

**BROWN COUNTY
SOUTH DAKOTA**

**NATURAL HAZARD MITIGATION PLAN
(UPDATE)
EXPIRES:
XX/XX/XXX**



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I: INTRODUCTION

CHANGES/REVISIONS TO INTRODUCTION:

- Changes were made in the language and the data used in this section and structure of the section. Tables were used to break down data provided about Brown County.
- Maps and figures were used to illustrate Brown County.
- Tables were used to illustrate differences in Brown County and jurisdictions.
- Demographic, economic and climate data was updated to give additional details on the population of Brown County.
- National Flood Insurance Participation was added to the Brown County Municipalities Overview.

INTRODUCTION

Natural hazards can severely impact the health, welfare, and security of Brown County residents. Residents are affected by storms, extreme temperatures, drought, flooding, tornados, high winds, and hail. Mitigation reduces the impact and costs of hazards. Brown County, working with South Dakota Office for Emergency Management, the Federal Emergency Management Agency (FEMA) and the Northeast Council of Governments (NECOG) prepared this Natural Hazard Mitigation Plan (plan) to guide natural hazard mitigation activities in the county.

This plan details the specific vulnerabilities and limits Brown County has to natural hazards. Shifting the focus from reaction to prevention can reduce harm to life and property. This plan identifies solutions to reduce the impact of natural hazards. The ideas are based on the principle that hazard mitigation works. Many mitigation actions can be implemented for minimal cost.

Mitigation planning analyzes and identifies the specific risks and the impact on residents. Addressing hazards before they occur can reduce the impact. It can have minimal costs but can prevent higher costs in the future, even up to the loss of lives. Mitigation is preventative actions based on analyzing historical events and finding solutions to the challenges created, it is not an emergency response or preparedness.

The plan can and should be used with other types of planning processes to identify weaknesses and/or refocus emergency response. However, the focus of the plan is for local leaders to discuss and implement strategies that avoid future risks caused by natural hazards. This is not an emergency response or emergency management plan.

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

AUTHORITY

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

1. Identifies hazards and their associated risks and vulnerabilities.

2. Develops and prioritizes mitigation projects; and
3. Encourages cooperation and communication between all levels of government and the public.

To be eligible for FEMA's Hazard Mitigation Grant Assistance Program, the disaster Mitigation Act of 2000 (DMA 2000) requires that local governments have a FEMA approved mitigation plan in place. Jurisdictions must demonstrate proposed mitigation projects have solid planning process where risks and capabilities of each community are assessed. Mitigation plans must be updated every five years to show progress has been made towards meeting mitigation goals and ensure the plan continues to be an effective mitigation tool to meet the needs of the county and communities.

PURPOSE OF THE PRE-DISASTER MITIGATION PLAN

The purpose of the Natural Hazard Mitigation plan is to fulfill federal, state, and local hazard mitigation measures and meet the planning needs of Brown County. Consistent with FEMA guidelines, this plan identifies risks and solutions for pre- and post-disaster mitigation. Implementation of both the short- and long-range projects will reduce losses. The projects listed will reduce hazards' impact on the community. Jurisdiction agencies and officials can create public awareness of the impact of natural hazards. This plan is a guide to help prevent or reduce Brown County's vulnerability to natural hazards.

PLAN USE

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

SCOPE

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

LOCAL GOALS

Community commitment begins with local involvement and is the basis for the Mitigation Plan. Priorities to stabilize the community's lifelines are at the top with a reduction in importance toward the bottom of the list.

- Protection of life before, during, and after a natural disaster by establishing safety and security for residents.
- Protection of emergency response capabilities (critical infrastructure) and establishing supplies of food, water, and shelter for affected residents.
- Establish and maintain communication and warning systems, establishing medical care and support processes for residents requiring emergency care.

- Protection of critical facilities and providing reliable energy sources.
- Government continuity by maintaining communications throughout and outside the area.
- Providing transportation in and out of the area.
- Protection of developed property, homes, businesses, industry, education, and culture of the community and by combining hazard loss reduction with the community's environmental, social, and economic needs.
- Protection of the environment and natural resources by mitigation measures.
- Protection against hazardous material exposure due to natural disasters.

GOALS OF MITIGATION PROGRAMS AS ESTABLISHED BY FEMA

- Eliminate or reduce long-term risk to life and property from natural hazards.
- Aid both the private and public sectors in understanding the risks and finding mitigation strategies to reduce those risks.
- Avoid risk of exposure to identified hazards.
- Minimize the impacts of risks when they cannot be avoided.
- Mitigate the impacts of damage due to identified hazards.
- Accomplish mitigation strategies so negative impacts are minimized.
- Provide a basis to fund projects that mitigate hazards; and
- Establish a regional platform to enable the community to take advantage of shared goals, resources, and the availability of outside resources.

WHAT IS HAZARD MITIGATION?

Hazard Mitigation is a plan of cost-effective actions taken to reduce vulnerability of people and property to natural hazards. There are three categories of hazard mitigation. This mitigation plan contains strategies from all three categories.

- Activities that keep the hazard away from people, property, and structures.
- Measures that keep people, property, and structures away from the hazard.
- Reduce the impact of hazards in the plan area.

Mitigation measures must be practical, cost effective, environmentally, and politically acceptable. Limiting the impact of natural hazards should not cost more than the damage. Mitigation measures can be specific or multi-functional. A storm shelter can be used for winter and summer storms as a cost-effective, multi-purpose use to mitigate against two hazards. Generators can be used when the power goes out for multiple reasons from storms to tornadoes to high heat waves. Mitigation can be hazard specific. An ordinance to regulate elevation height of a home is a specific requirement to mitigate against flooding.

The best way to mitigate natural hazards is to protect capital investments before building. Incorporating mitigation into planning requires that planners, developers, residents, and municipal leaders use mitigation to prevent loss. Ordinances, building codes, zoning or other considerations can prevent vulnerabilities. Special consideration and planning should be given to the most susceptible areas. These mitigation measures cost little but have a significant impact on the effect of natural hazards. Once a capital asset is built, it can be too late to mitigate hazards.

Most government programs focus on response and preparedness and neglect mitigation. Implementation and results take time. Incorporation into government

processes allows mitigation to be more integral in plans. Using data and analysis of area hazards, most communities can prepare and reduce the impact. Effective mitigation management is key. This plan is the first step of the mitigation process.

This plan evaluates Brown County's risks and vulnerabilities to natural hazards. It identifies projects for the local jurisdictions who participated. The suggested actions and implementation could reduce the impact of hazard events. This will only be achieved through coordination with emergency managers, political entities, public works officials, community planners and other individuals to implement this program.

Community Lifelines are mentioned throughout the plan and are the focus of FEMA's response to natural hazards. They allow FEMA to prioritize and concentrate actions to mitigate effects during a natural hazard. The priorities set by FEMA are a list of the basic services that communities need and how resources are prioritized before and after a natural hazard. The process of response becomes more efficient when stability is established through mitigation before a disaster.

Table 1.1: FEMA Community Lifelines	
Safety and Security	law enforcement/security, fire service, search and rescue, government services, community safety
Food, Water, and Shelter	food, water, shelter, agriculture
Health and Medical	medical care, public health, patient movement, medical supply chain, fatality management
Energy (Power and Fuel)	power grid, fuel
Communications	infrastructures, first responder communications, alerts, warnings, and messages, finance, 911 and dispatch
Transportation	highway/roadway/motor vehicle, mass transit, railway, aviation, maritime
Hazardous Materials	facilities, HAZMAT, pollutants, contaminants

Table 1.1 FEMA Community Lifelines listed on FEMA.gov.

BROWN COUNTY PROFILE

The county was named for Alfred Brown, a member of the South Dakota state legislature in 1879, and was organized in 1881. Columbia was the first town and was originally named the county seat. In 1882 the Milwaukee Railroad reached Aberdeen followed by the Northwestern Railroad. Columbia was asked by Northwestern Railroad to make the city a crossing point for the James River. Columbia refused and Northwestern Railroad extended its line 40 miles past Columbia. Due to a reduction in river shipping and the loss of the railroad crossing Columbia lost the county seat in 1887 and it was transitioned to Aberdeen by 1890. The county built the Brown County Courthouse and dedicated it March 24, 1904.

Aberdeen was officially plotted January 3, 1881, by Charles Prior of the Milwaukee Railroad and was named after his boss, Alexander Mitchell's, home in Aberdeen, Scotland. Initially nicknamed the "Town in the Frog Pond," flooding was periodic and frustrating. A pump system was created to pump out water that flowed into basements, but it took weeks. In 1884 a project was formed to use an artesian well to control the water. During the digging, the engineers found flaws in the plan when water came blasting out and flooded Main Street with over four feet of water. However, the artisan well that was discovered became the City's first water supply.

Aberdeen was built around the railroad system. The city had four different companies build depots, changing the City's nickname to the "Hub City" due to the hub-like tracks through town. The city is bisected by Moccasin Creek.

The seat of Brown County is in the City of Aberdeen, situated at the intersection of US Highway 281 and US Highway 12. Aberdeen is the largest city in Brown County with 28,225 residents occupying 13,227 housing units and occupies 16.59 square miles of the county with .02 square miles covered in water. Groton is the second largest community in Brown County, located 20 miles east of Aberdeen. It has 1,673 residents and 687 occupied homes. It covers approximately 1.8 square miles. Communities located in Brown County are shown in Figure 1.2.

Groton was organized in 1881 as a stop for the Chicago Milwaukee and St. Paul Railroad. Named after Groton, Massachusetts, the city is at the junction of US Highway 12 and SD Highway 37 and is eight miles from the James River. Many smaller towns in the area were originally intended as train stops and grew until railroad usage decreased.

Table 1.2: Brown County Fast Facts	
Population	• 38,301 residents as of 2020 census • Fourth most populated county in South Dakota • 22.69 people per square mile
Geographic Area	• Glacial Lakes & Prairie Region of northeastern South Dakota • 36 miles wide and 48 miles long, 1,731 square miles • 1,712 miles of land and 19 miles of water • Bordered by counties: McPherson, Marshall, Day, Edmunds, Faulk and Spink
Waterways	• James River, Elm River • Sand Lake, Putney Slough, Hecla Basin • Richmond Lake • Willow Creek, Snake Creek, Moccasin Creek
Land Uses	• Tourism, farming, hunting, fishing, waterfowl areas, industry
Major Highways	• US Highway 12 (east to west) • US Highway 281 (north to south) • SD Highway 37 and SD Highway 10
Cities and Towns	• Aberdeen (County seat), Claremont, Columbia, Frederick, Groton, Hecla, Stratford, Verdon, Warner, Westport and 44 townships
Water Supplier	• WEB water, BDM Water, City of Aberdeen
Electric Supplier	• Northwestern Energy • City of Groton

Table 1.2: Brown County Wikipedia, 2020 Natural Hazard Mitigation Plan

Aberdeen has a vibrant higher education community, and populations fluctuate depending on the time of the year. Home to Northern State University and Presentation College, those facilities bring in around 3,900 students to Aberdeen each fall. As a regional city center, Aberdeen has Avera St. Luke's Hospital and Sanford Hospital to assist local and rural patients as a regional healthcare center. Many people commute to and from the city for work, education, and activities. Aberdeen also offers many business and shopping opportunities in the area.

As a regional hub, activities draw people from outside the area to go to sporting events, community events, shopping and visiting. Tourists come to visit Wylie Park and Storybook Land, along with participating in the many events Aberdeen offers year-round. An estimated 1,500 people visit Storybook Land daily during the summer season. The Brown County Fair attracts over 225,000 people. Likewise, the YMCA Youth Basketball tournaments drew 2,500. Arts in the Park draws over 30,000 and the BMX Nationals drew 1,000 participants, not including the spectators. Many new industries have located or expanded in the area, allowing for faster growth, and increasing population. New residents require knowledge of how to respond in emergency situations and adapt to different weather conditions.



Figure 1.1: Map of South Dakota counties

Participants and spectators at events require accommodation which can strain resources of the county and city, sometimes beyond capacity. Many of these people are unaware of the emergency processes during a natural hazard. Emergency response agencies may be taxed if there is a natural hazard during these times. Winter and summer weather hazards have affected many area events.



Figure 1.2: Map of Brown County

Figure 1.3 illustrates the elevation of the County and the surrounding area of the James River Valley. The James River is a very slow-moving river and drops an average of one foot from north to south in Brown County. The lowest elevation is where the James River exits the county. There are three large areas where water collects: Sand Lake,

Putney Slough, and the Hecla Basin. The slow-moving water systems cause waterways to swell beyond the borders during heavy precipitation. The Elm River flows along Elm Lake and is fast-moving and meets the James River at Columbia in the northeast corner of Brown County. The Elm is controlled by a spillway, creating a reservoir. Aberdeen has claim on the top 12 feet of water, making it the City's main supply. The strength of the Elm River can cause the James River to back flow during years of heavy moisture. This causes the James River to swell past its banks and can cause perpetual flooding. The James River was the record-holder for longest days at flood stage. From April 21, 2019, until August 31, 2020, the James River was at flood stage. The 518 days set a record.

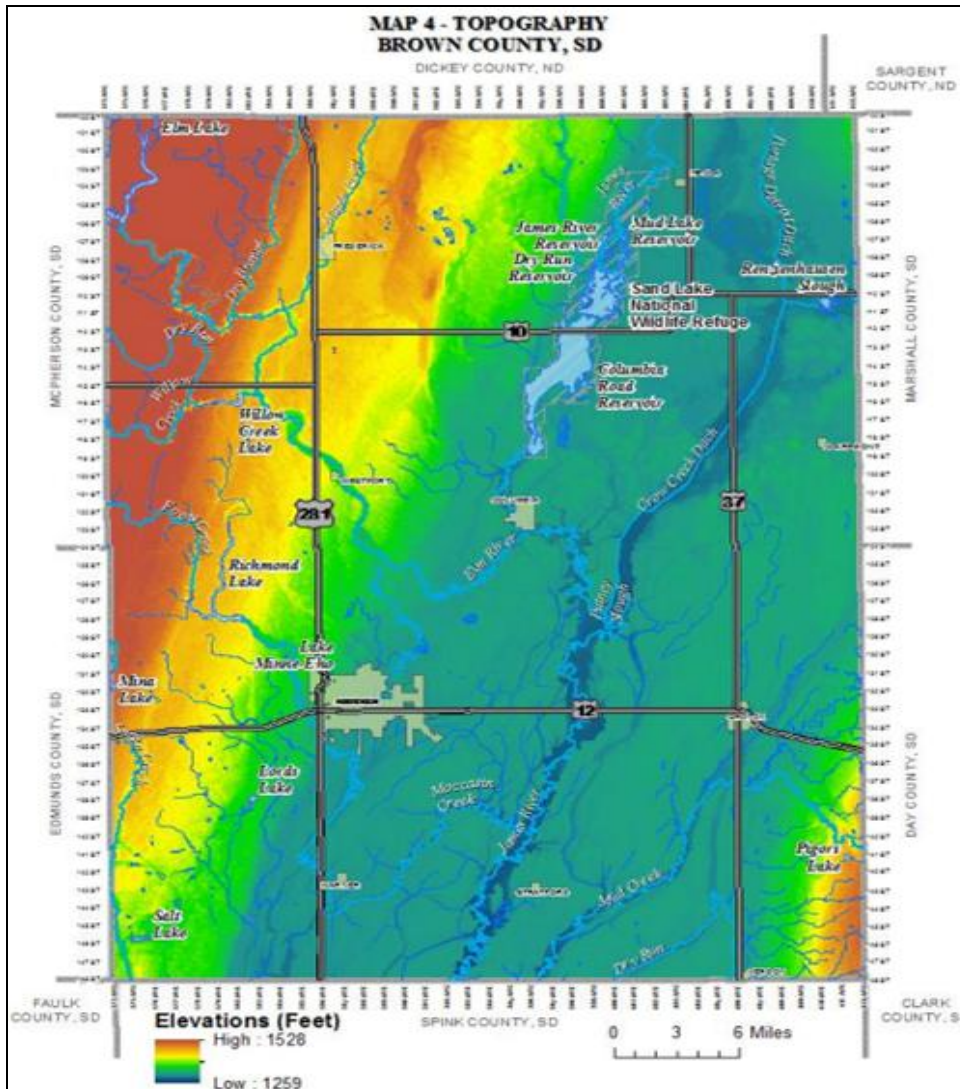


Figure 1.3: Brown County Elevations

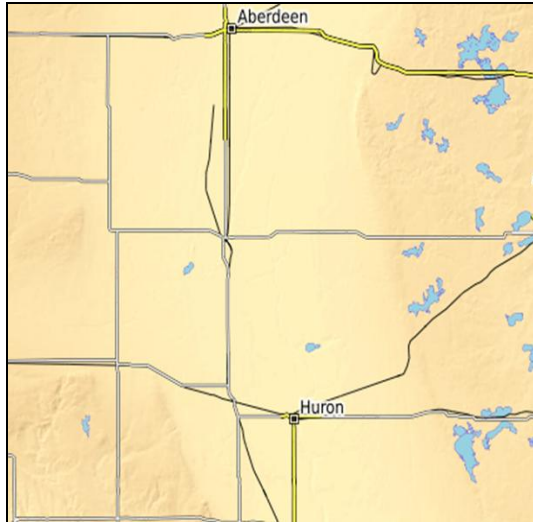


Figure 1.4: Brown County Topography

Brown County is in the James River Valley. This is characterized by low elevation changes and relatively flat terrain. Figure 1.4 illustrates how the river valley affects the landscape in Brown County. The third river in Brown County is the Maple River. This river enters north of Frederick and joins the Elm River near US Highway 281. Richmond Lake is the main lake in the area while Willow Creek and Snake Creek flow through the area also. Moccasin Creek flows through Aberdeen. Brown County's total water area is 18.54 square miles.



Brown County has multiple pipelines. The blue lines are natural gas transmission lines, and the red lines are hazardous liquid pipelines.

POPULATION DEMOGRAPHICS

According to the Census Bureau, in 2020 the County had a population of 38,301, a increase of 4.2 percent from the 2010 census of 36,531. With 38,301 people residing in 1,731 square miles, it translates to around 2269 people per square mile, classifying the county as rural. The City of Aberdeen is the county seat and is situated at the intersection of US Highway 12 and US Highway 281.

Table 1.3: Brown County Community Demographics	
Population per 2020 Census	38,301
People per square mile	22.69 people per square mile
Median Age of Residents	37.8
65+ Years Old Residents	17.6%
19 Years Old and Younger Residents	26.3%
Veterans	6.1%
Male to Female Ratio	Nearly 1 :1 49.18% male to 50.82% female
Average Family Size	3.01

Table 1.3: Brown County Population Demographics from 2023 American Community Survey

Table 1.4: Population in Brown County Jurisdictions				
City	2020 US Census Population	2010 Population per 2010 Census	Percent change from 2010 to 2020	Percent of the Brown County Population
Aberdeen	28,495	26,091	9.21%	74.40%
Claremont	108	127	-14.96%	0.28%
Columbia	160	136	17.65%	0.42%
Frederick	215	199	8.04%	0.56%
Groton	1,380	1,458	-5.35%	3.60%
Hecla	193	227	-14.98%	0.50%
Stratford	57	72	-20.83%	0.15%
Verdon	3	5	-40.00%	0.01%
Warner	485	457	6.13%	1.27%
Westport	88	133	-33.83%	0.23%
Brown County (Rural Areas)	7,117	7,626/36,531	-6.67%	18.58%
Total Brown County	38,301	36,531	4.85%	100%

Table 1.4: Population in Brown County Jurisdictions from 2020 Decennial Census

Brown County has 44 townships besides the communities that are in the county. Listed below are the townships and their populations as of the 2020 census. There has been an increase in population from 2010 to 2020 of 8,230 people in Brown County. Brown County has four Hutterite colonies. The Grassland Hutterite Colony (Westport), the Hutterville Hutterite Colony (Stratford), the Long Lake Hutterite Colony (Westport), and the Newport Hutterite Colony (Claremont)

Table 1.5: Brown County Township Population Per 2020 Census			
Township	Population	Township	Population
Aberdeen	935	Allison	21
Bates	44	Bath	742
Brainard	114	Cambria	119
Carlisle	35	Claremont	114
Columbia	96	East Hanson	118
East Rondell	76	Franklyn	32
Frederick	53	Garden Prairie	139
Garland	72	Groton	128
Greenfield	42	Gem	217
Hecla	28	Henry	104
Highland	802	Lansing	25
Liberty	142	Lincoln	1,165
Mercier	190	New Hope	107
North Detroit	52	Oneota	103
Ordway	254	Osceola	169
Palmyra	82	Portage	36
Prairiewood	303	Putney	91
Ravinia	350	Richland	155
Riverside	148	Savo	21
Shelby	76	South Detroit	67
Warner	473	West Hanson	54
West Rondell	82	Westport	92

Table 1.5: Brown County Township Population from 2020 Decennial Census

***Additional populations include Grassland Hutterite Colony (Westport), The Hutterville Hutterite Colony (Stratford), The Long Lake Hutterite Colony (Westport), and The Newport Hutterite Colony (Claremont).*

Table 1.5 lists the 44 Brown County Townships population in 2020. This chart includes organized townships only and does not include any unorganized locales in the Brown County area and are not separated by the Census Bureau. Figure 1.6 below is a map of Brown County townships.



Figure 1.6: Brown County township map

Table 1.6 shows the percentage of change comparing in population of Aberdeen, Groton, Brown County, South Dakota and the United States.

Table 1.6: Population Percentage Change					
Location/Year	1980	1990	2000	2010	2020
Aberdeen	-2.36%	-2.00%	-2.66%	5.81%	9.21%
Groton	20.47	-2.76%	13.38%	7.52%	-5.35%
Brown County	0.11%	-3.74%	-0.34%	3.02%	4.85%
South Dakota	3.68%	0.76%	8.45%	7.86%	8.90%
United States	11.38%	9.78%	13.15%	9.71%	7.35%

Figure 1.7, below, illustrates the differences between Aberdeen, Brown County and South Dakota. Brown County more closely mirrors Aberdeen in population shifts during the 1990s to 2000s.

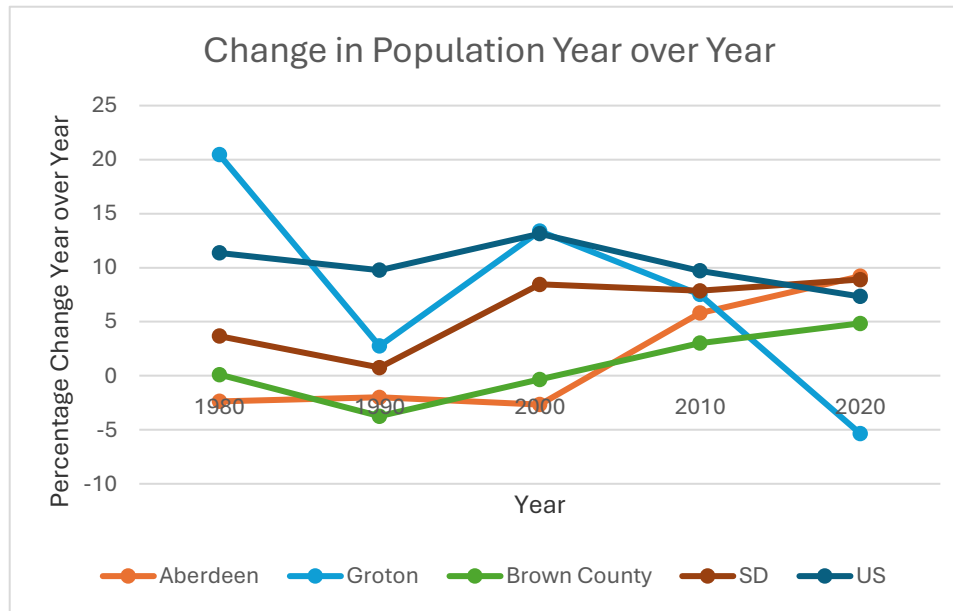


Figure 1.7: Population change from 1980

Brown County has 4.32% of the state's population. Of the 38,301 people in the county 95.4% Caucasian, 1.5% black or African American, 3.1% American Indian and 2.4% Asian. The poverty rate of Brown County is 11.7%. There is an average of 2.14 people per household. 93.7% of the residents have a high school diploma or GED and 33.8% have a bachelor's degree or higher education. Four Hutterite colonies are in Brown County: The Grassland Hutterite Colony, the Hutterville Hutterite Colony, the Long Lake Hutterite Colony, and the Newport Hutterite Colony.

Aberdeen has approximately 3.2% of the state's total population and is the third largest city in South Dakota. Currently, Aberdeen's population is 28,495, up from 26,091 in 2010. The total number of housing units in the Aberdeen area is 13,397. Increasing manufacturing opportunities, a regional medical center with two hospitals. Aberdeen has one local higher education facility, Northern State University. Aberdeen lost Presentation College on October 31, 2023. Aberdeen's Housing Study illustrated that there was a need for homes and infrastructure to support additional residents. Since 2010 Aberdeen has had an increase of 9.21%.

ECONOMIC PROFILE

Brown County's economy has grown along with its population. The highest percentage of occupations in Brown County are Management, business, science and arts (7,371), Sales and office occupations (3,525), Service occupations (3,436), Production, transportation, and material moving occupations (3,069), and natural resources, construction, and maintenance occupations (2,434). Average household income in Brown County is: \$70,898. Residential home ownership is 67.6%. Aberdeen has a median household income of \$64,405 and a home ownership rate of: 61.7%.

Table 1.7: Brown County 2020 Economic Profile	
Total Employment Establishments	1,245 Total Employer Establishments
Education Attainment	33.8% bachelor's degree or higher
Employment Rate and Labor Force Status	65.8%
Top Five Occupations	- Management, business, science, and arts - Sales and Office occupations - Service occupations - Production, transportation, and material moving - Natural resources, construction, and maintenance
Top Five Industries	- Educational Services, Health Care and Social Assistance - Retail - Manufacturing - Arts, entertainment, recreation, accommodation and food services - Agriculture, forestry, fishing, hunting and mining
Mean Hours Worked	38.6 hours weekly
Homeownership Rate	67.6%
Housing Units	18,090 housing units
Average Rent	\$777
Occupancy Characteristics	16,285 units occupied
Vacancy	1,805 vacant units
Veterans	6.6%

Table 1.7: Brown County 2024 American Community Survey

Table 1.8 shows income statistics for Aberdeen, Brown County, South Dakota, and the United States. Brown County and Aberdeen have lower median household income than the United States and the rest of South Dakota. Brown County and South Dakota have a lower percentage of residents below poverty than the United States. South Dakota and Brown County have a lower percentage of unemployed and disabled residents than the United States and Aberdeen.

Table 1.8: Income Statistics per 2024 ACS Data					
Area	Median Household Income	Employment Rate	Percentage Below Poverty	Unemployment *2020 Census	Disabled Populations
Brown County	\$70,898	65.8%	11.7%	3.3%	13.6%
Aberdeen	\$64,405	65.8%	13.8%	3.7%	14.8%
South Dakota	\$76,881	65.5%	10.4%	2.8%	13.8%
United States	\$81,604	60.6%	12.1%	4.6%	13.7%

Table 1.8: Income Statistics data from 2024 ACS Data

GOVERNANCE AND EMERGENCY SERVICES

Brown County is governed by a five-member board of commissioners. The sheriff's office has 65 full-time and 20 part-time employees based in Aberdeen to serve the county's rural areas and small communities, as well as managing the Brown County Jail.

The Aberdeen Police Department operates in Aberdeen with a staff of 50 commissioned offices, nine staff employees, and six volunteer reserve officers. The City of Groton has a four-man police force patrolling the area. Both coordinate with Brown County when needed. The South Dakota Highway Patrol station is located west of Aberdeen and serves the area. Ambulance services are provided by the Aberdeen Ambulance Service, Aberdeen Advanced Care Ambulance, Inc and Midwest Medical Transport Company. The Aberdeen Rural Fire Department and Aberdeen Fire and Rescue run an ambulance service and coordinate with other area departments when needed. There are 10 volunteer fire and rescue departments throughout the county: Bath Fire Department, Columbia Fire Department, Frederick Fire Department, Groton Fire Department, Hecla Fire Department, Stratford Fire Department, Hutterville Community Fire Department, and the Warner Fire Department.

CLIMATE

Brown County has warm summers with hot spells and occasionally cool days. Winters are cold characterized by arctic air surging over the area. Average annual snowfall is 38 inches, and average annual rainfall is 22 inches. The average high temperature is 85 and the average low is 1 degree. Brown County has an average of 199 sunny days annually and there are 7 months where there can be snowfall. The highest recorded winter snowfall amount was 110.8 inches from 1936 to 1937. The largest annual rainfall amount recorded was 42.11 inches in 1896. On July 9, 1936, the high record hit 115 degrees. The lowest temperature recorded was February 9, 1994, at -45 degrees. Highest windspeed was 110.47 miles per hour recorded July 31, 2008. There are weather extremes in Brown County, like many South Dakota counties. These extremes make mitigation difficult due to the variety, severity, and unpredictability of hazards.

Table 1.9: Brown County Climate	
Winter Temperature Averages	Average low 10 degrees
Summer Temperature Averages	Average high 84 degrees
Snowfall	Average of 37 inches of snow
Rainfall	Average of 27.42 inches of rain
Sunny Days	Average of 213 sunny days a year

Table 1.9: Brown County Climate data from USAFacts.org

Like many South Dakota counties, Brown County has some of the greatest weather variations in the world. Normally the temperature is moderate between March and June and September and October. The county has spells of extreme heat in July and August and cold November through February. Aberdeen's highest recorded temperature is 115 degrees, recorded on July 6, 1936, and July 9, 1936. The record low is 46 degrees below 0 on January 12, 1912. February 2021 Aberdeen experienced over 115 consecutive hours (4.79 days) with temperatures below 0.

Precipitation can vary significantly annually by location. The heaviest most intense precipitation often occurs with localized downpours associated with thunderstorms in June through August. The heaviest rainfall recorded was May 5-6, 2007. 8.74 inches fell in Groton, Aberdeen received 7.97 and Columbia has 8.73 inches of rain. Record snowfall occurred in the area on March 28, 1900. There was 18 inches of snow that fell. The most snowfall in a 2-day period was 21.3 inches in Westport November 24, 1993. Thunderstorms occur and average number of 36 a year.

TRANSPORTATION

Transportation planning for streets and roads begins with a relationship between land use and road network. Streets and roads function for mobility and land access. Highways prioritize mobility while local roads prioritize land access to farms and residences.

Functional classification groups streets and roads into classes according to their function. Listed below is Brown County's functional classification system. The classification is the same as what is used by the Federal Highway Administration.

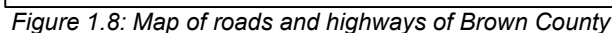
1. Principal Arterials – serve longer strips statewide or interstate, carry the highest traffic volumes, connect larger urban areas, provide minimal land access, and include both interstate and non-interstate principal arterial highways.
2. Minor Arterials – interconnect principal arterials, provide less mobility and slightly more land access, and distribute travel to smaller towns.
3. Major Collectors – provide both land access and traffic circulation connecting areas not served by arterials and connect intercounty traffic generators like schools, shipping points, parks, and important mining and agricultural areas.
4. Minor Collectors – collect traffic from local roads and bring all developed areas within a reasonable distance of a collector road.
5. Local Roads – provide direct access to adjacent land and to the highest classified roads and serve short trips.

A Major Street Plan includes a current and future hierarchy of street classifications for use in identifying and prioritizing transportation needs of Brown County. Two Federal Highways run through Brown County: US Highway 281 and US Highway 12. South Dakota 37 and South Dakota 10 are two state highways. There are county roads throughout the 44 townships of Brown County and ten incorporated towns. US Highway 281 runs along the western side of the county, moving north to south to the North Dakota border. It passes Warner and goes through the west side of Aberdeen. It continues north passing Westport, Barnard, and Frederick. US Highway 12 runs east to west, dividing the county along the southern end, intersecting Groton, Bath and Aberdeen. SD Highway 37 intersects Groton and moves north through Hecla. SD Highway 10 also moves through the northern part of the county intersecting Houghton near Sand Lake and the Wildlife Refuge.

Rural township roads generally show effects of high flooding. Maps of flooded roads are updated and available to the public by Emergency Management to inform drivers of issues. There are 675 miles of roads maintained by Brown County, according to the Brown County Master Transportation Plan. Road maintenance and repairs are impacted by flooding. There have been roads raised and reconstructed as the county works through its Pavement Management Plan.

Aberdeen's Master Transportation Plan details its community transit systems. Highway 12 also known as "6th Ave", runs through Aberdeen. The road experiences congestion at intersections. The addition of the beef processing plant south of Aberdeen also

Brown County has multiple airfields. The Aberdeen Regional Airport is the main airport service for residents. County Air Service, Thorson Airfield – SD 05, Groton Muni Airport 2e6, Reney NDB AB 203, Ott Landing Strip, Hite Private Airport SD49 and Krueger Landing Strip are all airfields in the county. There are two helicopter pads, one each at Sanford and St. Luke's hospitals.



NATIONAL FLOOD INSURANCE PROGRAM PARTICIPATION

Brown County participates in the National Flood Insurance Program. Currently FEMA is working with the county and communities to update the flood maps for NFIP use. Table 1.4 lists population, latitude and longitude, elevation, and NFIP status of communities in the county. Population statistics are from the 2020 Census and location, and elevation were from Google Earth. NFIP status was provided by Department of Public Safety Office of Emergency Management.

Table 1.10: Brown County Municipalities Overview				
Name (Cities and Towns)	Pop. (2020 Census)	Location	Elevation	NFIP (National Flood Insurance Program)
Aberdeen	28,495	45°27'52" N, 98°29'11" W	1,295 ft.	Yes
Claremont	108	45°40'19" N, 98°00'55" W	1,340 ft.	Yes
Columbia	160	45°36'47" N, 98°18'44" W	1,304 ft.	Yes
Frederick	215	45°50' N, 98°30' W	1,381 ft.	Yes
Groton	1,380	45°26'51" N, 98°5'54" W	1,302 ft.	Yes
Hecla	193	45°52'29" N, 98°09'06" W	1,299 ft.	Yes
Stratford	57	45°18'59" N, 98°29'46" W	1,302 ft.	Yes
Verdon	3	45°14'38" N, 98°05'50" W	1,306 ft.	No
Warner	485	45°19'33" N, 98°29'42" W	1,298 ft.	Yes
Westport	88	45°38'56" N, 98°29'48" W	1,332 ft.	Yes
Brown County (Total – Including Rural Areas)	7,117	45°45'29" N, 98°15'15" W	1,289 ft.	Yes

Table 1.10: Brown County Municipalities Overview Data from Google Earth and 2020 Decennial Census and FEMA community status book

II: PREREQUISITES

CHANGES/REVISIONS TO PREREQUISITES:

- The plan participants table was revised to reflect new participants in the Brown County Natural Hazard Mitigation Plan for 2027.
- The record of participation was updated.

ADOPTION BY LOCAL GOVERNING BODY

Requirement 201.6(c)(5) ... For multi-jurisdiction plans, has the governing body of each jurisdiction officially adopted the plan to be eligible for certain FEMA assistance?"

F2-a. To receive approval, the participants must adopt the plan and provide documentation that the adoption has occurred.

The Brown County Commission oversees the update of the Brown County Natural Hazard Mitigation Plan. The Commission has tasked the Brown County Emergency Manager with the responsibility of ensuring that the Plan is compliant with Federal Emergency Management Agency (FEMA) Guidelines and corresponding regulations.

MULTI-JURISDICTIONAL PLAN PARTICIPATION AND ADOPTION

This plan is multi-jurisdictional and serves the entire area located in Brown County, South Dakota. There are ten incorporated municipalities. Some municipalities elected not to participate in the planning process and the update of the 2022 Brown County Pre-Disaster Mitigation (PDM) Plan to the Brown County 2027 Natural Hazard Mitigation Plan. Participating jurisdictions include Brown County. Table 2.1 lists each municipality and if they were new, continuing, or non-participants. Municipalities that did not participate are still covered under the plan but will not have a separate mitigation strategy from the County.

Table 2.1: Plan Participants		
New Participants	Continuing Participants	Did Not Participate
Hecla	Brown County	Claremont
	Aberdeen	Frederick
	Columbia	Stratford
	Groton	Verdon
		Warner
		Westport

The Brown County Commission and participating municipalities passed resolutions to adopt the updated Plan. The Resolutions of Adoption are included in Appendix A. The dates of adoption by resolution for the jurisdictions are summarized in Table 2.2. The townships are not directly participating entities because they are too small, in population and resources, to be capable of handling mitigation on their own and are served by the County when necessary.

