes are the second most serious hazard facing the county, behind only winter storms.

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 next page (it is difficult to tell at this scale, but Jerauld County is in the 'Relatively High' 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 Jerauld 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 more than 20 thunderstorms and high wind events that produced wind speeds over 60 knots, including two that were over 70 knots. **Table C.2** shows more than 30 events with hail at least one inch in diameter, including six events with hail at least two inches in diameter. In terms of onset, summer storms typically develop with a long warning time, although certain hazards associated with such storms, such as hail or tornadoes, can develop more suddenly.

Regarding tornadoes, **Table C.2** shows four records of a tornado with a magnitude greater than F1 – three EF2 tornadoes and an EF4. The following table lists the entire range of tornado strength according to the enhanced Fujita scale.

Table 3.1 – 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 sJeraulded; 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 Jerauld County. **Table C.2** in **Appendix C** lists many other significant summer storms that have impacted the county. The most damaging tornado strike in Jerauld County occurred in June 2014 when a tornado damaged at least 43 homes in Wessington Springs, making at least 26 of them uninhabitable, and damaged or destroyed 12 businesses. The tornado also damaged powerlines, power poles, and trees, resulting in power outages to the entire town. Damage to public infrastructure was approximately $1.2 million.

Probability

As shown in **Table C.2 in Appendix C**, a total of 78 summer storm events, including hailstorms, thunderstorms, lightning, and tornadoes, have been recorded in Jerauld County since 1960, an average of more than one per year. Fourteen of these storms involved a tornado. From this information, the probability of a summer storm affecting Jerauld County in a given year is 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. According to the survey, flooding is not among the most serious hazards facing the county, ranking above only landslides and earthquakes.

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

- Flash flooding, which results from several inches or more of rain falling in a very short period. 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. There are no high or significant hazard dams in Jerauld County, so this is not an issue.

Location

Many areas of Jerauld County are vulnerable to flooding. The flooding that occurs typically happens during wet springs after winters with heavy snow cover, but flash flooding after very heavy rain also causes trouble. Typical damage includes washed out or damaged roads and culverts. Most of the flood prone area is located east of the Wessington hills, including land adjacent to Firesteel Creek.

Extent

The extent of flooding in Jerauld 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.

The flooding that occurred in Jerauld County in 2019 was notable for its severity and widespread impact. The flooding caused some county and township roads in the eastern part of the county to be closed for over a month.

History

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

Flooding in 1993 resulted in FEMA Disaster Declaration 999, which impacted 39 counties in South Dakota. The flood caused $53,427,320 in damage throughout the state, and

$11,024,621 of damage to public infrastructure. At the time, the disaster was considered one of the top ten natural disasters ranked by FEMA relief costs.

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 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 was over $35 million, which included $9.3 million in damage to public infrastructure.

Flooding in 1997 resulted in FEMA Disaster Declaration 1173, which was declared for all counties in South Dakota. At the time, the event was considered one of the top ten natural disasters ranked by FEMA relief costs. From November 1996 through February 1997, the weather across the eastern part of the state was cold and very wet, with record snowfall in many places. The persistent cold limited snowmelt between storms, causing snow to pile up to 24 inches deep in places. An April blizzard added to the snowpack, 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, taking the lives of two people.

Flooding in 2008 resulted in FEMA Disaster Declaration 1774. Although Jerauld County was not included in the disaster declaration, fairly significant damage to rural roads in the county did occur. One of the hardest hit roads was 365th Avenue, which leads to the Spring Valley Colony.

Flooding in 2010 in eastern South Dakota was the worst in a decade, resulting 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. Damage was extensive in Jerauld County, with public assistance costs of about $420,000. Additional flooding occurred in the county later in 2010 and then again in 2001 (see **Table C.1**).

In July 2010, a freak rain event that dumped almost ten inches of rain in a short period of time caused widespread flooding of roads, fields, and basements. Many houses in Wessington Springs received water damage. The Avera Weskota Memorial Hospital was one of the facilities in the city impacted by the event, suffering approximately $5,000 of damage.

Flooding in 2019 had a major impact throughout the year in Jerauld 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, with about $250,000 of public assistance costs in the county.

Probability

Table C.2 shows that eight flooding events have been recorded in Jerauld County since the mid-1990s, but some of the events appear to have been a recording of ongoing flood conditions. Excluding these events, it appears that there have been five separate flood events in Jerauld County since the mid-1990s, or less than two every ten years. Based on this analysis, the probability of flooding occurring somewhere in the county in a given year can be considered low. **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 of time, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals, and/or people. It is a normal, recurrent feature of climate that occurs in virtually all climate zones. Human factors, such as water demand and water management, can exacerbate the impact that drought has on a region. According to the survey, drought is the third most serious hazard facing the county.

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

Drought in South Dakota is often accompanied by periods of extreme heat, which is defined by FEMA as a condition in which the air temperature hovers at least 10° Fahrenheit above 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.

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, Jerauld County has experienced many years of below average annual precipitation, including some years in which precipitation was less than two thirds of normal. In terms of duration, it is not unusual for Jerauld County to experience periods of below normal precipitation that last for several months. During the 1930s, drought conditions persisted for multiple years. In an area that is so highly dependent on agriculture, the impact of a major drought can be significant. Although most agricultural producers now have crop insurance and agricultural practices today are more advanced, the impacts of drought can still be serious.

History

Jerauld County has experienced many significant droughts in its history. 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. Drought in 2012 was so devastating that the State of South Dakota activated a Drought Task Force.

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

Probability

Table C.2 in **Appendix C** shows at least one drought record in Jerauld County in nine 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

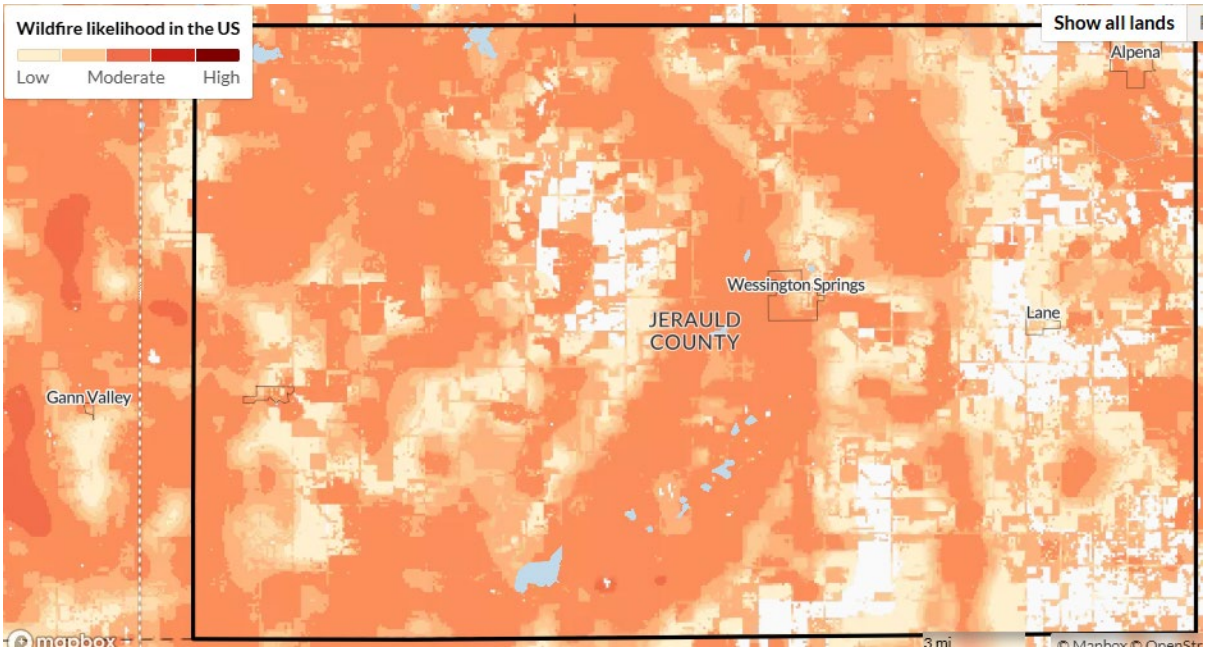
Description

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. Wildfires are not as serious a concern in Jerauld County as they are in other more forested parts of the country, but the opinion of the planning team

is that the hazard does warrant some attention in this plan. According to the survey, wildfire is the fifth most serious hazard facing the county.

Location

Wildfires are most likely to occur in large areas of extensive brush or unmanaged vegetation, including grassland, which makes up almost 30 percent of Jerauld County's land base and is especially prevalent in the western half of the county. Grassland fires are quite dangerous because they tend to spread faster than forest fires and are thus difficult to attack. 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 if it occurs).



Extent

Each of the fire departments in the county submits reports to the South Dakota Division of Wildland Fire about the fires they fight. The division compiles the reports and produces a comprehensive database of all the records, which the planning team was able to obtain for fires occurring in the county from 2000 through 2024. The following table summarizes this information in terms of the size of the fires that have been fought. It shows that most of the fires have been fairly small, most impacting no more than a few acres.

Table 3.2 – Wildfires in Jerauld County (2000 - 2024)

1 to 9 Acres	10 to 49 Acres	50 to 99 Acres	100 to 249 Acres	250 Acres or More	Average Annual Acres Burned
72	32	10	10	3	161

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

According to the database, common causes of wildfires in Jerauld County are from debris that catches fire and equipment that ignites vegetation. Several fires caused by lightning also are noted. Information is not available on the dollar amount of damage caused by any of the wildfires, or whether any injuries or deaths occurred.

History

Some notable wildfires have occurred in Jerauld County, but nothing on a truly destructive scale. The largest fire to occur in the county in recent years burned 400 acres southwest of Wessington Springs in 2000.

Probability

Wildfires affecting less than ten acres are likely to occur somewhere in Jerauld County most years, but large-scale wildfires are much less common. **Table 3.2** shows only three wildfires over 250 acres in size occurred between 2000 and 2024. Based on this period of analysis, the probability of a significant wildfire can be considered low. The probability of wildfire causing serious damage also is 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 Jerauld County are identified, including critical facilities and infrastructure, major employers, and other resources and activities important to the community. Assets that would play an important role in helping the community prepare for and respond to a hazard event are also included.