Barnard, Bath, Elm Lake, Ferney, Houghton, Ordway, Putney, Richmond Lake, Prairiewood Village and Tacoma Park are unincorporated communities with very small populations (20 people or less) except for Bath, Elm Lake, and Richmond Lake. Bath is 6 miles outside of Aberdeen and has experienced growth in the last decade, with an

estimated population of 142 people according to the 2020 census. Elm Lake is in the northwest corner of Brown County with a small portion located in McPherson County. Approximately 50 people live in the development around Elm Lake. Richmond Lake is northwest of Aberdeen and has approximately 650 people. Richmond Lake has an organized sanitary district but is not an incorporated municipality.

Table 2.2: Dates of Plan Adoption by Jurisdiction	
Jurisdiction	Date of Adoption

All jurisdictions were involved in the plan update to the extent they wanted to participate. Representatives from each municipality and the County attended the planning meetings and provided valuable perspective on the changes required. All representatives took part in group risk assessments and provided comments. Following each meeting representatives informed the respective councils and presented an update.

Table 2.2 is a Record of Participation and shows the requirements of the planning process for jurisdictions to be considered participants and lists the jurisdictions that met the requirements.

Table 2.3: Record of Participation

Nature of Participation	Brown County	Aberdeen	Claremont	Columbia	Frederick	Groton	Hecla	Stratford	Verdon	Warner	Westport
Attended Meetings or work sessions	☒	☒	☐	☒	☐	☒	☒	☐	☐	☐	☐
Submitted inventory and summary of reports and plans relevant to hazard mitigation.	☒	☒	☐	☒	☐	☒	☒	☐	☐	☐	☐
Submitted Risk Assessment Worksheet.	☒	☒	☐	☒	☐	☒	☒	☐	☐	☐	☐
Submitted description of what is at risk (including local critical facilities and infrastructure at risk from specific Hazards) Worksheet 3A	☒	☒	☐	☒	☐	☒	☒	☐	☐	☐	☐
Submitted a description or map of local land-use patterns (current and proposed/expected)	☒	☒	☐	☒	☐	☒	☐	☐	☐	☐	☐
Developed goals for the community.	☒	☒	☐	☒	☐	☒	☐	☐	☐	☐	☐
Developed mitigation actions with an analysis/explanation of why those actions were selected.	☒	☒	☐	☒	☐	☒	☐	☐	☐	☐	☐
Prioritized actions that emphasize relative cost-effectiveness.	☒	☒	☐	☒	☐	☒	☐	☐	☐	☐	☐
Reviewed and commented on draft Plan.	☒	☒	☐	☒	☐	☒	☐	☐	☐	☐	☐
Hosted opportunities for public involvement (allowed time for public comment at a minimum of 2 city council meetings giving a status report on the Plan update)	☒	☒	☐	☒	☐	☒	☐	☐	☐	☐	☐

III. PLANNING PROCESS

CHANGES/REVISIONS TO PLANNING PROCESS:

- The section was updated to reflect the new participants.
- Record of Review documents was updated.
- Table for a List of Representatives Involved in the Plan added to list representatives who were part of the plan for each jurisdiction.
- Plan Resources table added to list resources used in the plan and planning process.
- Brown County Mitigation Meetings table added to list meetings where the plan was discussed and open for public review and comment.
- Public Involvement was added to this part of the plan and information about the survey used to elicit public comment is listed here.
- The Record of Participation was added to this section to better illustrate the participants in the planning process.
- Table listing neighboring counties, who were contacted for plan input, added to this section.
- Capability Assessment Table was added to this section.

DOCUMENTATION OF THE PLANNING PROCESS

Requirement 201.6(c)(1) ... *Does the plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction."*

A1-a. *The plan must describe the current planning process.*

A1-b. *The plan must list the representatives from each of the participants in the current plan that will seek approval and how they participated in the planning process.*

Planning for the 2027 Natural Hazard Mitigation Plan Update began at the Brown County Commission Meeting at the Brown County Courthouse January 18, 2024. At that meeting, discussions were held to approve the grant funding of the Plan and for NECOG to write the Natural Hazard Mitigation Plan. Public planning meetings began February 3, 2025, at the Brown County Courthouse. Invitations to attend the planning meetings were sent to neighboring counties' emergency managers for input in the planning process. Public notices were placed on the Emergency Manager's Brown County webpage and the *Reporter and Farmer*. A steering committee was formed from those who attended the public meetings. A copy of the minutes and discussions is included in the plan as Appendix B. A list of times and dates of the meetings are below:

May 20, 2026, 1 p.m. at the Brown County Emergency Management Office
July 8, 2026, 1 p.m. at the Brown County Emergency Management Office
August 26, 2026, 1 p.m. at the Brown County Emergency Management Office

Public planning meetings were at the Brown County Emergency Management Office. Commission and City Council meetings of participating jurisdictions were used to inform the public about the Natural Hazard Mitigation Plan update. Representatives from participating jurisdictions worked through the 2022 Plan, noting deficiencies, corrections, and updates that needed to be made. Additional information was added to ensure that the requirements were met. Council and commissioner members made up most of the participants. Participants in the meetings have a wide range of participants. Brown

County administrative offices along with emergency services were present. Aberdeen's engineering department were also present along with emergency response services. Both Avera and Sanford representatives participated in the plan detailing emergency responses and opportunities to improve. Hecla's city council representative informed the planning committee on challenges Hecla faced in mitigation. An invitation was sent to Northern State University in Aberdeen to reach out about the planning for a large young population. Input was requested from the Aberdeen Chamber of Commerce and the Aberdeen Development Corporation. The updates were completed through three work meetings with the planning committee. These meetings were advertised through invitations. The date of the next meeting was set at the previous meeting. These methods of notifying the public were determined by the steering committee as the best way to create public awareness and involvement. The Brown County Emergency Manager also attended multiple meetings and the participating jurisdictions to ensure input was elicited. Copies of the plan were sent to all groups to elicit comments.

General public input was elicited from the use of a public survey. This survey was shared through emails, Facebook pages, and websites.

The plan author participated and followed the guidelines set in the FEMA G318 training and the FEMA Multi-Hazard Mitigation Guidance and Planning Tool as a basis for the plan update. This training provided guides for the planning update and meetings. Parts of the 2027 plan that did not meet FEMA's new guidelines were eliminated or adjusted to meet the new requirements. New updated requirements were included in the new plan update. Participating jurisdictions were given a copy of the mitigation strategy and were instructed to review all goals and projects to determine if changes were needed. Plan representatives were asked to discuss the mitigation strategy at council or commission meetings to determine if projects should be left in the plan, removed or were complete. Plan participants were also asked if recent developments created or changed risks. The meeting minutes and agendas for each of the meetings were published in the local newspaper or paper of record.

SELECTION OF THE STEERING COMMITTEE [§201.6(c)(1)]

The Brown County Emergency Manager and Northeast Council of Governments led the Natural Hazard Mitigation Plan update. Local jurisdictions were represented by mayors, commissioners, city council members and/or finance officers who attended the meetings. County department heads also participated. The committee members took the information from the work sessions back to their jurisdiction and discussed the progress of the plan at their council meetings. There were external contributors. Avera and Sanford were essential with their input at meetings and on the survey.

Representatives from local jurisdictions such as commission and council members and/or finance officers who attended were instrumental in the planning process by providing additional information when needed. Attendees reviewed the drafts and provided comments after the Northeast Council of Governments initiated changes to the 2027 plan. Each participating local jurisdiction had a member of their council represent the municipalities' interest in the plan.

The representatives were asked to share the plan progress at their council meetings. This encouraged participation and input on the plan from each council and allowed comments and participation in the process of updating the plan. The municipalities put the plan update on the agenda. Comments provided by residents at the city council

meetings were collected and incorporated into the plan. Table 3.1 lists the representative and the jurisdictions that were involved in the planning process.

Flooding has had significant impacts on Brown County. Flooding and severe weather impacts have created a culture of preparedness and advance planning for weather events to ensure that resources are where they need to be when they are needed. Essential as part of these conversations was the Brown County Sheriff's office, Brown County Emergency management, and the Aberdeen Police Department and Aberdeen's Fire Department. Mitigation does not need to be structures. Mitigation also can occur in the forethought that emergency services take to prevent issues by responding to events as quickly as possible.

Another essential element to the plan was the planning departments from Brown County Planning and Zoning and Aberdeen's engineering and planning departments. These departments work with residents to reduce the impact of disasters for residents, especially flooding. Communications and GIS proved essential as well assisting the plan with the challenges and considerations used to reduce the impact of disasters. Those who attended the initial planning meeting for the Plan update were asked to provide information whenever necessary. Attendees reviewed the drafts and provided comments after Northeast Council of Governments initiated changes to the existing plan. Each of the participating local jurisdiction had a member of their council represent the municipalities' interest in the plan. Those representatives are listed by jurisdiction in Table 3.1:

Table 3.1 Brown County Natural Hazard Mitigation Planning Committee	
Brown County	Mike Wiese Scott Meints C. Scott Bader Lynn Heupel Scott Madsen Kent Jones Jon Lemke Patti Woods Pat Wolberg
Aberdeen	Destin Spellman Tanner Johndahl Trevor Meints Jason Herbek Joel Weig Max Stoltenburg
Groton	Doug Heinrich
Hecla	Daniel Vancil
Columbia	Trevor Meints
** Did not participate in the plan	

Table 3.2 is a list of officials who, as of the writing of this plan, were members on the boards and commissions for the Brown County jurisdictions of the plan. They provided input at public meetings for the plan.

Table 3.2: List of Representatives Involved in the Plan

Brown County	
Duane Sutton	Chairman
Mike Gage	Vice Chairman
Drew Dennert	Commissioner
Kyler Dinger	Commissioner
Mike Wiese	Commissioner
Aberdeen	
Travis Schaunaman	Mayor
Rob Ronayne	President
Erin Fouberg	Council Member
David Novstrup	Council Member
Chad Nilson	Council Member
Charlotte Liebelt	Council Member
Rich Ward	Council Member
Alan Johnson	Council Member
Talmage Ekanger	Council Member
Claremont	
Shane Johnson	President
Frank Rasmussen	Trustee
Jason Spencer	Trustee
Columbia	
Corey Mitchell	President
Meghan Butler	Trustee
Emily Eichler	Trustee
Cole Kampa	Trustee
Trevor Meints	Trustee
Frederick	
Scott Campbell	President
Jeff Kusters	Trustee
Troy Millard	Trustee
Groton	
Scott Hanlon	Mayor
Karyn Babcock	Council Member
Brian Bahr	Council Member
Jon Cutler	Council Member
Jason Wambach	Council Member
Shirley Wells	Council Member
Hecla	
Randy Pfitzenreuter	Mayor
Mary Freudenthal	Council Member
Shelley Ruenz	Council Member
Gene Skoglund	Council Member
Reece Treeby	Council Member
Terry Ulmer	Council Member

Stratford	
Vern Prickett	President
Dave Bourassa	Trustee
Lloyd Jark	Trustee
Verdon	
Renee Hanlon	President
Scott Hanlon	Trustee
Warner	
David Fair	President
Mike Bertsch	Trustee
Gaylon Townsend	Trustee
Westport	
Mitch Wilson	President
Lawrence Schmit	Trustee
Shane Storm	Trustee
***Commissioners, council members, and other elected officials and non-elected officials of cities, towns and counties change often. These names are the most recent office/position holders.	

TECHNICAL REVIEW OF EXISTING DOCUMENTS

Requirement 201.6(b)(3)) ... Does the plan describe the review and incorporation of existing plans, studies, reports and technical information?

A4-a. The plan must document what existing plans, studies, reports, and technical information were reviewed and how they were incorporated, if appropriate, in the development/update of the plan.

The review and incorporation of existing plans, studies, reports, and technical information was completed. Each community was asked to provide a list of documents. Many of the smaller communities do not have such documents. The 2022 Mitigation Plan was a resource for the 2027 Mitigation plan. The plan author reviewed several documents which are listed in Table 3.3. Not all resources were used, but all were reviewed. Each community was contacted to determine if changes were needed. Each community was contacted to determine if changes were made to the technical documents.

Brown County updated and adopted their Comprehensive Plan November 19, 2019. The Brown County Zoning is updated as changes are required. South Dakota State Law requires that communities that have not adopted a building code automatically fall under IBC 2024. The County Planning and Zoning Director addresses building permits and processes to ensure they match what is allowed by the County. Building permits can be substantial or less than substantial and the process for approval can require homeowners to match current building standards on their existing home before making more changes. This prevents future issues by bringing the building up to current codes if there are additional things the owner would like to do. Brown County is currently undergoing FEMA flood mapping to update the flood insurance rate maps that are used. A summary of the technical review and incorporation of existing plans is included on page 24 Table 3.3. South Dakota passed a law in the 2024 legislative session that

does not require building permits for small replacement of items such as siding, windows (same size) and doors (same size). A building permit is still required for any changes to the structure or changes to the size or placement of windows or doors.

The City of Aberdeen has full-time planning staff, which manage residential and commercial buildings. Aberdeen also has the HAZUS programs to analyze hazards. They have some training completed on the system, but the process is not complete. Aberdeen's Growth Plan focuses on land use for residential and business growth. Goals are to increase Aberdeen's attractiveness to area and out-of-area residents and manage growth. The strategy includes but is not limited to encouraging development compatible with Aberdeen's long-term goals, revitalizing neighborhoods while providing affordable housing to attract and retain talent, developing downtown into a vibrant community area, encouraging growth while keeping Aberdeen's small-town character, enhancing Aberdeen's appearance, and encouraging retention while attracting residents from outside the area. Other goals included enhancing transportation alternatives, and more comprehensive and fiscally responsible development.

Aberdeen's development is reviewed and amended as needed. All zoning amendments go through a public hearing process. There is a public notice, approval required by the planning commission, followed by a first and second reading of the updated ordinance.

Within Aberdeen, Northern State University has a Campus Emergency Plan that was discussed due to the high number of student residents. NSU has enrollment of 3,700 students. As a diverse population, with international students, their plan emphasizes safety within the facilities and has maps in each residence hall to direct students to where it is safest in each building.

Aberdeen has two hospitals. Both have annual Hazard Vulnerability studies that look at area history of incidents to find potential areas of high, low,

Hecla is located a few miles south of the North Dakota border. It is 45 miles north of Aberdeen. Hecla has its own electrical power system and is working on a plan to improve their water and wastewater systems. Their system is vulnerable due to weather events due to the age of their infrastructure and power lines that are above ground. There are no secondary water sources for Hecla. Hecla is vulnerable because of the distance from Aberdeen and there are limited resources in the town. Hecla does have a fire department to assist residents with fire emergencies quickly.

The City of Groton has a Comprehensive Plan. Development is more restricted there not only due to lack of developers, but the location of flood plains to the east, southeast, and northwest. There are ordinances that require a flood certificate but only if the resident is building in the flood plain. There are concerns that the lack of curb and gutter in areas of Groton reduces control of water. Groton has their own electrical distribution system which distributes power from the Western Area Power Administration and Heartland Power District. Growth will require upgrades to the system.

Table 3.3: Record of Review (Summary) Local Jurisdiction

Program / Policy / Technical Documents	Brown Co.	Aberdeen	Claremont	Columbia	Frederick	Groton	Hecla	Stratford	Verdon	Warner	Westport	Notes
Comprehensive Plan	✓	✓	NP	NP	NP	✓	NP	NP	NP	NP	NP	
Capital Improv. Plan	NP	✓	NP	NP	NP		NP	NP	NP	NP	NP	
Flood Damage Prevention Ordinance	✓	✓	✓	✓	C	✓	C	✓	C	C	C	Brown coordinates with building officials in jurisdictions they work with.
Floodplain Management Plan	✓	✓	✓	✓	C	✓	C	✓	C	C	C	Brown does all admin of floodplains except Aberdeen, Columbia, Claremont, and Stratford Aberdeen Eng. Dept
Flood Ins. Studies/Eng. Studies for waterways	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	IMEG has Brown's Aberdeen has HDR working on a study James River Water Dev. Dist. studies Jame waterways.
Transportation Plan	✓	✓	C	C	C	C	C	C	C	C	C	
Emergency Operations	✓	✓	C	C	C	C	C	C	C	C	C	
Zoning Ordinance	✓	✓	C	C	C	✓	C	C	C	✓	C	
Building Code	NP/ IBC 2024	✓	IBC 2024	IBC 2024	IBC 2024	✓	IBC 2024	IBC 2024	IBC 2024	✓	IBC 2024	Aberdeen has building codes based on IBC 2024. Brown and the rest of the communities follow IBC 2024
Drainage Ordinance	✓	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	Used to have a drainage ordinance and use was discontinued. James River Water has documents for drainage. Hecla has a sewer and water plan
Critical Facilities maps	✓	✓	NP	NP	NP	NP	NP	NP	NP	NP	NP	
Existing Land Use maps	✓	✓	NP	NP	NP	NP	NP	NP	NP	NP	NP	
Elevation Certificates	✓	✓	✓	✓	C	✓	C	✓	C	C	C	
State Hazard Mitigation Plan	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Growth Management Plan	✓	✓	NP	NP	NP	NP	NP	NP	NP	NP	NP	Brown – 2018
Bridge Plan	✓	C	C	C	C	C	C	C	C	C	C	Brown - 2014
Community Ops Plan	✓	✓	NP	NP	NP	NP	NP	NP	NP	NP	NP	
HAZMAT	✓	C	C	C	C	C	C	C	C	C	C	
Hazard Vulnerability Analysis	✓	✓	C	C	C	C	C	C	C	C	C	Under Avera and Sanford for planning.
NA	: the plan does not apply to the jurisdiction											
NP	: the jurisdiction does not have this program/policy/technical document											
O	: the jurisdiction has the program/policy/technical document, but did not review/incorporate it in the mitigation plan											
C	: the jurisdiction is regulated under the County's policy/program/technical document											
✓	: the jurisdiction reviewed the program/policy/technical document											

Table 3.4: Additional Plan Resources	
Plan Name	Location of Use in Plan
South Dakota Hazard Mitigation Plan	Hazard Profile
Brown County Hazard Mitigation Plan (2022)	Used throughout the 2027 Mitigation Plan
Brown County Rural Development Site Analysis	Brown County's Profile and Brown County Projects
Brown County Zoning	Hazard Profile
Brown County Ordinances	Hazard Profile
City of Aberdeen Comprehensive Plan*	
Brown County Flood Prevention Ordinance	Hazard Profile
Aberdeen Flood Prevention Ordinance	Hazard Profile
Brown County Flood Maps	Hazard Profile
Flood Damage Prevention Ordinance and Management Plan – Brown County	Hazard Profile
Flood Insurance Studies	Hazard Profile
Brown County Emergency Operations Plan	Hazard Profile
NOAA Storm Events Database	Hazard Profile
Fifth National Climate Assessment	Hazard Profile
NIDIS (Drought.gov)	Hazard Profile
U.S. Air Quality Index (Airnow.gov)	Hazard Profile
E.P.A. (epa.gov/enviroatlas)	Hazard Profile
USA (usatoday.com/storytelling/news/investigation/rainfall-lookup/) Today	Hazard Profile
CDC (CDC.gov)	Unique and Varied Risk
National Climate Assessment	Hazard Profile
National Risk Index	Unique and Varied Risk
Climate Explorer	Hazard Profile
National Levee Database	Hazard Profile
Risk Factor (riskfactor.com)	Hazard Profile
Census Data (Census.gov)	County Profile, Hazard Profile, Development and Vulnerability
Aberdeen Insider	Brown County Profile
Dakota News Now	Hazard Profile
ClimRR	Hazard Profile
FEMA.gov	Used throughout the plan as a resource
Resilience Analysis and Planning Tool	Hazard Profile
Google	Used throughout the plan as a resource
Climate Viewer Maps	Hazard Profile
NPMS Public Viewer Brown County Pipelines	Used throughout the plan as a resource
SD Lakes	Hazard Profile
State of South Dakota Mitigations Project Map	Hazard Profile
USAFacts.com	Brown County Profile
Avera St. Lukes Threat/Hazard Analysis	Hazard Profile
Brown County Rural Development Site Analysis	Development
*Plans that were reviewed but not incorporated into the plan are marked with an Asterix.	

The resources listed in Table 3.4 were resources used by the plan author for information in the plan in addition to the technical documents. These resources include plans from

other jurisdictions as well as websites with information about the hazards and regulations in Brown County.

REVIEW OF THE 2022 PLAN

The planning team reviewed and analyzed each section of the plan, and each section was revised as needed as part of the update process. The plan author also used the Local Multi-hazard Mitigation Planning Guidance (dated March 23, 2023) and the Local Mitigation Plan Review Tool to update the plan.

While the entire plan was evaluated information was updated. Participants were asked to focus on the mitigation strategy and risk assessment. A review of the plan occurred during three two-hour work sessions and at City Council and Commission meetings held at the several locations and times on the following dates listed in Table 3.5.

Table 3.5: Brown County Mitigation Meetings				
Date	Location	Meeting Type	Advertisement	Stakeholders Represented
2/18/25	Brown Commission	County Commission	Agenda	County, public
2/12/25	Hecla	City Council	Agenda	County, public
2/4/25	Groton	City Council	Agenda	City, public
2/3/25	Westport	City Council	Agenda	City, public
2/3/25	Aberdeen	City Council	Agenda	City, public
2/5/25	Columbia	City Council	Agenda	City, public
2/12/25	Warner	City Council	Agenda	City, Public
3/3/25	Frederick	City Council	Agenda	City, public
5/20/26	Aberdeen	Planning	Invite, Agenda, social media	City, County, Public
7/14/26	Brown Commission	County Commission	Agenda	County, public
7/8/26	Aberdeen	Planning	Invite, Agenda, social media	City, County, public, non-profit
8/26/26	Aberdeen	Planning	Invite, Agenda, social media	City, County, Public, non-profit, news
Agendas are required to be posted 24 hours in advance of a meeting at the principal office of the jurisdiction and on the jurisdiction's website. The agenda must be visible, readable and accessible.				

Sign in sheets and meeting notes are attached as Appendix B to the plan for reference.

Communities in Brown County have experienced repeated times of flooding. Especially around the James River area. Water flows gradually along the James River due to the very low slope of the river through the county. The James River only loses 130 feet of elevation over roughly 474 miles of river. The average slope is a drop of about 5 inches per mile.

Brown County's Flood Damage Prevention Ordinance was established to reduce damages to flood prone areas. There is a floodplain permitting process for building in

flood prone areas. Buildings must be certified that the lowest floor is at least one foot above the base flood elevation and that new construction must have water resistant electrical, heating, ventilation, and plumbing. Another aspect is buildings must be anchored and secured to prevent buoyancy.

A floodproofing certificate, signed by a professional engineer, is required for any nonresidential structure located in or adjacent to a floodplain. This form sets the elevations, and the lowest floor of the structure, which must have at least one foot of freeboard. Freeboard is an additional amount of height above the base flood elevation. This is required for new buildings and buildings needing substantial improvements or additions that are in or adjacent to the floodplain. Residential structures will have the lowest floor at least one foot above the base flood elevation to obtain a FEMA elevation certificate. If the building does not have a basement and is slab on grade, the lowest floor must also have one foot of freeboard, as certified according to FEMA with a certificate. These preventative actions are an illustration of how protective mitigation can be in situations of recurring events. Holding pond areas are also established depending on how the structure affects the normal flow of water. According to the Brown County Rural Development Site Analysis, all CAFOs and other structures are prohibited from being built in a 100-year flood plain.

There is a lack of drainage in Brown County because the topography is very flat. It takes time for the water to either move downstream or evaporate. There can be flooded roads which obstruct access to homes and farmland. This flooding can hinder development in Brown County. Load limits and reduced speed limits are placed on roads to prevent further degradation. Croplands are also lost when there is flooding. Sometimes, flooding can delay planting or harvesting indefinitely, impacting the economy. Flooding can happen anywhere in the county although it generally occurs near the James River, Elm River, or Moccasin Creek. Flash flooding, where the water accumulates quickly has occurred and is often associated with massive rainfall and rapid snowmelt. May 5-6, 2007, the area received nine inches of rain during the two-day period. Groton received a record breaking 8.74 inches in a 24-hour period. These conditions contributed to massive flooding throughout the area. Nearly 75% of homes in Aberdeen reported some water in their basements. Many homes were condemned throughout the region. The entire county was declared a disaster area.

High water tables impact Brown County by causing residents to continually run sump pumps. If power was lost, many homes would be impacted because they are dependent upon those pumps to keep their home or building dry. Floodplain management is a gray area for the smaller jurisdictions. Many, such as Claremont, Columbia, and Frederick do not have the resources to administer floodplains on their own and reach out to the County's Planning and Zoning Department for assistance.

Table 3.6: Capability Assessment					
	Brown County	Aberdeen	Groton	Hecla	Columbia
Mitigation Capabilities – Administrative					
Building Official	Yes	Yes	Yes	Yes	Yes
Building Codes	Yes – Flood and Building Codes IBC 2024	Yes – Flood and Building Codes ICB 2024	Yes – Flood and Building Codes	Yes – Flood and Building Codes ICB	Yes – Flood and Building Codes ICB

			ICB 2024	2024	2024
Civil Engineer	Yes	Yes	Yes	Yes	Yes
Community Planner*	Yes	Yes	Yes	County	County
Floodplain Administrator	Yes	Yes	Yes	County	County
GIS Coordinator*	Yes	Yes	County	County	County
Emergency Manager	Yes	County	County	County	County
Planning Commission	Yes	Yes	Yes		
Membership with NEOG	Yes	Yes	Yes	County	County
Mitigation Capabilities – Technical					
Grant Writing*	NECOG/Yes	NECOG/YES	NECOG	NECOG	NECOG
Hazard Vulnerability Analysis	Yes	Yes	Yes	Yes	Yes
GIS Analysis*	Yes	Yes	Yes	Yes	Yes
Mutual Aid Agreements	Yes – Fire/Law	Yes – Fire/Law	Yes – Fire/Law	Yes - Fire	Yes - Fire
Other Studies/Reports/Maps					
Flood Insurance Studies/Engineering Studies/H&H Studies	Yes	Yes	Yes	Yes	Yes
Critical Facilities Map	Yes	Yes	County	County	County
Existing Land Use Maps	Yes	Yes	Yes	County	County
Dam Inspection Report	Yes	Yes	No	No	No
Funding Resources					
Capital Improvement Project Funding	Yes	Yes	No	No	No
Community Development Block Grant	Yes	Yes	Yes	Yes	Yes
Water Fees	No	Yes	Yes	Yes	Yes
Sewer Fees	No	Yes	Yes	Yes	Yes
Electricity Fees	No	No	Yes	Yes	No
Stormwater Utility Fee	No	Yes	No	No	No
Federal (non-FEMA) Funding	Yes	Yes	Yes	Yes	Yes
State Funding Programs	Yes	Yes	Yes	Yes	Yes
Education and Outreach					
Community Newsletter	No	No	No	No	No
Local Newspaper	Yes	Yes	Yes	Yes	Yes
Website	Yes	Yes	Yes	No	Yes
Social media	Yes	Yes	Yes	Yes	Yes
Text Alerts	Yes	Yes	Yes	County	County
Hazard Awareness Campaigns	Yes	Yes	Yes	County	County
Org. Rep. to Interact with Vulnerable Pop.	Yes	Yes	Yes	No	No
Community Board	No	No	No	Yes	Yes

PUBLIC INVOLVEMENT [§201.6(b)(1)]

Requirement 201.6(b)(1)) ... Does the plan document how the public was involved in the planning process during the drafting state and prior to plan approval?

A3-a. The plan must document how the public had an opportunity to be involved in the current planning process, and what that participation entailed, including how underserved communities and vulnerable populations within the planning area were provided an opportunity to be involved.

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

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

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

1-25-1.1. ...Each political subdivision shall provide public notice, with proposed agenda, which is visible, readable, and accessible for at least an entire, continuous twenty-four hours immediately preceding any official meeting, by posting a copy of the notice, visible to the public, at the principal office of the political subdivision holding the meeting. The proposed agenda shall include the date, time, and location of the meeting. The notice shall also be posted on the political subdivision's website upon dissemination of the notice if a website exists. For any special or rescheduled meeting, the information in the notice shall be delivered in person, by mail, by email, or by telephone, to members of the local news media who have requested notice. For any special or rescheduled meeting, each political subdivision shall also comply with the public notice provisions of this section for a regular meeting to the extent that circumstances permit.

The public was given opportunity to comment on the plan during the drafting stages, at the Natural Hazard Mitigation Planning Meetings and at County Commission, City Council and City Commission meetings. There were several work sessions and public hearings to involve the public, however, no one from the public commented on the plan or helped with the update. The public was notified through the local newspaper, social media, and the county website that the plan draft was being placed online for review and comment. The Planning Committee approved the use of a survey to elicit public comments. The survey, available online and on paper, had 242 respondents and allowed comments to be made. The survey and its report are in Appendix E.

There were several work sessions and public hearings to involve the public, however, no one from the public commented on the plan or helped with the update. The public was notified through the local newspaper, social media, and the county website that the plan

draft was being placed online for review and comment. Avera St. Luke's Hospital and Sanford Hospital attend the meetings to provide input. An invitation was sent to Northern State University; however, they were unable to attend. Even though no one from the public showed up to comment on the plan update, discussion occurred among the council members, engineers, finance officers, city engineers and/or attorneys (when relevant), and staff. This was documented in the meeting minutes and published in the paper or record as required by law. The plan was made available to county and city officials for comments and updates. Copies of the plan were sent to Avera St. Luke's Hospital, Sanford Hospital, and Northern State University. Outreach was made to the Aberdeen Development Corporation and the Chamber of Commerce. Comments were also made from the public through the survey conducted by the County. The survey and list of comments is in Appendix E. The Planning Committee approved the use of a survey to elicit public comments. The survey, available online and on paper.

SURVEY

A public survey was conducted during the update. Surveys were distributed through the Brown County Emergency Management Facebook, the Aberdeen Police Department Facebook Page and the Aberdeen Fire Department Facebook page and communicated at meetings and to make the survey accessible and equitable, a QR code was provided in the Facebook pages of the Aberdeen Police Department and the Brown County Emergency Management. The following table details demographic info of respondents for the survey. Ages of respondents ranged from under 18 to over 65. Hazard results are listed under each hazard in the Hazard Profile.

Table 3.7: Location of Survey Respondents		
Location	Number	Percentage of Respondents
Rural Brown County	36	14.9%
Aberdeen	178	73.6%
Claremont	1	0.4%
Columbia	3	1.2%
Frederick	3	1.2%
Groton	5	2.1%
Hecla	3	1.2%
Jobee Acres	1	0.4%
Prairiewood	1	0.4%
Richmond	3	1.2%
Warner	8	3.3%

NEIGHBORING JURISDICTION PARTICIPATION [201.6(b)(2)]

Requirement 201.6(b)(2)) ... Does the plan document an opportunity for neighboring communities local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development as well as businesses, academia, and other private and non-profit interests to be involved in the planning process.

A2-a. The plan must provide documentation of an opportunity for stakeholders to be involved in the current planning process.

Before the first planning meeting, an email was sent to neighboring emergency managers in the counties of: Spink, McPherson, Edmunds, Day, and Marshall. After the plan was drafted it was posted on the Brown County Website, City of Aberdeen website, and emailed to all participants and to the emergency managers in the neighboring counties of Spink McPherson, Edmunds, Day, and Marshall. All recipients listed in Table 3.6 received a copy of the plan draft and were allowed 32 days to comment on the draft.

Table 3.8: Neighboring Emergency Managers			
Neighboring County	Emergency Manager	Response Received	Comments
Spink	Andrew Rindelaub	No	None
McPherson	Dave Ackerman	No	None
Edmunds	Tracy Hutson	No	None
Day	Bryan Anderson	No	None
Marshall	Logan Roehr	No	None

IV. RISK ASSESSMENT

CHANGES/REVISIONS TO RISK ASSESSMENT:

- All figures in this section were updated, as necessary.
- Removed redundant language in the hazard profile section and removed hazards listed that had no occurrences in the hazard area.
- Condensed hazard descriptions into each hazard section.
- Added a table of Presidential Disaster Listings.
- Added Overview County Flood and NFIP Repetitive loss properties table under flood.
- Added information on mitigation projects completed in Brown County.
- Added subsidence as a risk to the county due to multiple jurisdiction concerns.
- NFIP requirements were added to this section.
- Probability of Future Occurrence discusses the impact of climate change on the county.
- Added Hazard Vulnerability to Critical Structures table.

IDENTIFYING HAZARDS

A summary of natural hazard occurrences in Brown County since 2014 is in Appendix D. Although there are many websites for hazard data, the primary sources were: the National Oceanic Atmospheric Administration (NOAA), the National Weather Service in Aberdeen, South Dakota State Fire Marshall's office, National Inventory of Dams, FEMA, and the United States Drought Monitor. Additional resources were provided from the newspapers *The Aberdeen Insider* and *The Aberdeen American News* and are listed in Table 3.4 in the planning process section. These sources accumulate information over time, yet there are instances where the data is incomplete. The plan writer extrapolated based on the reputable available data and planning committee input.

Although the accumulation of occurrences is broad, a complete list does not exist due to the remoteness of the area. For example: one can assume that although there was hail in Brown County, there would be damage, even if it was just minor insurance claims. NOAA does not always account for this damage. Also, there are other organizations that are more detailed for certain hazards. The National Drought Monitor gathers facts about drought. This specificity allows more detail with the data.

One example where official information is not complete is fire occurrences. The NOAA website listed zero wildfire occurrences in the last 10 years. The State Fire Marshal, Doug Hinkle, was contacted to verify that information. He explained that the state's information is more accurate and is obtained from reports submitted by the local fire departments who respond to the events. Sometimes, fire departments do not file reports with the state. Although the information provided by the State Fire Marshal's office is not entirely complete either, it is more accurate than NOAA's data and was used in the plan.

Other examples of difficulty obtaining accurate information about Brown County hazards through NOAA were drought, lightning, and extreme temperatures. Although these are common in Brown County, there was little to no data about these events and damages. One thing to note: in South Dakota, the weather is generally accepted as constantly changing. One statement common to the area is: "if you don't like the weather, wait five minutes." This idea illustrates the resilience of residents and the acceptance of rapidly changing and unpredictable weather conditions.

HAZARD PROFILE – IDENTIFYING HAZARDS

Requirement 201.6 (c)(2)(i): Does the plan include a description of the type, location and extent of all natural hazards that can affect the jurisdiction. Does the plan include information on previous occurrences of hazard events and on the probability of future hazard events?

B1-a. The plan must include a description of all natural hazards that can affect the jurisdiction(s) in the planning area and their assets, such as dams, located outside the planning area.

The geographic location of each natural hazard is addressed in the update. Most hazards are widespread and can occur anywhere in the County. The history of hazard occurrences is in Appendix D. Table 4.1 identifies the Latitude and Longitude of the jurisdictions, population, elevation, and number occupied homes according to the 2020 US Census. To illustrate the growth in Brown County and the increased risk, occupied housing units and the difference over the last 10 years are included.

Name (Cities and Towns)	Pop. - 2010 Census	Pop. - 2020 Census	Diff. in Pop.	Location	Elev.	Housing Units in Hazard Area (2010)	Housing Units in Hazard Area (2020)	Diff - Housing Units (2010 to 2020)
Aberdeen	25,713	28,495	2,782	45°27'52" N, 98°29'11" W	1,295 ft.	12,158	13,397	1,239
Claremont	48	108	60	45°40'19" N, 98°00'55" W	1,340 ft.	61	60	-1
Columbia	90	160	70	45°36'47" N, 98°18'44" W	1,304 ft.	80	74	-6
Frederick	286	215	-71	45°50' N, 98°30' W	1,381 ft.	119	118	-1
Groton	1,555	1,380	-175	45°26'51" N 98°5'54" W	1,302 ft.	630	641	11
Hecla	219	193	-26	45°52'29" N, 98°09'06" W	1,299 ft.	155	156	1
Stratford	58	57	-1	45°18'59" N, 98°29'46" W	1,302 ft.	41	41	0
Verdon	3	3	0	45°14'38" N, 98°05'50" W	1,306 ft.	4	4	0
Warner	355	485	130	45°19'33" N, 98°29'42" W	1,298 ft.	171	176	5
Westport	76	88	12	45°38'56" N, 98°29'48" W	1,332 ft.	51	47	-4
Rural Brown	8,128	7,117	-1,011			3,236	3,171	-65
Brown County	36,531	38,301	1,770	45°45'29" N, 98°15'15" W	1,289 ft.	16,706	17,885	1,179

Table 4.1: Data from US Census Bureau Decennial Census 2010 and 2020 and Google Earth

The scope of the hazards, information on previous occurrences, and the probability of future events for each hazard is in Table 4.2 and the data is in Appendix D. While the planning committee reviewed all hazard events from the last 100 years, the list of some hazards was extremely long. The information provided is not a complete list of events but an overview of the last ten years and is summarized here. New occurrences that happened since the previous plan were added. As climate change continues to impact

the area with more and increasingly severe trends, recording weather events becomes more important to mitigation. The complete 10-year history can be found in Appendix D.