Government offices

- Jerauld County Courthouse, Wessington Springs
- Alpena City Office
- Lane City Office
- Wessington Springs City Office

Community facilities

- Alpena Community Center
- Jerauld County Ag Building, Wessington Springs

Utilities

- Alpena water tower
- Alpena sewage treatment lagoon
- Wessington Springs sewage treatment lagoon
- Wessington Springs water tower

Medical facilities

- Avera Weskota Memorial Hospital, Wessington Springs

Educational facilities

- Wessington Springs school (K-12)

Major employers

- LSI Jack Links, Alpena

Other important resources and activities

- Wessington Springs Foothills Rodeo (held in summer on Jerauld County 4-H Grounds)
- Music in the Garden (held in summer at Shakespeare Garden in Wessington Springs)

Emergency preparedness and response

- Jerauld County Emergency Management Office, Wessington Springs
- Jerauld County Sheriff's Office, Wessington Springs
- Wessington Springs Police Department
- Alpena Fire Department
- Wessington Springs Fire Department
- Jerauld County Highway Department, Wessington Springs
- Disaster relief shelters in Alpena and Wessington Springs (see p.50)
- Emergency shelters in Alpena and Wessington Springs (see p.50)

Hazard Impact Analysis

This section assesses the vulnerability of Jerauld 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 [7].

- 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 Jerauld 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 due to a variety of natural hazards.
- 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. Factors considered include development trends in the county, which were obtained through an analysis of Census data and population projections, and through discussion with local officials about where housing development and other growth may be likely to occur. Other factors, including the possible impact of climate change, also are considered.

At the end of the chapter, the county's vulnerability to each hazard is summarized. Vulnerability is characterized as either "Low", "Moderate", or "High", based on the results of the risk analysis.

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

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

because of accumulated snow for days or even weeks. Winter storms also can kill or injure livestock and can cause significant crop losses when they occur early in the growing season.

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

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

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

Prior Events:

A total of 70 winter storm events, including blizzards, ice storms, heavy snow, and extreme cold events, are shown in the National Climatic Data Center's Storm Events Database for Jerauld County through 2024 (see **Table C.2 in Appendix C**). In comparison, the average for South Dakota counties is 104 winter storm events. This would indicate that Jerauld County might be somewhat less prone to experiencing adverse winter weather than other counties in the state, although consideration should be given to the fact that Jerauld County's total land area is only about half the size of the average South Dakota county.

Past Damage Amounts:

Winter storms have the potential to cause significant amounts of damage. The ice storm that occurred in November 2005 caused almost $700,000 in damage to Central Electric Cooperative infrastructure within Jerauld County and many other winter weather events have caused significant amounts of damage in the county (see **Table C1** and **Table C2** in the appendix).

Given Jerauld County's agriculturally based economy, another method to determine vulnerability is to look at the impact of winter storms on the county's agricultural producers. Farmers typically protect themselves from the impacts of adverse weather and other natural hazards by insuring their crops against losses through multi-peril crop insurance, which is underwritten by the Risk Management Agency, a part of the U.S. Dept of Agriculture. Data on indemnity payouts for crop loss in Jerauld County due to various types of winter weather events between 2000 and 2023 was obtained from the Risk Management Agency and is

presented in the following table. During this period of analysis, winter weather-related payouts represented approximately 5% of all indemnity payouts in Jerauld County.

Table 3.3 – Crop Loss Due to Winter Weather

Year	Frost	Freeze	Cold Winter	Cold Wet Weather
2000	$893	$0	$6,490	$0
2001	$0	$0	$798,011	$4,563
2002	$13,069	$10,444	$25,390	$30,773
2003	$6,880	$5,044	$41,016	$0
2004	$77,798	$27,126	$4,693	$2,479
2005	$5,262	$2,316	$7,914	$1,204
2006	$0	$0	$1,957	$0
2007	$0	$7,771	$52,848	$0
2008	$0	$847	$2,489	$688
2009	$0	$320,816	$480,057	$37,974
2010	$0	$0	$2,898	$72,519
2011	$2,169	$0	$8,821	$111,564
2012	$0	$4,203	$2,100	$4,995
2013	$0	$0	$249,982	$249,671
2014	$0	$2,244	$287,619	$8,550
2015	$0	$8,780	$496,645	$0
2016	$0	$10,081	$5,598	$28,801
2017	$0	$165,975	$106,612	$14,490
2018			$2,918	$96,211
2019				$209,642
2020			$42,246	$214,966
2021	$5,283		$9,369	
2022			$75,532	$13,879
2023				$10,311

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

Building Exposure:

The total value of buildings in Jerauld County is approximately $292,480,000, according to the South Dakota Hazard Mitigation Plan, which ranks the county 55th among the state's 66 counties. The median figure for South Dakota counties is approximately $606,000,000. The county's building exposure can thus be considered low.

Population Density:

Jerauld County is sparsely populated, with an average of just 3.1 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. Jerauld County would have to be rated low in terms of population density.

Future Vulnerability

Looking ahead, Jerauld County's vulnerability to winter storms is not expected to increase significantly in the foreseeable future and may in fact decrease somewhat if the population continues to decrease as expected. However, climate change may have an impact on local

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

Summer Storms

All areas of Jerauld 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, Jerauld 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:

For this analysis, only the number of tornadoes and major hail events (hail at least one inch in diameter) are considered, due to inconsistencies in how the other types of summer storms are recorded in the National Climatic Data Center's Storm Events Database [8]. A total of 14 tornadoes and 22 major hail events were recorded for Jerauld County. In comparison, the average number of tornadoes for South Dakota counties is 28 and the average number of major hail events is 57. This would indicate that Jerauld County might be less prone to experiencing severe summer weather than other counties in the state, but again consideration should be given to the fact that Jerauld County's total land area is only about half the size of the average South Dakota county.

Past Damage Amounts:

Summer storms have the potential to cause significant amounts of damage. As shown in **Table C.2**, many summer storm events have caused property or crop damage in the county.

[8] The analysis goes back to 1960 for tornadoes and 2000 for hail events.

As with winter storms, another method to determine the county's vulnerability to summer storms is to look at the impact of such storms on the county's agricultural producers. Summer storms can cause a lot of damage to cropland, especially when they are accompanied by hail. Data on indemnity payouts for crop loss in Jerauld County due to hail as well as high wind events between 2000 and 2023 was obtained from the Risk Management Agency and is presented in the following table. During this period of analysis, summer storm-related payouts represented approximately 4% of all indemnity payouts in Jerauld County.

Table 3.4 – Crop Loss Due to Severe Summer Weather

Year	Hail	High Wind		Year	Hail	High Wind		Year	Hail	High Wind
2000	$533,245	$19,942		**2008**	$227,506	$14,396		**2016**	$2,468	$70,904
2001	$1,862			**2009**	$671,519			**2017**	$83,336	$12,805
2002	$746			**2010**				**2018**	$179,419	$4,318
2003	$4,761	$2,697		**2011**		$6,816		**2019**	$601	$110,763
2004		$12,347		**2012**	$37,149	$8,780		**2020**		$2,642
2005	$190,153	$12,478		**2013**	$19,315	$1,603		**2021**	$428,296	
2006	$2,868	$8,375		**2014**	$4,375	$6,308		**2022**	$453,190	$301,518
2007		$2,749		**2015**	$141,199			**2023**	$19,025	

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

Building Exposure:

The total value of buildings in Jerauld County is approximately $292,480,000, according to the South Dakota Hazard Mitigation Plan, which ranks the county 55th among the state's 66 counties. The median figure for South Dakota counties is approximately $606,000,000. The county's building exposure can thus be considered low.

Population Density:

Jerauld County is sparsely populated, with an average of just 3.1 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. Jerauld 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 the housing stock in each town is older than the state average, and an assumption can be made that some of the older houses may not be built as sturdily as newer homes, thus 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 worse in Alpena and Lane, given the high percentage of mobile homes in those communities.

Table 3.5 – Housing Stock Characteristics

Community	Housing Stock Built Before 1960	Housing Stock Built Since 2000	Mobile Homes
Alpena	66.5%	5.3%	17.6%
Lane	62.5%	12.5%	12.5%
Wessington Springs	48.9%	5.7%	5.2%
South Dakota	*26.4%*	*31.5%*	*6.4%*

Source: 2020 US Census (DP04 Selected Housing Characteristics)

Future Vulnerability

Looking ahead, the county's expected decline in population suggests that vulnerability to summer storms is not likely to increase in the future. 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 South Dakota.

Flooding

Like all counties in South Dakota, Jerauld is vulnerable to flooding, even though there are no designated flood hazard zones anywhere in the county, nor are there any repetitive loss or severe repetitive loss properties. Because of the specific nature of flooding, the county's vulnerability to flooding will be analyzed first on a general county-level basis, and then specifically for each community. Given the degree to which flooding is geographically based, this approach made the most sense to the planning team.

General Flood Vulnerability

According to the HAZUS analysis that was run for the South Dakota Hazard Mitigation Plan (see Table 3-45 of that plan), the potential building damage loss from flooding in Jerauld County is $591,000, whereas the median figure for all South Dakota counties is approximately $2,800,000. The building damage loss ratio (the percent of the total building inventory value that could be damaged from flooding in any given year) of 0.3 percent is one of the lowest among South Dakota counties and well below the median value of 0.8 percent. The potential displaced population in Jerauld County was determined to be 77 people, well below the median value of South Dakota counties of approximately 255 people.

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. Data on indemnity payouts for crop loss in Jerauld County due to flooding, as well as excess moisture/precipitation, between 2000 and 2023 was obtained from the Risk Management Agency and is presented in the following table. During this period of analysis, flood-related payouts represented about 27% of all indemnity payouts in Jerauld County.

Table 3.6 – Crop Loss Due to Flooding

Year	Flooding	Excess Moisture/ Precip		Year	Flooding	Excess Moisture/ Precip		Year	Flooding	Excess Moisture/ Precip
2000		$406,320		**2008**		$602,622		**2016**		$611,493
2001		$1,798,593		**2009**		$403,421		**2017**		$2,960
2002		$55,638		**2010**		$2,063,876		**2018**		$364,609
2003		$36,800		**2011**		$2,922,511		**2019**		$9,405,420
2004		$99,052		**2012**		$95,175		**2020**		$1,890,400
2005		$170,733		**2013**		$233,524		**2021**		$28,940
2006	$54,536	$6,340		**2014**		$2,719		**2022**		$296,875
2007		$698,752		**2015**		$11,287		**2023**		$6,546

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

2019 was probably the worst year ever in terms of flooding's impact on South Dakota's agricultural producers. The state ranked first in the nation with almost 4 million acres of farmland prevented from being planted due to flooding, more than double the next nearest state. However, Jerauld County was not impacted as much as most other counties in the state. Approximately 36,000 acres of land in Jerauld County were not planted due to flooding in 2019, which was 14% of land that would otherwise have been planted, ranking the county 28th 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 number of housing units at risk of flooding and the assessed value of residential dwellings and commercial buildings at risk. The following table summarizes the results of the analysis (note that both analyses may have included a small amount of land outside the communities, in which case some of the values in the table could be somewhat inflated).