Hazard probabilities are based on events that occurred in the last 10 years. The hazard rating of dam failure is low meaning there is a low hazard to downstream areas if the dam breaches. Three dams have a hazard rating of high and ten have a hazard rating of low. Dams that have higher downstream hazard rating have all been inspected and

Table 4.2: Probability of Events Occurring in Brown County				
Event	Probability	# of Events	# of Years	Source
Dam Failure as rated by the National Inventory of Dams	Low	3 of the 13 dams are high hazard, 9 are low	10 Years	National Inventory of Dams
Wildfire	100%	939 total fires	10 Years	SD State Fire Marshall
Drought	60% annual chance	22 Events 621 Days over 6 Years	10 Years	NOAA
Flood	80% annual chance	83 Events/8 years	10 Years	NOAA
Flash Floods	50% annually	5 Events over 5 years	10 Years	NOAA
Total flood events		88 Events	10 Years	NOAA
Hail	100%	109 Events	10 Years	NOAA
High Winds/Dust Storm	100% annual chance	31 Events/10 years	10 Years	NOAA
Thunderstorm Winds/Lightning	100%	178 Events over 76 Days	10 Years	NOAA
Funnel Cloud/Tornado	60% annual chance	4 Funnel Clouds/6 Tornadoes in 6 years	10 Years	NOAA
Extreme Temperatures – Cold	100% chance (10 years with extreme cold events)	Cold: 31 Days	10 Years	NOAA
Extreme Temperatures - Heat	50% change (5 years with high heat events)	Heat: 9 Days	10 Years	NOAA
Winter Weather/Blizzards/Ice Storms/Winter Storms	100%	47 Events	10 Years	NOAA

Table 4.2 data from NOAA, SD State Fire Marshall, NID detailed in Appendix D.

Weather patterns can increase in magnitude and frequency due to climate change and its effects on weather patterns. According to Laura Edwards, State of South Dakota Climatologist, weather extremes will become more common as climate change shifts the average temperatures upwards. The swings from high to low precipitation will not be as gradual and winters will become warmer on average.

Brown County, Avera St. Luke's Hospital, and Northern State University are part of a National Oceanic and Atmospheric Associate (NOAA) program that recognizes organizations for being StormReady. StormReady jurisdictions must maintain a 24-hour warning point and Emergency Operations Center to relay hazards. They must ensure that the Warning Point and EOC can monitor local weather and flood observation data, that hazardous weather and flooding is addressed in emergency management plans, conduct community preparedness programs for hazardous weather and flooding, and train storm spotters. Establishing an effective relationship with Emergency Management and local National Weather Service is essential.

Dams with the potential to impact Brown County have been having repairs and work done to ensure that they are safe. The spillway replacement has been funded through the state, Brown County, and the federal Rehabilitation of High Hazard Potential Grant Program.

SUMMARY OF VULNERABILITY

Table 4.3 is a list of natural hazards produced from the FEMA worksheets completed by each local jurisdiction located in Brown County. Representatives from each community completed the worksheet for their location. Representatives of Brown County completed the worksheet for county-wide risks. The risk assessment worksheets were used to complete the Natural Hazard Mitigation Plan. These worksheets performed the basis for the projects listed in the mitigation portion of the plan and are in Appendix C. Table 4.3 lists the natural hazards of concern in Brown County.

Table 4.3: Natural Hazards Categorized by Likelihood of Occurrence		
High Probability	Low Probability	Unlikely to Occur
Extreme Cold	Dam Failure	Earthquake
Extreme Heat	Drought	Landslide
Freezing Rain/Sleet/Ice	Flash Flood	Subsidence
Hail	Flood	
Heavy Rain	Ice Jam	
Heavy Snow	Rapid Snow Melt	
Lightning	Tornado	
Strong Winds	***Earthquakes are marked with an asterisk because they occur but are so small that the effects are minimal. Mitigation measures specifically for earthquakes are not a priority.	
Thunderstorm		
Urban Fire		
Utility Disruption		
Wildfire		

Every possible hazard was evaluated and identified depending on the likelihood of occurrence in each jurisdiction. Hazards that happen at least once a year were in the High Probability column; hazards that had occurred and could occur in the future but not yearly were placed in the low probability column; and hazards that have never occurred before and are unlikely to happen were placed in the Unlikely to Occur column.

Only the High Probability and Low Probability hazards will be evaluated further in the plan. Hazards were identified in several ways including: observing development patterns, interviews from towns and townships, public meetings, Natural Hazard Mitigation Plan work sessions, previous disaster declarations, consulting the South Dakota State Hazard Mitigation Plan and research of the history of hazard occurrences

in Brown County. Public input on natural hazards was conducted through a survey. A report on the responses to the survey is included in Appendix E. Vulnerability to hazards were assessed in a similar way and the responses are listed under each natural hazard in the hazard profile section.

For simplicity of the mitigation plan, hazards were grouped based on their likelihood of occurrence at the same time. Wildfire is combined with urban fire. Freezing Rain is combined with sleet, snow, and heavy snow. Heavy Rain is combined with lightning, funnel clouds, tornadoes and thunderstorms. Flooding is combined with flash floods.

Due to the natural landscape, similarities, and the widespread nature of these hazards most parts of Brown County have the same hazard profile and probability of hazard occurrence. Each jurisdiction has their own vulnerabilities to natural hazard occurrences due to their resources and rural nature.

Brown County Summary of Vulnerability:

Brown County identified that they have moderate vulnerability to Dam Failure, Drought, Extreme Cold and Heat, Flash Flood and Flood, Freezing Rain/Sleet, Hail, Heavy Rain and Snow, Rapid Snow Melt, Strong Winds, Thunderstorms, Tornadoes, Urban Fires, Utility Disruption, and Wildfire. They have a Low Vulnerability to Ice Jams, Lightning, and Subsidence. Table 4.5 lists the Presidential Disasters that affected Brown County from 1969.

Brown County has had roads underwater due to flooding. Each spring and fall the County Highway Department places load limits on the roads to prevent further damage. Roads can break up and be damaged due to truck traffic on roads. Flooding makes roads softer, more susceptible to damage and even unpassable. Flooding of roads is a concern because travel is more difficult in an emergency, to receive EMS services, and impacts the economy by affecting farmers and hunters. The widespread nature of flooding can cause the county to build up roads just to make them temporarily passable, reducing funds available for other development. Damage to roads continues in drought due to the repeated exposure to high heat alternated with high water.

Winter weather is widespread and brings hazardous amounts of ice, snow, high winds, and extremely cold temperatures. Storms can be dangerous, impacting on driving conditions and causing freezing temperatures. Snow can last long periods of time and accumulate to create flooding when the snow melts and can cause ice jams in the local waterways. Summer storms can cause accumulation of water through heavy rains and a lack of dispersion. Although some jurisdictions have storm sewers, many do not.

Drought impacts crops, livestock, and the area, especially since Brown County's economy is reliant on agriculture. During the last ten years, Brown County has experienced multiple periods of drought ranging from moderate to severe. As the possibility of increasing temperatures due to global warming, area vulnerability and its impact on the economy can be more severe than historic weather patterns.

Aberdeen Summary of Vulnerability: Aberdeen is unique as they are a much larger town with a higher population than other municipalities. They have indicated that they have a high vulnerability to: Extreme Cold, Extreme Heat, Freezing Rain/Sleet, Heavy Rain and Heavy Snow and Strong Winds. They have a medium vulnerability to: Dam Failure, Flash Flood, Flood, Hail, Lightning, Rapid Snow Melt, Tornadoes, and Urban

Fires. Aberdeen has a low vulnerability to Drought, Thunderstorms, Utility Disruptions, and Wildfires.

Aberdeen has Northern State University which has populations that are vulnerable to events. There are concerns about safety and access for food and emergency services to these residents if an event occurs that doesn't allow students to travel off campus. Access to storm shelters is limited but students are directed to safer areas of the building with emergency procedures and maps. Many students have transportation, but some do not have access to cars.

Aberdeen's transportation system, Rideline, enables many in the area to travel throughout the town for appointments and resources. The transportation system will continue working in an emergency if it is considered safe. The Aberdeen Regional Airport has concerns about flooding. They are especially vulnerable due to their location and elevation. They currently can store 14 million gallons of water in retention ponds and have a pump that can be used to clear water out of the airport. There are concerns about pump usage since the water that they remove would go downstream, possibly overwhelming those areas.

Aberdeen's population is also vulnerable to natural events that impact water supply. Aberdeen is working with WEB to get a pipeline from the Missouri River to the city. After Aberdeen is connected, the long term, plan is to get the water to BDM to supplement their water supply. The pipeline is currently working in Phase II and Phase III has been bid. The final stretch from Mina to Aberdeen is currently in planning. Aberdeen is vulnerable to drought since the city has access to the first twelve feet of the Elm reservoir. This reservoir is impacted in years of drought. If there is a reduced level of water at the Elm, Aberdeen's water supply is reduced and their backups are utilized. The city does have a backup water supply of wells and Willow Creek. The water treatment plant produces 11 million gallons of water for city use. Each source is significantly impacted by drought. Aberdeen has a standing water restriction order to address water loss. Agreements between the city and WEB Water will get the city an additional 4 million gallons through the project. This will give the city additional water for incoming residents, development and industry. Aberdeen is currently running near capacity and will be blending WEB water with their surface water sources to have additional capacity.

Aberdeen is constantly addressing water issues with their system. The storm sewer system has been expanded, and retention ponds were added through the town. A FEMA LIDAR study showed that Aberdeen was vulnerable to flooding events. However, the City has an agreement with an engineering firm, HDR, to conduct a hydrology study which will reveal how the stormwater sewers, retention ponds, channels, flood levee and lift stations all work together in the event of a flood. Aberdeen has received multiple grants from FEMA for storm sewer upgrades and has also conducted the projects on their own. As development increases, there are flood ordinances to direct developers and direction for retention ponds and floodway regulations within developments to prevent significant flooding. The City has worked to fix vulnerabilities especially since the flood of 2007 which affected a significant amount of the town and residents.

Sirens are also a concern. Replacement of alarm sirens was done decades ago, and new updated sirens are needed. It was discovered in the spring of 2026 that one of the sirens was not working properly and had to be manually turned on. Storm shelters are not a priority for Aberdeen. Generally, when there is a storm, residents do not utilize the

shelters since there are neighbors or family that accommodate the residents who do not have shelter. Aberdeen is also a support for the incorporated and unincorporated communities in the area. They provide resources and assistance in the event of a natural hazard. Northwestern Energy is the power provider for the city. They are looking to expand with a power station by 2030. By current permitting, they are required to add additional capacity to allow for an increase in residents and industry. This increase is required by 2030. The new

Groton Summary of Vulnerability: Groton has indicated that they are highly vulnerable to: Drought, Extreme Cold and Heat, Flash Flood and Flood, Freezing Rain/Sleet, Hail, Heavy Rain and Snow, Lightning, Strong Winds, Thunderstorms, Tornados, and Urban Fires. There is a medium level of vulnerability with: Rapid Snow Melt, and Utility Disruption.

Groton is located about 20 miles away from Aberdeen. Groton has their own clinic and has emergency resources in their area. The local EMS and Fire Station help to reduce the impact of natural hazards in the area. There are also residents who will go into snowstorms and blizzards on snowmobiles in the event of an emergency with residents. These people will locate the patient and get them to emergency care as quickly as they can. Groton also has their own electrical grid and provides power to their residents.

Storm shelters are a concern for Groton as they have vulnerability to storms. They set the state rainfall record at 8.74 inches in a 24-hour period from May 5th to May 6th, 2007. A severe storm which blew down power lines and damaged trees occurred October 10, 2021. They were approved for a storm shelter at their city park, which will protect residents who live nearby in apartments, campers, and park and pool members. Groton is working on an expansion of their sewer system to address additional infiltrates from heavy rain events and issues with their system. Expansion of the storm sewer and curb and gutter is needed to help address rainfall issues when they occur.

Hecla Summary of Vulnerability: Hecla has indicated that they are most vulnerable to dam failure, drought, Extreme Cold and Heat, Flood, Freezing Rain/Sleet/Ice Hail, Strong Winds, Thunderstorm, Tornado, and Utility Disruption. They have medium vulnerability to: Flash Flood, Heavy Rain and Snow, Lightning, Rapid Snow Melt, Subsidence, and Wildfire.

Hecla has its own power grid, the Hecla Municipal Electric Utility. Although there have been improvements to the grid in the past, there are still improvements that need to be made. The power lines are above ground making them susceptible to damage from storms and winds. Their supplier of electricity is Heartland Energy. They are especially vulnerable to utility disruption as their community has minimal resources to address emergency issues.

Hecla is especially concerned with flooding caused by dams from North Dakota. There are times when water is released, and they have found themselves with a much higher water level due to that. There is also concern about dam failure from North Dakota since they are downstream and would be heavily impacted if that were to occur. Heavy Rain, Heavy Snow, Freezing Rain/Sleet/Ice and Rapid Snow Melt increases their water table causing flooding of their sewer system and overwhelming their lift station and lagoon. Strong winds and tornados are also a concern. Hecla has had flooding in seven of the last ten years. Recurring flooding damages infrastructure along with homes and

structures and makes the city more vulnerable. There is also vulnerability if the power grid is affected and sump pumps cannot keep up with the demand due to lack of electricity.

Columbia Summary of Vulnerability: Columbia has indicated that they are Highly vulnerable to: Extreme Cold and Heat, Freezing Rain/Sleet, Hail, Heavy Rain and Snow, Lightning, Strong Winds, Thunderstorms, Urban Fire, and Utility Disruption.

Columbia's distance from Aberdeen makes it more vulnerable due to emergencies that can occur. The county, in conjunction with Columbia's Fire Department, works to reduce the impact of weather and utility emergencies by strategically placing equipment where it could potentially be needed. Located 17 miles from Aberdeen, emergency responses are delayed from Aberdeen, especially during severe weather events.

Columbia is about 7 miles from Columbia Road Dam. Owned by US Fish and Wildlife, the earthen dam reduces impacts from flooding by the James River. Columbia is also the only other jurisdiction to have a levee system. Both are non-accredited. The James River North side protects the southern part of Columbia.

Table 4.4: Hazard Vulnerability Assessment									
Natural Hazards Identified	Brown Co.	Aberdeen	Groton	Hecla	Columbia				
Dam Failure	M	M	NA	NA	L				
Drought	M	L	H	H	L				
Earthquakes	N/A	N/A	NA	NA	NA				
Extreme Cold	M	H	H	H	H				
Extreme Heat	M	H	H	H	H				
Flash Flood	M	M	H	M	L				
Flood	M	M	H	H	L				
Freezing Rain/Sleet	M	H	H	H	H				
Hail	M	M	H	H	H				
Heavy Rain	M	H	H	H	H				
Heavy Snow	M	H	H	H	H				
Ice Jam	L	N/A	L	NA	L				
Landslides	N/A	N/A	NA	NA	NA				
Lightning	L	M	H	H	H				
Rapid Snow Melt	M	M	M	H	L				
Strong Winds	M	H	H	H	H				
Subsidence	L	N/A	NA	M	NA				
Thunderstorms	M	L	H	H	H				
Tornadoes	M	M	H	M	L				
Urban Fire	M	M	H	NA	H				
Utility Disruption	M	L	M	H	H				
Wildfire	M	L	H	H	L				
NA: Not applicable; not a hazard to the jurisdiction									
L: Low risk; little damage potential (minor damage to less than 5% of the jurisdiction)									
M: Medium risk; moderate damage potential (causing partial damage to 5-10% of the jurisdiction and irregular occurrence)									
H: High risk; significant risk/major damage potential (for example, destructive, damage to more than 10% of the jurisdiction and regular occurrence)									

BROWN COUNTY PRESIDENTIAL DISASTERS

Requirement 201.6(c)(2)(i)) ... Does the plan include a description of the type, location, and extent of all natural hazards that can affect the jurisdiction? Does the plan also include information on the previous occurrences of hazard events and on the probability of future hazard events?

B1-d. The plan must include information on previous hazard events for each hazard that affects the planning area.

Brown County has been included in eighteen Presidential Disaster Declarations. Thirteen included flooding. Four of the flood disasters were based on summer storms and two were on winter storms. Only one was due to drought. Most types of weather events such as extreme cold and heat, freezing rain/sleet, hail, heavy rain and snow, lightning, strong winds, and thunderstorms are county-wide and impact large areas of the population.

The widespread nature of the presidential disasters shows the entire county is vulnerable. Flooding impacts residents by flooding homes and roads and covering fields, making it difficult if not impossible to plant or harvest crops and feed livestock. Roads covered in water are a concern due to the inaccessibility of some areas of the county for residents and emergency services. Winter and summer storms can damage homes and crops. Extreme heat or cold can put residents in danger if they do not have ways to cool or heat themselves. It also impacts crops and livestock by freezing or overheating and damaging crops and the feed for livestock. Hail and winds damage buildings and crops along with potentially hurting residents and livestock.

Brown County's economy is heavily dependent on agriculture and each of these events has had a severe impact on the residents and economy. Table 4.5 lists the Presidential Disasters that have affected Brown County since 1969.

Table 4.5: Brown County Presidential Disaster Declarations 1969 - 2020			
Disaster	Incident Period	Declaration Date	Reason
DR-257-SD	April 18, 1969	April 18, 1969	Flooding
EM-3015-SD	June 17, 1976	June 17, 1976	Drought
DR-999-SD	May 6, 1993, to September 10, 1993	July 19, 1993	Flooding, Severe Storms
DR-1031-SD	March 1, 1994, to July 29, 1994	June 21, 1994	Severe Storm, Flooding
DR-1052-SD	March 1, 1995, to June 20, 1995	May 26, 1995	Severe Storms and Flooding
DR-1156-SD	January 3, 1997, to January 31, 1997	January 10, 1997	Severe Winter Storms/Blizzards
DR-1173-SD	February 3, 1997, to May 24, 1997	April 7, 1997	Severe Storms and Flooding
DR-1218-SD	April 25, 1998, to June 22, 1998	June 1, 1998	Flooding, Severe Storms and Tornadoes
DR-1375-SD	March 1, 2001, to April 30, 2001	May 17, 2001	Winter Storms and Flooding
DR-1620-SD	November 27, 2005, to November 29, 2005	December 20, 2005	Severe Winter Storm
DR-1702-SD	May 4, 2007, to June 8, 2007	May 22, 2007	Severe Storms, Tornadoes and Flooding
DR-1844-SD	March 11, 2009, to July 6, 2009	June 16, 2009	Severe Storms and Flooding
DR-1915-SD	March 10, 2010, to June 20, 2010	May 13, 2010	Flooding
DR-1984-SD	March 11, 2011, to July 22, 2011	May 13, 2011	Flooding
DR-4440-SD	March 13, 2019, to April 26, 2019	June 7, 2019	Severe Winter Storms and Flooding
EM-3475-SD	January 20, 2020, to ongoing	March 13, 2020	Covid 19-Pandemic
DR-4527-SD	January 20, 2020, to ongoing	April 5, 2020	Covid-19 Pandemic
DR-4718-SD	April 9, 2023-May 5, 2023	July 6, 2023	Flooding

Table 4.5: data from FEMA Disaster Declarations Database

In response to these disaster declarations, Brown County, and jurisdictions within the county, have implemented mitigation projects. Brown County has 54 mitigation projects to reduce the impacts of disasters. The seven project types are: drainage improvements, generators, road raises, saferooms, powerline burials, spillway repairs and downstream channel repairs at Richmond Lake Dam. Total costs paid by FEMA as of January 2026 were \$5,231,977. Project costs and details are included in Table 4.6. Figure 4.1 is a map of Brown County and the locations of mitigation projects. Of these fifty-four projects approved by FEMA, forty-seven are completed, six have been approved and one is pending.

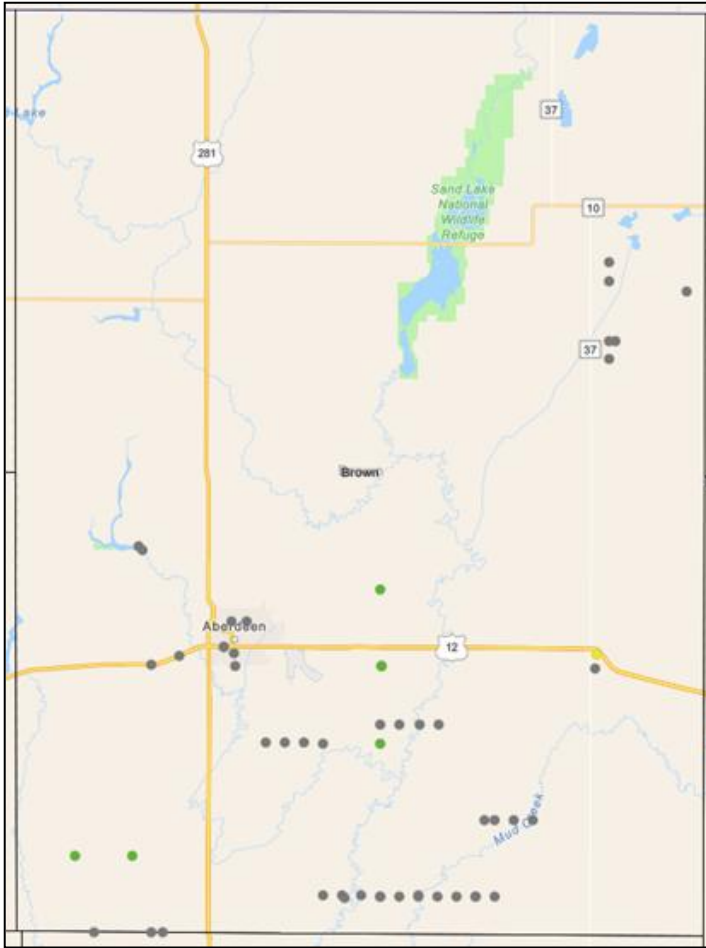


Figure 4.1: South Dakota Mitigation Project map of Brown County

Through these mitigation projects, Brown County and the participating jurisdictions have reduced their vulnerability to their populations. Additional project work will further decrease the risk and vulnerability to natural hazards.

Table 4.6: Brown County Mitigation Projects		
Project Type	Number of Projects	Total Received
Stormwater	2	\$354,900
Generator	1	\$19,238
Saferoom	1	\$357,750
Powerline Burials	38	\$2,615,300
Flood Control	2	\$337,500
Road Raises	6	\$3,574
Culverts	4	\$1,543,715
Total	54	\$5,231,977

ASSESSING VULNERABILITY: OVERVIEW OF HAZARD PROFILE

Requirement 201.6(c)(2)(ii): Does the plan include a description of the type, location, and extent of all natural hazards that can affect the jurisdiction? Does the plan also include information on previous occurrences of hazard events and on the probability of future hazard events?

- B1-b.** The plan must include information on the location for each identified hazard.
- B1-c.** The plan must provide the extent of the hazard that can affect the planning area.
- B1-d.** The plan must include information on previous hazard events for each hazard that affects the planning area.
- B1-e.** The plan must include the probability of future events for the identified hazards that can affect the planning area.
- B1-f.** For multi-jurisdictional plans, when hazard risks differ across the planning area and between participating jurisdictions, the plan must specify the unique and varied risk information for each applicable jurisdiction and their assets outside of the planning area.

HAZARD PROFILE

DAM FAILURE

Table 4.7: Dam Failure	
Dam failure causes a sudden and rapid release of water from the dam. Damage that can occur would depend on the amount of water released and the downstream residents or structures. Dam failures can also cause the loss of water stored for reservoirs and power.	
Dam Failure	- Caused by high water flows or structural failure. - It can cause considerable damage depending on the vulnerable structures and residents downstream.
Dam Breach	An overflowing of the dam
Condition Assessment Definitions	- Satisfactory: No existing or potential deficiencies are recognized - Fair: No existing dam safety deficiencies are recognized for normal loading conditions. Rare or extreme hydraulic and/or seismic events may result in a dam safety deficiency - Poor: A dam safety deficiency is recognized for loading conditions which may realistically occur. Remedial action is necessary - Unsatisfactory: A dam safety deficiency is recognized that requires immediate or emergency remedial action - Not Rated: This dam has not been inspected or has been inspected but not rated
Hazard Potential Definitions	- High Hazard dams: failure or mis-operation will probably cause loss of human life. - Significant Hazard dams: failure or mis-operation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities or other impacts. - Low Hazard dams: failure will not result in loss of life and minimal damage to property or the economy.
Brown County Dams	Three of the thirteen dams are high hazard dams are in Brown County. Elm, Richmond and Willow Creek.

Table 4.7: Dam Failure Description 2020 Brown County Natural Hazard Mitigation Plan

Dam breach or failure is a concern for the citizens of Brown County. Dam failure is usually associated with intense rainfall or prolonged flood conditions but can occur anytime. Dam failure can be caused by many types and combinations of conditions. Some reasons may be age, faulty design, construction and operational inadequacies, intentional breaches, or a flood event larger than the design can handle. The greatest threat from dam failure is to people and structures immediately below the dam since flood discharges decrease as the wave moves downstream. This is the dams “down hazard level.” Dams with a high hazard level can cause a high level of destruction downstream compared with low hazard dams. Brown County has seventeen earth dams listed in the National Inventory of Dams. Table 4.8 lists each dam and its location.

Table 4.8: Dam Locations in Brown County								
ID	Name	Owner	Location - Lat/Long	Year Built	Type/ Hazard	Insp Date:	Height (ft)	Max Storage (acre-feet)
SD00005	Tacoma Park	GF&P	45.536836 -98.238284	1935	Low	N/A	20	80
SD00006	Richmond	S&PL	45.533354 -98.591572	1935	High	11/22/22	52	19,800
SD00008	Willow Creek	Aberdeen	45.714363 -98.590598	1934	High	11/22/22	49	7,650
SD00079	Frederick	GF&P	45.832428 -98.512709	1931	Low	11/05/19	20	145
SD00328	Elm Lake Dam	S&PL	45.852123 -98.708724	1937	High	11/22/22	52	28,800
SD01191	Houghton Dam/Mud Lake Dam	US F&W	45.775002 -98.25	1939	Low	10/20/20	7	43,524
SD01192	Columbia Road Dam	US F&W	45.668059 -98.305557	1939	Low	10/20/20	10.5	41,933
SD02138	Pigors Dam	GF&P	45.336403 -98.000534	1937	Low	11/05/19	20	950
SD02202	Highland Dam	S&PL	45.347063 -98.640136	1937	Low	11/05/19	14	450
SD02396	Dry Run Sub-impoundment	US F&W	45.810172 -98.251793	1938	Low	N/A	10	260
SD02410	Casanova GPA	GF&P	45.402839 -98.635334	1995	Low	11/05/19	9	238
SD02440	Bill Welk Dam	Bill Welk	45.608674 -98.638396	1996	Low	N/A	15	441
SD02692	Hanson Pond	BNSF	45.450071 -98.578465	1910	Low	N/A	15	228
SD14075	Ordway (Elm River #2)	Aberdeen	45.57836 -98.4213		Low	N/A		
SD14077	Kruse (Elm River #4)	Aberdeen	45.67341 -98.5387		Low	N/A		
SD14074	Maple River Diversion (Elm River #3)	Aberdeen	45.72093 -98.5771		Low	N/A		
SD14076	Elm River #1	Aberdeen	45.55233 -98.4037		Low	N/A		

Table 4.8: Dam Locations in Brown County data from National Inventory of Dams

Dam failure can be caused by extreme rainfall, rapid snow melting, and dam degradation. The most severe threats are to people and buildings in the path of the waterflow after a breach. Cropland in the path of the water can also be impacted.

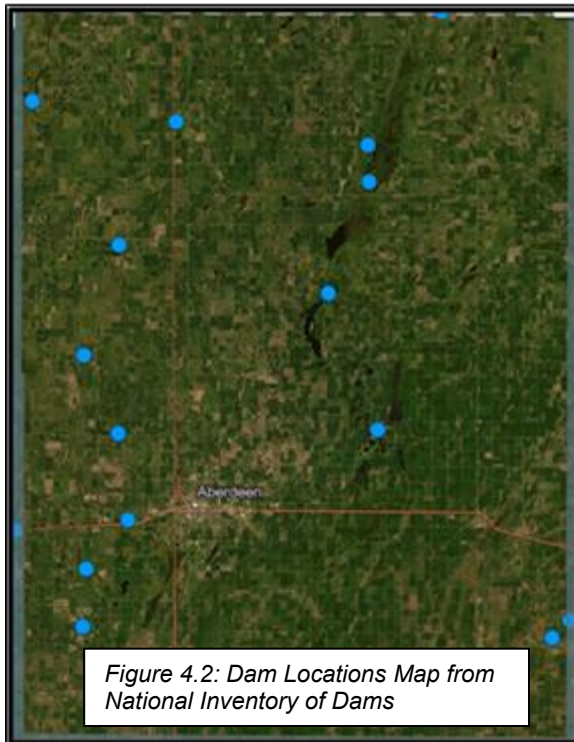
The extent of damage depends on the size of the dam and circumstances of the failure. A large dam failure might cause considerable loss of property, destruction of cropland, roads, utilities and even loss of life. Similar consequences may occur in small dam failure including loss of irrigation water for a season and extreme financial hardship to many area farmers. Aberdeen's water supply is dependent on the Elm River Dam. If this dam were to break, not only would it be a severe down hazard, but it would severely impact the water supply. Aberdeen has the top 12 feet of the Elm River for the potable water supply. Aberdeen also uses Willow Creek and its reservoir along with wells to have a capacity of 11 -11.5 million gallons of water for residents and business.

Aberdeen is looking at increasing capacity for its water supply because when there is drought, capacity at the Elm and Willow reservoirs is low. This can significantly impact water quality and quantity. Aberdeen has water restrictions during the day, especially in summers with high drought conditions. Aberdeen, WEB water and BDM are working to get water from the Missouri River across the state to Aberdeen. This project coordination has allowed the group to create a pipeline for Missouri water access. As of the writing of this plan, the project has gotten bid to the Mina Lake area and work is continuing to finish the pipeline to Aberdeen.

Richmond, Elm and Willow Creek Dams are high hazard dams. The Elm Lake Dam near Frederick was built in 1937. In July 2020 the dam was damaged by summer storms, causing slabs of concrete to break off the spillway. The state of South Dakota, along with Brown County and the City of Aberdeen are allocated funds for the repairs. The new Elm Lake spillway is wider than what currently exists. It spans 170 feet compared with 150 feet at its current width and the dam crest is four and a half feet higher. Although the crest will be higher, the water will flow from the same elevation. The added height will help hold back water during heavy water flows. Work is complete on the dam. Currently, Brown County is working on a plan to address access. Current bidding has come in higher than expected. Total cost of the repairs was \$5.77 million. Figure 4.2 illustrates the location of dams in Brown County.

Another structure that is used to control flooding along the James River is the Crow Creek Drainage Ditch. Built in the 1910s to 1920s to move water from poorly drained glacial potholes and sloughs into the James River. This drainage ditch was to connect the Upper Crow Creek Drainage Ditch in Marshall County to the Lower Crow Creek Drainage Ditch in Brown County. This drainageway is part of a system that handles regional run-off. It can take weeks to drain the ditch. The Crow Creek system is roughly 42 miles in length. There have been drainage disputes between Brown and Marshall Counties regarding the water the drainageway manages.

There is a floodgate structure where the Crow Creek meets the James River. In 2024 Brown County received more than \$150,000 in grant funding to help install a new floodgate at the point where Crow Creek meets the James River. This floodgate not only manages water flowing south along the Crow Creek Drainage Ditch, but it also helps to keep the James River from backflowing in the drainage ditch.



Richmond Dam is on Richmond Lake and Willow Creek Dam is near Westport. Richmond Lake has been damaged and repairs to the spillway are needed. Work will begin to replace the spillway at Richmond in summer of 2026. Total replacement is estimated at \$26 million, and South Dakota has matching funds through FEMA. Bids came in over the expected cost at \$30.7 million. Additional funding was approved from South Dakota legislature in the amount of \$8,212,497 to complete the funding for the project. Project work is expected to begin in spring of 2026 and continue through fall of 2027. Richmond will have to be lowered to accommodate the repairs. Road repairs will take place after the dam is replaced. Willow Creek is another of Aberdeen's water sources.

DROUGHT

Table 4.9: Drought

Decrease in precipitation which impacts streams, reservoir, lakes, and groundwater levels. Crops and vegetation are impacted. Even a small reduction in precipitation can impact crops and livestock. Due to the economic reliance on agriculture in Brown County, droughts can have a serious economic impact. Drought generally occurs about every three years while significant drought occurs around every 50 years. Drought can also impact the power grid causing loss of power for residents due to overuse. As climate change increases temperatures drought impacts and severity are expected to increase.

Drought	• Prolonged lack of moisture • Generally, due to high temperatures and low relative humidity in the summer but can occur in the winter due to lack of snow.												
Drought Category System: US Drought Monitor Measure of Drought Intensity	<table> <tr> <th colspan="2">Drought Category System</th></tr> <tr> <td>D0 – Abnormally Dry</td><td></td></tr> <tr> <td>D1 – Moderate Drought</td><td></td></tr> <tr> <td>D2 – Severe Drought</td><td></td></tr> <tr> <td>D3 – Extreme Drought</td><td></td></tr> <tr> <td>D4 – Exceptional Drought</td><td></td></tr> </table>	Drought Category System		D0 – Abnormally Dry		D1 – Moderate Drought		D2 – Severe Drought		D3 – Extreme Drought		D4 – Exceptional Drought	
Drought Category System													
D0 – Abnormally Dry													
D1 – Moderate Drought													
D2 – Severe Drought													
D3 – Extreme Drought													
D4 – Exceptional Drought													

Table 4.9: Drought and Wildfire descriptions from National Risk Index

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

as a likelihood of occurrence in the survey. Seven (2.9%) of survey responses said that they were negatively affected by drought in the last 10 years.

Table 4.10: NOAA Drought Event Statistics	
Number of Events in last 10 Years: Drought	22 Events/621 Days
Number of Years with events: Drought	6 Years
Possible number of days with events per year Drought	62.1 days per year over 10 years
Probability of future annual events: Drought	60% annual chance

South Dakota's economy is closely tied to agriculture. Even moderate drought can magnify economic losses and its impact statewide during drought conditions, especially prolonged drought. Roughly every 50 years a significant drought occurs within the county, while less severe drought can happen every three years. The most common time of the year for drought tends to be July through October. The intensity can vary from None to Extreme Drought. Brown County generally is none to abnormally dry. But there have been periods of moderate to severe drought. This can contribute to a reduction in available water for crops and livestock if conditions hold or get worse quickly, as in a flash drought. High periods of drought can destroy crops and kill livestock.

Figure 4.3 and 4.4 illustrates the time periods of drought in Brown County since January 4, 2000. A darker red color indicates higher levels of drought. Even moderate drought can magnify economic losses and impact statewide during drought conditions, especially prolonged drought. Roughly every 50 years a significant drought occurs, while less severe drought can happen every three years. The most common time of the year for drought tends to be July through October.

The intensity can vary from Abnormally Dry to Moderate Drought. Table 4.11 shows drought conditions according to the National Drought Monitor from January 1, 2001, to December 31, 2025. High periods of drought can destroy crops and kill livestock increasing the financial impact on Brown County.