Table 3.7 – Community Flood Loss Estimation

Community	Building Structural Damage	Debris Generated (Tons)	Households Displaced	People Needing Shelter	Housing Units at Risk	Assessed Value of Property at Risk
Alpena	$48,700	52	17	0	19	$2,091,000
Lane	$0	0	1	0	0	$0
Wess Springs	$27,500	14	6	0	0	$0

Sources: FEMA HAZUS loss estimation software; Jerauld 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. Fewer than 1% of residential properties in Alpena are at risk and only about 3% of residential properties in Lane and Wessington Springs are at risk.

Future Vulnerability

Looking ahead, the population of Jerauld County is expected to continue declining, and no major development has occurred in the county since the current plan was developed, both of which indicate the county's vulnerability to flooding is not likely to increase. 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 Jerauld 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, Jerauld 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 Jerauld County have crop insurance, which helps lessen the financial impact of droughts and other natural disasters. Modern agricultural practices, such as no-till farming and the development of more drought-tolerant crops, can also help farmers better withstand years of below average rainfall.

Data on indemnity payouts for crop loss in Jerauld County due to drought and heat between 2000 and 2023 was obtained from the Risk Management Agency and is presented in the following table. During this period of analysis, drought-related payouts accounted for about 59% of all indemnity payouts in Jerauld County, by far more than any other hazard. It is safe to say that drought has a major impact on Jerauld County farmers [9].

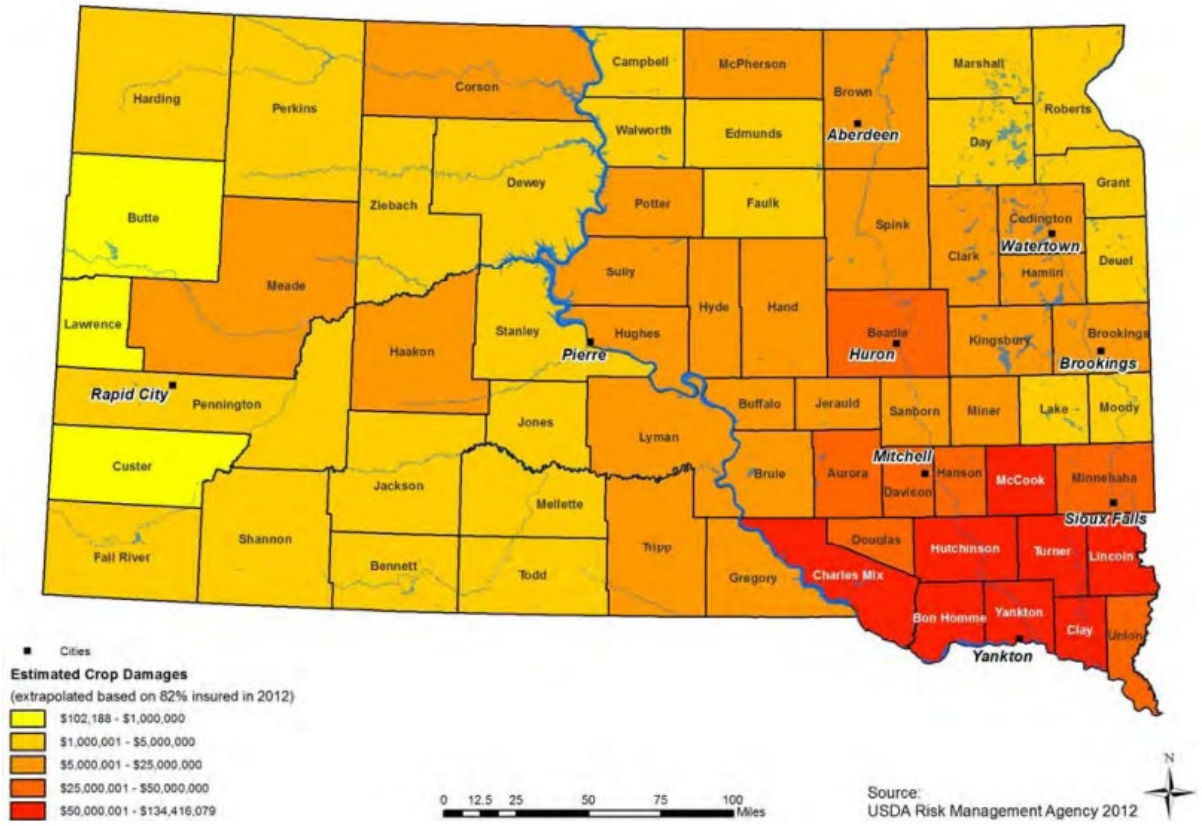
Table 3.8 – Crop Loss Due to Drought and Heat

Year	Drought	Heat		Year	Drought	Heat		Year	Drought	Heat
2000	$1,495,513	$3,369		**2008**	$317,355	$21,916		**2016**	$272,255	$97,048
2001	$578,561	$19,657		**2009**	$210			**2017**	$6,641,402	$62,512
2002	$5,164,721	$81,593		**2010**	$1,847			**2018**	$233,539	$23,061
2003	$1,523,204	$68,851		**2011**	$6,738			**2019**	$2,816	
2004	$112,003	$454		**2012**	$5,823,023	$204,807		**2020**	$42,350	$6,051
2005	$1,080,708	$230,357		**2013**	$695,244			**2021**	$2,619,240	$264,792
2006	$5,613,119	$459,717		**2014**	$363,757			**2022**	$9,496,889	$813,365
2007	$239,517	$27,503		**2015**	$665,099			**2023**	$3,473,083	$647,083

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

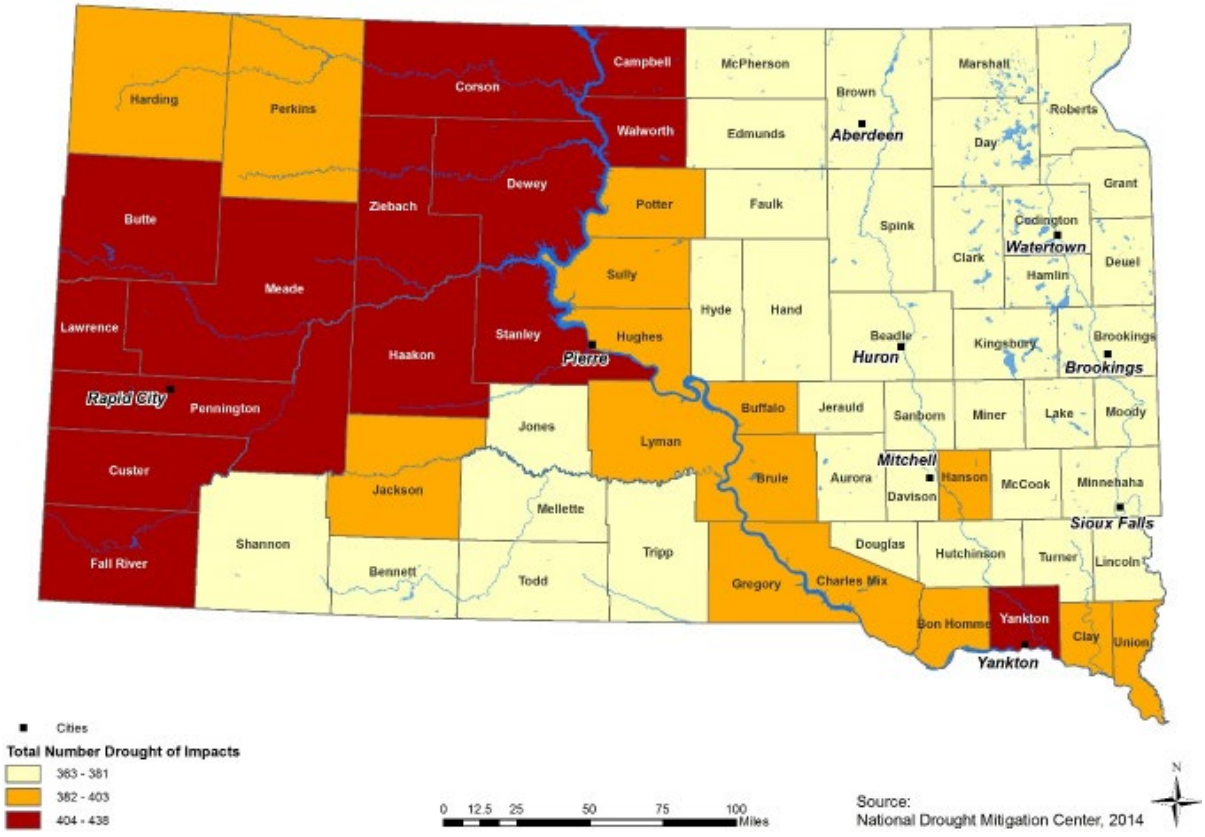
[9] Drought is the costliest natural hazard statewide for South Dakota farmers. From 2000 through 2017, drought payouts accounted for approximately 50% of all indemnity payouts in the state.

The 2012 drought had a major impact on the state's agricultural producers. Jerauld did not suffer as much crop loss that year as counties in the southeastern part of South Dakota did, but the impact was still considerable. The figure below, as reproduced from the South Dakota Drought Mitigation Plan, shows the 2012 drought's impact statewide.



To determine which areas of the state are most vulnerable to the agricultural impacts of drought, the authors of the South Dakota Drought Mitigation Plan 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. Jerauld County's average annual loss from drought for the 2000 – 2014 period was $1,867,807, compared to a total crop value of $62,010,000, resulting in a loss ratio of 3.0%. In comparison, the average loss ratio figure for South Dakota counties was 3.1%. The authors of the South Dakota Drought Mitigation Plan assigned a "Low" vulnerability rating for Jerauld County for this measure of drought vulnerability.

Vulnerability also was assessed by reviewing the South Dakota Drought Mitigation Plan's section on the National Drought Mitigation Center's Drought Impact Reporter. The Drought Impact Reporter analyzes drought impact information from a broad range of areas, including the social, economic, and environmental realms. As shown in the figure on the next page from the South Dakota Drought Mitigation Plan, Jerauld County is in the lower range of counties in terms of the number of drought impacts.