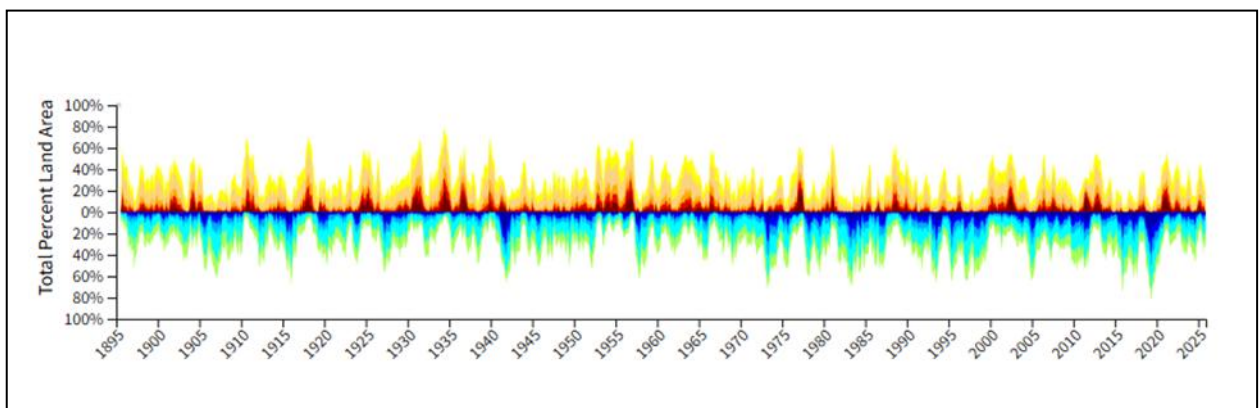


Figure 4.3: Standardized Precipitation index

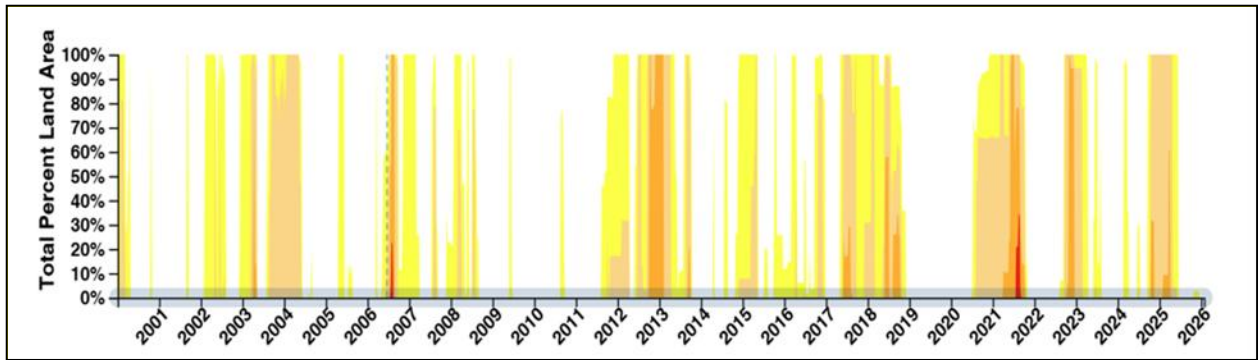


Figure 4.4: Brown County Drought

Severe Drought began in the region in May 2021. According to Laura Edwards, State Climatologist, the D3 category may be seen three times a century. That level of drought severely impacts farmers and ranchers. Shocks to the agricultural sector of South Dakota's economy reverberates throughout the economy. As temperatures are projected to increase well in the future due to climate change, it's reasonable to expect that drought and its effects will also increase.

Severe drought impacts fire and air quality also. Drought makes fires more common. Drought can intensify and create a fast-moving wildfire when combined with South Dakota's high winds. When there are no rainfall and crops die, winds can cause dust storms. Such windstorm happened June 1, 2018, after an abnormally dry period, according to NOAA. Wind gusts up from 60 to 80 miles an hour stirred up the dust. This resulted in a "black blizzard" situation where visibility was reduced to less than an eighth of a mile at times in the evening, causing multiple traffic accidents. The high winds also caused power lines to come down, and some trees started on fire. This illustrates how all these different natural hazards can come together to create a situation where there can be significant and widespread loss. Another impact of fire is smoke, even from fires that are states away, severely impacting air quality and increasing the likelihood for respiratory issues with people and animals. Fine particles in smoke can cause short and long-term health problems. This can affect traffic conditions if it is strong enough.

Drought impacts water supply for the county. Aberdeen has recently applied to reserve water from the Missouri River from the South Dakota Water Management Board. This allocation is reserved in the amount of 9,500 acre-feet of water. Aberdeen is working with WEB Water and BDM to bring a pipeline to the area with water from the Missouri River. Once complete, Aberdeen will apply to use the water. After Aberdeen receives the water, BDM will be working to get a pipeline to their facility to provide water to northeastern South Dakota.

Due to concerns with drought and fire, Brown County's Title 18 Fire Safety Ordinance. It is a Class 2 misdemeanor to set or cause to be set a fire in any woods, marsh prairie grass, or inflammable material at any time of year without having a natural windbreak. Controlled burns must be reported before burning. Information required is: location, time, substance, and approximate completion time and contact information. Once the burn has been completed, the residents are required to notify Brown County of the location and that the burn is done and safe. Table 4.11 shows drought conditions over the last ten years.

Table 4.11: National Drought Monitor January 1, 2014, to December 30, 2025	
Months	Condition
January 7, 2014 to November 18, 2014	None
November 25, 2014 to March 10, 2015	Abnormally Dry
March 17, 2015 to May 12, 2015	Moderate Drought
May 19, 2015 to October 18, 2016	None
October 25, 2016 to December 20, 2016	Moderate Drought
December 27, 2016 to May 2, 2017	None
May 9, 2017 to May 29, 2018	Abnormally Dry to Moderate Drought
June 5, 2018 to October 16, 2018	Moderate Drought to Severe Drought
October 23, 2018 to 11/27/2018	Abnormally Dry to Moderate Drought
December 4, 2018 to July 7, 2020	None
July 14, 2020 to May 25, 2021	Moderate Drought
June 1, 2021 to July 20, 2021	Severe Drought
July 27, 2021 to September 7, 2021	Extreme Drought
September 14, 2021 to November 2, 2021	Abnormally Dry to Moderate Drought
November 9, 2021 to September 20, 2022	None
September 27, 2022 to April 18, 2023	Moderate to Severe Drought
April 25, 2023 to October 1, 2024	None to Abnormally Dry
October 8, 2024 to June 10, 2025	Moderate to Severe Drought
June 17, 2025 to December 30, 2025	None

Table 4.11: Drought History from January 1, 2013, to December 26, 2023, from National Drought Monitor

Drought can intensify and create a fast-moving dust storm when dry fields are combined with South Dakota's high winds. Such a windstorm happened in Brown County on June 1, 2018. Winds combined with severe drought conditions brought a dust storm to the area. Winds from 60 to 80 miles per hour stirred up large amounts of dust. Visibility was reduced to an eighth of a mile or less at times. Hundreds of acres of soybeans were damaged and had to be replanted. A fire started near Richmond Lake when high winds downed power lines. Accidents happened due to the lack of visibility and high winds tipped over a trailer.

Table 4.12: Major historic drought occurrences	
2012-2013 (July 2012-April 2013)	Drought conditions continued over all southeast South Dakota at well below normal rainfall keeping soil and vegetation dry. Harvest of drought affected crops was done in October, but there was no estimate available on reduction of yields. Winter wheat was planted on time, but the lack of moisture slowed germination. Water restrictions were eased, with water use dropping off in the fall. Drought was generally listed as severe to extreme.
1987-1990	An abnormally low amount of precipitation in the summer of 1987 and a hot and dry summer in 1988, negatively impacted South Dakota's economy. Brown County received disaster aid during this time. Agricultural income was down .8 percent and wheat price per bushel decreased significantly in 1988.
1930s	During the infamous dust bowl years, Brown County was affected. Particularly dry summers were in 1934 and 1936.
1880s-1890s	The years 1887, 1894-1896, 1898-1901 were very dry.

Table 4.12: Major Historic Drought Occurrences 2020 Brown County Natural Hazard Mitigation Plan

WILDFIRE

Table 4.13: Wildfire	
Wildfires are more likely to occur when there is drought due to the lack of moisture. They can cause extensive damage throughout the county depending on how fast or far they spread. Counties enact burn bans or controlled burn requirements to prevent human-caused fires, however, they can also be started by natural causes or inadvertently such as a spark from an engine or train. Wildfire can be greatly affected by South Dakota's winds.	
Wildfire	• Uncontrolled blazes that spread quickly • Ignition can be caused by natural or human-caused causes. • More likely to occur when there is drought or hot temperatures causing drier than normal vegetation. • Can change direction or jump barriers, especially under windy conditions.
NWCG Wildfire Size Class	• A: Greater than 0 but less than or equal to .25 acres • B: 0.26 to 9.99 acres • C: 10.0 to 99.9 acres • D: 100 to 299 acres • E: 300 to 999 acres • F: 1000 to 4999 acres • G: 5000 to 9999 acres

Table 4.13: Wildfire description from the 2020 Brown County Natural Hazard Mitigation Plan

Something as simple as a tossed cigarette or sparks from a train can cause fires. Due to concerns with situations where there are high winds and relatively dry conditions, Brown County's Ordinances Title 18 state that no person shall set any open fire when

the fire danger index from NOAA reaches the categories of: “very high or “extreme fire danger” “fire weather watch or “red flag warning for any or all of Brown County. This automatically prohibits burning within the county. Wildfire is ranked 7th in the survey. Two respondents (.8%) said that they were negatively impacted by wildfire.

Table 4.14: South Dakota Fire Marshall Office Wildfire Event Statistics	
Number of Events in the last 10 Years: Wildfire	939 total fires
Number of Years with events: Wildfire	10
Possible number of days with events per year: Wildfire	93.9 possible days with events per year
Probability of future events: Wildfire	100%

The information in Table 4.16 was received from the State Fire Marshall, Doug Hinkle, from 2014 to 2024. There were 939 fires recorded in Brown County. Of the fires, 354 were structure fires, 207 were vehicle fires, and 482 were other fires. The “other fires” category includes fires of natural vegetation, outside rubbish, special outside fires, cultivated vegetation and crop fires. Of the fire service personnel, there were twelve fire-related injuries and no deaths. There were 32 civilian fire related injuries and 8 civilian fire related deaths. The total damage from fires was \$16,340,195. It is unknown which fires resulted from human activity.

Table 4.15 Extent of Wildfire Classes and Occurrence in Brown County between 2014-2025		
Wildfire Class	Size	Number of Occurrences
Wildfire Class A	<1 acres	58
Wildfire Class B	1-9.9 acres	21
Wildfire Class C	10-99 acres	
Wildfire Class D	100-299 acres	5
Wildfire Class E	300-999 acres	
Wildfire Class F	1,000-4,999 acres	
Wildfire Class G	5,000-9,999 acres	1
Wildfire Class H	10,000-49,999 acres	
Wildfire Class I	50,000-99,999 acres	

March 10, 2025, during an expansion of drought and high fire danger conditions, a fire occurred southwest of Aberdeen that burned 135 acres and 500 hay bales. The cost of the fire was \$65,000 in damage but could have been worse if the winds had picked up and increased the speed and spread of the fire. This particularly dry period saw three damaging fires within a 2-month period. March 30, 2025, a fire 5 miles from Aberdeen destroyed forty vehicles that were being used for spare parts. May 10-11, 2025, was dry, hot and windy. Temperatures were in the upper 80s to 90s, and winds peaked at over 60 miles per hour. A train caused multiple small fires along 5 miles of track on the 10th. On the 11th, blowing dust reduced visibility and a fire developed near the edge of Claremont. This fire went on to burn 80 acres and damaged power lines cutting electricity to 245 residents. A second fire burned 859 acres of mostly farm and pastureland. Monday the lack of visibility and smoke reduced visibility for motorists.

Table 4.16: Fire Summary by Incident Type: 2012-2022								
	Freq	% Of Total	No Aid	Aid Given	Aid Received	Other Aid Given	Exp	Total
Fires								
Structure Fires	354	3.07%	291	77	63	0	13	444
Vehicle Fires	207	1.79%	167	29	39	1	2	238
Other	482	4.18%	293	195	188	1	1	678
Total:	939	8.14%	751	301	287	2	15	1,295
Pressures, Ruptures, Explosion Overheat	77	0.67%	77	0	0	0	0	77
Emerg. Med Treat	4913	42.6%	4,733	14	173	7	0	4,927
All Other	69	0.6%	66	3	2	1	0	72
Total Calls	4982	43.2%	4,799	17	175	8	0	4,999
Haz Cond. Calls	1219	10.57%	1,206	6	11	2	0	1225
Serv. Calls	1012	8.77%	1,003	2	7	2	0	1014
Good Intent Calls	711	6.16%	679	99	32	0	0	810
Severe Weather or National Disaster Calls	9	0.08%	9	0	0	0	0	9
Special Incidents Calls	44	0.38%	42	0	2	0	0	70
Unknown Incident Type	0	0.00%	0	0	0	0	0	0
Total False Calls	2218	19.23%	2,210	4	24	2	0	2,222
Total Calls	11,533	100.00%	10,992	429	633	16	16	11,978
Casualty Summary		Civilian		Fire Service				
Fire Related Injury		32		12		Total Fire \$ Loss		
Non-Fire Related Injury		60		5		\$16,340,195		
Fire Related Deaths		8		0		Total \$ Loss		
Non-Fire Related Death		15		0		\$16,980,099		

Table 4.16: Fire Summary by Incident Type 2012 to 2022 Data from SD Fire Marshall's Office

HIGH/SEVERE WIND

Table 4.17: High and Severe Winds

Winds are a constant part of life in South Dakota. High winds damage roofs, trees and if severe, residents, structures, signs, and automobiles. These winds occur throughout the county and can cause widespread damage and can be unpredictable in the area. Mitigation measures include insurance, warnings and saferooms to prevent injuries or even death of residents.

When high winds are combined with cold, there is a wind chill. In South Dakota, because high winds are common, wind chills are common in the winter. Wind chill values can go as low as -50 to -60 degrees.

Strong Winds	• Considered to be 40 miles per hour or more. • Make other natural hazards even more hazardous and destructive. • Causes snow drifting, extreme cold with wind chill, spreading wildfires faster, increases damage from thunderstorms, causes destruction of property, can injure residents through flying debris or causing structures or trees to fall, and power loss through downed power lines.
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Table 4.17: High/Severe Wind description from the 2020 Brown County Natural Hazard Mitigation Plan

Severe wind events are common. Several times a year Brown County can expect fierce winds greater than 40 mph. Gusts of wind higher than 100 mph have been recorded. Wind can be damaging in multiple ways. It can create even lower cold temperatures and if high enough, can destroy buildings and crops. High winds can cause planes or helicopters to crash and when combined with other hazards such as fire, cold or snow can create even more destruction. High winds have caused deaths. September 25, 1986, two girls were killed when high winds tore through their trailer park in Aberdeen, starting a fire in their home. Strong winds were ranked as first as a likelihood of occurrence in the survey. 110 (45.5%) said that they were negatively affected by drought in the last 10 years.

Table 4.18: NOAA High and Severe Wind Events

Number of Events in the last 10 Years: High Winds	31 Events
Number of Years with events: High Winds	10 Years
Possible number of days with events per year: High winds	100% chance of a high wind event each year
Probability of future events: High Winds	100%

High winds are hard to mitigate and are frequent in South Dakota. Windspeeds up to 46 miles per hour can break larger branches off trees. Winds between 47 to 45 miles per hour can damage roofs and other structures that are not secured to the ground. Trees can be uprooted with wind speeds from 55 to 63 miles per hour and any wind speed over 64 miles per hour can cause damage to buildings and potentially people. Mobile homes are very susceptible to high winds due to the lack of a foundation. One way that Brown County mitigates wind events is tie down ordinances for mobile homes to keep them secure. Anchored homes are still susceptible to windspeeds over 90 miles per hour. Due to the frequency, Brown County Building Code establishes a threshold of 90 miles per hour wind resistance for construction purposes. Damaging winds are more prevalent and widespread than tornadoes. Damaging winds are more prevalent and

widespread than tornadoes. High winds tear branches off trees causing additional damage to homes, cars, and crops.

High winds events are common in Brown County and can be expected annually. 2022 had nine high wind events alone. The highest wind event Brown County has had in the last 10 years was April 15-16, 2024. Peak wind speeds were up to 77 miles per hour. There was building damage through the area due to the winds.

Table 4.19 Beaufort Wind Scale			
Force	Speed (mph)	Description	Specifications (for use on land)
0	0-1	Calm	Calm; smoke rises vertically
1	1-3	Light Air	Direction of wind shown by smoke drift, but not by wind vanes
2	4-7	Light Breeze	Wind felt on face; leaves rustle; ordinary vanes moved by wind
3	8-12	Gentle Breeze	Leaves and small twigs in constant motion; wind extends light flag
4	13-18	Moderate Breeze	Raises dust and loose paper; small branches are moved
5	19-24	Fresh Breeze	Small trees in leaf begin to sway; crested wavelets form on inland waters
6	25-31	Strong Breeze	Large branches in motion; whistling heard in telegraph wires; umbrellas used with difficulty
7	32-38	Near Gale	Whole trees in motion; inconvenience felt when walking against the wind
8	39-46	Gale	Breaks twigs off trees; generally impedes progress
9	47-54	Severe Gale	Slight structural damage occurs (chimney pots and slates removed)
10	55-63	Storm	Seldom experienced inland; trees uprooted; considerable structural damage occurs
11	64-72	Violent Storm	Very rarely experienced; accompanied by widespread damage
12	72-83	Hurricane	

High winds combined with dry conditions to generate large wildfires in the area. Although they were swiftly suppressed, blowing winds created a dust cloud that was seen by satellite, and the smoke and dust colored the sky which was noted by residents.

Aberdeen requires elevation and foundations for mobile homes. Methods can be over the top ties, frame ties to ground anchors, all components of the anchoring system must be capable of carrying a force of 4,800 pounds. Brown County has not specifically stated that tie downs must be used, however, a requirement from trailer and mobile home manufacturers states that the mobile home or trailer must be placed on a foundation and secured. Groton's building codes are based on the International Building Codes. Hecla follows IBC 2024 and works with the county on building permitting processes.

THUNDERSTORMS, HEAVY RAIN AND LIGHTNING

Table 4.20: Thunderstorms, Heavy Rain, and Lightning

Thunderstorms can occur county-wide and cause significant damage to residents, structures, crops, and livestock. Thunderstorms generally include other hazards such as high winds, heavy rains, thunder, lightning, and hail. Mitigation includes warning systems, storm shelters, and insurance policies.

Heavy rain can be county-wide and cause flooding of structures, roads and slowing emergency services response. Roads and bridges can be washed out making access difficult. Storm sewers may not be able to manage this heavy rain event and cause structures to be flooded, however, mitigation with storm sewers can reduce the flooding impacts.

Lightning occurs with thunderstorms, which can be county-wide. Poles, towers, and lines are more vulnerable to being struck by lightning, potentially causing power loss or structure damages. Lightning can cause fires, especially when combined with a drought-affected area. Residents can be injured by being struck when unprotected outside.

Thunderstorms	• Caused by rapid changes in temperature, air pressure, and air moisture. • Causes hail, lightning, thunder, high winds, and heavy rain. • Storm Prediction Center has a 5-point risk category • Level 1: lowest risk, isolated, short-lived storms and limited intensity • Level 2: has a higher intensity with potential for strong or damaging winds and a few tornadoes • Level 3: storm can be persistent and intense, with some tornadoes and wind damage • Levels 4 and 5 represent widespread and long-lived severe storms.
Heavy Rains	• Occurs when more than 3.30 inches (0.762 sm) per hours falls. • Intensity and duration play a factor. • Light rain: Less than .10 per hour • Moderate Rain: .10-.30 per hour • Heavy Rain: more than .3 inches per hour • Violent Rain: more than 2 inches per hour.
Lightning	• A buildup of electrical charge due to rapidly rising air and precipitation movement in thundercloud. • Can reach temperatures of up to 50,000 F in a split second. • Rapid heating, expansion, and cooling of air near lightning is what causes thunder. • Annualized Frequency can be calculated as the number of historical occurrences of natural hazards withing a certain period. <i>Annualized Frequency = Number of Recorded Events or Event days/Period of Record</i>

Table 4.20: Tornadoes, Thunderstorms and Hail descriptions from the 2020 Brown County Natural Hazard Mitigation Plan

The annual risk for intense summer storms is very high. All of Brown County is susceptible to summer storms. Warning time is normally several hours, to relocate and evacuate if necessary. Tornadoes occur with little or no warning. Specific areas within the county have a high risk of being impacted if hit by a tornado or severe storms.

Brown County has a high seasonal population, especially around lakes during the summer. Thunderstorm, Lightning, and Hail were ranked as second as a likelihood of occurrence in the survey. 69 (28.5%) said that they were negatively affected by thunderstorms in the last 10 years.

Table 4.21: NOAA Thunderstorm, Heavy Rain, and Lightning Events	
Number of Events in the last 10 Years: Thunderstorm Events	178 Events over 76 days
Number of Years with events: Thunderstorm Events	10 years with an event
Possible number of days with events per year: Thunderstorm Events	7.6 days per year
Probability of future events: Thunderstorm Events	100%

Thunderstorms, tornados, and hail in the County are common and widespread. Appendix D shows the extent and severity. The County continues to educate residents about the dangers of such storms through public service announcements and other media along with drills at area schools.

Thunderstorm events have potential to damage crops, power lines, buildings, and personal property. Residents can use insurance to mitigate damage from storms and storm shelters to protect residents. Burying power lines reduced damage to those lines ensuring power for residents. Generators help with reducing the impact of power loss where lines have not been buried, and storm shelters protect residents if the storm becomes severe and produces tornadoes and high winds.

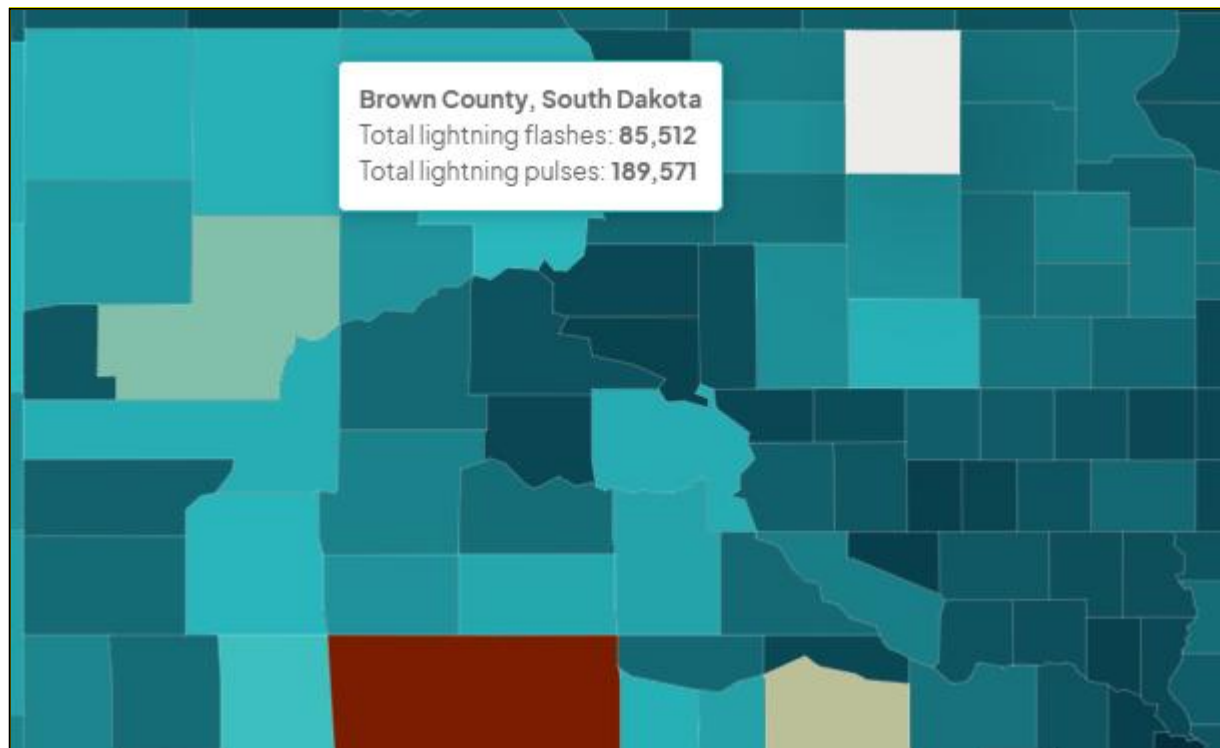


Figure 4.5: Lightning history from aem.eco

The severity of lightning can range from significant to insignificant depending on where it strikes and what is hit. Water towers, cell phone towers, power lines, trees, and common structures have the possibility of being struck and damaged. People who leave shelter during thunderstorms to watch or follow lightning have the possibility of being struck. Brown County has a lightning flash count of 85,512 and total lightning pulses of 189,571 in 2025.

Heavy rain from storms can lead to flooding. If a city has a storm sewer system, heavy rain can overload it causing flooding. Brown County has very slow drainage through the James River. The James River has a very flat gradient dropping only about 5 inches per mile. During heavy rain, the river widens out of its banks to accommodate the additional water. Many cities in Brown County do not have storm sewer systems and the heavy rain causes flooding through the towns and surrounding areas. Aberdeen and Groton have storm sewer systems. Both communities have worked to upgrade their systems. Aberdeen has extensively added to their stormwater system including levees, retention ponds and channels.

Table 4.22 Lightning Activity Level	
Scale	Description
LAL 1	No thunderstorms
LAL 2	Isolated thunderstorms. Light rain will occasionally reach the ground. Lightning is very infrequent, 1 to 5 cloud to ground strikes in a five-minute period
LAL 3	Widely scattered thunderstorms. Light to moderate rain will reach the ground. Lightning is infrequent, 6 to 10 cloud to ground strikes in a five-minute period
LAL 4	Scattered thunderstorms. Moderate rain is commonly produced. Lightning is frequent, 11 to 15 cloud to ground strikes in a five-minute period
LAL 5	Numerous thunderstorms. Rainfall is moderate to heavy. Lightning is frequent and intense, greater than 15 cloud to ground strikes in a five-minute period
LAL 6	Dry lightning (same as LAL 3 but without rain). This type of lightning has the potential for extreme fire activity and is normally highlighted in fire weather forecasts with a Red Flag warning

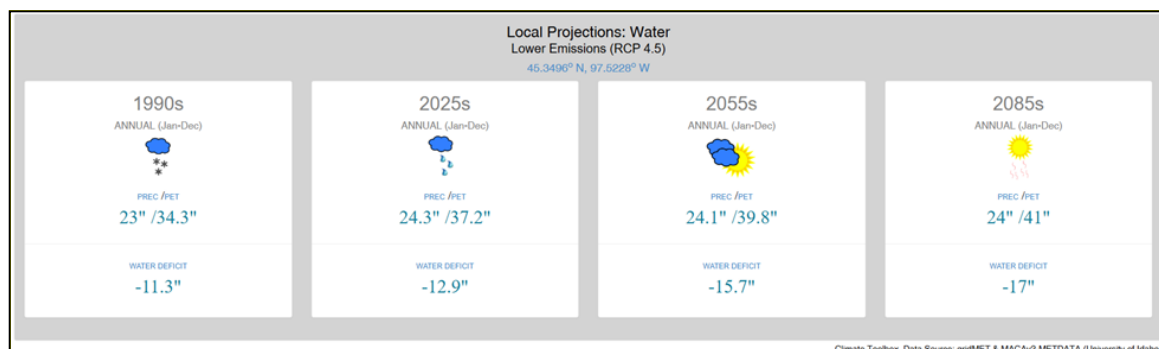


Figure 4.6: Precipitation projections into 2085 based on lower CO2 Emissions.

Figure 4.6 illustrates projected rainfall over the next 50 years. With lower emission projections, there is still a decrease in average annual rainfall in Brown County. The increasing deficit will influence agriculture and tourism in Brown County.

HAIL

Table 4.22: Hail

Hail generally occurs when there are thunderstorms. This type of event is common and usually is county-wide. Hail can damage crops, livestock, structures, and cars. Residents are vulnerable to injury when caught outside in a hailstorm. Mitigation is difficult and insurance is usually the process to mitigate hail damages.

Hail	• Water and ice balls. • Water droplets are pushed upwards by storm winds and fall as ice pellets. • Measure 5 to 150 millimeters in diameter on average. • More severe thunderstorms create larger hailstones.
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Table 4.22: Hail Hazard description from the 2020 Brown County Natural Hazard Mitigation Plan

Hail events are common in Brown County, however, the information provided by NOAA was incomplete due to inconsistent reporting after events. A full list of occurrences reported in NOAA's Storm Events Database can be found in Appendix D. It is reasonable to expect that at least some property or crop damage was sustained though it may not have been reported, because it was believed to be insignificant, or because those responsible did not report it to the proper agencies. Although there were many storms listed in the database, no damage was recorded. Hopefully, collection of this data will advance to make it available for mitigation. Hail is common during spring, summer, and fall and causes widespread damage each year. Thunderstorm, Lightning, and Hail were ranked as second as a likelihood of occurrence in the survey. 69 (28.5%) said that they were negatively affected by thunderstorms in the last 10 years.

Table 4.23: NOAA Hail Events

Number of Events in last 10 Years: Hail	109 Events
Number of Years with events: Hail	10 Years
Possible number of days with events per year: Hail	10.9 Events Annually
Probability of future events: Hail	100%

The widespread damage hail creates can make it hard to mitigate. Hail as small as mothballs make holes in leaves, affecting crops. The average size in the last 10 years recorded by NOAA in Brown County was 1.26 inches. A 1.23-inch hailstorm can punch through shingles on roofs, break window frames, severely damage crops, cars, and structures.

The largest hail in the last ten years was four inches and was recorded at Winship Township on August 23, 2020. An isolated severe thunderstorm produced very large hail. The above table illustrates hail severity and the sizes and impacts that they cause. Once hail is around 1" the national weather service issues a severe thunderstorm warning. Large hail indicates strong winds that are a sign that there can be high winds and other elements making the storm more severe.

Table 4.24: Hail Severity		
Hail Diameter (inches)	Description	Severity
1/4"	Pea	Not Severe <i>limited damage, no severe thunderstorm warning from National Weather Service</i>
1/2"	Marble/Softball	
3/4"	Penny	
7/8"	Nickel	
1" Severe	Quarter	Severe Hail <i>The damage that occurs when hail is around 1" diameter or larger is more severe. This size of hail will cause the National Weather Service to issue a thunderstorm warning.</i>
1 1/4"	Half Dollar	
1 1/2"	Walnut/Ping Pong Ball	
1 3/4"	Golf Ball	
2"	Hen Egg/Lime	
2 1/2"	Tennis Ball	
2 3/4"	Baseball	
3"	Teacup/Large Apple	
4"	Softball	
4 1/4"	Grapefruit	

TORNADOES AND FUNNEL CLOUDS

Table 4.25: Tornadoes and Funnel Clouds				
Tornadoes are produced by thunderstorms, generally beginning as a funnel cloud. Although a tornado is produced by a funnel cloud, a funnel cloud does not always produce a tornado. These can travel unpredictably throughout the storm area and occur with little to no warning. Mitigation includes warning systems, storm shelters, and insurance policies.				
Tornadoes	- Violent windstorms may occur as many as one or multiple at a time. - Occur most often in May, June, and July between 4 p.m. to 6 p.m. - Occurs when cool air overrides warm air causing the warm air to rise rapidly. - May not touch down on the ground. - Enhanced Fujita Tornado Damage Scale based on windspeed:			
	EF-scale	Class	Wind speed mph	Wind speed km/h
	EF-0	weak	65-85	105-137
	EF-1	weak	86-110	138-177
	EF-2	strong	111-135	178-217
	EF-3	strong	136-165	218-266
	EF-4	violent	166-200	267-322
	EF-5	violent	> 200	> 322
Funnel Clouds	- May or may not produce a tornado. - Indicates a high probability of tornadic activity of the storm.			

Table 4.25: Tornado and Funnel Cloud Hazard description from the 2020 Brown County Natural Hazard Mitigation Plan

Figure 4.7 shows tornadoes specific to Brown County. Gathering historical data on tornadoes is difficult due to occurrences and unconfirmed reports. Each year at least a few tornadoes affect the county. Tornadoes and funnel clouds were ranked fourth as a likelihood of occurrence in the survey. 4.1% said that they were negatively affected by tornadoes in the last 10 years. The survey asked residents if they had a safe place to go in the event of a tornado and 90.1% answered yes and 9.9% answered no. Most residents listed a basement a few listed other residents' homes, and some were not sure where they would go, listed a closet, or the Washington St. gymnasium. Another location was in the inner hallways of the first floor of an apartment or underground parking garage. When asked if residents knew where storm shelters were located, 117 (48%) said no, 95 (39%) said yes and 30 (12%) said they didn't have one in their area. The map in Figure 4.7 shows tornado history from 1955 to 2019 for South Dakota from South Dakota's 2024 Hazard Mitigation Plan.

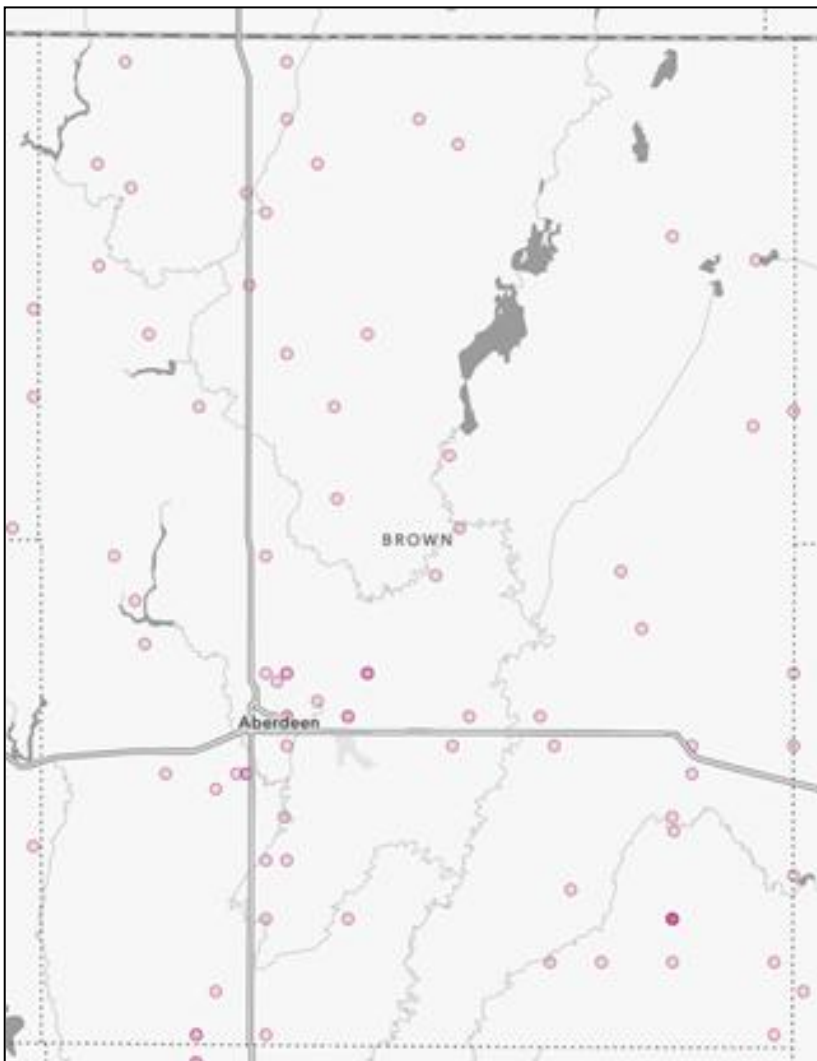


Figure 4.7: Map of Brown County Tornadoes:1953 to 2022 from NOAA's Storm Events Database

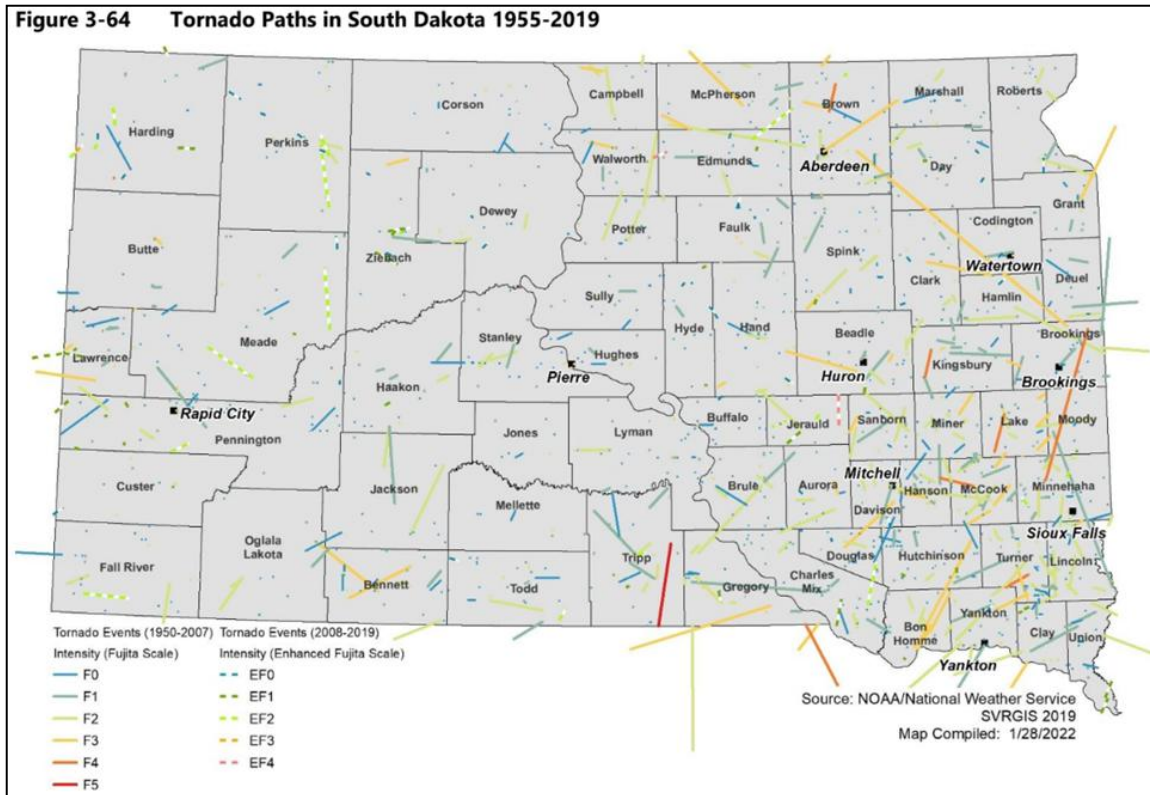


Figure 4.8: Map of Tornado paths in South Dakota from South Dakota's 2024 Hazard Mitigation Plan

Tornadoes may occur with little or no warning, are unpredictable, common, and widespread. The entire county is at risk if hit by a tornado or severe storms. In Brown County, there is a high number of fishermen and wildlife enthusiasts who participate in the natural offerings of the county. These populations are at particularly high risk in the event of a severe storm. In remote locations with limited protection, they are more vulnerable. Appendix D shows the extent and severity. The County continues to educate residents about the dangers of such storms through public service announcements and other media along with drills at area schools. Safe rooms that are easily accessible are options for residents. Groton is currently working with FEMA to provide a storm shelter at their park/pool/campground complex.