Future Vulnerability

Vulnerability to drought may increase in coming years if current land use trends continue and more marginal land in the county is brought into agricultural production. Climate change also may increase the frequency and severity of droughts in the future. The expected increase in Jerauld 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 Jerauld County was analyzed using two different sources. According to the U.S. Forest Service's Wildfire Risk to Communities website, Jerauld County's overall wildfire risk is considered medium, higher than 60% of the counties in the United States and 51% of South Dakota's counties, although the risk in Wessington Springs is considered to be high. Information from the SILVIS Lab at the University of Wisconsin shows that a total of 39 housing units are located in the Wildland-Urban Interface, which are locations vulnerable to wildfires because of a combination of dense housing and vegetation. The 39 housing units at risk represent 4.1% of the total housing stock in Jerauld County. For comparison, the statewide figure is 25.9%. The table on the following page summarizes the overall risk in Jerauld County.

Table 3.9 – Housing Stock in Wildfire Risk Zones in Jerauld County

Houses At Risk	Median Housing Value in Jerauld Co.	Total Value of Homes at Risk
39	$117,600	$4,586,400

Sources: silvis.forest.wisc.edu/data/wui-change; 2020 U.S. Census/American Community Survey

Future Vulnerability

Looking ahead, the population of Jerauld County is expected to continue to decline, so vulnerability to wildfires is not likely to increase. One factor that could increase wildfire vulnerability is the continued spread of cedar trees. These trees are spreading quickly in Jerauld County, 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 Jerauld 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 30 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 more or less equally.

- **Winter Storms**

Jerauld County's vulnerability to winter storms can be considered at least moderate. The authors of the South Dakota Hazard Mitigation Plan assigned Jerauld a rating of Moderate when considering prior winter storm events in the county, the county's building exposure, and the county's 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 of Wessington Springs or Alpena puts them at increased risk. If roads are blocked by snow for extended periods of time, residents outside these communities may not have access to groceries, medical supplies, or other essential items. 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**

Jerauld County's vulnerability to summer storms can be considered moderate. The authors of the South Dakota Hazard Mitigation Plan assigned Jerauld a rating of Moderate when considering prior tornado events in the county, the county's building exposure, and the county's 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 Alpena and Lane, both of which have a relatively high percentage of mobile homes, which can be overturned by winds of 60 to 70 miles per hour if they are not anchored properly. In Alpena 18% of the housing stock consists of mobile homes and in Lane the percentage is 13%; the statewide figure is 6%.

- **Flooding**

The overall vulnerability of Jerauld County to flooding can be described as low to moderate. According to the vulnerability analysis conducted for the South Dakota Hazard Mitigation Plan, Jerauld's estimated flood loss is among the lowest in the state. Much of the vulnerability is to cropland and to rural county roads. Flooding in 2019 had a significant impact on the county, especially in Alpena, Franklin, and Blaine Townships in the eastern part of the county. One of the hardest hit roads was 392nd Avenue south of Alpena, which was closed off and on for a total of about 40 days. Following is a summary of vulnerability in each of the communities:

Alpena is vulnerable to flooding. As shown in **Table 3.7**, the total value of property vulnerable to flooding in the community is over $2 million. The flood prone areas are mostly undeveloped open space, although some residential housing is affected, particularly along Willow Avenue. The RiskFactor analysis found only a minor amount of residential flood risk in the community. Flooding in 2019 caused some road damage here, but no significant property damage.

Lane does not appear to be very vulnerable to flooding, although the HAZUS software did identify flood-prone areas outside the town. The RiskFactor analysis found only a minor amount of residential flood risk in the community. Flooding in 2019 caused a minor amount of basement flooding.

Wessington Springs does not appear to be very vulnerable to flooding, although the HAZUS software did identify a flood prone area along a wooded ravine just south of the community. Low level flooding does occasionally impact the city, especially when water runs off the Wessington hills following heavy precipitation events. The RiskFactor analysis found only a minor amount of residential flood risk in the community. Flooding in 2019 caused some road damage in Wessington Springs, but no significant property damage.

- **Drought**

Jerauld County's vulnerability to drought can be considered at least moderate 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 Low for Jerauld County in terms of drought's impact to crops between 2000 and 2014. The eastern half of the county with its heavier reliance on row crops may be somewhat more vulnerable than the western half, where grazing predominates. 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 Jerauld County can be considered moderate, although it may be somewhat higher in the Wessington Springs area. Approximately 4% of the county's population lives in a location vulnerable to wildfire, well below the statewide figure of 26%. No truly destructive wildfire has ever been recorded in the county. The risk assessment conducted for the South Dakota Hazard Mitigation Plan assigned a rating of Low for Jerauld County regarding aggregate wildland fire vulnerability.

Figure 3.1 – Alpena

Figure 3.2 – Lane

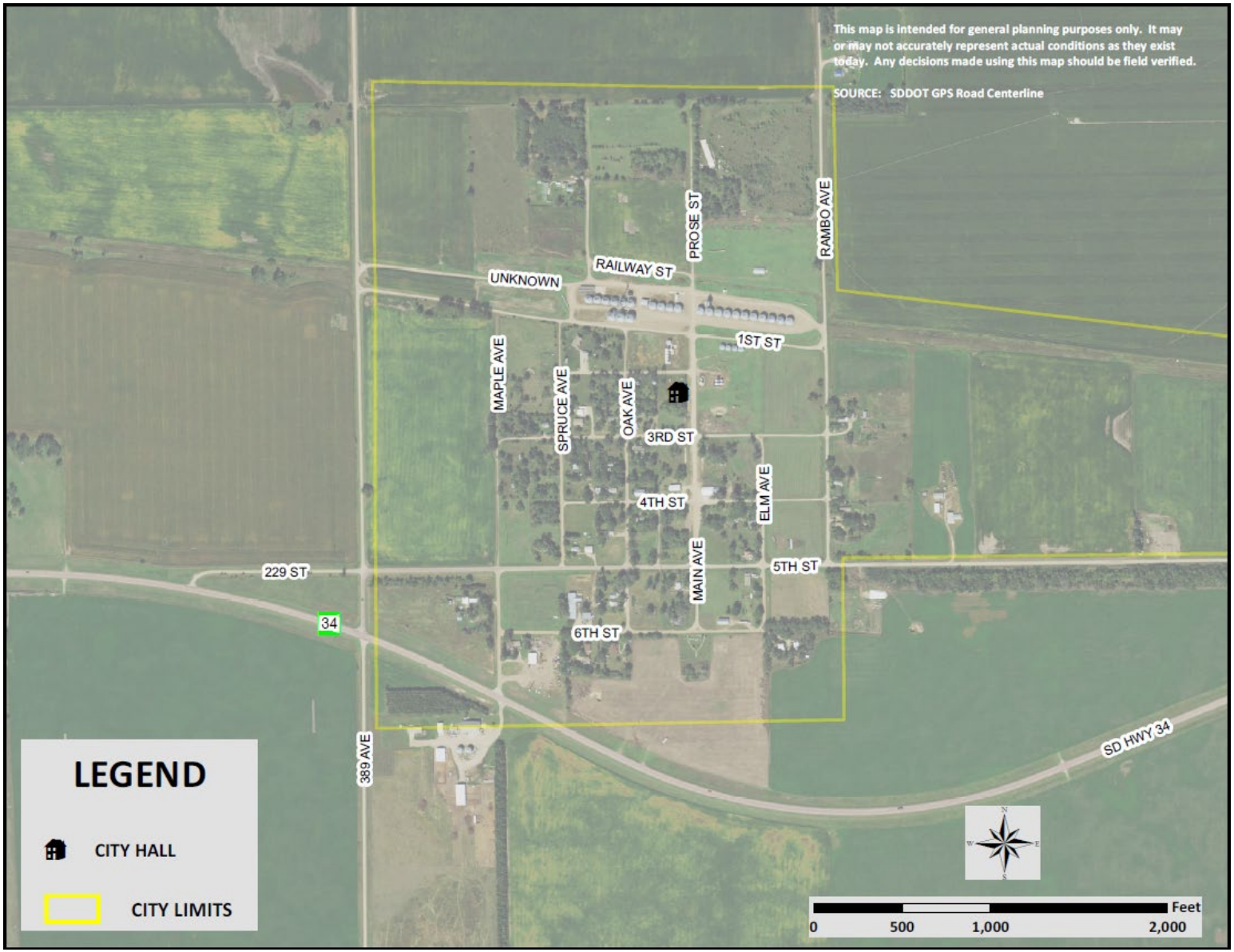
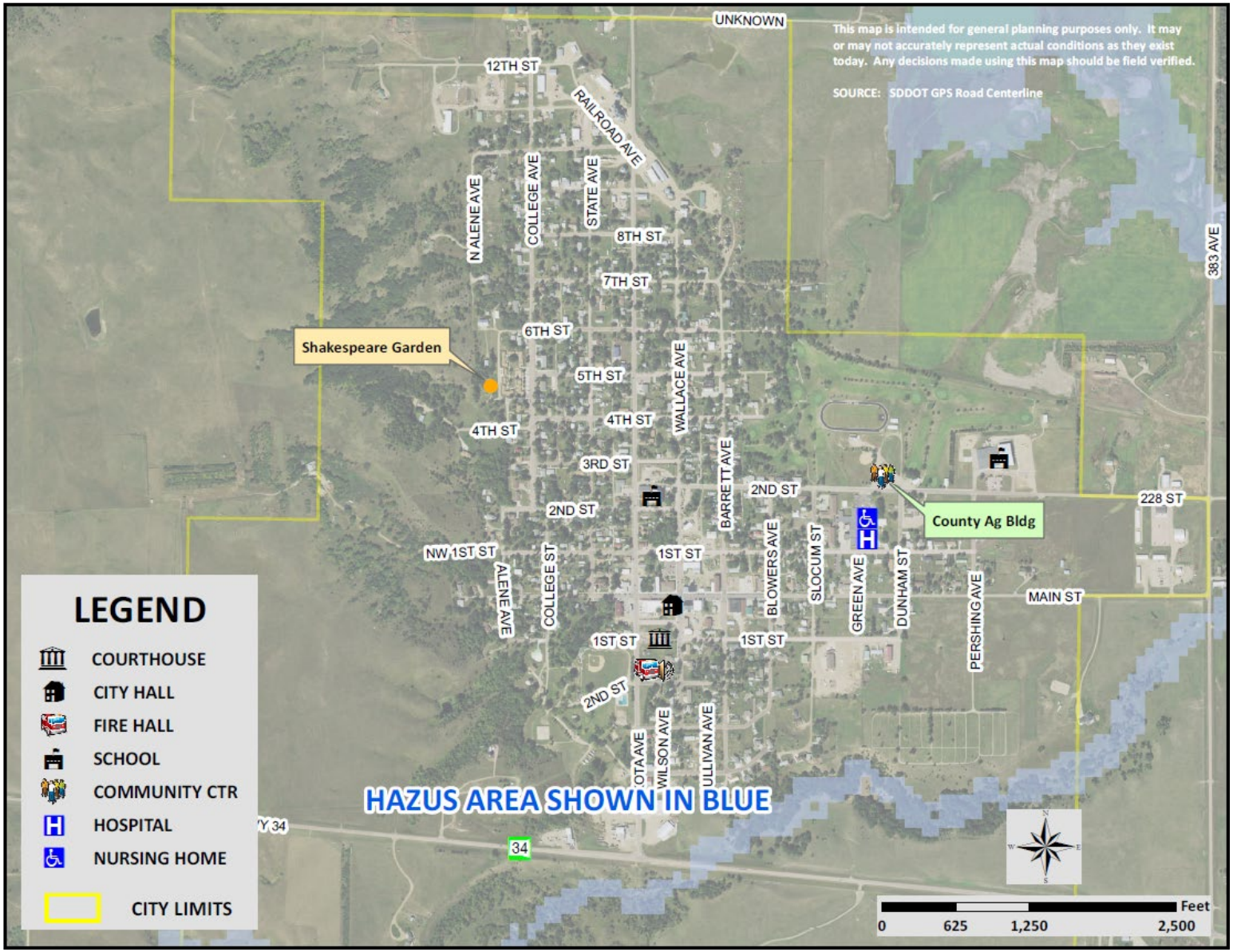