Table 4.26: NOAA Tornado and Funnel Clouds Events	
Number of Events in the last 10 Years: Tornadoes and Funnel Clouds	4 Funnel Clouds 6 Tornadoes
Number of Years with events: Tornadoes and Funnel Clouds	6 Years with an event
Possible number of days with events per year: Tornadoes and Funnel Clouds	1 Event per year
Probability of future events: Tornadoes and Funnel Clouds	60%

Table 4.26 shows Brown County's statistics for tornadoes. South Dakota has had a tornado event that destroyed an entire town. Manchester, South Dakota was destroyed by an F4 tornado that occurred June 24, 2003. Although no one was killed, the town was never rebuilt. On May 30, 1998, Spencer South Dakota was hit by an F4 tornado. It destroyed 150 of the town's 170 structures and of 320 people, 150 were injured and

six were killed. The high number of injuries and deaths was attributed to the lack of warning sirens. Due to a power outage, the sirens did not go off to warn residents of the tornado. This tornado was the second deadliest in South Dakota's history. The town was nearly destroyed by the events of that night. June 13, 2017, storms rapidly developed over central and eastern South Dakota between Pierre and Aberdeen. These storms produced large hail, damaging winds, and eventually tornadoes. The storm produced tornadoes and damaging winds, causing EF-0 and EF-1 damage.

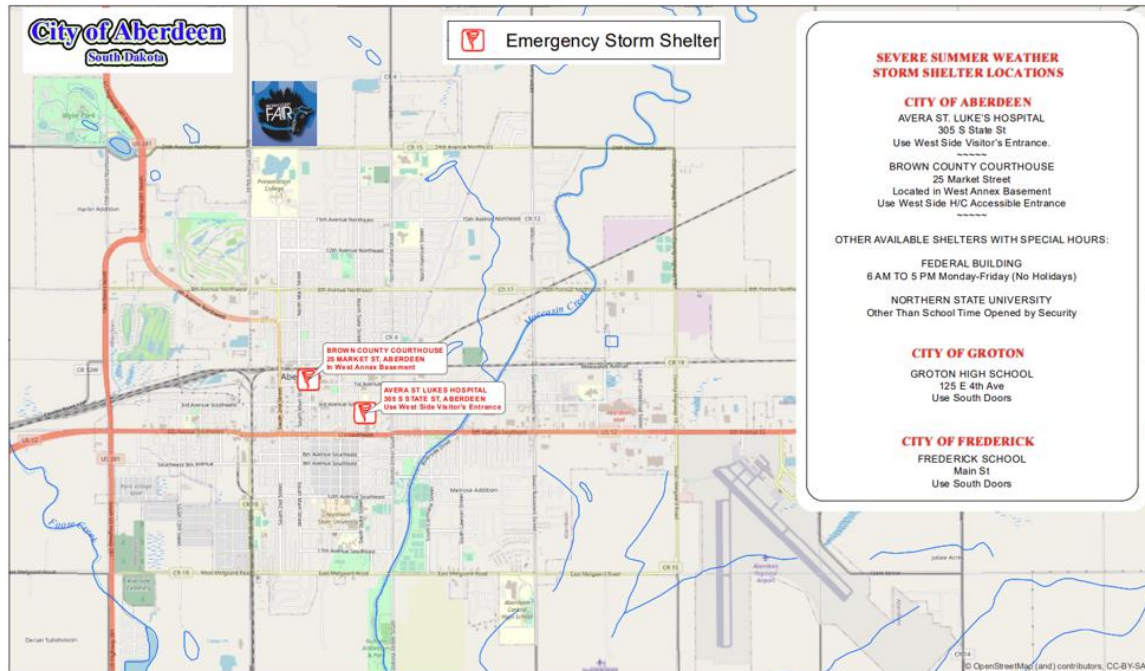


Figure 4.8: Map of Storm Shelters in Aberdeen and List of Brown County shelters

Emergency Services was also part of the survey. When residents were asked if they needed to use the services provided by fire, ambulance, law enforcement in the last five years, 84 (35.6%) of respondents said yes and 152 (64.4%) said no. Another question was if there was anything that needed to be done regarding mitigation and comments included more storm shelters, shelter belts, better drainage, recommendations to prevent damage, warning systems, snow plowing, and more resources to power companies to respond to damaged power lines. Information campaigns and early warning systems were also listed.

EXTREME TEMPERATURES

Table 4.27: Extreme Heat and Cold

Extreme heat and cold can be county-wide. High heat combined with high humidity can increase dangers when combined with other hazards such as drought and wildfires. Extreme cold is also even more dangerous when combined with the hazards of a winter storm. These hazards are difficult to mitigate for. Warnings, upgrades to the power grid, saferooms that provide a place to go power access and travel advisories can be used to mitigate the dangers.	
Extreme Cold	- Below 0 degrees F. - It can accompany winter storms, adding to the danger. - It causes danger to residents outside for too long and exposed to the cold. - It can affect transportation by making it difficult for equipment to start or keep starting and the power grid by over taxing the system.
Extreme Heat	- Heat is greater than 100 F and can be accompanied by high humidity. - It can increase drought, causing crop damage and danger to livestock. - It can cause danger to residents without the ability to cool and the power grid by overtaxing the system.
Wind Chill	The combination of sub-zero temperatures and winds creates a temperature much colder than the air temperature alone. Wind chills can reach as low as between -50 to -60 degrees.

Table 4.27: Extreme Heat and Cold description from the 2020 Brown County Natural Hazard Mitigation Plan

Extreme temperatures are common in Brown County. At least once a year there is extreme heat and cold. Information from NOAA's website is in Appendix D. Residents adapted to the extreme temperatures and events are not reported as often as they occur. Arctic air comes from Canada and affects the region with colder than normal temperatures during the winter. Variations in weather patterns can push air from polar regions. The arctic air moves over Brown County, causing significant drops in temperatures. Power outages occur by overloading power grids to maintain heat. Pipes and infrastructure can be affected. People who choose to venture out in extreme cold temperatures risk becoming stranded and freezing.

Table 4.28: NOAA Extreme Temperature Events

Number of Events in the last 10 Years: Cold/Wind Chill	31 Days
Number of Years with events: Cold	10 Years with an event
Possible number of days with events per year: Cold	3.1 days per year
Probability of future events: Cold	100%
Number of Events in the last 10 Years: Heat	9 Days
Number of Years with events: Heat	5 years with an event
Possible number of days with events per year: Heat	.5 days annually
Probability of future events: Heat	50%

On January 25, 2018, a 68-year-old woman passed away due to exposure to cold. She was found near a grove of trees near Hecla. Arctic air and north winds caused extreme wind chills of 35 to 50 below zero from the 15th to the 16th of January 2018. This cold causes schools and businesses to shut down due to dangers of people going outside.

Wind chills in South Dakota make frigid winter temperatures much colder and dangerous. Exposed skin can quickly freeze, causing frostbite. Cars and equipment can be difficult to impossible to start, which leaves motorists stranded in the cold.

High heat is also dangerous. Summer temperatures have reached a heat index of 114 degrees Fahrenheit. Summer average temperatures have shifted higher due to climate change causing warmer temperatures. This increases the risk of drought and impacts residents who cannot find places to cool off and affects power by higher-than-normal use of air conditioners. When humidity and heat are both high, the body cannot cool itself. This causes overheating resulting in fatigue, dehydration, cramps, heat exhaustion, heat stroke and even death. Residents are more prepared for extreme temperature events, but livestock is vulnerable to high cold or heat, impacting the economy. Water supplies are vulnerable and rural water systems may not be sufficient to meet higher demands which impact residents. High temperatures were in the upper 8s to the 100s with overnight lows in the upper 60s to the mid-70s. Heat indexes were 108 degrees at Aberdeen.

High heat indexes peaked July 19-July 21 of 2016. The high temperatures were in the upper 0s to 100s. Overnight lows were in the upper 60s to mid-70s. Aberdeen registered a high of 108 degrees. August 2-3, 2024, high temperatures registered in the upper 90s to low 100s. Heat index values reached 110 degrees in Stratford. Figure 4.9 is a heat index chart for NOAA and Figure 1.10 is a wind chill chart that shows temperatures when wind and cold combine.

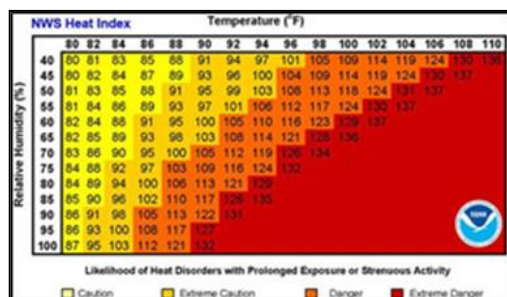


Figure 4.9: Heat Index Chart from NOAA

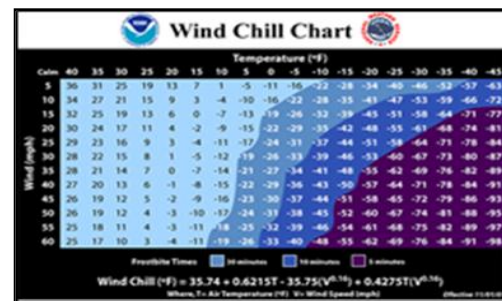


Figure 4.10: Wind Chill Chart from NOAA

WINTER STORMS, BLIZZARDS, SNOWSTORMS, FREEZING RAIN, ICE JAMS

Table 4.29: Winter Hazards

All winter hazards have serious impacts countywide. Winter storms are common in the area occurring frequently beginning in October and ending as late as April. Hazards are reduction in visibility for transportation, slippery surfaces for traffic and residents, road closures, blowing and drifting snow, dangerously cold temperatures, reduction in response of emergency services, power loss, and livestock loss. Moisture accumulation causes the potential for spring flooding. As climate change occurs and global average temperatures increase, storms are predicted to be more severe.	
Blizzards	• It lasts three hours or more. • Winds greater than 35 miles per hour • Temperatures below 20 degrees F • White out conditions with visibility less than ¼ mile
Freezing Rain	• Temperatures below 30 degrees F combined with rain.
Ice Jams	• Warm temperatures and rain cause rapid snowmelt and rivers swell, breaking ice. Large chunks flow downstream and cause blockages of waterways.
Severe Winter Storms	• Snow accumulation of more than 4 inches during a 12-hour period.
Sleet	• A mix of rain and snow that covers surfaces and makes slippery to traverse.
Snow	• Precipitation that occurs below freezing temperatures. • Accumulates on every surface of the ground.
Snow Drifts	• Wind blows snow into large accumulations. It can be as high as 20-40 feet.

Table 4.30: Winter Hazards description from the 2020 Brown County Natural Hazard Mitigation Plan

Winter storms and blizzards are common in Brown County and are considered extreme in many parts of the country. Planning and response mechanisms for snow and ice storms are routine procedures. Response to snowstorms is managed through special emergency vehicles and snowmobiles when residents have an emergency, although response time is impacted depending on storm severity. Winter storms often cover large areas, and most occur countywide. Winter storms can leave large accumulations of snow and ice. This snowpack can cause ice jams in rivers and cause significant flooding events when combined with spring rain.

Table 4.30: NOAA Winter Events

Number of Events in last 10 Years: Winter Hazards	47 Events
Number of Years with events: Winter Hazards	10 Years
Possible number of days with events per year: Winter Hazards	4.7 days annually
Probability of future events: Winter Hazards	100%

Beginning in October 2022 and ending in April of 2023, Brown County was repeatedly subjected to winter storms, blizzards, high winds, and ice storms. Those storms shut down transportation and impacted on the economy, later accumulating to spring flooding in 2023. On December 29, 2019, a winter storm turned into a blizzard for much of South Dakota. Wind gusts of 50-60 miles per hour created blizzard conditions throughout the James River valley. This severely impacted road conditions and travel. A No Travel Advised advisory was set for most of the state and county roads, along with Interstate 90

and 29. Accidents occurred with several vehicles sliding into the ditch and there were power outages to almost a thousand people in northeast South Dakota. Snowfall ranged from 6-20 inches of snow. The storm ended early on December 30.

A list of recorded winter storm occurrences is included in Appendix D. Severe Winter Weather was ranked third as a likelihood of occurrence in the survey. Fifty (20.7%) of respondents said that they were negatively affected by tornadoes in the last 10 years.

Power loss is a significant concern with winter weather. During severe storms, if power is lost, cold can become dangerous. When asked if there was an alternate source of heat for respondents during power loss, 36% said yes; 64% said no. Of those with an alternate source of power, residents listed a propane fireplace, generators, cars or another home with a generator or source of power. Most residents stated that they could be without power for 2-4 days 103 (42.6%) residents. 33 (13.6%) said they could survive a few hours to a day, 42 (17.4%) said they could survive a day. 32 (13.2% of residents said they could survive 5-10 days and another 32 (13.2%) of respondents said they could survive more than 11 days.

Table 4.31 Regional Snowfall Index	
Category	Description
1	Notable
2	Significant
3	Major
4	Crippling
5	Extreme

FLOOD

Table 4.32: Flood

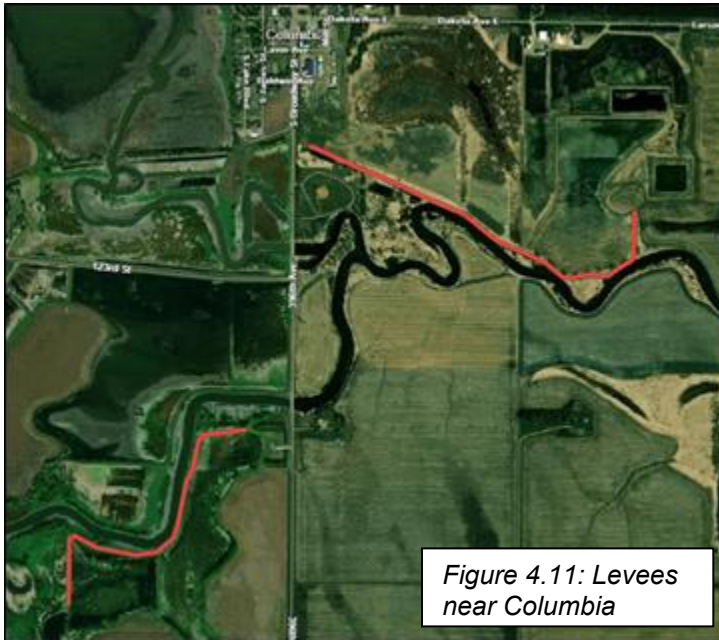
Flooding is an overflow of water that submerges land, causes property damage, and can harm residents caught in the water. Six inches of running water can sweep a vehicle off the road. Flooding disrupts electric services, destroys structures, and affects transportation. Emergency services can have challenges responding to residents needing help. Disruption of communication, transportation, electric service, and community services, along with contamination of water supplies and transportation accidents. Mitigation for flooding includes building codes, enforcing flood map requirements, flood insurance, travel advisories and warnings, sump pumps for homes and sandbagging to prevent water from reaching structures.

Flooding	• Overflow of water that submerges land. • Residents and structures can be washed away. • It can develop quickly or over a longer time. • Caused by heavy rains, ice jams blocking waterways, and heavy snowmelt. • Magnitude and Severity: • <i>Damage to private property (financial hardship on residents)</i> • <i>Damage to public property and infrastructure increasing public expenditures and taxes</i> • <i>Loss of personal income in agricultural sectors</i> • <i>Businesses' losses on recreational sectors</i> • <i>Emotional distress on residents experiencing flooding</i> • <i>Injuries and death</i> • Two types: inundation and flash. • <i>Inundation Flooding: usually in the spring due to rapid snowmelt. The James River is a slow-moving river so when flooded, the water moves slowly out of the area.</i> • <i>Flash Flooding: usually in the summer, caused by heavy rainfall and is localized. It can overwhelm stormwater systems, culverts, and other systems to deal with water.</i>
Extent of Flooding: Flood Stages and Impacts	• Major Flood: Extensive inundation of structures and roads, significant evacuations of people and/or transfer of property to higher elevations. • Moderate flood: Some inundation of structures and roads near stream, evacuations of people and/or transfer of property to higher elevations. • Minor Flood: Minimal or no property damage, but possibly some public threat (e.g., inundation of roads). • Action: An established gage height which when reached by a rising stream, lake, or reservoir represents the level where action is taken in preparation for possible significant hydrologic activity. • No Flood: No flooding is indicated.

Table 4.32: Flood Hazard description from the 2020 Brown County Natural Hazard Mitigation Plan

Numerous flood events have happened in Brown County over the past 50 years. Most are flooding overland from heavy rainfall and spring thaws causing the James River, Elm River or Moccasin Creek to rise above flood stage. The most typical structures affected are low-lying streets and roads. Croplands are also affected, impacting agriculture. Critical infrastructure and housing are the biggest concern when it comes to mitigation. Multiple locations in Brown County are susceptible. The James River drainage basin

runs through the county and due to the low elevation, makes the entire county vulnerable according to Brown County's Comprehensive Plan.



There are two types of levees: accredited and non-accredited. FEMA accredits a levee when it provides adequate protection in a flood and operation and maintenance plans are enforced by the levee owner. Accredited levees can be used to lower flood insurance requirements. If a non-accredited levee is protecting development, the homes are not eligible for reduction in risk on the FIRM. Levees help reduce the risk, but do not eliminate it. Levees can and sometimes do fail or are overtopped and can create more damage than if the levee had not been built by trapping water.

Figure 4.9 illustrates the two levee systems located near Columbia. The James River North Side levee is located north of the James River and helps to protect nine people, seven buildings, and approximately \$1.74 million dollars of property. The levee is .91 miles and is a non-accredited levee system. South of Columbia along the Elm River is the Elm River South Side levee. It was constructed in 1969 and is also non-accredited. It is .74 miles long and currently protects no people, buildings, or property.

Aberdeen has worked to establish storm water systems to reduce the impact. Levee systems are used to mitigate against flooding of Moccasin Creek in Aberdeen. Brown County has three levee systems and one currently in development. Two levee systems are in Columbia where the James River and the Elm River meet. The other is in Aberdeen along Moccasin Creek. The third being developed along Camino Real subdivision. This subdivision on the outskirts of Aberdeen would be severely impacted if there were flooding. Aberdeen's growth contributes to concerns that as the City expands, there will be additional measures needed to reduce the impact of flooding.

The Moccasin Creek RB (Right Bank) system begins on the north side of Aberdeen. Initially tying into an access road that was raised during flooding in 1997 it goes east for about a half mile then moves southward along the tributary of moccasin creek. Ranging from four to seven feet in height, it runs for 2.7 miles and is shown in Figure 4.12. The

levee protects 5,453 people and 2,126 buildings with a property value of \$591 million dollars. This levee is accredited with FEMA and according to a risk assessment on September 14, 2017, the risk is low. There are seepage concerns due to unwanted vegetation, animal burrows and culverts with 1-4 inches of joint separation.

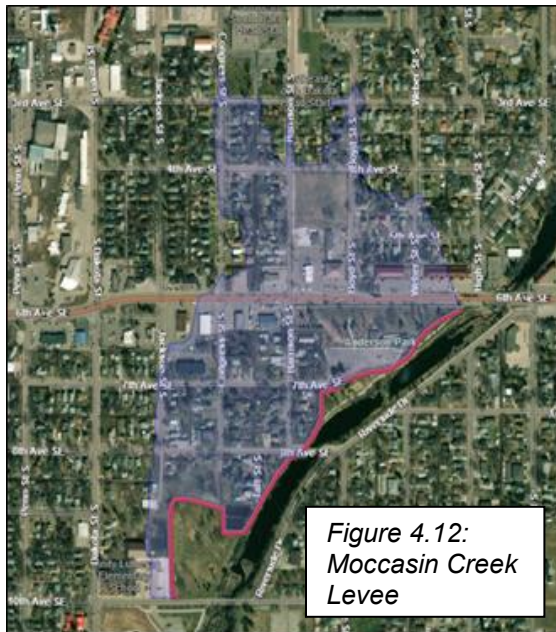


Figure 4.12:
Moccasin Creek
Levee

A second levee system is located along Moccasin Creek on the west side beginning near Anderson Park and is shown in Figure 4.13. This levee is non-accredited with FEMA and protects a population of 302 and 129 buildings with a property value of \$77.6 million. It is .55 miles in length and was constructed in 1969. South of the levee system is Aberdeen's soccer fields. As water flows south along Moccasin Creek high water levels can flow into the fields which act as a holding area until the waters recede. Aberdeen is working to recertify their levee system for their FEMA hydrology modeling. Without the levee system, significant portions of Aberdeen are at risk.

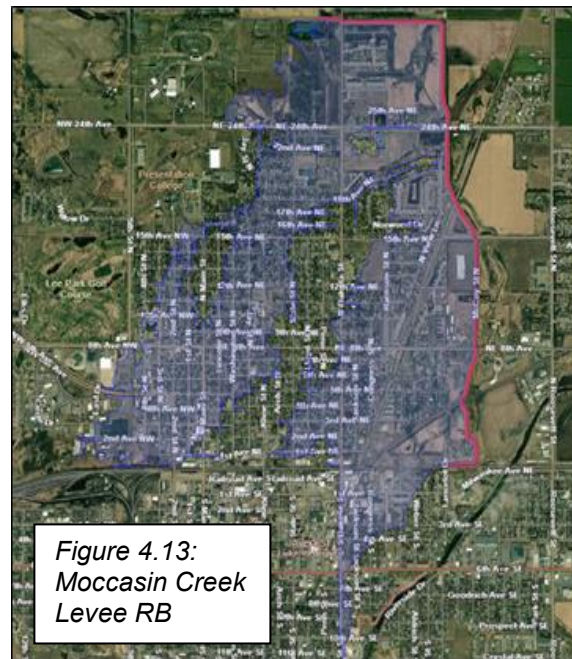


Figure 4.13:
Moccasin Creek
Levee RB

Brown County's Flood Damage Prevention Ordinance was instated to reduce damage to flooding areas. There is a floodplain permitting process for building in flooded areas. Buildings must be certified that the lowest floor is at least one foot above the base flood elevation and that new construction must have water resistant electrical, heating, ventilation, and plumbing. Another aspect is buildings must be anchored and secured to prevent buoyancy.

A floodproofing certificate, signed by a professional engineer, is required for any nonresidential structure located in or adjacent to a floodplain. This form sets the elevations, and the lowest floor of the structure, which must have at least one foot of freeboard. Freeboard is an additional amount of height above the base flood elevation. This is required for new buildings and buildings needing substantial improvements or additions that are in or adjacent to the floodplain. Residential structures will have the lowest floor at least one foot above the base flood elevation to obtain a FEMA elevation certificate. If the building does not have a basement and is slab on grade, the lowest floor must also have one foot of freeboard, as certified according to FEMA with a certificate. These preventative actions are an illustration of how protective mitigation can be in situations of recurring events. Holding pond areas are also established depending

on how the structure affects the normal flow of water. According to the Brown County Rural Development Site Analysis, all CAFOs and other structures are prohibited from being built in a 100-year flood plain.

There is a lack of drainage in Brown County because the topography is very flat. It takes time for the water to either move downstream or evaporate. There can be flooded roads which obstruct access to homes and farmland. This flooding can hinder development in Brown County. Load limits and reduced speed limits are placed on roads to prevent further degradation. Croplands are also lost when there is flooding. Sometimes, flooding can delay planting or harvesting indefinitely, impacting the economy. Flooding can happen anywhere in the county although it generally occurs near the James River, Elm River, or Moccasin Creek. Flash flooding, where the water accumulates quickly has occurred and is often associated with massive rainfall and rapid snowmelt. May 5-6, 2007, the area received nine inches of rain during the two-day period. Groton received a record breaking 8.74 inches in a 24-hour period. These conditions contributed to massive flooding throughout the area. Nearly 75% of homes in Aberdeen reported some water in their basements. Many homes were condemned throughout the region. The entire county was declared a disaster area.

High water tables impact Brown County by causing residents to continually run sump pumps. If power was lost, many homes would be impacted because they are dependent upon those pumps to keep their home or building dry. Floodplain management is a gray area for the smaller jurisdictions. Many, such as Claremont, Columbia, and Frederick do not have the resources to administer floodplains on their own and reach out the County's Planning and Zoning Department for assistance.

Flooding hinders development in Brown County. Land that can be built on is limited due to the groundwater levels and the lakes encroaching on land throughout the county. Load limits and reduced speed limits are placed on roads to prevent further degradation. Croplands are lost when there is flooding. Sometimes, flooding delays planting or harvesting, impacting the economy.

Flash flooding, where the water accumulates quickly, has occurred, and is often associated with massive rainfall and rapid snowmelt, but generally flooding in Brown County is due to the slow of drainage and water accumulation. Culverts and bridges are used throughout the county to allow water to flow while maintaining roadways. However, in times of severe flooding, the impact is minimal.

Table 4.33: NOAA Flood and Flash Flood Events	
Number of Events in the last 10 Years: Flood	83 Events
Number of Years with Events: Flood	8 Years
Possible number of days with events per year Flood	83 days
Probability of future events: Flood	80%
Number of Events in the last 10 Years: Flash Flood	5 Events
Number of Years with Events: Flash Flood	5 Years
Possible number of days with events per year Flash Flood	.5 days annually
Probability of future events: Flash Flood	50%

High water tables impact Brown County by causing residents to continually run sump pumps. If power is lost, many homes would be impacted because they are dependent upon those pumps to keep their home or building dry. Some Brown County municipalities do not have the resources to administer floodplains on their own and residents request the County's Planning and Zoning Department for assistance. The Planning and Zoning Director is the floodplain manager for Brown County. When a resident requests to build in a floodplain, the County Planning and Zoning Office Director is the floodplain coordinator who requires a certificate to ensure the structure is above the base flood elevation and has the correct amount of freeboard.

Flood impacts residents financially, physically, and emotionally. Flooding can cause damage to property, lives, and public assets. Flooding affects the agricultural sector by decreasing access to land for crops, farm animals and for hunting. Floods also make it difficult to traverse the county on roads, creating higher response times for emergency services. This higher response time puts residents' lives at risk. Flood risk varies throughout the county dependent on waterways, soil content, ground cover, and construction. Flooding and its impacts are dependent on previous rainfall, rate of precipitation accumulation, and the time of year. Flood was ranked fifth in likelihood of occurrence in the survey. 78 of respondents (32.2%) said that they were negatively affected by tornadoes in the last 10 years. Another question in the survey asked about taking alternate routes to work/school/church/medical facility. 66 (27.3%) said that they had that impact from a natural hazard.

FEMA has preliminary flood maps for the county. FEMA did not consider the infrastructure (retention ponds, channels, and levees) into the study. Aberdeen has contracted with HDR to study how water would move throughout Aberdeen with this infrastructure. Another concern is the James River and its impact on flooding throughout the county. The James River Basin has been a focus area of study for FEMA due to the amount of flooding that occurs. The James River recently finished at a record flood stage of 518 days from April 2, 2019, to August 31, 2020. The fact that the James River is a slow-flowing river and spreads out substantially when in flood stage impacts large areas surrounding the river. As the river swells and spreads, it covers farmland, roads, and structures that are in the area. Drivers who chose to drive over these roads have had to request rescues due to losing control and sliding into ditches.

The James River Water Development District (JRWDD) works with federal and state agencies, municipalities, landowners, and the public to support the restoration and the ecosystem of the James River. The James River basin affects many counties throughout eastern South Dakota, including Brown. Some of the activities they are involved in are hydrology studies, support of the ecosystem such as trees, dam releases and potential exposure issues, monitoring of the river and its flow and assisting jurisdictions and landowners in the James River basin with projects in the area.

FEMA uses LiDAR (a high-resolution, very detailed topographical map of the earth) to get geographical information of the county. FEMA completed field studies of culverts, bridges, and dams to map how water will flow. They also used HEC-RAS 5.03 from the Hydrologic Engineering Center River Analysis System which allows the study of how water flows in the area by simulating a drop of water landing on the ground. The mapping includes a study of the sediment that will flow with the water and temperature and water quality monitoring. Following adoption of the newly updated flood maps,

Brown County will have six months to formally adopt the new rates and inform homeowners of the changes.

Brown County's floodplain administrator is the Planning and Zoning Director. Certain municipalities address their own flooding such as Aberdeen, Groton, and Warner. The County is responsible for: Claremont, Columbia, Frederick, Hecla, Stratford, Verdon, and Westport. Brown County issues floodplain permits requiring certification that the structure is one foot above Base Flood Elevation. Aberdeen also requires certification that the structure is one foot above base flood elevation. The most recent maps of the floodplain are from 2008-2010.

NATIONAL FLOOD INSURANCE PROGRAM PARTICIPATION

Requirement: 201.6(d)(3)(ii): *Does the plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate?*

C2-a. *The plan must describe participation in the NFIP for each participant, as applicable, in accordance with NFIP regulatory requirements.*

NFIP: [§201.6(c)(2)(ii)]

As an NFIP participant, Brown County has flood insurance and benefits available in the event of a flood. As part of the NFIP there is flood insurance and benefits available in the event of a flood. The following list is of NFIP participating jurisdictions in Brown County. Table 4.34 is an excerpt from the NFIP Participation Community Status book.

Currently, Brown County is part of the Community Rating System (CRS) program. As part of the NFIP there is flood insurance and benefits available in the event of a flood. The following table lists participating jurisdictions Brown County. NFIP Participation Community Status book listing is in Table 4.8.

Residents throughout the county participate in the NFIP. Brown County, Aberdeen, Columbia, Frederick, Groton, Hecla, Stratford and Westport have flood insurance policies in force. There have been repetitive losses that have occurred in Brown County, Aberdeen, Frederick, and Hecla. According to South Dakota Department of Public Safety, there are 82 flood insurance policies in force with 488 paid losses. Participants and losses are listed on page 82 Table 4.36 through Table 4.38.

Table 4.35: Federal Emergency Management Agency

Community Status Book Report

SOUTH DAKOTA

Communities Participating in the National Flood Program

Effective 1/9/2025

CID	Community Name	County	Init FHBM Id	Init FIRM Id	Curr Eff Map Date	Reg Emer-Date	Curr Class	% Disc SFHA
460006#	BROWN COUNTY*	BROWN COUNTY	12/20/74	09/30/88	09/29/10	09/30/88		
460007#	ABERDEEN	BROWN COUNTY	10/05/73	06/01/78	09/29/10	06/01/78	9	05%
460105#	CLAREMONT NSFHA COMM	BROWN COUNTY	04/25/75	09/30/88	NSFHA	03/05/10		
460008#	COLUMBIA	BROWN COUNTY	12/06/74	07/17/78	09/29/10	04/07/94		
460009#	FREDERICK	BROWN COUNTY	11/22/79	03/01/79	03/18/08	03/01/78		
460179#	GROTON	BROWN COUNTY	07/11/75	03/01/78	03/18/08	03/01/78		
460294#	HECLA	BROWN COUNTY		09/30/88	(NSFHA)	09/03/86		
460065#	STRATFORD	BROWN COUNTY		03/18/08	(NSFHA)	03/08/10		
460298#	WARNER	BROWN COUNTY	04/22/80	03/18/08	09/29/10 (M)	06/08/98		
460011#	WESTPORT	BROWN COUNTY	03/06/79	08/05/86	03/18/08	08/05/86		

Table 4.35: Community Status book from FEMA.gov

The town of Verdon is the only community located in Brown County that is not an NFIP participant. All other jurisdictions participate in NFIP. FEMA is working on new flood maps and is waiting on Aberdeen's hydraulic study before finalization. Aberdeen is working with HDR to conduct a hydrology study of the improvements the city has made to improve and hold water during events. Once the maps are complete, they will be made public. Once public, there will be a 90-day appeal and comment period followed by letter of final determination and adoption. and compliance with the new local standards to complete the updating process of the maps.

The James River Basin is being mapped by FEMA. The James River recently finished record flood stage of 518 days from April 2, 2019, to August 31, 2020. The fact that the James River is a slow-flowing river and spreads out substantially when in flood stage impacts large areas surrounding the river. Moccasin Creek is also a slow-moving body of water. When flooded, the creek spreads out and crosses roads. Drivers who choose to drive on these roads have had to request rescues due to losing control and sliding into ditches. The following map is a draft of the flood risk assessment for Brown County. Figure 4.14 shows the many areas of Brown County vulnerable to flooding.

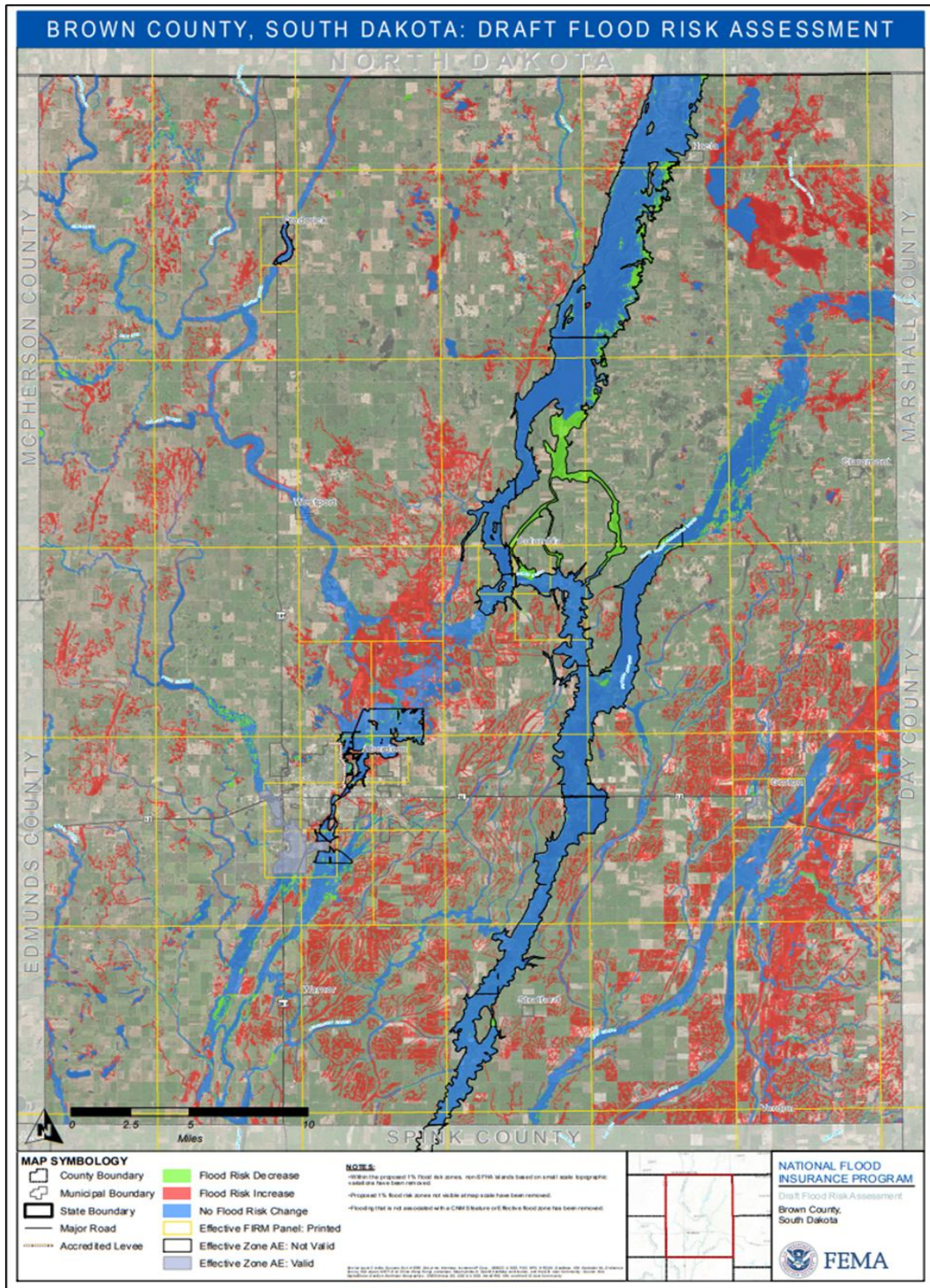


Figure 4.14: Brown County Draft Flood Assessment

Community Rating System Program:

This program allows for community mitigation actions to count towards lower flood insurance premiums for residents. The community receives a rating of nine through one

which shows the level of premium discount that ranges from 5% to 45%. Residents throughout the county participate in the NFIP.