Figure 3.3 – Wessington Springs



CHAPTER IV
RISK MITIGATION STRATEGY

Background

The previous chapter described the types of hazards most likely to impact Jerauld 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 Jerauld County. For the purposes of this plan, these resources are divided into regulatory mechanisms and other capabilities.

Regulatory Mechanisms

Regulatory mechanisms and authorities in Jerauld County are limited. The following table summarizes the existing policies, programs, and resources within Jerauld County that can support the local mitigation strategy.

Table 4.1 – Regulatory Mechanisms

Item	Notes
Jerauld County Zoning Ordinance	The ordinance, which is based on the Jerauld County Comprehensive Plan, controls where growth and development can occur within the county.
Jerauld County Burn Ban Ordinance	This ordinance prohibits open burning during very dry periods. They are issued by the Jerauld County Emergency Management Office acting under the authority of the county commission.
Wessington Springs Zoning Ordinance	The ordinance, which is based on the City's comprehensive plan, controls where growth and development can occur within the city.

Jerauld County, Alpena, and Wessington Springs participate in the National Flood Insurance Program (NFIP). The Town of Lane does not participate in the program because no Flood Insurance Rate Map or Flood Hazard Boundary Map has been issued for the jurisdiction, nor are there any repetitive loss structures within the community. Currently there is one active National Flood Insurance Program policy in Jerauld County with a value of $350,000. The following table provides information on NFIP participation in the county.

Table 4.2 – National Flood Insurance Program Participation

Jurisdiction	CID	Current Effective Map Date	Reg-Emer Date	Appointed Designee	Implementation/Enforcement
Jerauld Co.	460273	(NSFHA)	06/08/98	N/A	The County has been a part of the NFIP program since 1998, but it has not been mapped and therefore there are no floodplain regulations.
Alpena	460096	(NSFHA)	06/08/98	N/A	The City has been a part of the NFIP program since 1998, but it has not been mapped and therefore there are no floodplain regulations.
Lane	*(The community does not participate in the NFIP program)*				
Wessington Springs	460043	(NSFHA)	01/03/84	N/A	The City has been a part of the NFIP program since 1984, but it has not been mapped and therefore there are no floodplain regulations.

Other Capabilities

Other resources and capabilities exist within Jerauld 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 following table and discussed in further detail below.

Table 4.3 – Other Local Capabilities to Support Hazard Mitigation

	Jerauld County	Alpena	Lane	Wessington Springs
ADMINISTRATIVE & TECHNICAL				
Emergency management staff	X			
Planning staff	X			X
Engineering/Public works staff		X		X
Floodplain management staff	X	X		X
Code enforcement staff				X
FINANCIAL				
Budgeting process	X	X	X	X
Levy/Project surcharge for specific purposes				X
EDUCATION AND OUTREACH				
StormReady Program	X			
Severe Weather Awareness Week	X			
Social media	X	X		X
PHYSICAL ASSETS				
Relief shelter	X	X		X
Storm shelter	X	X		X
Warning siren		X	X	X

Administrative and technical staff to support hazard mitigation in the county are limited. For instance, Jerauld County has an emergency manager, but the position is only half time and there are no other emergency management staff to support the manager. Planning and engineering staff within the county are likewise limited.

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 Jerauld 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 Jerauld County is limited, but efforts are being made. The Jerauld 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. Jerauld County, Alpena, and Wessington Springs also have Facebook pages that have been used to communicate severe weather awareness and hazard mitigation.

There are many physical assets in Jerauld 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. Each siren is tested regularly, each has a backup source of power, and each can be activated remotely by local officials or from the 911 dispatch center in Huron. Public facilities that can serve as emergency shelter from a tornado or other severe weather include the basement of the county courthouse in Wessington Springs and LSI Jack Links in Alpena. Facilities that can provide short-term relief following a disaster include the Alpena Community Center, which has a backup power generator and the County Ag building in Wessington Springs, which also has a backup generator.

Despite limited resources, Jerauld County and each of the jurisdictions participating in this plan can enhance their mitigation capabilities. A good way for the jurisdictions to expand their capabilities is through their partnership with the Planning & Development District III office. District III has decades of experience working on various planning and community development activities within Jerauld County, and over a decade of experience working with the county's emergency management office. District III wrote Jerauld County's current hazard mitigation plan, and its staff has helped develop applications to fund mitigation projects within the county. After funds have been awarded for a project, District III can help ensure that the project is completed satisfactorily and that all FEMA grant award conditions and requirements are followed.

Mitigation Goals and Objectives

For this plan update, there were no significant changes in community priorities, as the planning team decided to keep the goals and objectives listed in the current mitigation plan. This decision was based in part on the results of the survey, which identified the protection of critical facilities as the highest mitigation priority. The team also wanted to ensure that the goals and objectives of this plan supported the priorities of the other local planning resources. The following goals were identified:

- Minimize loss of life and injuries from hazards.
- 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.
- Minimize development in areas that are prone 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 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
JERAULD COUNTY		
Powerline burial.	Winter Storm	Central Electric continues to make progress burying powerlines in Jerauld County.
Drainage improvement projects along county roads (clean waterways, replace culverts, raise roads).	Flooding	The County has used Rural Access Infrastructure Fund program funds to make some improvements.
Require people wanting to do controlled burns to first contact proper authorities.	Wildfire	Although the County has taken no statutory action, compliance is better now, due in part to public outreach.
TOWN OF ALPENA		
Storm drainage improvements on east side of town.	Flooding	The Town hired an engineering firm to develop a flood study of the community, which was recently completed.
Storm drainage improvements along Pine Avenue.	Flooding	The Town hired an engineering firm to develop a flood study of the community, which was recently completed.
Build/install a tornado safe room.	Summer Storm	No longer a priority, since LSI Jack Links has made its facility available to the community.
TOWN OF LANE		
Build/install a tornado safe room.	Summer Storm	No progress - lack of funds.
Drainage improvements.	Flooding	No progress - lack of funds.
CITY OF WESSINGTON SPRINGS		
Continue relocating overhead utility lines underground.	Winter Storm	No progress - lack of funds.
Develop hydrology and hydraulics study for community.	Flooding	No progress – lack of funds.
Address drainage issues along 1st Street SE and State Street.	Flooding	No progress – lack of funds.
Address drainage at sewer lagoon.	Flooding	The City is in the process of upgrading the lagoon, which will help address the drainage problems there.

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 are those that can be completed within a few years, while Long term actions may take several years or more to accomplish due to cost or other factors.
- The estimated cost to implement the action.
- Resources that may be available to help fund the action.
- 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?

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

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

<u>FEMA grant programs</u>

- Hazard Mitigation Grant Program (HMGP)

- 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

JERAULD COUNTY ACTIONS	PRIORITY	PROJECT LEAD	TIME	COST	FUNDING	NOTES
Continue participation in the National Flood Insurance Program	HIGH	Director of Equalization	SHORT	N/A	N/A	The DOE will contact the South Dakota floodplain coordinator to learn more about the NFIP program.
Update the comprehensive plan	HIGH	County commission	SHORT	N/A	N/A	The plan was developed in 1998 and has not been significantly modified since then.
Participate in StormReady Program	HIGH	Emergency Mgmt Director	SHORT	N/A	N/A	The Emergency Management Director will make inquiries into the program.
Participate in Firewise Program	HIGH	Emergency Mgmt Director	SHORT	N/A	N/A	This is primarily for the western part of the county. The Emergency Management Director will make inquiries into the program.
Improve drainage along county and township roads	HIGH	Highway Superintendent	LONG	Unknown	DOT; HMGP	Actions could include replacing or upgrading culverts, elevating roadways, or cleaning out roadside ditches. County may pursue grant funding if a project appears to be grant eligible.
Acquire generator for courthouse	HIGH	Emergency Mgmt Director	MID	≈ $60,000	HMGP; Courthouse Security Grant Program	An 85-kW generator is proposed to replace the existing 50-kW generator, which is not sufficient to run the heating & cooling system. The County will continue to pursue grant funding.
Install warning siren at Spring Valley Colony	HIGH	Emergency Mgmt Director	MID	≈ $30,000	HMGP; Local funds	County will consider pursuing grant funding.
Put up snow fences to limit blowing and drifting snow over roads	MED	Highway Superintendent	LONG	Unknown	DOT; Local funds	County will look into feasibility of pursuing this option.
ALPENA ACTIONS	**PRIORITY**	**PROJECT LEAD**	**TIME**	**COST**	**FUNDING**	**NOTES**
Continue participation in the National Flood Insurance Program	HIGH	Finance Officer	SHORT	N/A	N/A	The finance officer will contact the South Dakota floodplain coordinator to learn more about the NFIP program.
Make stormwater system improvements to the west side of town	HIGH	City council	MID	≈ $250,000	DANR; HMGP	An engineering firm has proposed a solution centered along Willow Avenue that will include installing storm sewer inlets and piping, replacing culverts, and

						reshaping ditches. The City intends to pursue grant funding.
Acquire generator for fire hall	HIGH	City council	MID	≈$30,000	AFG; HMGP	City intends to pursue grant funding.
Purchase float pumps to help fight wildfires	HIGH	Fire chief	MID	_____	AFG; WUIGP	This equipment would improve the ability to fight wildfires. The Alpena fire department will consider pursuing grant funding.
Construct tornado shelter	MED	City council	MID	Unknown	HMGP	City may pursue grant funding for a standalone or multi-purpose structure.
WESSINGTON SPRINGS ACTIONS	**PRIORITY**	**PROJECT LEAD**	**TIME**	**COST**	**FUNDING**	**NOTES**
Continue participation in the National Flood Insurance Program	HIGH	Finance Officer	SHORT	N/A	N/A	The finance officer will contact the South Dakota floodplain coordinator to learn more about the NFIP program.
Update the comprehensive plan	HIGH	City council/Planning board	SHORT	N/A	N/A	The plan was developed in 2001 and has not been significantly modified since then.
Acquire generator for street shop	HIGH	City council	MID	≈$30,000	HMGP	City intends to pursue grant funding.
Upgrade electrical distribution system	HIGH	Electric system superintendent	MID	Unknown	HMGP; Local funds	The City has identified locations where power lines could be buried. The City intends to pursue grant funding if a project appears to be cost effective.
Install warning siren on west side of town	HIGH	City council	MID	≈$30,000	HMGP; Local funds	The existing warning sirens are very difficult to hear in some areas on the western side of town. The City will consider pursuing grant funding.
Conduct hydrology study of community	HIGH	City council	MID	≈ $75,000	DANR; HMGP	Once the City moves to the Mid-Dakota Water System, the wells that currently provide water for the city will be capped. How to handle the excess water that will result needs to be studied. The Cit may pursue grant funding.
Purchase float pumps to help fight wildfires	HIGH	Fire chief	MID	_____	AFG; WUIGP	This equipment would improve the ability to fight wildfires. The Wessington Springs fire department will consider pursuing grant funding.
Construct tornado shelter	MED	City council	MID	Unknown	HMGP	City may pursue grant funding for a standalone or multi-purpose structure.

Potential Resources for Funding Assistance:

AFG	FEMA Assistance to Firefighters Grant Program
HMGP	FEMA Hazard Mitigation Grant Program
WUIGP	Wildland Urban Interface Grant Program
DANR	South Dakota Dept of Agriculture and Natural Resources
DOT	South Dakota Dept of Transportation

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 Jerauld 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 Jerauld County, Town of Alpena, and City of Wessington Springs websites, and a hard copy is available for review at the Jerauld County courthouse and in each city office. Going forward, Jerauld County and each of the participating 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 Jerauld County Commission.
- Press releases and social media posts.
- Surveys to get feedback from the public about mitigation priorities.
- Community visits by the Jerauld 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 Jerauld County Emergency Management Director is ultimately responsible for implementing this plan. The director will work under the direction of the Jerauld County Commission 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 also will play a critical role in carrying out the action plan by identifying and

prioritizing the actions they want to pursue, allocating resources for their implementation, and applying for funding assistance as needed.

An important part of implementing the plan is plan monitoring and evaluation, which will be performed by the Jerauld County Emergency Management Director with the support of the Jerauld County Commission. The plan will be reviewed at least annually by the commission, 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.

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

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

- Occurrence of a significant disaster event – Serious events can reveal flaws in local jurisdictions' disaster preparedness plans. The 9/11 terrorist strikes are a dramatic example of this type of event.
- Change in the nature or magnitude of risks – Changing environmental conditions can be significant enough to make jurisdictions reevaluate their mitigation strategy. As previously discussed, climate change may increase the County's vulnerability to certain types of hazards.
- Changes in development – Population change and increased development in sensitive areas can impact risk.
- Change in local priorities – Local priorities regarding mitigation projects can change for a number of reasons. Regular meetings between the Jerauld County commission and the local township boards are one way in which the county stays current on the townships' needs regarding their roads, bridges, and other infrastructure.
- Funding availability – The availability of money often determines whether an action can be implemented. For example, local budget cuts can delay, or prevent altogether, a mitigation project's implementation. On the other hand, grant opportunities for specific types of mitigation projects may argue for their implementation.
- Other factors – Many other factors can have an impact on hazard mitigation efforts. Political realities, including changes in local leadership, can influence local mitigation strategies. Changes in laws and regulatory requirements may make certain mitigation actions more or less feasible or desirable. Advances in

technology may make it possible in the future to address certain types of hazards more effectively or at lower cost.

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

Jerauld County and each of the participating jurisdictions will integrate relevant information and strategies from this plan into their planning mechanisms and development regulations. The process of integrating the plan will look different in each of the communities, but there are some commonalities. For instance, each jurisdiction prepares an annual budget. Those communities that are interested in seeking funds for hazard mitigation projects 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.

Following are the local planning mechanisms into which information from this plan will be integrated. A summary of the process by which integration is expected to occur is provided.

- Jerauld County Comprehensive Plan and Zoning Ordinance – the Planning & Development District III office developed the comprehensive plan and zoning

ordinance working with the Jerauld 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. Jerauld County has contacted the District III office to begin updating the comprehensive plan and zoning ordinance.

- Jerauld County Highway Plan – the highway plan is developed by the Jerauld 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 eligible for FEMA funding, such as those that involve drainage improvements to mitigate flooding.
- Wessington Springs 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. Wessington Springs has contacted the District III office to begin updating the comprehensive plan and zoning ordinance.
- Wessington Springs Housing Study - the Planning & Development District III office produced the study, working with the Wessington Springs planning board. The City and District III will integrate relevant information acquired through the development of this plan into the housing study when it is next updated.

It must be acknowledged that little progress has been made to integrate Jerauld County's current mitigation plan into other local planning mechanisms, other than the inclusion of some aspects of the plan into the Comprehensive Economic Development Strategy (CEDS) for the Planning & Development District III region, which includes Jerauld County. To improve this situation, 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 Jerauld County Emergency Management Director, who will continue to reach out to each community at least annually to review their hazard mitigation needs and priorities.

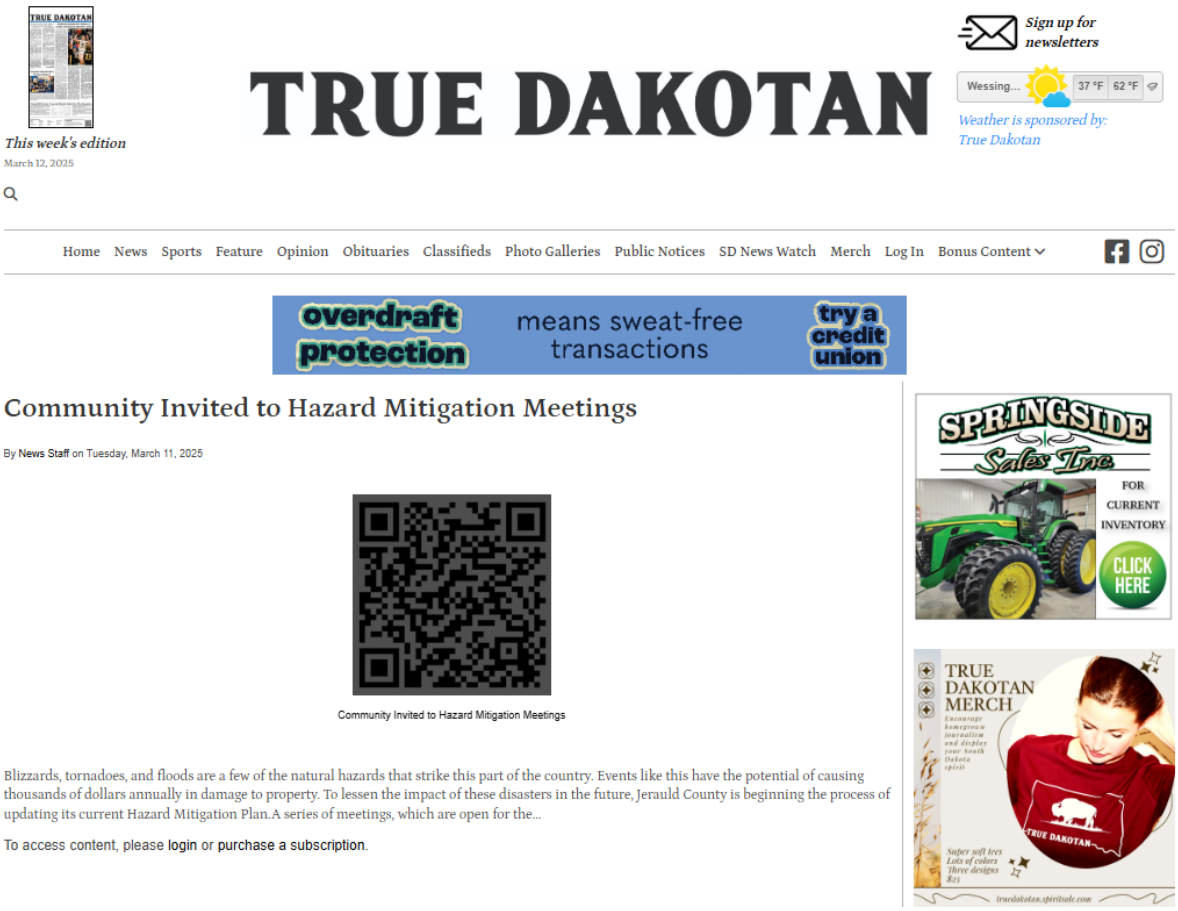
APPENDICES

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

APPENDIX A: Outreach Effort

A major effort was made to solicit input into this plan. Outreach included press releases that were printed in the Wessington Springs *True Dakotan*, information posted on community websites and social media, and surveys that were made available to the public. This section documents the outreach effort.

Press Release in Wessington Springs *True Dakotan* Prior to First Meeting:



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Community Invited to Hazard Mitigation Meetings

By News Staff on Tuesday, March 11, 2025

Community Invited to Hazard Mitigation Meetings

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

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TRUE DAKOTAN MERCH

Press Release in Wessington Springs *True Dakotan* Before Final Meeting:

Survey Poster

PUBLIC PARTICIPATION NEEDED!

JERAULD COUNTY

HAZARD MITIGATION PLAN PUBLIC SURVEY

The Jerauld 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. Jerauld County is seeking feedback from stakeholders and the public to incorporate into the plan.

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

A hazard mitigation plan is the representation of the jurisdiction'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 Jerauld County to reduce negative impacts from future disasters on lives, property, and the local economy. Efficient hazard mitigation planning can significantly reduce the physical, financial, and emotional losses caused by natural disasters.