Aberdeen is the only city in Brown County listed as participating in the Community Rating System. The Community Rating System allows communities who meet certain requirements to lower the flood insurance rates for residents. Classifications are set by the credit points in 19 creditable activities. There are four categories: Public Information, Mapping and Regulation, Flood Damage Reduction, and Warning and Response. Although discounts apply to all residents, residents have criteria that are required as well.

If their structure is not in compliance, they are unable to receive the discount until they comply. Brown County is currently not part of the Community Rating System.



Having a qualified Flood Plain Administrator is a mitigation activity. Requiring that new construction meets the flood plain ordinance and having someone to enforce those requirements is essential to mitigation planning and helps reduce the risk of natural weather events becoming natural disasters.

Figure 4.15 is Brown County's 2D Enhanced Base Level Elevation mapping. The light blue zones are considered Zone A and the red is Zone AE. This was taken from the Risk Mapping that FEMA is currently working on for the James River Valley and surrounding counties. FEMA

uses LiDAR (a high-resolution, very detailed topographical map of the earth) to get geographical information of the county. FEMA completed field studies of culverts, bridges, and dams to map how water will flow. They also used HEC-RAS 5.03 from the Hydrologic Engineering Center River Analysis System which allows the study of how water flows in the area. The mapping includes a study of the sediment that will flow with the water and temperature and water quality monitoring.

The new maps are not approved and are not final at the time of this plan's adoption. Aberdeen is working on a hydrology study with HDR to account for improvements Aberdeen has added to their stormwater system. FEMA's floodplain study does not consider the retention ponds, levees, and channels that were added to the system. Once updated, the maps will require new revised ordinances to address the changes in the FIRMs. Following adoption, Brown County will have six months to formally adopt the new rates and inform homeowners of the changes. The new flood maps have orange as a .2% of flood hazard, a 1% chance of average depth of less than one foot or with

drainage areas of less than a square mile. Dark blue areas are zones AE with a base flood elevation or depth, and light blue areas are special flood hazard areas. These areas have a much higher chance of flooding each year.

The Brown County Planning and Zoning Department maintains the Flood Insurance Rate Maps for all planning mechanisms in the county, specifically development of new homes and businesses. When a business, resident, or colony wants to develop they are instructed to hire a surveyor/engineer from the private sector and the responsibility remains with the developer. In addition to the Flood Insurance Rate Maps on file at the County Planning and Zoning Department, FEMA requires all NFIP participants to pass the Flood Damage Prevention Ordinance which states that the City/County “elects to comply with the requirements of the National Flood Insurance Act of 1968 (P.L. 90-488, as amended).” This ordinance is included as Appendix G.

According to community information, Brown County was entered into FEMA September 30, 1988. Other jurisdictions were entered into FEMA’s system earlier. Frederick and Groton were both added March 1, 1978, and Aberdeen was June 1, 1978.

CURRENT FLOODING CONDITIONS

Flooding continues to create challenges for the Brown County area. Roads need to be consistently repaired due to soft ground and water levels; infrastructure is significantly impacted to communities. The county generally placed load limits on vulnerable highways to prevent damage, especially during the spring when there is higher potential for flooding and the spring thaw cycle makes them more vulnerable. New updated flood maps will help the county direct development and protect infrastructure.

ASSESSING VULNERABILITY: ADDRESSING REPETITIVE LOSS PROPERTIES

Requirement 201.6(c)(2)(ii): *Does the plan include a summary of the jurisdiction’s vulnerability and the impacts on the community from the identified hazards? Does this summary also address NFIP insured structures that have been repetitively damaged by floods?*

B2-c. *The plan must address repetitively flooded NFIP-insured structures by including the estimated numbers and types (residential, commercial, institutional, etc.) of repetitive/severe repetitive loss properties.*

Repetitive loss properties are those for which two or more losses of at least \$1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. Most of the repetitive loss structures are in Aberdeen (45 repetitive losses). Frederick and Hecla each have 2 repetitive loss structures. Rural Brown County has 2 repetitive loss structures. Total payments in participating jurisdictions are \$397,286.29 for contents and structures. Information in the following table was provided by Marc Macy from the South Dakota Department of Public Safety, Office of Emergency Management and is current as of April 2026. Table 4.36 is the numbers of repetitive loss properties and the payments that were issued. The most recent losses were in Aberdeen in July 2011, Hecla April 2010 and Brown County March 2010.

Table 4.36: NFIP Repetitive Losses

Location of Repetitive Loss Buildings	RL Building Type	RL Buildings (Number of Losses)	Flood Zone	Building Payments (Total)	Contents Payment (Total)	RL Payments Total
Aberdeen	Single Family	41		\$275,394.35	\$20,743.91	\$296,138.26
Aberdeen	Commercial	2		\$19,750	\$2,266	\$22,016
Aberdeen	Non-Bus. Non-Res.	2		\$2,294	\$1,473	\$3,767
Frederick	Single Family	2		\$38,800	\$3,600	\$42,400
Hecla	Single Family	2		\$5,688	\$0	\$5,688
Brown County	Single Family	2		\$27,277	\$0	\$27,277
Total County Payment		51		\$369,203.35	\$28,082.91	\$397,286.29

***Claremont, Columbia, Stratford, Warner, and Westport are NFIP participants, but Verdon is a non-participant.*

Table 4.36: NFIP Insurance Participants and Losses from the South Dakota Department of Public Safety

Table 4.37: Flood Insurance Policies in Force

Location	Policies in Force	Insurance in Force	Number of Paid Losses	Total Losses Paid	Substantial Damage Claim from 1978
Brown County	13	\$1,845,000	58	\$626,131.43	5
Aberdeen	59	\$16,008,000	406	\$2,487,761.18	20
Columbia	0	\$0.00	1	\$21,299.76	0
Frederick	5	\$696,000	7	\$70,813.67	1
Groton	1	\$128,000	5	\$27,921.06	1
Hecla	0		2	\$5,688.34	0
Stratford	0		1	\$7,284.41	0
Westport	4	\$278,000	8	\$39,166.06	1
	82	\$18,955,000	488	\$3,286,066.00	28

Table 4.38: Repetitive Losses by Jurisdiction

Jurisdiction	Most Recent Date of Loss	# Repetitive Loss Properties	# of Losses	Net Building Payment	Net Contents Payment	Total Net Payment
Brown County	03/18/2010	1	2	\$27,276.67	\$0.00	\$27,276.67
Aberdeen	07/10/2011	12	26	\$176,612.66	\$16,170.91	192,783.57
Hecla	04/09/2010	1	2	\$5,688.34	\$0.00	\$5,688.34
Total:		14	30	\$209,577.67	\$16,170.91	\$225,748.58

Table 4.38: NFIP Insurance Participants and Losses from the South Dakota Department of Public Safety

ADDITIONAL HAZARDS

Additional hazards that were in the previous plan: subsidence, earthquakes and landslides were removed due to lack of occurrences in the Brown County area.

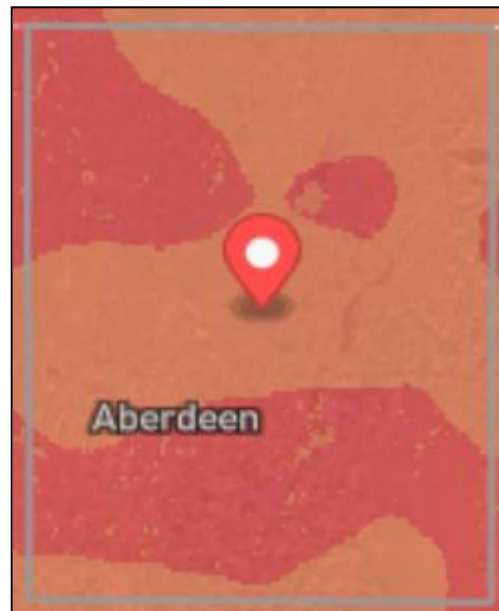
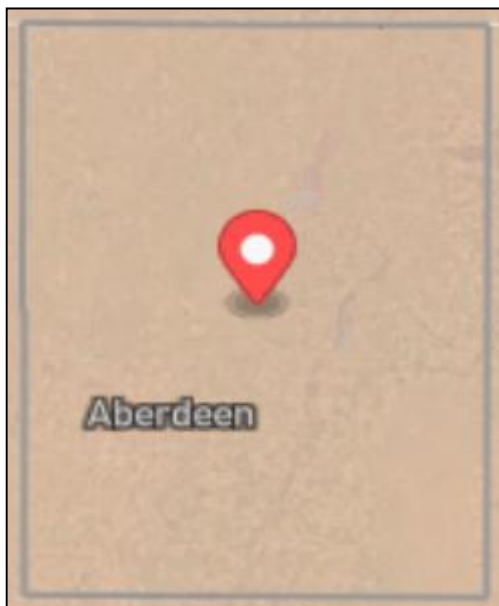
PROBABILITY OF FUTURE OCCURRENCE – CLIMATE CHANGE

All these hazards have occurred in Brown County and will occur in the future and all jurisdictions have the same probability of the hazards affecting each jurisdiction. These hazards significantly impact Brown County's agriculture-based economy. According to

the Fifth National Climate Assessment, the Northern Great Plains will become warmer, and generally wetter. Wetter winters and summers delay planting and harvest, drought reduces crop yields and affects livestock. Climate change will have a significant impact on Brown County, increasing these events. Streamflow would increase, impacting the James River. Dams would be more vulnerable to breach because of the wetter land and higher single event amounts of rain projected. According to Larua Edwards, state of South Dakota Climatologist, rain events will be more significant and due to the longer timeframes of higher temperatures causing drought, the ground is less able to absorb the additional moisture. Weather related events would increase along with severity and duration. The damage from winter and summer storms would increase.

ClimRR is a resource for weather projections and their review of Brown County. By the end of the century, high temperatures are expected to increase an average of 10.44 degrees from the historical average. The average low temperatures will also shift higher. Temperature projections by ClimRR indicate average highs increasing by an average of 10 degrees Fahrenheit by the end of the century. Average lows trend higher also with an average increase of 10 degrees. These hotter temperatures increase the risk of drought, fire and dust storms.

	Historical	Mid-Century (RCP 8.5)	End of Century (RCP 8.5)	Difference
Max Avg. Temp. Autumn	61.95	65.51	71.53	9.58
Min Avg. Temp. Autumn	42.36	47.31	53.18	10.82
Max Avg. Temp. Winter	28.64	33.60	39.50	10.56
Min Avg. Temp. Winter	13.87	21.05	27.73	13.86
Max Avg. Temp. Spring	55.82	59.67	63.87	8.05
Min Avg. Temp. Spring	38.72	42.42	47.15	8.43
Max Avg. Temp. Summer	82.50	87.47	93.51	11.01
Min Avg. Temp. Summer	59.47	64.34	70.69	11.22



Figures 4.16 and 4.17: Brown County Heat Risk 2025 vs. 2055 from Risk Factor

The maps from Risk Factor in Figures 4.16 and 4.17 illustrate the number of days over 100 degrees Fahrenheit. According to Risk Factor, a sweltering day that “feels like” being over 100 degrees is expected to occur 7 times in 2025. In 30 years, or 2055, Brown County will experience 13 days that fit those criteria, nearly doubling the number of days at that heat index.

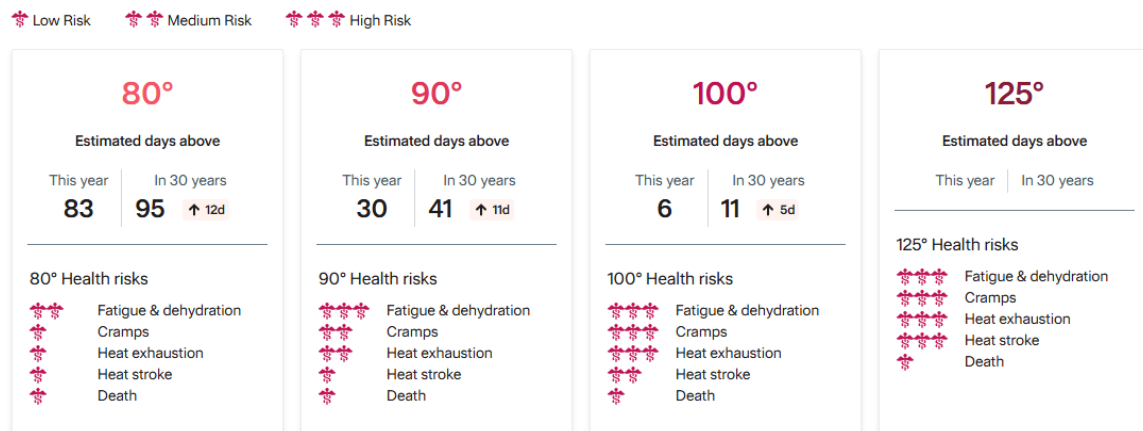
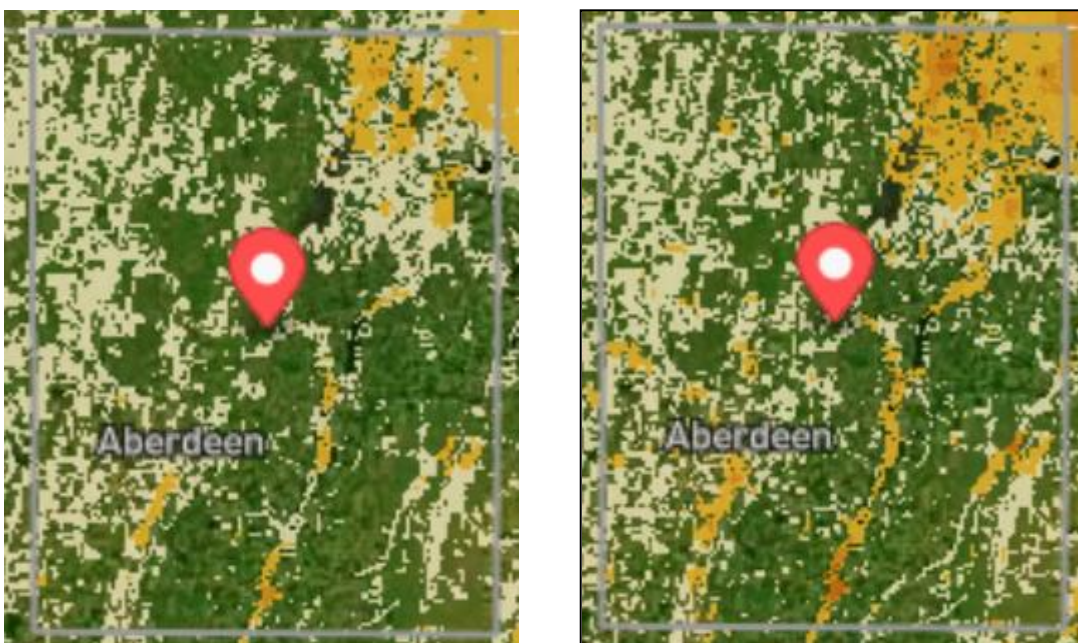


Figure 4.18: Risk Factor analyses of future heat days

Figures 4.19 and 4.20 are from Risk Factor and are a projection of the illustration of the fire risk in Brown County and how it will increase in the next 30 years. Areas that are darker orange show higher projected fire risk as compared with the sections in the green. More areas shift from green to light and darker orange from the year 2025 to 2055. Today there are 13,177 properties at risk of wildfire. In 2055 18,786 are projected to be vulnerable.



Figures 4.19 and 4.20: Brown County Heat Fire 2025 vs. 2055 from Risk Factor

Dense smoke and dust storms will impact Brown County more as more areas will be impacted by wildfire due to drought. Those wildfires will spread smoke throughout the continent. Higher temperatures will increase wind causing smoke to go farther.

According to ClimRR, annual precipitation during the fall, spring and summer will be affected by climate change. During the fall, spring and summer there will be an increase in maximum daily precipitation by the end of century. State climatologist Laura Edwards stated that rain events will be more extreme in amounts of precipitation.

Table 4.40: Annual Precipitation Stats			
Season	Historical average	Mid-Century	End of Century
Annual Total	20.73	24.97	27.5
Autumn	0.77	1.04	0.96
Spring	1.15	1.41	1.48
Summer	1.2	1.31	1.79
Winter	0.03	0.03	0.03

Table 4.40: Climate Stats based on calculations from ClimRR.

These projections show a decrease in precipitation for Brown County by the end of the century. Projections show that by the end of the century days with precipitation will decrease from the historical average. This information indicates that rain will be less frequent and will potentially trigger drought events. As climate change shifts weather patterns, the likelihood of more severe weather extremes will affect the county.

ClimRR projections indicate a historical number of days annually without precipitation at 20.67 and a historical amount of precipitation of 20.73 inches annually. By the end of the century, the number of days without precipitation is projected to reduce to 17.00. Annual precipitation projections will go up to 27.5 inches annually. The increase in precipitation and reduction in days with precipitation increases the potential for flooding due to the increased days and precipitation.

More precipitation increases flood risk, especially around the James River where floods are prevalent and extensive. Due to the slow movement of the river, floods will be longer in duration. Winter weather will be impacted by the increase in ice storms. These storms will be less predictable and more intense. The warmer air will destabilize the jet stream making cold air from the polar vortex able to impact South Dakota.

Table 4.41: Summer Heat Index Projections (Fahrenheit)			
	Historical	Mid Century	End of Century
Daily Max	82.36	86.42	94.50
Seasonal Max	105.3	115.51	129.95
Days with Max Heat over 95	10.00	18.10	40.63
Days with Max Heat over 105	1.13	3.83	15.03
Days with Max Heat 115	0.13	0.83	4.27
Days with Max Heat over 125	0.07	0.43	2.13

Table 4.41: Climate Stats based on calculations from ClimRR.

Table 4.41 shows heat index projections and the differences between the historical, mid-century and by the end of the century. Heat impacts drought, fire, and severe summer storms. Figure 4.21 shows the fire risk to structures in Brown County.

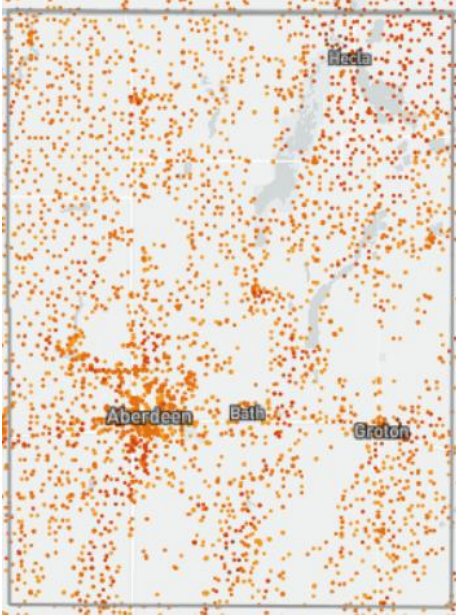


Figure 4.21 Risk Factor map of properties at risk from fire

Shifts in weather patterns due to climate changes are affecting early winter storms. The higher average temperatures are causing more ice storms, which would have been snowstorms. There are also later spring snows. Precipitation increases are projected for Brown County through the end of century. As precipitation increases flood events, potential updates to Brown County's flood maps should be reassessed due to the flooding situation, especially from the slow-moving James River, to keep developments from potential loss. New developments will be vulnerable to hazards that affect the rest of the county, such as heat, cold, drought, fire, winter and summer storms. Residents who live closer to populated areas will be less vulnerable in hazard situations than residents who live nearer to populated centers.

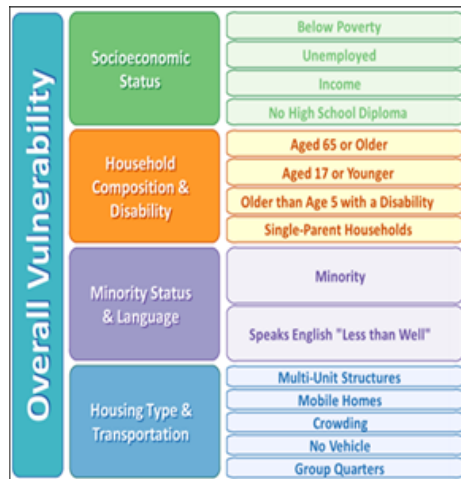
ASSESSING VULNERABILITY: VULNERABLE POPULATIONS

Requirement 201.6(c)(2)(ii): Does the plan include a summary of the jurisdiction's vulnerability and the impacts on the community from the identified hazards? Does this summary also address NFIP insured structures that have been repetitively damaged by floods?

B2-a. The plan must describe the vulnerability of each participant to the identified hazards. The description must include current and future assets and the risk that makes them susceptible to damage from the identified risk hazards.

The social vulnerability index through the CDC is based on socioeconomic status (below poverty, unemployed, income, high school graduation), household composition and disability (65 or older, 17 or younger, older than 5 with a disability, single-parent homes) minority status and language (minority, English-speaking), housing type and transportation (multi-unit structures, mobile homes, crowding, access to vehicles, group quarters.) Data is based on census data. It refers to a community's capacity to prepare for and respond to stress of hazardous events in the community ranging from natural disasters to human caused threats. Brown County's overall vulnerability is low to medium, 0.2669 according to CDC.gov and the National Risk Index. Brown County has a low level of vulnerability (.1549) for Socioeconomic status. Low to moderate vulnerability (.2628) in national household characteristics. Racial and ethnic minority

status theme is .42, a low to medium level of vulnerability. Brown County has a rank of .5905 for housing type and transportation which is a medium to high vulnerability.



There are areas that are more vulnerable in Brown County. Vulnerability increases in the southern part of the county. Certain areas in Aberdeen show higher overall vulnerability than the rest of the county. The maps of Brown County's Social Vulnerability are in Appendix E. Based on the maps, there is a range of vulnerabilities throughout the county.

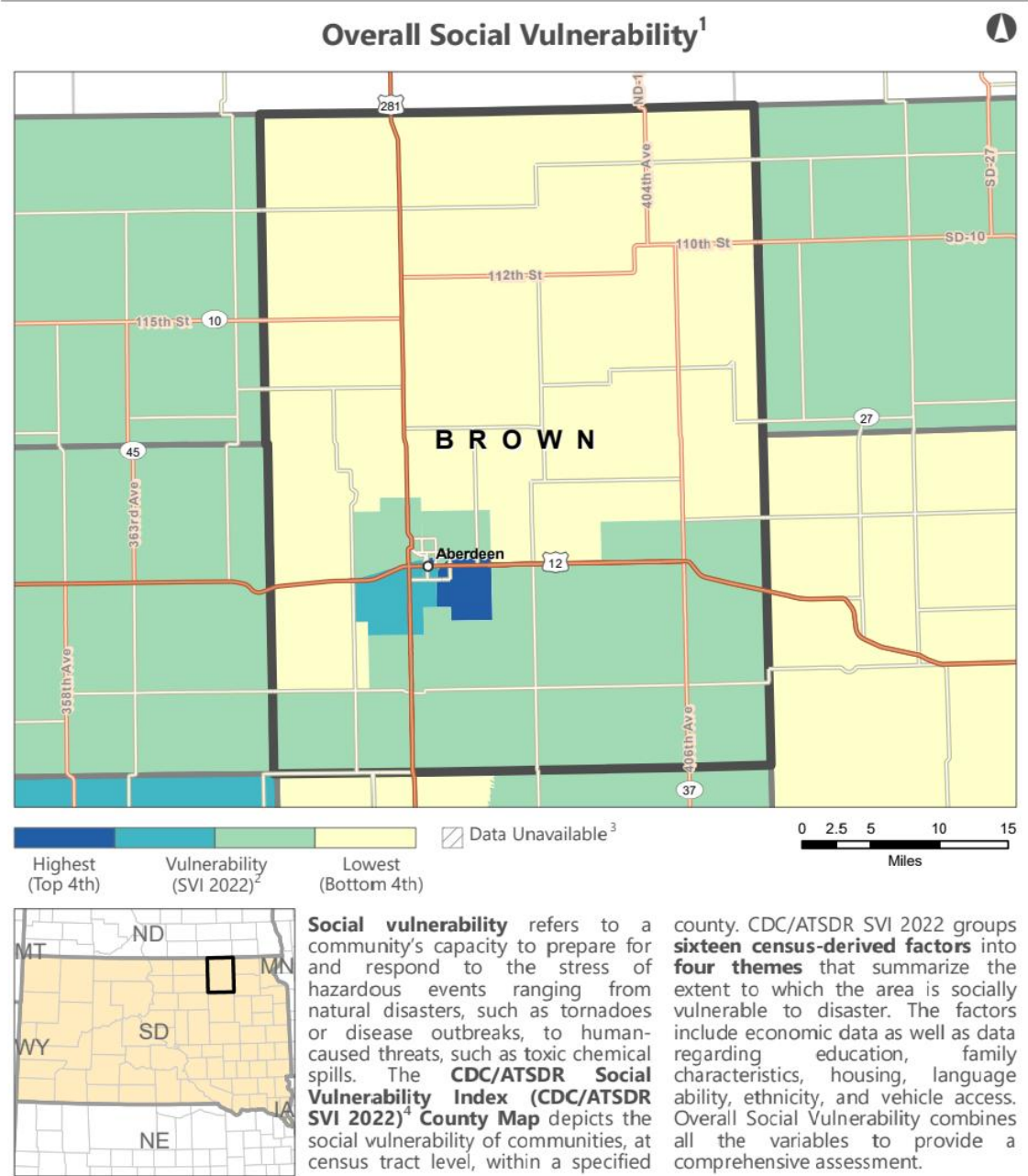
FEMA's Community Resilience Challenges Index Percentile is 12th of 100. The top 3 drivers of the CRCI values are Population change, number of households, and home ownership.

Table 4.42: Brown County CRCI Indicators

Characteristics	Percentage
Percent without HS Diploma	6.34%
Percent Age 65 and Older	17.62%
Percent with a Disability	12.11%
Percent Households without a Vehicle	5.92%
Percent Households with Limited English	1.63%
Percent Single-Parent Households	18.03%
Percent Households Without a Smartphone	12.28%
Percent Mobile Homes Relative to Housing	5.70%
Percent Owner-Occupied Housing	59.71%
Number of Hospitals per 10,000 People	0.00
Number of Medical Practitioners per 1,000 People	24.97
Percent without Health Insurance	7.47%
Percent Below Poverty Level	10.58%
Median Household Income	\$70,239
Percent of Unemployed Labor Force	3.47%
Percent Unemployed Women in Labor Force	3.36%
Percent Workforce Employed in Predominant Sector	23.64%
Income Inequality (Gini Index)	0.44
Social/Civic Organizations per 10,000 People	1.58
Percent without Religious Affiliation	24.81%
Percent Inactive Voters	6.96%
Population Change	0.62

CDC/ATSDR Social Vulnerability Index 2022

BROWN COUNTY, SOUTH DAKOTA



ATSDR Agency for Toxic Substances and Disease Registry



Geospatial Research, Analysis, and Services Program

Figure 4.22 Social Vulnerability Map

ASSESSING VULNERABILITY: IDENTIFYING STRUCTURES

Requirement §201.6(c)(2)(ii): *Does the plan include a summary of the jurisdiction's vulnerability and the impacts on the community from the identified hazards? Does this summary also address NFIP insured structures that have been repetitively damaged by floods?*

B2-b. *The plan must describe the potential impacts on each participating jurisdiction and its identified assets.*

One of the primary purposes of this plan is identifying critical structures and facilities in Brown County. This helps determine what is at risk. In the event of a disaster, Brown County and participating entities can prevent further loss of life by generator powered critical facility shelters. Brown County's smaller towns have additional risks to citizens if power fails or structures are damaged. Travelling during a severe storm can be hazardous. Residents would leave the safety of their homes to find shelter and power. Local critical structures with power and shelter allow citizens protection in their community and reduce exposure. Clinics are in Groton and Aberdeen to serve residents during a medical emergency. Residents needing medical care in a severe storm would need to travel in the treacherous elements or require emergency responders to travel to them.

In smaller communities, critical structures can be anything from hospitals, schools, and law enforcement buildings to bars and local churches. Each facility contributes to the community through tax revenue and jobs for residents to safety and resources. These structures represent the community's lifelines. A church can provide shelter and a base of communications in disasters. It can be a place to disperse supplies like food, water, and power. Although some structures in the Brown County plan may not be considered essential, these structures are the lifelines of each community. Residents can congregate, communicate and during a natural hazard, mitigate aspects of a disaster.

Places like city pools and parks give residents places to go and attract people from outside the community. These public spaces support the town financially through taxes, permits and participant fees. It may be one of a few sources of revenue. Damage to these structures can show how fragile the balance can be in an area, and a natural hazard can impact more than just the building or structure. Loss of critical infrastructure can severely impact the community if destroyed, long past the hazard event.

The plan author acknowledges that determining what is "critical" can mean something different to every community and that the information provided is not comprehensive. However, the information provided by the participants was used as a baseline and can be supplemented in the future during the annual plan review and/or during the 5-year update. Using information provided by the representatives from each community helps establish a sense of ownership.

Many structures and departments vital to emergency operation in Brown County are in the City of Aberdeen. Table 4.43 is a list of critical facilities that would cause the greatest disruption in the county if destruction occurred. While these facilities may be vital community assets, they are not necessarily vulnerabilities. Additional resources are in Bath, Columbia, Frederick, Groton, Hecla, Stratford, Hutterville, and Warner for emergency response by their fire departments countywide.

Future development will be coordinated with the County and the jurisdictions' building codes. FEMA's updated flood maps will allow both entities to coordinate development to avoid future flood hazards. However, new developments will be vulnerable to county-wide hazards such as drought, high winds, summer and winter storms, and fire.

The information provided in Table 4.43 was updated from the 2022 Mitigation Plan. Participants were instructed to think of structures that would cause the most devastation to their communities if lost: "Those structures that you cannot live or operate without." While the information may not be comprehensive it gives FEMA, SDOEM, and readers an idea of how communities in rural South Dakota feel about certain structures. Each critical structure was determined to have one main function in the BRIC format, although many of the structures would have multiple uses in an emergency. Hazard vulnerability is listed in the far-right column giving a clearer picture of Brown County's vulnerability, especially since most hazards are county-wide.

Table 4.43: Critical Structures				
Brown County				
Structure Name	Address	Type	Owner	Hazard Vulnerability
Brown County Courthouse	25 Market St.	Government Facilities	Public	All hazards except flood – not in flood zone
Various Communication Tower Sites	Various Locations in County	Routers	Public	All hazards including flood – parts in flood zone
Brown County Communications	25 Market St.	Emergency Services	Public	All hazards except flood – not in flood zone
Brown County Sheriff's Office	22 Court St.	Government Facilities	Public	All hazards except flood – not in flood zone
11 Fire Departments	Throughout Brown County	Government Facilities	Public	All hazards including flood – parts in flood zone
Northern Border Transport Line	SE Corner to NW Corner Brown County	Energy	Private	All hazards including flood – parts in flood zone
Willow Creek Dam	SW NE Sec 19-T126N-R64W	Dam	Public	All hazards including flood – in flood zone
Elm Lake Dam	SE Sec.31-T128N-R65W	Dam	Public	All hazards including flood – in flood zone
Brown County Fair	Brown Co. 10 and 387th Ave	Fairgrounds	Public	All hazards including flood – parts in flood zone
Richmond Dam	NE SE Sec. 23-102N-64W	Dam	Public	All hazards including flood – in flood zone
Brown County Landfill	13225 379 th Ave	Landfill	Public	All hazards except flood – not in flood zone
Brown County Highway Department	3133 8 th Ave NE	Government Facilities	Public	All hazards including flood – in flood zone
AGTEGRA Coop Propane Bulk Plant	105 392 Ave, Bath	Agriculture	Private	All hazards except flood – not in flood zone
Brown County Jail	22 Court St.	Government Facilities	Public	All hazards except flood – not in flood zone
Aberdeen				
Structure Name	Address	Type	Owner	Hazard Vulnerability
Aberdeen Municipal Building	123 S. Lincoln St.	Government Facilities	Public	All hazards except flood – not in flood zone
Avera St. Luke's Hospital Campuses	205 S. State & N Hwy 281 & 15th Ave	Healthcare	Private	All hazards except flood – not in flood zone

Qwest Building	15 4th Ave SW	Communication	Private	All hazards except flood – not in flood zone
Northern State University	1200 S. Jay St.	Education	Public	All hazards except flood – not in flood zone
Heartland Fuels	38469 133rd St.	Energy	Private	All hazards except flood – not in flood zone
Northwestern Energy Substations & Gas Lines	1 mile S. of Aberdeen on Br. Co. 10	Energy	Private	All hazards including flood – parts in flood zone
Nustar	12948 386th Ave	Energy	Private	All hazards except flood – not in flood zone
National Weather Service	824 Brown Co. 14 S	Weather Service and EAS	Public	All hazards except flood – not in flood zone
NOAA & EAS Transmission Site	824 Brown Co. 14 S	Weather Service and EAS	Public	All hazards except flood – not in flood zone
Aberdeen Regional Airport	E Hwy 12	Aviation/Airport	Public	All hazards including flood – is partially in flood zone
Aberdeen Police Department	114 2nd Ave SE	Law Enforcement Facilities	Public	All hazards except flood – not in flood zone
Aberdeen Water Treatment Facility	12668 391 st Ave.	Treatment Facility	Public	All hazards including flood – is partially in flood zone
Aberdeen Wastewater Treatment Facility	Aberdeen SD	Treatment Facility	Public	All hazards including flood – is partially in flood zone
Aberdeen Public Works	123 S. Lincoln St.	Government Facilities	Public	All hazards except flood – not in flood zone
Aberdeen Parking and Traffic	1024 3 rd Ave SW	Government Facilities	Public	All hazards except flood – not in flood zone
BAE Systems	3317 8th Ave NE	Defense Industry Base	Private	All hazards including flood – in flood zone
Aberdeen Livestock Sales Company	38458 133rd St.	Agriculture	Private	All hazards except flood – not in flood zone
Hub City Livestock Auction Inc.	S. 5th St.	Agriculture	Private	All hazards including flood – in flood zone
Aberdeen Regional Haz. Mat. Team	111 2nd Ave SE	Chemical Hazmat	Public	All hazards except flood – not in flood zone
Sanford Hospital	2905 3 rd Ave SE	Hospital	Private	All hazards except flood – not in flood zone
Water Booster Stations	Various	Water Supply	Public	All hazards including flood – parts in flood zone
SD Emergency Management Regional Coordinator	Aberdeen SD	Emergency Management	State	All hazards except flood – not in flood zone
Aberdeen Fire Department #1	121 2 nd Ave SE	Fire Department	Public	All hazards except flood – not in flood zone
Aberdeen Fire and Rescue #2	1825 8 th Ave NW	Fire Department	Public	All hazards except flood – not in flood zone
Aberdeen Fire and Rescue Station #3	1005 Melgaard Rd. S.	Fire Department	Public	All hazards except flood – not in flood zone
Highway Patrol	2731 US-12	Emergency Services	State	All hazards except flood – not in flood zone
DemKota Ranch Beef	13 135 th St.	Agriculture	Private	All hazards including flood – in flood zone
Aberdeen Ambulance Service	21 2 nd Ave NW	Ambulance Service	Public	All hazards including flood – in flood zone
Aberdeen Advanced Care Ambulance	121 S 2 nd St	Ambulance Service	Public	All hazards except flood – not in flood zone
Aberdeen Health and	1700 US 281	Medical	Public	All hazards except flood