TAKE THE SURVEY

www.districtiii.org

PUBLIC PARTICIPATION IN HAZARD MITIGATION PLANNING

Public participation in the Jerauld 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 Jerauld County and the participating municipalities eligible to apply for FEMA hazard mitigation funding.

PHONE: (605) 539-1311
EMAIL: JASONWEBER@JERAULDSD.COM

Survey Form with Responses

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 MEETING:

Jerauld County Hazard Mitigation Planning Meeting

April 8, 2025

NAME	REPRESENTING $ Mileage
Mark Coran	MORWS 0
Shane Mentzer	Jerauld Co Commission .5 miles
Walt Hein	Jerauld Co Commission .25 mi
Shawn Ochsner	Town of Alpena 18 miles
Maria Howard	Avera Weskota Memorial Hospital .25 mi
Linda Williams	City of Wessington Springs 4 Blocks
Shannon Eggerhaus	Jerauld Co. – 18 miles
[illegible]	Town of Alpena 18 miles
Eric Schroeder	Wess. Springs Fire Dept. 1 mile
Philip LaBore	Wess Springs City .5
Charles Brugeleen	Jerauld County
Stephanie Reasy	Avera Weskota .5 miles
Lucas VanEngelenburg	City of Wess Springs .5 miles
Michael Ormsmith	WS School District .5 miles
Dedrich Koch	Jerauld Co States Atty 25 miles
Jason Weyer	Jerauld Co Sheriff
John Clem	Planning District III
Shannon Viereck	Planning District III
Eric Ambroson	Planning District III

SIGNUP SHEET – SECOND MEETING:

Jerauld County Hazard Mitigation Planning Meeting

May 6, 2025

NAME	REPRESENTING	2nd Mileage
Linda Wilkins	City of Wessington Springs	0
Jeff Kelsey	Alpena	18
Mark A Green	MDRWS	.1 miles
Charles Bergeteen	WS	.1 miles
Walt Hein	~~WS~~ Jerauld Co	.1 mi
Fred Yarbrough	Jerauld Co	6 miles
[signature]	Jerauld Co	25 m
Shane Mentzer	Jerauld Co	
Eric Schroeder	Jerauld Co. EM & VSFD	0
Shannon Eggerhaus	Jerauld County	0 3 miles
Melanie Glasing	Alpena	18 miles
John Clem	District III	
Shannon Viereck	District III	

SIGNUP SHEET – FINAL MEETING:

JERAULD COUNTY MINUTES

ALPENA MINUTES

WESSINGTON SPRINGS MINUTES

APPENDIX C: History of Previous Hazard Occurrences

This appendix provides details about hazard events that have impacted Jerauld County in the past. **Table C.1** below lists all the events since 1970 that resulted in a major disaster declaration in which Jerauld County was part of the designated area.

Table C.1 – Major Disaster Declarations Affecting Jerauld County

Dec #	Declaration Date	Type	Primary Damage Impact
3015	Jun 1976	Drought	
764	May 1986	Severe storms; Flooding	
999	Jul 1993	Severe storms; Tornado	
1045	Mar 1995	Severe winter storm	
1052	May 1995	Severe storms; Flooding	
1075	Jan 1996	Ice storm	
1156	Feb 1997	Severe winter storm; Blizzard	
1173	Apr 1997	Severe storms; Flooding	
1375	May 2001	Severe storms	
1620	Dec 2005	Severe winter storm	
1702	May 2007	Severe storms; Tornado; Flood	
1887	Mar 2010	Severe winter storm	Utilities
1915	May 2010	Flooding	Roads and bridges
1938	Sep 2010	Severe storms; Flooding	Roads and bridges
1984	May 2011	Flooding	Roads
4186	Jul 2014	Severe storms; Tornado; Flood	Roads and bridges
4233	Jul 2015	Severe storms; Tornado; Flood	Utilities
4440	Jun 2019	Severe winter storm; Flooding	Roads and bridges

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

Table C.2 is a list of the most significant hazard events reported for Jerauld 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 its information from a variety of sources, including county, state and federal emergency management officials, local law enforcement officials, National Weather Service damage surveys, the insurance industry, and the general public.

The Storm Events Database is useful, but it does have limitations. One problem is that records for certain hazard events, including winter storms and blizzards, only go back to the 1990s. Another issue is that damage amounts in 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 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 Jerauld County

Date	Event Type	Event Description	Mag	Prop Damage ($1,000s)	Crop Damage ($1,000s)
6/3/1966	Hail		2.00 in.		
8/8/1969	Hail		2.50 in.		
7/2/1974	Thunderstorm Wind		65 kts.		
6/3/1975	Tornado		F1	25	
6/10/1978	Hail		1.75 in.		
7/4/1978	Thunderstorm Wind		78 kts.		
5/18/1984	Tornado		F0		
5/18/1984	Tornado		F0		
6/22/1984	Tornado		F0		
5/8/1985	Tornado		F0		
4/26/1991	Hail		1.75 in.		
5/28/1991	Hail		2.75 in.		
5/15/1992	Tornado		F0		
5/15/1992	Tornado		F0		
6/12/1994	Hail		1.75 in.	50	50
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.			

Date	Event Type	Event Description	Mag	Prop Damage ($1,000s)	Crop Damage ($1,000s)
1/24/1996	Heavy Snow				
1/29/1996	Extreme cold	Wind chill readings as cold as 80 below zero occurred as winds over 30 mph combined with temperatures of 10 below to 30 below zero. Many vehicles failed to start, but the main impact was financial with greatly increased heating energy use, and purchase of supplies and services to ensure furnace operation.			
2/10/1996	High Wind		58 kts.	10	
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	
4/25/1996	High Wind		62 kts.		
7/7/1996	Hail	A swath of hail 2 to 3 miles wide caused crop damage which was total in much of the area. The hail accumulated as much as a foot in places. The hail, which was accompanied by damaging winds, also broke windows and damaged vehicles.	1.75 in.	100	2,000
7/7/1996	Thunderstorm Wind	Thunderstorm winds caused damage to trees, farm buildings, power lines, and crops. Two barns were destroyed. Large trees were uprooted just south of Lane.	62 kts.	100	100
10/29/1996	High Wind		57 kts.		
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.		10	
12/14/1996	Heavy Snow				
12/16/1996	Blizzard				
1/4/1997	Blizzard				
1/9/1997	Blizzard				
1/15/1997	Extreme cold	Temperatures a few degrees below zero accompanied by wind gusts over 40 mph created wind chills as cold as 70 below zero. Drifting snow and areas of low visibility in blowing snow also occurred in open areas.			
2/3/1997	Heavy Snow				
3/12/1997	Flood				
4/1/1997	Flood				
4/6/1997	High Wind		63 kts.	10	
12/30/1997	High Wind		50 kts.		
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.			
6/10/1998	Hail		1.75 in.	50	
8/24/1998	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	

Date	Event Type	Event Description	Mag	Prop Damage ($1,000s)	Crop Damage ($1,000s)
1/1/1999	Winter Storm				
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				
1/10/2000	High Wind		52 kts. E		
2/1/2000	Drought	Dry weather that prevailed during the fall continued in February, Dry surface and soil conditions remained quite pronounced. Water levels continued to fall slowly. especially in wetlands, small streams, and lakes. Above normal temperatures contributed to further drying. Grass fires were again a problem in some areas.			
3/1/2000	Drought				
4/1/2000	Drought				
4/5/2000	High Wind		56 kts. E	17	
6/3/2000	Hail		1.50 in.		
6/3/2000	Thunderstorm Wind		69 kts. E	50	
7/11/2000	Thunderstorm Wind		61 kts. E	50	
8/5/2000	Hail		1.75 in.		
8/5/2000	Thunderstorm Wind		57 kts. E	10	
9/6/2000	Thunderstorm Wind		61 kts. E		
11/6/2000	Winter Storm				
11/11/2000	Winter Storm				
12/16/2000	Blizzard				
12/28/2000	Blizzard				
1/13/2001	Winter Storm				
1/29/2001	Blizzard				
2/7/2001	Winter Storm				
2/24/2001	Winter Storm				
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.			
2/11/2002	High Wind		50 kts. E		
3/14/2002	Winter Storm				
7/24/2002	Hail		1.50 in.		
8/3/2002	Thunderstorm Wind		61 kts. E	20	

Date	Event Type	Event Description	Mag	Prop Damage ($1,000s)	Crop Damage ($1,000s)
8/21/2002	Lightning				
6/16/2003	Thunderstorm Wind		61 kts. E	5	
6/24/2003	Thunderstorm Wind	Thunderstorm winds damaged numerous structures. The roofs and siding of several homes were damaged, and the roof of a camping bath house was blown off. A picnic shelter and a baseball grandstand were destroyed, as were lumber yard structures. The brick wall of a high school was damaged. The storm overturned and heavily damaged a camper and a van. Several other vehicles were heavily damaged by tree or other debris, including at least two inside destroyed small garages. The walls of a church were damaged when moved slightly by the wind. There was widespread tree damage, including numerous trees blown down. Power lines were blown down, resulting in power outages. Several windows were broken.	78 kts. E	1,000	
6/24/2003	Tornado	A tornado destroyed trees and crops before crossing the county line from Jerauld into Sanborn County.	F1	10	
11/22/2003	Winter Storm				
5/19/2004	Hail		1.25 in.		
8/1/2004	Thunderstorm Wind		61 kts. E		
8/3/2004	Lightning				
8/3/2004	Thunderstorm Wind		69 kts. E	10	
10/30/2004	High Wind		50 kts. E		
3/10/2005	High Wind		54 kts. E	50	
5/7/2005	Thunderstorm Wind		61 kts. E	5	
6/7/2005	Thunderstorm Wind		61 kts. E		
8/3/2005	Hail		1.75 in.		
9/18/2005	Hail		1.75 in.	30	
11/8/2005	High Wind		52 kts. E		
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 and west of the James River, in the area where a severe ice storm immediately preceded the blizzard. Several reports of 6 to 8 foot drifts were received. Travel was made impossible in many areas as roads were closed for extended periods. Most schools and businesses not already closed because of the ice storm were forced to close. The winds during the blizzard continued to bring down power lines and poles, most of which had been coated and weighted down by ice in the area hit by the ice storm.		100	
3/12/2006	Winter Storm				
7/18/2006	Drought				
8/1/2006	Drought				

Date	Event Type	Event Description	Mag	Prop Damage ($1,000s)	Crop Damage ($1,000s)
8/10/2006	Thunderstorm Wind		61 kts. E		
9/16/2006	Hail	Large hail damaged siding on a home and dented vehicles.	2.75 in.	5	
12/30/2006	Winter Storm				
2/28/2007	Heavy Snow				
3/1/2007	Blizzard				
4/10/2007	Heavy Snow				
4/10/2008	Blizzard				
4/25/2008	Heavy Snow				
11/6/2008	Blizzard				
12/14/2008	Blizzard				
12/20/2008	Blizzard				
3/30/2009	Blizzard	Snowfall of 8 to 12 inches, accompanied by northerly winds gusting over 45 mph, produced blizzard conditions that brought travel and commerce to a standstill. Numerous businesses, schools, and roads were closed; and many roads not officially closed were impassable. The town of Wessington Springs received 10 inches of snow.			
4/4/2009	Blizzard				
6/16/2009	Hail		3.00 in.		
7/9/2009	Hail		1.50 in.		
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 7 inches, previously existing snow cover, and northwest winds gusting to over 40 mph produced widespread blizzard conditions, with visibilities less than a quarter mile. New snowfall included 7 inches at Wessington Springs. Schools and businesses were closed, and travel became impossible in much of the area. The wind combined with cold temperatures to produce wind chills colder than 35 below zero during the latter part of the storm. This extreme cold continued into the next day, Friday, January 8th.			
1/7/2010	Extreme cold	Persistent north/northwest winds combined with very cold air to produce wind chill values that dropped to 35 below zero.			
5/24/2010	Thunderstorm Wind		56 kts. E	10	
7/21/2010	Thunderstorm Wind		61 kts. E		
7/30/2010	Flash Flood	Heavy rainfall, unofficially reported at up to 9.50 inches, caused widespread flooding of roads, fields, and basements. Several roads were washed out. Most houses in the town of Wessington Springs received water damage. several bridges were damaged		100	
8/3/2010	Flash Flood				
10/26/2010	High Wind		52 kts. E		
12/10/2010	Blizzard	Snowfall ranging from 2 to 8 inches was accompanied by sustained winds reaching 40 mph at times, with gusts as high as 55 mph. The snowfall, strong winds, and existing snow cover resulted in widespread blizzard conditions. Travel was			

Date	Event Type	Event Description	Mag	Prop Damage ($1,000s)	Crop Damage ($1,000s)
		impossible in much of the area, and businesses and schools were forced to close.			
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				
2/1/2011	Extreme cold	North/northwest winds averaging 15 to 30 mph combined with temperatures dropping below zero to produce wind chills of 35 to 40 below zero.			
2/20/2011	Heavy Snow				
3/17/2011	Flood				
4/15/2011	Heavy Snow				
7/15/2011	Extreme heat				
7/26/2011	Thunderstorm Wind		61 kts. E		
2/13/2012	Heavy Snow				
2/28/2012	Heavy Snow				
4/15/2012	High Wind		57 kts. M		
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 governments continued to use water use restrictions in an effort to prevent serious water supply problems.			
10/1/2012	Drought				
10/17/2012	High Wind		50 kts. M		
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.			

Date	Event Type	Event Description	Mag	Prop Damage ($1,000s)	Crop Damage ($1,000s)
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	An extended period of precipitation began with freezing rain and freezing drizzle producing light ice accumulations, then changing to sleet and then snow, with sleet and snow accumulations reaching over 13 inches at Wessington Springs. The winter precipitation made travel very difficult, resulting in schools and businesses being forced to close.			
5/26/2013	Hail		1.25 in.		
12/3/2013	Winter Storm	Snow, heavy in areas, accumulated up to 8 inches from the evening of December 3rd through the afternoon of December 4th. Difficult travel conditions forced delayed openings or early closings of some schools and businesses on December 4th.			
1/16/2014	High Wind		50 kts. E		
1/26/2014	High Wind		50 kts. E		
6/18/2014	Hail		1.50 in.		
6/18/2014	Tornado	A tornado severely damaged the roof of a farm building and caused tree damage.	EF1	15	
6/18/2014	Tornado	A tornado destroyed a farm building and caused tree damage, with trees splintered and debarked.	EF2	20	
6/18/2014	Tornado	A tornado destroyed a farm building, damaged trees, and caused an unknown amount of crop damage.	EF2	25	
6/18/2014	Tornado	A tornado severely damaged a farm building by causing the collapse of its roof. The tornado also caused tree damage, snapping several off at the trunk. An unknown amount of crop damage was also suspected.	EF1	50	
6/18/2014	Tornado	A tornado severely damaged two family farms, including destroying a farmhouse as the family took shelter in their basement. A couple in the house suffered minor injuries.The tornado also damaged trees, power poles, and power lines; and caused an unknown amount of crop damage.	EF4	300	
6/18/2014	Tornado	A tornado damaged at least 43 homes in Wessington Springs, making at least 26 of them uninhabitable. The tornado also destroyed at least 3 businesses and damaged 9 others. The tornado also caused considerable damage to power lines, power poles, and trees, resulting in power outages to the entire town. Vehicles and signs were also damaged. The damage included an estimated 1.2 million dollars in damage to public infrastructure. There were no reported fatalities and one minor injury. The tornado also caused an unknown amount of damage to corn and soybean crops.	EF2	5,200	
12/15/2014	Winter Storm				
6/20/2015	Thunderstorm Wind		52 kts. EG		
7/23/2015	Hail		1.75 in.		

Date	Event Type	Event Description	Mag	Prop Damage ($1,000s)	Crop Damage ($1,000s)
8/9/2015	Hail		1.75 in.		
11/30/2015	Winter Storm				
12/25/2015	Winter Storm				
1/16/2016	Extreme Cold				
2/19/2016	High Wind		55 kts. MG		
5/25/2016	Hail		1.00 in.		
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				
6/11/2017	Thunderstorm Wind		56 kts. EG		
6/22/2017	Hail		1.75 in.		
7/21/2017	Hail		1.00 in.		
12/25/2017	Extreme cold				
12/31/2017	Extreme Cold	Low temperature at Wessington Springs was -20.			
1/11/2018	Extreme cold				
1/15/2018	Extreme cold				
2/10/2018	Extreme cold				
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 40 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 14 inches measured at Wessington Springs.			
7/3/2018	Extreme heat				
7/8/2018	Extreme heat				
7/11/2018	Extreme heat				
8/4/2018	Hail		1.75 in.		
1/1/2019	Extreme Cold				
3/13/2019	Flood	Flooding resulted in damage to public infrastructure including county and township roads and culverts		250	
3/14/2019	Blizzard				
4/11/2019	Blizzard				
6/1/2019	Flood				8,980
6/29/2019	Extreme Heat				
7/20/2019	Thunderstorm Wind		61 kts. EG		
9/12/2019	Flood				34
11/29/2019	Winter Storm				

Date	Event Type	Event Description	Mag	Prop Damage ($1,000s)	Crop Damage ($1,000s)
12/1/2019	Winter Storm				
12/28/2019	Blizzard	Light mixed precipitation resulted in a minor glaze of ice accumulation, then heavy snowfall (12 inches at Wessington Springs) and high wind resulted in white out conditions. Snow drifts to several feet were common.			
1/17/2020	Blizzard				
1/18/2020	Cold/wind Chill				
2/12/2020	Blizzard				
8/8/2020	Thunderstorm Wind		61 kts. EG	5	2
8/30/2020	Hail		1.50 in.		
12/23/2020	Blizzard				
1/14/2021	High Wind		56 kts. MG		
2/14/2021	Extreme Cold				
3/14/2021	Winter Storm				
6/1/2021	Drought				818
7/1/2021	Drought				870
8/1/2021	Drought				202
9/1/2021	Drought				
10/1/2021	Drought				
10/9/2021	Hail		1.75 in.		60
10/9/2021	Thunderstorm Wind	Thunderstorm winds damaged siding on a house in Alpena.	56 kts. EG	5	
11/1/2021	Drought				
11/11/2021	High Wind		50 kts. MG		
12/1/2021	Drought				
12/31/2021	Cold/wind Chill				
1/1/2022	Cold/wind Chill				
1/6/2022	Extreme Cold				
2/22/2022	Cold/wind Chill				
4/1/2022	Drought				
4/6/2022	High Wind		53 kts. MG		
4/7/2022	High Wind		55 kts. MG		
4/12/2022	High Wind		55 kts. MG		
4/14/2022	High Wind		59 kts. MG		
4/22/2022	Hail		2.25 in.		
4/23/2022	High Wind		50 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	65 kts. MG		

Date	Event Type	Event Description	Mag	Prop Damage ($1,000s)	Crop Damage ($1,000s)
		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.			
5/29/2022	Thunderstorm Wind		50 kts. MG		
6/13/2022	Thunderstorm Wind		65 kts. MG		
7/3/2022	Thunderstorm Wind	Four large metal grain bins were destroyed by thunderstorm wind gusts.	61 kts. EG	100	440
7/5/2022	Thunderstorm Wind		61 kts. MG		
8/2/2022	Thunderstorm Wind		69 kts. MG		67
8/5/2022	Excessive Heat				
9/20/2022	Drought				
10/1/2022	Drought				
11/1/2022	Drought				
12/1/2022	Drought				
12/14/2022	Blizzard				
12/21/2022	Blizzard/Extreme Cold				
1/1/2023	Drought				
2/1/2023	Drought				
2/14/2023	High Wind		52 kts. MG		
2/21/2023	Blizzard				
2/23/2023	Cold/wind Chill				
3/1/2023	Drought				
4/1/2023	Drought				
6/13/2023	Drought				
7/1/2023	Drought	Severe drought conditions improved to moderate conditions during late July. Crop damage is an estimate from insured losses.			2,980
7/25/2023	Thunderstorm Wind		54 kts. MG		
7/26/2023	Excessive Heat				
7/30/2023	Hail		1.25 in.		19
8/21/2023	Excessive Heat				
9/2/2023	Heat				
10/17/2023	High Wind		51 kts. MG		
12/25/2023	Blizzard				
1/12/2024	Extreme Cold				
1/20/2024	Cold/wind Chill				
1/26/2024	Dense Fog				

Date	Event Type	Event Description	Mag	Prop Damage ($1,000s)	Crop Damage ($1,000s)
3/24/2024	Winter Storm				
4/6/2024	High Wind		37 kts. MS		
7/13/2024	Heat				
7/14/2024	Thunderstorm Wind		54 kts. MG		
8/2/2024	Heat				
8/25/2024	Excessive Heat				
10/29/2024	Drought				
11/1/2024	Drought				
11/20/2024	High Wind		56 kts. MG		

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

APPENDIX D: References

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