Rehab				– not in flood zone
US Post Office	1202 S 5 th St	Post Office	Public	All hazards except flood – not in flood zone
Aberdeen Central High School	2200 S Roosevelt St.	Education	Public	All hazards except flood – not in flood zone
Aberdeen Christian School	1500 US 281	Education	Private	All hazards including flood – in flood zone
Trinity Lutheran School	923 S Dakota St.	Education	Private	All hazards including flood – in flood zone
Roncalli Elementary	501 3 rd Ave SE	Education	Private	All hazards including flood – in flood zone
Roncalli Primary School	419 1 st Ave NE	Education	Private	All hazards including flood – in flood zone
Aberdeen Catholic Schools – Jr./Sr. High	1400 N Dakota St.	Education	Private	All hazards including flood – in flood zone
Montrssori School of Aberdeen	515 8 th Ave NW	Education	Private	All hazards including flood – in flood zone
Mike Miller Elementary	3010 Milwaukee Ave NE	Education	Public	All hazards except flood – not in flood zone
CC Lee. Elementary	1900 N State St.	Education	Public	All hazards including flood – in flood zone
May Overby Elementary	612 14 th Ave SE	Education	Public	All hazards except flood – not in flood zone
OM Tiffany Elementary	819 8 th Ave NE	Education	Public	All hazards including flood – in flood zone
Simmons Elementary	1500 S 3 rd St.	Education	Public	All hazards except flood – not in flood zone
Lincoln Elementary	414 S 10 th St.	Education	Public	All hazards except flood – not in flood zone
Holgate Middle School	2200 N Dakota St.	Education	Public	All hazards including flood – in flood zone
Simmons Middle School	1300 S 3 rd St.	Education	Public	All hazards except flood – not in flood zone
Aberdeen Public Schools – District Office	1224 S 3 rd St.	Education	Public	All hazards except flood – not in flood zone
SD School for the Blind and Visually Impaired	605 14 th Ave SE	Education	Public	All hazards except flood – not in flood zone
Dependable Sanitation	1520 390 th Ave	Waste Disposal	Private	All hazards including flood – in flood zone
3M	610 Co Rd 19	Industrial	Private	All hazards except flood – not in flood zone
Barnett Center	Aberdeen SD	Education	Public	All hazards except flood – not in flood zone
AGP Soybean Plant	4816 8 th Ave NE	Industrial	Private	All hazards except flood – not in flood zone
BAE Systems	3319 8 th Ave NE	Industrial	Private	All hazards including flood – in flood zone
Midstates Inc	4820 Capital Ave NE	Industrial	Private	All hazards except flood – not in flood zone
Twin City Fan	515 Commerce St.	Industrial	Private	All hazards except flood – not in flood zone
Service to the Blind and Visually Impaired	1707 4 th Ave SE Suite A	Education	Public	All hazards except flood – not in flood zone
A-1 Sanitation	38435 133 rd St	Waste Disposal	Private	All hazards except flood – not in flood zone
Aberdeen Civic Arena	203 S Washington	Community Center	Public	All hazards except flood – not in flood zone
Salvation Army	1025 6 th Ave SW	Community Service	Private	All hazards except flood – not in flood zone

The Journey Home	420 S Washington St.	Homeless Facility	Public	All hazards except flood – not in flood zone
Federal Building	115 4 th Ave SE	Federal	Federal	All hazards except flood – not in flood zone
Safe Harbor	2005 S Merton St.	Women's/Children's Shelter	Public	All hazards except flood – not in flood zone
Regional Interagency Office	422 S Washington St.	Emergency Operations	State	All hazards except flood – not in flood zone
WEB Water Development	38456 US-12 West	Water Distribution	Private	All hazards except flood – not in flood zone
US District Court	102 4 th Ave SE	Federal	Federal	All hazards except flood – not in flood zone
Glacial Lakes Energy	38469 133 rd St.	Energy	Private	All hazards except flood – not in flood zone
Hub City Livestock Auction	2502 S 5 th St.	Agriculture	Private	All hazards including flood – in flood zone
Aberdeen Livestock	38458 133 rd St.	Agriculture	Private	All hazards except flood – not in flood zone
Livestock Specialists	12 N Dakota St.	Agriculture	Private	All hazards including flood – in flood zone
AGTEGRA Cooperative	105 392 nd Ave S.	Agriculture	Private	All hazards except flood – not in flood zone
AGTEGRA West Terminal	38457 133 rd St.	Agriculture	Private	All hazards except flood – not in flood zone
Livestock Specialists Feed Mill	124 S. Dakota St.	Agriculture	Private	All hazards except flood – not in flood zone
AGTEGRA Coop Grebner Terminal and Innovation Ctr.	105 392 nd Ave S.	Agriculture	Private	All hazards except flood – not in flood zone
Hefty Seed Company	38352 W Hwy 12	Agriculture	Private	All hazards except flood – not in flood zone
Simplot Growers Solutions	38420 W. Hwy 12	Agriculture	Private	All hazards except flood – not in flood zone
Winfield United	39280 133 rd St.	Agriculture	Private	All hazards except flood – not in flood zone
Vitalant	131 N Roosevelt St.	Healthcare	Private	All hazards including flood – in flood zone
LifeServe Blood Center	2727 6 th Ave SE #102	Healthcare	Private	All hazards except flood – not in flood zone
Pro Ag Supply Inc.	4750 E Hwy 12	Industrial	Private	All hazards except flood – not in flood zone
AT&T Comm Site	407 2 nd Ave NW	Communications	Private	All hazards including flood – in flood zone
Brown County Annex	25 Market St.	Communications	Public	All hazards except flood – not in flood zone
Brown County SW Annex	124 Market St.	Communications	Public	All hazards except flood – not in flood zone
CenturyLink	15 4 th Ave SW	Communications	Private	All hazards except flood – not in flood zone
Verizon Cell Tower	2830 Industrial Ave.	Communications	Private	All hazards except flood – not in flood zone
Velocitel Cell Tower Site	1006 Melgaard Rd.	Communications	Private	All hazards except flood – not in flood zone
Industrial Park Water Tower	4406 8 th Ave NE	Water	Public	All hazards except flood – not in flood zone
Water Storage – 3rd Ave NE, Fairgrounds, Washington St. West Hill	Multiple Sites	Water	Public	All hazards including flood – some are in flood zone
Retention Ponds – Goodrich Ave-Grand	Multiple Sites	Storm Water	Public	All hazards including flood – some are in

St, Rolling Hills, Sacred Heart Cemetery, U-Haul, Southwest, S. Lawson, South HAPI, Mel Rose, Sapphire, Lamont, Reif, Northview Lane, Conlin's				flood zone
Aberdeen Booster Station	214 Jackson St.	Energy	Public	All hazards including flood – in flood zone
SD National Guard Armory	115 S. Roosevelt #A	Government	Public	All hazards except flood – not in flood zone
US Army Reserve Center Complex	115 S. Roosevelt #B	Government	Public	All hazards except flood – not in flood zone
SD National Guard Motor Pool	1223 S Melgaard St.	Government	Public	All hazards except flood – not in flood zone
Aberdeen Technology Ed and Career Academy	2300 S. Roosevelt	Education	Public	All hazards except flood – not in flood zone
Alpine Academy	405 S. Washington	Education	Public	All hazards except flood – not in flood zone
East River Electric Coop IP Substation	4170 8 th Ave NE	Energy	Private	All hazards except flood – not in flood zone
NW/NE Substations - 181E, #181H, #181G, #181J, #181A, #181F, #181L	Multiple Sites	Energy	Private	All hazards including flood – some are in flood zone
NWE Remedial Operations (NWPS Gas Plant)	1104 1 st Ave NE	Energy	Private	All hazards including flood – in flood zone
NW/NE Aberdeen Power Plant Siebrecht Substation	421 135 th St	Energy	Private	All hazards except flood – not in flood zone
Ameriprise Financial Advisors	101 3rd Ave SW	Financial	Private	All hazards except flood – not in flood zone
Area Federal Credit Union	2324 8 th Ave NE	Financial	Private	All hazards including flood – in flood zone
BankNorth – Ken's	2105 6 th Ave SE #100	Financial	Private	All hazards except flood – not in flood zone
Dacotah Bank	314 S Main St.	Financial	Private	All hazards except flood – not in flood zone
Dakotaland Federal Credit Union	224 6 th Ave SE	Financial	Private	All hazards except flood – not in flood zone
Edward Jones – multiple sites	Multiple Sites	Financial	Private	All hazards including flood – some are in flood zone
First Interstate Bank	119 6 th Ave SE	Financial	Private	All hazards except flood – not in flood zone
First Interstate Bank	1805 6 th Ave SE	Financial	Private	All hazards including flood – in flood zone
Great Plains Bank	3915 6 th Ave SE	Financial	Private	All hazards except flood – not in flood zone
Healthcare Plus	203 S Dakota St.	Financial	Private	All hazards except flood – not in flood zone
Holtey Financial	1002 S. Lawson	Financial	Private	All hazards except flood – not in flood zone
Investment Center Advisors LLC	125 S. Brown County 19	Financial	Private	All hazards except flood – not in flood zone
Legacy Financial Advisors – Ameriprise	1108 S Main St. #101	Financial	Private	All hazards except flood – not in flood zone

Midwest Building – Dacotah Bank	401 S Main St.	Financial	Private	All hazards except flood – not in flood zone
Plains Commerce	524 S Dakota	Financial	Private	All hazards except flood – not in flood zone
Schwan Financial	401 S Vivian St.	Financial	Private	All hazards except flood – not in flood zone
Thrivent Financial	614 S Main St. #2	Financial	Private	All hazards except flood – not in flood zone
US Bank	320 S 1 st St.	Financial	Private	All hazards except flood – not in flood zone
Wells Fargo – Bank	204 S 1 st St	Financial	Private	All hazards except flood – not in flood zone
Wells Fargo Advisors	504 6 th Ave SE	Financial	Private	All hazards except flood – not in flood zone
CorTrust Bank	2016 6 th Ave SE	Financial	Private	All hazards except flood – not in flood zone
CashWa Distributing	810 3 rd Ave	Financial	Private	All hazards except flood – not in flood zone
Amazon Last Mile Delivery Center	28013 6 th Ave SE	Distribution	Private	All hazards except flood – not in flood zone
Magnum Trucking Terminal	504 Corporation St.	Distribution	Private	All hazards except flood – not in flood zone
Spee-Dee Delivery Terminal	405 Production St.	Distribution	Private	All hazards except flood – not in flood zone
UPS	924 S 4 th St.	Distribution	Private	All hazards except flood – not in flood zone
The UPS Store	1020 6 th Ave SE #2	Distribution	Private	All hazards except flood – not in flood zone
Performance Oil	38462 W Hwy 12	Energy	Private	All hazards except flood – not in flood zone
AGP Soybean Processors	4815 8 th Ave NE	Agriculture	Private	All hazards except flood – not in flood zone
Natural Gold, LLC Soy Processors	4745 Railroad Ave SE	Agriculture	Private	All hazards except flood – not in flood zone
Harms Oil Company	12955 386 th Ave.	Energy	Private	All hazards except flood – not in flood zone
SD DOT Regional Office and Shops	2731 W 12 Hwy	Government	Public	All hazards except flood – not in flood zone
Sanitary Lift Stations - #1-5, #8-21, #23-25	Various	Wastewater	Public	All hazards including flood – some in flood zone
Storm Sewer Lift Stations #1-8, #10-11, #13, #15-17	Various	Storm Sewer	Public	All hazards including flood – some in flood zone
Mosquito Control Building	1020 S Lloyd St.	Government	Public	All hazards except flood – not in flood zone
Brown County Blue Building	12 N Main St	Government	Public	All hazards except flood – not in flood zone
Aberdeen Public Works Complex	902 3 rd Ave SW	Government	Public	All hazards except flood – not in flood zone
Dakota Roots Healthcare	1206 S Main	Healthcare	Private	All hazards except flood – not in flood zone
Horizon Healthcare Clinic	506 Wilson St.	Healthcare	Private	All hazards including flood – in flood zone
Modern Day Health	1409 6 th Ave SE	Healthcare	Private	All hazards including flood – in flood zone
Avera Northern Plains	820 1 st Ave SE #400	Healthcare	Private	All hazards except flood – not in flood zone
Ophthalmology Associates	905 N 3 rd St.	Healthcare	Private	All hazards including flood – in flood zone
DaVita Moccasin	3313 6 th Ave SE	Healthcare	Private	All hazards except flood

Creek Dialysis	#A			– not in flood zone
Brown County Community Health	402 S. Main	Government/Healthcare	Public	All hazards except flood – not in flood zone
Avera Cancer Institute	308 S Pann	Healthcare	Private	All hazards except flood – not in flood zone
Linde Distribution Inc.	111 N Roosevelt St.	Industrial	Private	All hazards including flood – in flood zone
Matheson Tri-Gas Inc.	151 6 th Ave SE	Energy	Private	All hazards except flood – not in flood zone
Silverlane Memory Care	1518 Meadowbrook Ct	Healthcare	Private	All hazards except flood – not in flood zone
Angelhaus Regional Basic Care Center	1717 Melgaard Rd	Healthcare	Private	All hazards except flood – not in flood zone
Gellhaus Carehouse II	1005 Redwood Ln.	Healthcare	Private	All hazards except flood – not in flood zone
Spitzer-Miller Funeral Home	1111 S Main	Community	Private	All hazards except flood – not in flood zone
Schrivers Memorial Mortuary	414 5 th Ave NW	Community Support	Private	All hazards including flood – in flood zone
Dacotah Prairie Museum	21 S Main	Government	Public	All hazards except flood – not in flood zone
Prairie Heights Healthcare	400 8 th Ave NE	Healthcare	Private	All hazards including flood – in flood zone
Bethesda Home	1224 S High St.	Healthcare	Private	All hazards except flood – not in flood zone
Mother Joseph Manor	1002 N Jay St.	Healthcare	Private	All hazards including flood – in flood zone
VA Outpatient Clinic	3307 10 th Ave SE	Healthcare	Private	All hazards except flood – not in flood zone
Dakota Oil	117 Railroad Ave and 9 N Main	Energy	Private	All hazards except flood – not in flood zone
Stern Oil Company	38403 133 rd St	Healthcare	Private	All hazards except flood – not in flood zone
Aberdeen Public Library	215 4 th Ave SE	Government	Public	All hazards except flood – not in flood zone
BNSF Maintenance Yard	700 Railroad Ave SW	Transportation	Private	All hazards except flood – not in flood zone
Aberdeen Ride Line	205 N 4 th St	Transportation	Private	All hazards including flood – in flood zone
Dietrich's of Aberdeen	715 9 th Ave SW	Transportation	Private	All hazards except flood – not in flood zone
Claremont				
Structure Name	Address	Type	Owner	Hazard Vulnerability
Claremont Rural Fire Station #1	Claremont SD	Emergency Services	Public	All hazards except flood – not in flood zone
Claremont United Methodist Church	201 6 th St.	Religious	Private	All hazards except flood – not in flood zone
Full Circle Ag	11873 410 th Ave	Agriculture	Private	All hazards except flood – not in flood zone
Columbia				
Structure Name	Address	Type	Owner	Hazard Vulnerability
US Post Office	5 N Broadway	Post Office		All hazards except flood – not in flood zone
American Legion Post 58 Community Center	Columbia	Community Center	Federal	All hazards except flood – not in flood zone
Agtegra Cooperative	24 S Mill St.	Agricultural	Private	All hazards except flood – not in flood zone
Columbia City Office	10 N Broadway St.	City	Private	All hazards except flood – not in flood zone

St. John's Lutheran Church	126 N James St.	Religious	Public	All hazards except flood – not in flood zone
Columbia Rural Fire Station #1	10 N Broadway	Emergency Services	Private	All hazards except flood – not in flood zone
Frederick				
Structure Name	Address	Type	Owner	Hazard Vulnerability
Agtegra Coop	10700-10726 386 th Ave.	Gas Station	Private	All hazards including flood – in flood zone
Frederick Area School	202 Main St.	School	Public	All hazards except flood – not in flood zone
Frederick Rural Fire Station 1	406 3 rd Ave	Fire Station	Public	All hazards except flood – not in flood zone
Frederick Community Center	406 3 rd Ave	Community Center	Public	All hazards except flood – not in flood zone
US Post Office	413 Main St.	Post Office	Federal	All hazards including flood – in flood zone
St. Paul's Lutheran Church	3 rd Ave	Religious	Private	All hazards including flood – in flood zone
Groton				
Structure Name	Address	Type	Owner	Hazard Vulnerability
POET Biorefining	40425 133rd St.	Energy/oil/natural gas	Private	All hazards except flood – not in flood zone
WAPA Electric Substation	5 miles S. of Groton on SD Hwy 37	Energy/electricity	Private	All hazards except flood – not in flood zone
Groton Police Department	209 S. Main	Government Facilities	Public	All hazards including flood – in flood zone
Avera Clinic of Groton	8 East Hwy 12	Clinic	Private	All hazards except flood – not in flood zone
Basin Electric Power Cooperative	1409 N Broadway	Electric Coop	Private	All hazards except flood – not in flood zone
City of Groton Office	209 N Main St.	City Hall	Public	All hazards including flood – in flood zone
Granary Rural Cultural Center	40161 128 th St	Cultural Center	Public	All hazards except flood – not in flood zone
Avantara Rehabilitation Center	1106 N 2 nd St.	Rehabilitation Center	Private	All hazards except flood – not in flood zone
Groton Community Transit	205 E 2 nd Ave	Transit	Public	All hazards except flood – not in flood zone
Groton Dakota Press	28 N Main St	Newspaper	Private	All hazards including flood – in flood zone
Groton Elementary School	810 N 1 st St	School	Public	All hazards except flood – not in flood zone
Groton Area School District	406 N 2 nd St	School	Public	All hazards including flood – in flood zone
James Valley Communications	235 E 1 st Ave	Utility	Private	All hazards except flood – not in flood zone
American Legion	13 N Main St.	Community	Private	All hazards except flood – not in flood zone
Groton Area High School	406 N 2 nd St	School	Public	All hazards including flood – in flood zone
Ken's Food Fair and Shell Express	Junction of Hwy 12 and 37	Grocery	Private	All hazards including flood – in flood zone
Lori's Pharmacy	1205 N 1 st St	Pharmacy	Private	All hazards except flood – not in flood zone
US Post Office	201 N Main St.	Post Office	Federal	All hazards including flood – in flood zone
Groton Community Center	109 N 3 rd St.	Community Center	Public	All hazards except flood – not in flood zone
American Legion Lounge	12 N Main St.	Community Center	Private	All hazards except flood – not in flood zone

Groton Fire and Rescue	305 E Railroad Ave	Emergency Services	Public	All hazards except flood – not in flood zone
Groton Municipal Airport	12766 406 th Ave	Airport	Public	All hazards except flood – not in flood zone
Lift Station Ablen Sewer Lift	201 E 7 th Ave	Lift Station	Public	All hazards except flood – not in flood zone
Lift Station Aspen Sewer Lift	300 E Aspen Ave.	Lift Station	Public	All hazards except flood – not in flood zone
Lift Station Cottonwood Sewer Lift	1510 N Broadway	Lift Station	Public	All hazards including flood – in flood zone
Lift Station Hanlon Sewer Lift	106 W Hwy 12	Lift Station	Public	All hazards including flood – in flood zone
Lift Station Olive Grove Sewer Lift	604 E 5 th Ave	Lift Station	Public	All hazards except flood – not in flood zone
Lift Station Olson Sewer Lift	1306 N 3 rd St.	Lift Station	Public	All hazards except flood – not in flood zone
Lift Station Railroad Sewer Lift	1 S Madison St	Lift Station	Public	All hazards except flood – not in flood zone
Well House	301 E Aspen Ave	Water	Public	All hazards except flood – not in flood zone
Water Tower/Pump House	16 E Railroad Ave	Water	Public	All hazards except flood – not in flood zone
Substation	810 N Broadway	Electricity	Public	All hazards including flood – in flood zone
Substation	10 E Railroad Ave	Electricity	Public	All hazards except flood – not in flood zone
City Shop	10 E Railroad Ave.	Government Facilities	Public	All hazards except flood – not in flood zone
Rosewood Court	705 N 6 th St.	Community	Private	All hazards except flood – not in flood zone
Hecla				
Structure Name	Address	Type	Owner	Hazard Vulnerability
Hecla Electric Substation	Junction of SD Hwy 37 & SD Hwy 10	Energy/electricity	Private	All hazards except flood – not in flood zone
Brown County Highway Department – Hecla	202 5 th St.	Government	Public	All hazards except flood – not in flood zone
Hecla Public Works	510 Elm St.	Government	Public	All hazards except flood – not in flood zone
Hecla Water Pump	2 nd St.	Government	Public	All hazards except flood – not in flood zone
Hecla Water Tower	315 Main St.	Government	Public	All hazards except flood – not in flood zone
Sewer Lift Pump and Control	606 6 th St.	Government	Public	All hazards except flood – not in flood zone
Hecla City Bar & Grill	218 Main St.	Agriculture	Public	All hazards except flood – not in flood zone
Hecla Gymnasium	408 Main St.	Government	Public	All hazards except flood – not in flood zone
Zastrow's Service Station	718 Walnut Street	Agriculture	Private	All hazards except flood – not in flood zone
United Methodist Church	321 Main Street	Religious	Private	All hazards except flood – not in flood zone
James Valley Telecommunications	402 Main Street	Telephone	Private	All hazards except flood – not in flood zone
Brown Marshall Soil Conservation	304 Main Street	Government	Public	All hazards except flood – not in flood zone
US Post Office	226 Main St.	Government	Federal	All hazards except flood – not in flood zone

Hecla LCMC Lutheran Church	511 Main St.	Religious	Private	All hazards except flood – not in flood zone
Prince of Peace Lutheran Church	702 Pine St.	Religious	Private	All hazards except flood – not in flood zone
Hecla Community Center	206 Main St.	Community Center	Public	All hazards except flood – not in flood zone
Hecla Rural Fire Station 1	206 Main St.	Emergency Services	Public	All hazards except flood – not in flood zone
Full Circle Ag	408 2 nd St.	Agriculture	Private	All hazards except flood – not in flood zone
Hecla Implement	512 2 nd St	Agriculture	Private	All hazards except flood – not in flood zone
Dakota Plains Feed & Grain	310 Depot St.	Agriculture	Private	All hazards except flood – not in flood zone
Stratford				
Structure Name	Address	Type	Owner	Hazard Vulnerability
Huttenville Colony	14625 401st Ave	Agriculture & Food	Private	All hazards except flood – not in flood zone
Stratford Community Center	267 Rondell Ave	Community Center	Public	All hazards except flood – not in flood zone
Stratfor Rural Fire Station 1	250 Rondell Ave	Fire Station	Public	All hazards except flood – not in flood zone
Stratford Lift Station	Stratford	Lift Station	Public	All hazards except flood – not in flood zone
Verdon				
Structure Name	Address	Type	Owner	Hazard Vulnerability
Hanlon Brothers Construction	40 3 rd St	Business	Private	All hazards except flood – not in flood zone
Warner				
Structure Name	Address	Type	Owner	Hazard Vulnerability
US Post Office	22 Main St. W	Federal Govt	Federal	All hazards except flood – not in flood zone
Warner City Office	11 Main St. E	City Office	Public	All hazards except flood – not in flood zone
Warner Community Center	11 Main St. W	Community Center	Public	All hazards except flood – not in flood zone
Warner Rural Fire Station	221 Central Ave	Fire Department	Public	All hazards except flood – not in flood zone
Agtegra Coop Warner	38565 142 nd St.	Agriculture	Private	All hazards except flood – not in flood zone
St. John Lutheran Church	110 E Main St.	Religious	Private	All hazards except flood – not in flood zone
Warner School	110 1 st Ave SW	School	Public	All hazards except flood – not in flood zone
Westport				
Structure Name	Address	Type	Owner	Hazard Vulnerability
SHeD Bar & Grill	25 BC Hwy 10	Restaurant	Private	All hazards including flood – in flood zone
US Post Office	14 Main St. W	Federal Government	Federal	All hazards including flood – in flood zone
Sacred Heart Church	11 2 nd Ave W	Religious	Private	All hazards including flood – in flood zone

ASSESSING VULNERABILITY: ESTIMATING POTENTIAL LOSSES

B2-a. For each participating jurisdiction, does the plan describe the potential impacts of each of the identified hazards on each participating jurisdiction?

Potential housing losses are based on the 2020 census of occupied and unoccupied structures. The value of structures varies as time passes and valuations increase or decrease depending on the economic values. The final table shows the current occupied and unoccupied housing structures as of the census in 2020, which are essential to a safe functional community. Average home prices in Brown County are \$229,274.

Table 4.44: Brown County Residences in the Hazard Area							
Brown County Total							
Residents-2020	2020 Occupied	2020 Unoccupied	2020 Total	2010 Occupied	2010 Unoccupied	2010 Total	Difference 2010 to 2020
33,301	16,130	1,755	17,885	15,489	1,217	16,706	1,179
Aberdeen							
28,495	12,226	1,171	13,397	11,418	740	12,158	1,239
Claremont							
108	49	11	60	53	8	61	-1
Columbia							
160	69	5	74	70	10	80	-6
Frederick							
215	101	17	118	101	18	119	-1
Groton							
1,380	579	62	641	576	54	630	11
Hecla							
193	108	48	156	127	28	155	1
Stratford							
57	31	10	41	30	11	41	0
Verdon							
3	2	2	4	2	2	4	0
Warner							
485	168	8	176	166	3	171	5
Westport							
88	38	9	47	48	3	51	-4
Rural Brown County							
7,117	2,759	412	3,171	2,898	340	3,236	-65

ASSESSING VULNERABILITY: ANALYZING DEVELOPMENT TRENDS

Requirement 201.6(d)(3): ... Was the plan revised to reflect changes in development?

- E1-a.** The plan must describe changes in development that have occurred in the hazard-prone areas and how they have increased or decreased in vulnerability of each jurisdiction since the previous plan was approved.
- E2-c.** The update plan must explain how the jurisdiction(s) integrated information from the mitigation plan into other planning mechanisms, as a demonstration of progress in local hazard mitigation efforts.

Land use and development trends for each jurisdiction were identified by the representative on the planning committee. In total, Brown County has seen an increase in population from 2010 to the census in 2020. Rural Brown County has seen an increase overall in population and the largest percentage of the population is in

Aberdeen. Aberdeen saw a 9.21% growth from 2010 to 2020. Aberdeen has 74.4% of the population in Brown County. Columbia, Frederick and Warner were three other jurisdictions that say there was a population increase of 17.65%, 8.04%, and 6.13% respectively. All other jurisdictions, including rural Brown County, saw declines in population. Housing and business development remain a strong focus for Brown County and its jurisdictions. Education is an area focus. Aberdeen's school district is the largest. Frederick has a school district and is 24 miles away from Aberdeen and Warner also has a school district and is ten miles away from Aberdeen. Groton has a school district and is 20 miles away from Aberdeen.

Brown County: Brown County has seen an increase in population between the 2010 census and 2020 census of 4.85%. The average increase in population comes primarily from four jurisdictions: Aberdeen, Columbia, Frederick, and Warner. Rural Brown County has seen a decrease in population of -6.67%. Some jurisdictions have lost more than others. Claremont, Groton, Hecla, Stratford, Verdon, and Westport have had decreases from 2010 to 2020. Housing has decreased countywide -.02% but most jurisdictions have seen an increase in housing.

Brown County is part of the James River Vally which has had repeated instances of flooding. A slow-moving river, the James can swell outside of its banks when in wet years and can take a significant amount of time to flow out of the area. Water has restricted access to residents through flooded and soft roads and is a concern, especially in spring and fall for damage to roads when there is heavy truck traffic. Certain roads need to be constantly monitored, and flooding can quickly occur and dissipate. Mapping flooded roads is difficult due to the number of roads and the timeframe that water can move out of the area.

Brown County housing is tight due to development. Aberdeen is the hub for services in the area and when there is development, Aberdeen is utilized more for its services. There is a data center being built in Ellendale, which is 40 miles away and demand for housing and services has increased in the county.

Development in Brown County has focused on powerline burials in conjunction with power companies and addressing dam issues within the county. Northwestern Energy is in the process of permitting and constructing a new substation south of Aberdeen. The substation will produce electrical power using natural gas.

The County has addressed two dam issues. The Elm River Dam was repaired after a large piece broke off. Repairs are complete and the county is addressing roads issues that also arose during the repairs. Richmond Lake Dam is also in the process of being repaired due to spillway breakage concerns. Repairs are expected to be completed in 2027. The county has also expanded their landfill.

Brown County development follows Brown County Planning and Zoning Guidelines. This department is responsible for addressing flooding. The Floodplain administrator is the Planning and Zoning Director. Updated floodplain maps have been delayed due to flood map concerns, particularly in Aberdeen. Aberdeen is working to get hydrology studies of their stormwater capabilities and levee systems to reduce the floodplain estimates. Development in Brown County is addressed through the Planning and Zoning Commission. The commission receives and processes building permits and

variances. If the building is on a floodplain a permit is required. Brown coordinates for floodplains in Frederick, Hecla, Verdon, Warner and Westport.

Highway access throughout the county can be impacted by high water events. Roads have been built up and loan limits established when required to reduce the wear and tear of roads. When roads are under water, that is communicated to dispatch who updates a map to ensure that first responders have the most current information. When Brown County emergency services are dispatched, two services are sent to ensure that at least one will get to the emergency quickly.

Aberdeen: Aberdeen is the most populated city in Brown County. As the most populated city in Brown County, resources are centralized in the city. There are two hospitals, which actively assist in emergency planning and processes, and fire stations are spaced throughout the city. Along with resources also comes additional vulnerable populations such as multiple nursing homes, schools, a university, and the South Dakota School for the Blind and Visually Handicapped. Aberdeen is located at the junction of US Highway 281 and US Highway 12. This increases traffic along that corridor of agricultural and industrial items.

With a history of flooding, the city has installed significant infrastructure to reduce its impact on residents. As the city develops and expands, needs are continually reassessed. After its historic flood event in 2007, Aberdeen installed multiple retention pods, upgraded storm sewer throughout the city, especially along Kline Street, and looked at their levee system to protect the city. The floodplain administrator is the city engineer. When a resident chooses to build in a floodplain, a floodplain certificate is required. Residents must ensure that there is 1 foot of freeboard above the Base Flood Elevation. Aberdeen has building codes and inspectors to enforce the ordinances.

Aberdeen has increased businesses and had reductions in their industrial businesses. Assisted by the Aberdeen Development Corporation and the Aberdeen Chamber of Commerce, business growth is a continual focus for the organizations and the city. A new industrial park is being developed for future businesses locating along Roosevelt.

The city is working on many infrastructure projects. A new water tower to increase supply for the industrial area of the city is being installed and wastewater facility upgrades are ongoing. Working with WEB water and BDM, the city is expanding water supply with a new line from Missouri. This will increase the water provided for the city and will expand capacity for new businesses. Aberdeen was previously near maximum capacity, and these upgrades will allow for expansion.

The Aberdeen police department is working on better alerts for residents. Siren systems throughout the city need replacement and expansion. The current sirens need to be manually turned on when a storm is nearby. South Dakota has seen events where the sirens did not sound and residents were hurt. Expansion is critical in the area to ensure safety of residents from severe weather hazards. Aberdeen has been expanding outwards and the police department is centrally located. Although officers are continually on duty throughout the city, due to the widespread nature of Aberdeen, response times are affected. Fire is also affected by Aberdeen's expansion. As housing developments move farther from the city center, additional resources will be needed for residential safety.

Ellendale North Dakota has had its development that has impacted Aberdeen and Brown County. Applied Digital is building mega data center and housing in Ellendale is limited. Many of the people working at the center have found temporary housing in Aberdeen and the smaller communities along Highway

Groton: Groton is the second most populated city in Brown County. Located 20 east of Aberdeen along Highway 12, it has its own school system, clinic, police department and fire department. Groton addresses their own development through ordinances. Development is currently severely limited because there are sloughs located near the city which reduce developable land. Groton has a Development Corporation. Their focus is on bringing housing and businesses to Groton. Groton has been updating their ordinance book including planning and zoning ordinances and subdivision regulations February 7, 2022.

Groton has been working on infrastructure improvements, particularly over the last 5 years. They have worked on water and wastewater system improvements, a new water tower, and were working on a storm shelter in their park. This storm shelter will be located near their city park, pool, and apartments to allow residents a safer place to go in the event of a severe storm. Groton also has their own power. Their electrical grid is supplied with power from the Western Area Power Administration. Groton purchases the power and sells it to residents. Power is highly vulnerable during any severe weather event.

The Groton school district is working on a vote for bonds to replace their aging school building. This replacement would be more energy efficient and replace an area of the school that was built in 1934 and upgrade the school's career and technical education building. Groton also has a nursing home in the city which adds to the vulnerable population.

Columbia: Columbia has had multiple projects for the city. Development of a baseball field has created a vibrant community space. The city is currently working on improving the wastewater and storm water system. Another infrastructure piece the city is working to address is a second lagoon.

Hecla: Hecla has been working on development on their wastewater system. Hecla has had infiltrates which stress their system. The lift station and sewage pumps need to be upgraded. They have completed their phase I and are working on funding for phase II. Hecla is close to the James River and when the river is high, water becomes a significant problem for infrastructure and residents. Hecla has their own power. The lines are above ground. There is a need for powerline burial because severe weather can down the lines, leaving residents without power.

Hecla is also looking to expand their fire capabilities. They are working on a fire hall project. Access is a concern for Hecla. Bown County 5 floods and limits access to the city. In an emergency, this could create bottlenecks reducing response time. Hecla is also impacted by the data center development in Ellendale ND. Workers at the data center have been renting what homes they can get, and this stresses the system.

UNIQUE OR VARIED RISK ASSESSMENT

Requirement 201.6(c)(2)(i): *Does the plan include a description of the type, location, and extent of all natural hazards that can affect the jurisdiction? Does the plan also include information on previous occurrences of hazard events and on the probability of future hazard events.*

B1-f. *For the multi-jurisdictional plans, when hazard risks differ across the planning area and between participating jurisdiction, the plan must specify the unique and varied risk information for each applicable jurisdiction and their assets outside the planning area.*

Most of the natural hazards identified in the risk assessment have an equal chance of occurrence in the county and have similar risks county-wide. While the extent to which each jurisdiction is affected by hazards other than flooding varies slightly between the local jurisdictions, the implications are the same. Development trends and land use were assessed by each jurisdiction's representatives to the planning committee.

Brown County:

Brown County has indicated that they have a medium vulnerability to: Dam Failure, Drought, Extreme Cold and Heat, Flash Flood and Flood, Freezing Rain/Sleet, Hail, Heavy Rain and Snow, Rapid Snow Melt, Strong Winds, Thunderstorms, Tornadoes, Urban Fire, Utility Disruption, and Wildfire.

The county is a large county that is 1,731 square miles with communities spread throughout the county. Communications are essential in rural areas to serve residents quickly. There are areas in the county where communications are patchy at best. This risk can be dangerous in an emergency.

The James River runs along the eastern edge to central part of the county. The slow-moving river causes flooding as it spreads out due to a lack of embankments. Flooding timelines can be long because the water takes so long to flow out of the area.

The rural nature of the county increases vulnerability. Rural residents are significant distances from emergency services and flooding can overflow onto roads. Infrastructure is at risk from extreme heat and cold of the area. The temperature changes damage infrastructure making residents more vulnerable to breaks and outages. Flooding, although more localized near the James River, is a county-wide problem. There are many waterways and sloughs that increase when there are high amounts of precipitation.

One of the survey questions was what residents felt could be done for disaster mitigation. Additional storm shelters, preparedness, and alerts were responses from residents.

Table 4.45: Brown County Emergency Communication Methods	
Area Newspaper	<i>Aberdeen Insider, Aberdeen American News</i>
Social media (Facebook)	Brown County Emergency Management, Brown County Sheriff's office, Aberdeen Rural Fire Department, Aberdeen Police Department,
Sirens	All communities that are in Brown County – however, may needs updates or are having issues
Text Alerts	Brown County Emergency Management, Aberdeen Citywide alerts

Aberdeen: Aberdeen has a high vulnerability to Extreme Cold and Heat, Freezing Rain/Sleet, Heavy Rain and Snow, and Strong Winds. They have a medium vulnerability to: Dam Faiulre, Flash Flood and Flood, Hail, Heavy Rain and Snow, Strong Winds, Tornadoes and Urban Fire.

Aberdeen is at the junction of Highways 281 and 12. Flooding has historically been an issue. Brown County has initial flood maps from FEMA. Those flood maps indicated an expansion of the floodplains. One item not considered for the flood maps was the improvements Aberdeen has undertaken to improve stormwater runoff. Infrastructure has included upgraded stormwater systems and retention ponds and upsizing pipes. There is currently a hydrology study underway for the city to consider these improvements. Aberdeen also has a levee system and is working with the Army Corps of Engineers to recertify those implements to reduce the impact of flooding.

Aberdeen has been working on development and although there are considerable resources for residents in the event of a hazard, the city itself is expanding in all directions. This expansion increases response times. Siren system expansion is needed because the system is out of date and currently requires manual operations. This makes residents on the edge of Aberdeen more vulnerable.

Surveys responses stated that there was a need for storm shelters, hazard awareness, and more timely alerts.

Groton: Groton has indicated they have high vulnerability to: Drought, Extreme Cold and Heat, Flash Flood, Flood, Freezing Rian and Sleet, Hail, Heavy Rain and Snow, Lightning, Strong Winds, Thunderstorms, Tornadoes, Urban Fire, Wildfire. They have a medium vulnerability to Rapid Snow Melt, and Utility Disruption.

Groton has a campsite in town. There are also many apartment buildings without access to a safe room. The construction of the saferoom at their park will address this. Water and flooding is also an issue. The sloughs surrounding the community limit development and when water levels are high, affect the city.

Survey responses indicated a need for planning for natural hazards and preparedness.

Hecla: Hecla has indicated a High Vulnerability to: Drought, Extreme Cold and Heat, Flood, Freezing Rain/Sleet, Hail, Heavy Rain and Snow, Strong Winds, Thunderstorms, Utility Disruption, and Wildfires. They have medium risk to: Flash Flood, Subsidence, and Tornadoes.

Hecla indicated that their power grid is vulnerable. The overhead lines are vulnerable to severe winter and summer storms. With a older population, electric power is essential to health needs due to their distance from Aberdeen and its resources.

Survey responses indicated that there is a need to improve infrastructure and updated power transmission lines.

Columbia: Columbia has stated they have a high vulnerability to: Extreme Cold and Heat, Freezing Rain/Sleet, Hail, Heavy Rain and Snow, Lightening, Strong Winds, Thunderstorms, Urban Fire and Utility Disruption.

Surveys indicated a need to address severe snow issues to prevent emergencies.

V. MITIGATION STRATEGY

CHANGES/REVISIONS TO THE MITIGATION SECTION:

- Goals were changed to reflect participant communities and changes in some of the priorities and completed projects.
- Goals that were completed were updated. Ongoing mitigation projects are listed.
- Projects were transitioned into a table format and organized by county and jurisdictions. Nonparticipating jurisdictions were listed under the project format. However, due to lack of participation, they will be required to go through the county for projects.

MITIGATION REQUIREMENTS

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

- C1-a.** The plan must describe the existing authorities, policies, programs, funding, and resources of each participant are available to support the mitigation strategy.
- C1-b.** The plan must describe the ability of each participant to expand on and improve the capabilities described in the plan.

Requirement 201.6(c)(3)(i): Does the plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards?

- C3-a.** The plan must include goals to reduce the risk of the identified hazards. Goals must be consistent with the hazards identified in the plan.

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

- C4-a.** The mitigation strategy must include an analysis of a comprehensive range of actions of projects that the participants considered to specifically address vulnerabilities identified in the risk assessment.
- C4-b.** Each plan participant must identify one or more mitigation actions the participant(s) intends to implement for each hazard addressed in the risk assessment.

Requirement 201.6(c)(3)(iii): Does the plan contain an action plan that describes how the actions identified will be prioritized, implemented, and administered by each jurisdiction?

- C5-a.** The plan must identify who is responsible for administering each action, along with the actions' potential funding sources and expected timeframes for completion.
- C5-b.** The action plan must identify who is responsible for administering each action, along with the action's potential funding source and expected time frames for completion.

MITIGATION OVERVIEW

The State Hazard Mitigation Plan addresses several mitigation categories including warning and forecasting, community planning, and infrastructure reinforcement. Brown

County and the participants' greatest needs are flood mitigation, generators, storm shelters and public awareness. There are several aspects tied to the State's plan.

A main concern for Brown County is flooding. Due to its history, Brown County is highly susceptible to flooding. Distribution of information on flooding and flood plains and reducing risk should be given to homeowners so they can address potential issues with their homes. High winds are also another concern for residents. Owners (and renters) need to identify safe places within their homes and nearby locations if necessary. Local radio stations and weather advisory systems announce severe weather over the radio or social media. School closings, activity postponements, and travel advisories are communicated by radio, social media, and text. Alerts are sent to area users' phones through alert systems that county and municipalities have set up. Residents can submit their information to the system and sign up.

IDENTIFICATION AND ANALYSIS OF MITIGATION ACTIONS FOR PARTICIPATING JURISDICTIONS

After meetings with the local jurisdictions and opportunities for public input, mitigation goals were devised to best aid the County in reducing and lessening the effects of hazards. Projects previously identified in the 2020 Natural Hazard Mitigation Plan were carefully analyzed and discussed to determine which projects had merit to be in the updated plan and determine if the projects meet the mitigation needs of the county.

Goals and projects were focused on FEMA's community lifelines. Storm shelters contribute to safety, security, and communication. Storm sewers, levees, and holding ponds create ways to store water safely from residents, reducing the impact of the flooding on community and all systems. Generators contribute to energy lifelines but also aid in the medical and health lifelines, allowing residents to continue to receive medical care. Flooded roads impact emergency response and transportation so storm sewer projects that were included keep hazards away from infrastructure and homes. Education, awareness, and ordinances help residents know how to respond to hazards, increasing safety. Removal of threats such as trees that could fall keeps residents safe from the additional dangers that can occur when a natural hazard event happens.

A timeframe for completion, oversight, funding sources, and other relevant issues were addressed. The implementation strategies are designed for the specific goal and area. Often, these projects will not encounter any resistance from environmental agencies, legal authorities, and political entities. When there are concerns, they will be addressed by the jurisdiction.

PRIORITIZATION OF MITIGATION ACTIVITIES

***Requirement 201.6(c)(3)(iii)** ... Does the plan contain an action plan that describes how the actions identified will be prioritized, implemented, and administered by each jurisdiction?*

C5-a. *The plan must describe the criteria used for prioritizing the implementation of the actions.*

Plan participants were instructed that a Benefit Cost Analysis would be required when applying and the plan author advised that specific details of each project could be analyzed during the application period. Ongoing projects and projects without cost that were listed in the 2022 Plan were reviewed and evaluated based on a cost/benefit ratio and priority from high to low. A *high* priority classification means that the project should

be implemented as soon as possible and would effectively minimize losses. A *moderate* classification means that the project should be considered and completed after the high priority projects have been completed. A *low* priority means that the project should not be considered soon but is a potential solution and should not be eliminated until further evaluation. Such projects may be completed considering closures of all other projects striving toward the same goal.

Funding discussions took place with plan participants who chose the goals and actions for mitigation projects. Many small rural towns and townships have problems accomplishing capital improvements due to more restricted budgets and fewer revenue options. The concern is the required 25% match for mitigation projects with FEMA funding and meeting the required Benefit Cost Analysis due to population. Options for the town's portion such as an in-kind match were discussed to cover the cost. Projects were prioritized by the number of residents to benefit, cost, and the reduction in damage after implementation. Projects are listed from Table 5.1 to Table 5.3. The focus of mitigation will be on the project that the community chose and is able to complete.

Projects that were not needed were removed. Some projects were similar and left in the plan. Those projects were condensed and prioritized. Projects were grouped based on the hazards that each participating jurisdiction indicated were either high or medium risk and those that tend to occur at the same time. Projects with a low or no risk of occurring in the hazard area were not considered. Coordination with other jurisdictions to have a multi-jurisdictional project was also an option that was discussed. The main entity or office responsible for project implantation is bold.

If a mitigation action lists multiple responsible jurisdictions, oversight is assigned to the corresponding jurisdiction unless otherwise specified.

Table 5.1: Mitigation Goals and Actions	
Flood Hazard Events	
Section 1: Mitigation to reduce the impact of flooding in Brown County	
Goal #1: Reduce the impact of floods, flash flood, and rapid snow melt.	

Project: 1	Fortify existing levees. Focus will be on where the Elm River and Moccasin Creek meet and to build the Tacoma Park levee higher. These levees need to be upgraded. A 15-25% increase in height will reduce flooding.
Responsible Entity	Brown County Commission Chairman , SD OEM, FEMA, Army Corps of Engineers County, City
Priority	High
Funding Source	Brown County general funds , FEMA FMA, FEMA HMA
Timeframe	Ongoing
Cost	\$1,000,000 to \$5,000,000
Notes	Projections for flooding call for increased levees to protect structures.

Project: 2	Raise roads to prevent water from running over and creating unsafe conditions due to deteriorating surfaces. Study is required to determine which roads are best to begin with and how many the county should raise. This would allow the county to increase accessibility during high water and flooding events.
Responsible Entity	Brown County Commission Chairman , SD OEM, FEMA County Highway Dept.
Priority	High
Funding Source	Brown County general funds , FEMA FMA, FEMA HMA
Timeframe	Ongoing
Cost	\$100,000 to \$600,000 per location
Notes	Roads can make areas inaccessible to residents and emergency responders. Brown County instates load limits when needed to protect the roads, but, in years of heavy moisture, roads can flood. Increasing the height of the roads increases accessibility no matter what the flooding conditions are.

Project: 3	Public Safety Communications Tower for the Brown County area.
Responsible Entity	Brown County Commission Chairman , SD OEM, FEMA, SD Highway Patrol
Priority	High
Funding Source	Brown County general funds , FEMA FMA, FEMA HMA, SD General Funds,
Timeframe	1-3 years
Cost	\$500,000 to \$1,000,000
Notes	Communications in Brown County is dependent on towers outside of the county which makes communication spotty in rural areas of the county where emergency services are assisting residents.

Project: 4	Distribute information to residents to deal with flooding. This would address transportation, home protection, insurance information, safety issues and how to proceed after the flood is over. Residents would benefit from the increased information and how to prepare for flood events.
Responsible Entity	Brown County Commission Chairman , SD OEM, FEMA, USACE
Priority	High
Funding Source	Brown County General funds ,
Timeframe	Ongoing
Cost	\$1,000-\$5,000
Notes	Ongoing outreach activities such as the Brown County Fair and National Night Out are currently utilized to inform residents. Both events are well attended by area residents.

Project: 5	Install "High Water" flood markers along rivers and creeks from flood or storm events to allow for clear visibility. These elevation markers can be used throughout the county to indicate high flood levels.
Responsible Entity	Brown County Commission Chairman , SD OEM, FEMA, USACE
Priority	High
Funding Source	Brown County General funds , USACE
Timeframe	Ongoing
Cost	
Notes	There is a river gauge that was added to Moccasin Creek. This would allow for ease and speed when assessing current high-water marks.

Project: 6	Study of Mud Creek, especially near Groton and the slough/lagoon area. Minimizing the effects of Mud Creek would address the floodplain in the southeast quarter of Groton, which would aid development.
Responsible Entity	Mud Creek Drainage Board , Brown County Commission, SD OEM, FEMA, USACE
Priority	Medium
Funding Source	Mud Creek Drainage Board Funds , USACE
Timeframe	Ongoing
Cost	\$60,000 to \$100,000
Notes	This will study how Mud Creek responds to flooding events. There are over 200 structures in the floodplain and the ability to reduce the impact of flooding on the residents and the government.

These projects were removed by the County	
Project: COMPLETED	Construct a holding pond near the airport to hold excess water during heavy rain events.
Responsible Entity	Brown County Commission Chairman , Brown County Emergency Management
Priority	
Funding Source	Brown County general funds ,
Timeframe	As soon as possible
Cost	\$100,000 to \$1,000,000 per location
Notes	This was to ensure that roads are passable in the event of high water.

Project: REMOVED	Clean out the James River and tributaries. A study should be done to determine areas in which debris and earth build up causing the river to back up and flood land.
Responsible Entity	
Priority	
Funding Source	
Timeframe	
Cost	
Notes	Logistically difficult and costly as the James River and its tributaries impact many other counties. Environmental impacts would need to be assessed along with water flows.

Project: Removed	"Knife in" drain tile piping in ditches to reduce water collection and possible flooding of roads in the county. The LIDAR study could assist with this process identifying ditches that would be ideal for water reduction
Responsible Entity	Brown County Commission Chairman , SD OEM, FEMA, USACE
Priority	Medium
Funding Source	Brown County General funds , USACE
Timeframe	Ongoing
Cost	\$100,000-\$500,000
Notes	Drain tile is not regulated by the Brown Count Commission.

Section 2: Mitigation to reduce the impact of summer and winter storms.

Goal #1: Reduce the impact of severe summer and winter storms including strong winds, tornadoes, freezing rain/sleet, hail, heavy rain, heavy snow, lightning, and extreme cold and reduce the impact of potential utility disruption to residents.

Project: 1	Create awareness about the dangers of severe weather and how to respond. Education materials can be distributed at events in the area to educate residents. Printed materials would be beneficial when internet and electricity are out, and communication is minimal.
Responsible Entity	Brown County Commission Chairman , Brown County Emergency Management, SD OEM, FEMA,
Priority	High
Funding Source	Brown County General funds , FEMA HMA, FEMA FMA
Timeframe	1-5 years
Cost	\$1,000-\$5,000 per location annually
Notes	Materials can be created and distributed at a minimal cost. The County is currently involved in the Brown County Fair, and it is a place for distribution of information and materials.

Project: 2	Purchase and install generators at places throughout the county that vulnerable populations depend on for assistance. Locations include critical structures including but not limited to the Salvation Army Food Bank, area fire departments, area saferooms, area lift stations, and area community centers.
Responsible Entity	Brown County Commission Chairman , Brown County OEM, SD OEM, FEMA,
Priority	High
Funding Source	Brown County general funds , jurisdiction general funds, FEMA HMA, FEMA FMA
Timeframe	Ongoing until all critical facilities in the county have generators.
Cost	\$100,000 to \$500,000
Notes	This would ensure that local critical facilities, jurisdictions and residents have access to power during hazardous events.

Project: 3	Construct additional shelters with generators focusing on mobile home parks, campgrounds and vulnerable cities and towns in the County. Additional areas of concern are Melgaard Park, Wylie Park, Westport, and Groton.
Responsible Entity	Brown County Commission Chairman , Brown County OEM, SD OEM, FEMA,
Priority	High
Funding Source	Brown County general funds , FEMA HMA, FEMA FMA
Timeframe	Ongoing
Cost	\$500,000 to \$1,000,000
Notes	This would ensure that area residents have a safe local place to go in the event of a weather hazard.

Project: 4	Siren warning system – countywide. An updated warning system that is county-wide will ensure consistency in response from the county and jurisdictions. Updated systems will notify residents as soon as specific parameters that have been set occur. This reduces need for a person to cause the alarm to sound and provides consistency in response.
Responsible Entity	Brown County Commission Chairman , Brown County OEM, SD OEM, FEMA,
Priority	High
Funding Source	Brown County general funds , FEMA HMA, FEMA FMA
Timeframe	Ongoing
Cost	\$50,000 to \$150,000
Notes	This would ensure that area residents have enough warning time to find a safe local place to go in the event of a weather hazard.

Project: 5	Upgrading utility lines. There are three project areas: 1. Advise utility companies in future construction projects. 2. Burial of utility lines when needed. 3. Require upgrading of overhead lines when age or disaster provide opportunity. There are many ways electrical companies can upgrade their systems: Guy wires, power anchors, dead-end poles, cross arms, anti-galloping services, T2 conductors, and pole testing. <i>As electrical companies are included in South Dakota's Mitigation Plan, the project would be listed in Brown County's plan but would go through the state for funding.</i>
Responsible Entity	Area power suppliers , Brown County Commission Chairman, Brown County OEM, SD OEM, FEMA,
Priority	High
Funding Source	Area power companies' general funds , FEMA HMA, FEMA FMA
Timeframe	Ongoing until all power lines have been buried in the county.
Cost	\$100,000 to \$500,000
Notes	This would ensure that public locations have access to power events in severe weather events. This is part of the state mitigation plan.

Project: 6	Removal of trees from power lines. High winds, prevalent throughout the county, frequently toss tree limbs into power lines. This is particularly dangerous for rural residents with limited communication and shelter access.
Responsible Entity	Area power suppliers , Brown County Commission Chairman, Brown County OEM, SD OEM, FEMA,
Priority	Low
Funding Source	Area Power providers , Brown County general funds
Timeframe	Ongoing
Cost	\$10,000-\$50,000 annually
Notes	As electrical companies are included in South Dakota's Mitigation Plan, the project would be listed in Brown County's plan but would go through the state for funding. Power companies are listed in the state mitigation plan.

Project: 7	Survey areas in need of shelter belts and plant trees accordingly. Diversity of trees needs to be increased due to losses from diseases and pests impacting the area. Residents would have more protection from the hazards associated with winter, summer storm, and high wind events.
Responsible Entity	Brown County Conservation District (south Brown County) and the Brown-Marshall Conservation District (northern Brown County), Brown County Commission Chairman, Brown County OEM
Priority	Low
Funding Source	Conservation general funds and Brown County general funds
Timeframe	Ongoing
Cost	\$1,000-\$10,000 annually
Notes	Conservation districts assist natural resource conservation and work with NRCS, FSA, SD GF&P, and Pheasants Forever to conserve and provide technical assistance to landowners and communities.

Section 3: Mitigation to reduce the impact of Wildfire/Drought.
Goal #1: Reduce the impact of wildfires, extreme heat and drought.

Project: 1	Find funding sources to pay for people to fill positions while individuals are at training courses. Training courses often last several days and replacements for those days are hard to find and pay for.
Responsible Entity	Brown County Commission Chairman, Brown County OEM
Priority	High
Funding Source	Brown County general funds
Timeframe	Ongoing
Cost	\$10,000-\$50,000 annually
Notes	Funding for area coverage during training classes is harder for smaller departments and departments dependent on volunteers. Training is essential for departments to continue to operate safely. This would allow those smaller departments to have training and yet protect the public.

Project: 2	Replace broken, nonfunctional cleanouts and repair ones that do not need to be replaced.
Responsible Entity	Brown County Commission Chairman, Brown County OEM, Brown County Highway Department
Priority	Medium
Funding Source	Brown County general funds
Timeframe	Ongoing
Cost	\$100,000-\$250,000 annually
Notes	Cleanouts have been mapped and some need to be repaired or replaced to ensure that water flows through them correctly.

Project: 3	Have rural fire departments locate dry fire hydrants.
Responsible Entity	Brown County Commission Chairman , Brown County OEM, area fire departments
Priority	Medium
Funding Source	Brown County general funds
Timeframe	Ongoing
Cost	\$100-\$1,000 annually
Notes	This would ensure that area fire departments know where fire hydrants are located for use in an emergency.

Project: 4	Remove trees from the right of way on township and county roads. Large tree branches can easily fall during regular high wind, thunderstorms, and snow. These are a danger to vehicles as well as pedestrian traffic.
Responsible Entity	Brown County Commission Chairman , Brown County OEM, Brown County Highway
Priority	Medium
Funding Source	Brown County general funds
Timeframe	Ongoing
Cost	\$100-\$1,000 annually
Notes	This would reduce the fuel for fires, especially during dry years, along with reducing the impact of wind damages and thunderstorms.

Project: 5	Install and replace rural residential numbers that identify their address to have consistency for emergency responders who are looking for the address.
Responsible Entity	Brown County Commission Chairman , Brown County Geographic Information Systems, Brown County Communications, Brown County OEM, Brown County
Priority	Low
Funding Source	Brown County general funds
Timeframe	3-5 years
Cost	\$1,000-\$25,000 annually
Notes	This would ensure that emergency services would be able to quickly identify locations when residents call for assistance.

The following projects were removed by the county.	
Project COMPLETED	Finish mapping cleanouts and identify them in the field with a sign so that they can be easily found, especially in an emergency.
Responsible Entity	Brown County Commission Chairman , Brown County OEM, Brown County Highway Department
Priority	
Funding Source	Brown County general funds
Timeframe	
Cost	
Notes	These have been mapped. However, the county wants to replace damaged ones.

Project REMOVED	Dredge reservoirs to improve water quality. Reservoirs silt in and dredging helps water to flow to more places, quickly and easily.
Responsible Entity	Brown County Commission Chairman , Brown County OEM, Brown County Highway Department
Priority	
Funding Source	
Timeframe	
Cost	
Notes	This project was removed due to lack of funding and is logistically difficult and lack of interest in the project and a low impact.

Project REMOVED	Burn areas along the James and other Rivers to ensure a fire break rather than ignition fuel. This was proposed because of the April 2003 wildfire which burned around 7,000 acres. Dry, rotten brush along the James River
Responsible Entity	Brown County Commission Chairman , Brown County OEM
Priority	
Funding Source	
Timeframe	
Cost	
Notes	This was removed due to logistics, cost and environmental impact to perform.

Section 3: Mitigation to reduce the impact of Dam Failure.	
Goal #1: Reduce the impact of dam failure.	

Project #1	Enforce inspection schedules and maintain the action plan in the event of damage or degradation to Brown County.
Responsible Entity	Brown County Chairman, Brown County Commission, Brown County Emergency Management, SD OEM, SD School and Public Lands, SD GF&P, US F&W, BNSF
Priority	Medium
Funding Source	Participating Jurisdictions, Private Dam owners , FEMA BRIC, SD OEM, SD School and Public Lands, SD Game, Fish and Parks,
Timeframe	Ongoing
Cost	\$5,000 to \$10,000
Notes	The County does not own or maintain the dams in the county. Improvements to the Richmond Dam and the Elm Lake Dam have been undertaken by state agencies over the last five years. These improvements will repair the spillways and significantly extend the life of Richmond Lake Dam and Elm Lake Dam.

MULTI-JURISDICTIONAL PLAN REQUIREMENTS

Requirement §201.6(c)(3)(iv): For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval of credit of the plan.

The participating jurisdictions prioritized projects by the ones that would have a great impact and benefit public needs. Current prioritization methods were feasibility, impact to the public, improvements that offer greatest operational flexibility, and benefits to cost ratio. Some of these items may shift in the future depending on circumstances that shift the analysis and priorities. Final costs will be based on bid costs and will be updated as

the process moves forward. Each project must meet FEMA's Benefit Cost Analysis as a pre-requisite for funding through FEMA programs.

Previous plans had included the townships. Due to budget constraints and lack of participation in the 2016 and 2020 plan, the township projects were included as part of the county's project list. The county has the capacity to address the projects that were previously listed as part of the township plan. Participants in the plan included Brown County, Aberdeen, Groton and Hecla.

Table 5.2: Mitigation Goals and Actions

Section 3: Mitigation to reduce the impact of flooding.

Goal #1: Reduce the impact of floods, flash flood, and rapid snow melt.

Project #1	Aberdeen Levee Improvements – The levees in Aberdeen are essential to flood mitigation in the area. The levee system is going through a flood risk analysis by the US Army Corps of Engineers. The study may require additional improvements to the levee to recertify its protection statistics.
Responsible Entity	Aberdeen mayor and city council, SD OEM, FEMA,
Priority	High
Funding Source	Aberdeen General funds , FEMA FMA, FEMA HMA, SD DANR SRF loan funds, USDA RD loan funds, USDA RD CF
Timeframe	3 years
Cost	\$2 million to \$3 million
Notes	FEMA's floodplain mapping began the process to get the levee recertified, which is a requirement of the flood mapping process. The levee protects approximately 1,200 residences and is currently in the process of recertification. Those requirements would be a cost burden to the city.

Project #1	Final Lift Improvements – The final lift station takes on almost all the city's sewerage before lifting it to the wastewater treatment plant. The lift station has degraded and there is a need to add redundancy for the system.
Responsible Entity	Aberdeen mayor and city council, SD OEM, FEMA,
Priority	High
Funding Source	Aberdeen General funds , FEMA FMA, FEMA HMA, SD DANR SRF loan funds, USDA RD loan funds, USDA RD CF
Timeframe	3 years
Cost	\$1 million to \$2 million
Notes	Benefit would be to increase city-wide protection in high water events.

Project #1	Moccasin Creek – Moccasin Creek is a shallow drainage way and runs through Aberdeen. During heavy rains it floods. In times of drought, it dries up and becomes a smelly eyesore. The City aspires to make improvements to the creek to help improve water flow, aesthetics, and create a recreational waterway.
Responsible Entity	Aberdeen mayor and city council, SD OEM, FEMA,
Priority	High
Funding Source	Aberdeen City Council , FEMA FMA, FEMA HMA, SD DANR SRF loan funds, USDA RD loan funds, USDA RD CF
Timeframe	Ongoing
Cost	\$50,000 to \$500,000
Notes	Moccasin Creek needs continual attention to prevent an accumulation of sediment and vegetation. The waterway runs directly through Aberdeen and increases likelihood of flooding. Increasing water movement through the creek decreases flooding in Aberdeen. This would be a permanent project for Aberdeen to reduce flooding.

Project #2	Forest Acres Holding Pond Expansion - This project would expand the existing holding pond to help protect homes that are vulnerable during rains more than 1.5". This system handles the bulk of the land mass in the Forest Acres Addition.
Responsible Entity	Aberdeen mayor and city council, SD OEM, FEMA,
Priority	High
Funding Source	Aberdeen General funds , FEMA FMA, FEMA HMA, SD DANR SRF loan funds, USDA RD loan funds, USDA RD CF
Timeframe	3-5 years
Cost	\$500,000-\$1,000,000
Notes	This project would reduce flooding in the Forest Acres area of Aberdeen.

Project #3	NE Storm Sewer Equalization/Upsizing - This project would tie 2 storm sewer holding ponds and pumping systems. This would allow the system that is fullest to flow to the lesser used system and alleviate flooding. This would help protect dozens of homes that were flooded in 2007. These properties are vulnerable during rains of 3.5" in a 24-hour period.
Responsible Entity	Aberdeen mayor and city council, SD OEM, FEMA,
Priority	Medium
Funding Source	Aberdeen General funds , FEMA FMA, FEMA HMA, SD DANR SRF loan funds, USDA RD loan funds, USDA RD CF
Timeframe	3-5 years
Cost	\$250,000 to \$1,000,000
Notes	This project would allow the system to be able to upsize to accommodate higher water amounts in the event of flooding.

Project #6	1st Ave NE Storm Sewer Upsizing - This project is to reduce street flooding and associated risks to structures. These properties are vulnerable during rains of 2" in a 24-hour period.
Responsible Entity	Aberdeen mayor and city council, SD OEM, FEMA,
Priority	Medium
Funding Source	Aberdeen General funds , FEMA FMA, FEMA HMA, SD DANR SRF loan funds, USDA RD loan funds, USDA RD CF
Timeframe	3-5 years
Cost	\$1,000,000-\$5,000,000
Notes	This project would allow the system to be able to upsize to accommodate higher water amounts in the event of flooding.

Project #6	Baird Park Holding Pond & Lift - This project would take overflow from the Fairgrounds Road system, which has been overloaded 4 times in the last 15 years. This area would be long-term storage until the Fairgrounds Road system is able to handle it. This is a regional drainage system improvement but would locally help residential structures too.
Responsible Entity	Aberdeen mayor and city council, SD OEM, FEMA,
Priority	Medium
Funding Source	Aberdeen General funds , FEMA FMA, FEMA HMA, SD DANR SRF loan funds, USDA RD loan funds, USDA RD CF
Timeframe	1-5 years
Cost	\$1,000,000-\$5,000,000
Notes	This project would allow the system to be able to upsize to accommodate higher water amounts in the event of flooding.

Project #6	NW Holding Pond Phase II - This project expands the current holding pond of 85-acre feet to 150-acre feet. This is a regional drainage system improvement and would provide 100+ year protection from most flood related events.
Responsible Entity	Aberdeen mayor and city council, SD OEM, FEMA,
Priority	Medium
Funding Source	Aberdeen General funds , FEMA FMA, FEMA HMA, SD DANR SRF loan funds, USDA RD loan funds, USDA RD CF
Timeframe	1-5 years
Cost	\$1,000,000-\$5,000,000
Notes	This project would allow the system to be able to upsize to accommodate higher water amounts in the event of flooding.

Project #6	3rd Ave SE Storm Sewer Upsizing – This would reduce flooding from a bottle neck of undersized storm sewer.
Responsible Entity	Aberdeen mayor and city council, SD OEM, FEMA,
Priority	High
Funding Source	Aberdeen General funds , FEMA FMA, FEMA HMA, SD DANR SRF loan funds, USDA RD loan funds, USDA RD CF
Timeframe	1-5 years
Cost	\$1,000,000-\$5,000,000
Notes	This project would allow the system to be able to upsize to accommodate higher water amounts in the event of flooding.

Project #6	Storm Sewer Modeling and Sanitary Sewer Bypass – City sanitary sewer collection system is nearing capacity. Modeling shows where the improvements should be made and what improvements would have the most benefit to the city. A sanitary sewer bypass around town would allow future development without increasing the burden on the city's system. The city is currently working through modeling, however, there may be additional spots where increased modeling is required.
Responsible Entity	Aberdeen mayor and city council, SD OEM, FEMA,
Priority	High
Funding Source	Aberdeen General funds , FEMA FMA, FEMA HMA, SD DANR SRF loan funds, USDA RD loan funds, USDA RD CF
Timeframe	1-5 years
Cost	\$5,000,000-\$10,000,000
Notes	This project would allow the system to be able to upsize to accommodate higher water amounts in the event of flooding.

Project #	Upgrade storm drainage and pumping systems - This will prevent flash flooding, ground saturation and sewage from backing up into homes. This would include sewer upgrades to reduce sewer infiltration. Sewer infiltration causes municipalities to discharge their lagoons more frequently and increases the chance of sewer lift station failure and occurs when the James River or other waterways are higher than normal due to rain or snowmelt. Storm sewer systems would help with increasing drainage away from municipalities. Installing, increasing, or expanding these lines will assist municipalities with water removal, especially along the main roads and streets.
Responsible Entity	Claremont, Columbia, Hecla, Stratford, Warner, Westport
Priority	High
Funding Source	Jurisdiction General funds , FEMA FMA, FEMA HMA, SD DANR SRF loan funds, USDA RD loan funds, USDA RD CF
Timeframe	1-5 years
Cost	\$1000-\$5000 a year
Notes	

Project #6	Lagoon Improvements - Rip-rap lagoon due to higher levels to prevent erosion, implement 24-hour monitoring on inflow to lagoons and sewer main and get permission from DANR to pump those mains when overloaded. Install and improve pumps, plugs, and valves for maintenance in the sewer system to alert to flooding and system overloading.
Responsible Entity	Claremont, Columbia, Frederick,
Priority	Medium
Funding Source	Jurisdiction General funds, FEMA FMA, FEMA HMA, SD DANR SRF loan funds, USDA RD loan funds, USDA RD CF
Timeframe	1-5 years
Cost	\$1000-\$5000 a year
Notes	

Project #7	Road improvements - Improve roads that have been washed away due to extremely high-water tables. This would include rebuilding roads, installing curb and gutter, resurfacing and potentially building roads up to alleviate the impacts of flooding. Culverts can be installed and adjusted in size to increase the flow of water out of the area.
Responsible Entity	Columbia, Groton,
Priority	Medium
Funding Source	Jurisdiction General funds, FEMA FMA, FEMA HMA, SD DANR SRF loan funds, USDA RD loan funds, USDA RD CF
Timeframe	1-5 years
Cost	\$500-\$1000
Notes	

Project #7	Code enforcement - Improve code enforcement to help mitigate flooding.
Responsible Entity	Groton
Priority	Medium
Funding Source	Groton General funds
Timeframe	1-5 years
Cost	\$500-\$1000
Notes	

Project #7	Dike/Levee project - The James River was at flood stage for nearly two years in the past. This has a significant impact due to the high water. Hecla would build a levee or dike around the town to prevent the loss of homes and infrastructure during a flood, especially when North Dakota releases a high amount of water. An option for the Elm River is to construct an earthen dike with flap gates where needed, to prevent city flooding. The objective is to get Westport out of the 100-year floodplain and reduce the impact of repeated damage to infrastructure and structures from flooding. The reduction in flood insurance costs would also make Westport more appealing for business. It will also eliminate the need for emergency storm sewer and overflow pump.
Responsible Entity	Hecla, Westport
Priority	Medium
Funding Source	Jurisdiction General funds , FEMA FMA, FEMA HMA, SD DANR SRF loan funds, USDA RD loan funds, USDA RD CF
Timeframe	1-5 years
Cost	\$1,000,000 to \$5,000,000
Notes	

Project #7	Tree removal – Remove a tree that blocks water from flowing through a drainage canal south of Verdon. This tree impedes water flow through the area. The canal is in Spink County, so coordination is required.
Responsible Entity	Verdon
Priority	Medium
Funding Source	Verdon General funds
Timeframe	1-5 years
Cost	\$500-\$1000
Notes	

Project #7	Drainage study – Conduct a drainage study including an analysis of drain tile, and the current water and wastewater systems.
Responsible Entity	Westport
Priority	
Funding Source	
Timeframe	
Cost	
Notes	

Project #7	Implementing use of backflow preventers – Use backflow preventers in homes to prevent sewer backflow issues.
Responsible Entity	Westport
Priority	
Funding Source	
Timeframe	
Cost	
Notes	

Section 2: Mitigation to reduce the impact of summer and winter storms.	
Goal #1: Reduce the impact of severe summer and winter storms including strong winds, tornadoes, freezing rain/sleet, hail, heavy rain, heavy snow, lightning, and extreme cold. and reduce the impact of potential utility disruption to residents.	

Project #1	Warning Siren Update and Expansion - This project upgrades and expands the warning siren system of Aberdeen. The current system is over 20 years old and due to Aberdeen's rapid growth, requires updates and expansion to alert residents effectively.
Responsible Entity	Aberdeen
Priority	High
Funding Source	Aberdeen general funds, FEMA HMA, FEMA FMA,
Timeframe	3-5 years
Cost	\$25000-\$500,000 per generator
Notes	Generators can be installed at water towers, fire stations, lift stations, city halls, and saferooms. Generators will decrease vulnerability by allowing access to power especially for vulnerable populations with powered medical devices and will ensure communications with electronic services.

Project #2	Purchase a generator for City Hall and Fire Hall. This project would ensure that the building could be used as a storm shelter in the event of power failure.
Responsible Entity	Aberdeen
Priority	High
Funding Source	Aberdeen city council, FEMA HMA, FEMA FMA
Timeframe	3-5 years
Cost	\$1,000,000 to \$5,000,000 per saferoom
Notes	

Project #3	Purchase generators - These will provide stand-by power during natural hazard occurrences. Some of the structures to receive them would include lift stations, community centers, fire halls, safe rooms, city halls, gymnasiums, and schools. In some municipalities, the school is the largest building to be able to hold residents in the event of a storm,
Responsible Entity	Frederick, Groton, Hecla, Westport
Priority	Low
Funding Source	Jurisdiction city council,
Timeframe	5 years
Cost	\$1000 – 5000
Notes	Each municipality needs power to survive outages during storm events. Essential structures and infrastructure need backup power to continue working during a power outage. Parameters

Project #1	Burying power lines throughout town – Both Groton and Hecla provide power to residents. Each system needs powerline burial for the lines to be safe from storm hazards.
Responsible Entity	Groton, Hecla,
Priority	High
Funding Source	
Timeframe	
Cost	
Notes	Powerline burial needs to happen to prevent outages and powerline breaks during winter and summer storms.

Project #1	Storm shelter – Hecla needs a storm shelter that could be used for both summer and winter storms.
Responsible Entity	Hecla,
Priority	High
Funding Source	Participating jurisdictions general funds,
Timeframe	5 years
Cost	\$1,000,000 to \$2,000,000
Notes	Hecla is discussing either retrograding a building to a storm shelter or building a storm shelter. One item of interest is radio-controlled locks for ease of access in rural areas.

Project #1	Disaster planning - Identify, develop, and implement emergency plans, including maintenance of equipment and facilities. Planning would include software and hardware to conduct GIS mapping and develop a database of events and options.
Responsible Entity	Westport
Priority	High
Funding Source	Participating jurisdictions general funds,
Timeframe	5 years
Cost	\$500 annually
Notes	

Project #1	Natural planning - Snow fences with a cooperative effort to leave selected crops in place. Tree shelter belts to be cleaned up and reinvigorated with new trees. Another natural planning item is cleaning up debris along the river and in flood plains.
Responsible Entity	Westport
Priority	
Funding Source	
Timeframe	
Cost	
Notes	Snow fences allow for more control of snow in the area. Tree shelter belts enable higher snow control. Some have degraded and trees are vulnerable. Cleaning up debris in floodplains and along the river prevents items from doing more damage when water levels increase.

Section 3: Mitigation to reduce the impact of Dam Failure.

Goal #1: Reduce the impact of dam failure.

Project #1	Enforce inspection schedules and maintain the action plan in the event of damage or degradation to Brown County.
Responsible Entity	Aberdeen Mayor , Aberdeen City Council, Brown County Emergency Management, SD OEM, SD School and Public Lands, SD GF&P, US F&W, BNSF
Priority	Medium
Funding Source	Aberdeen Mayor , Aberdeen City Council, FEMA BRIC, SD OEM, SD School and Public Lands, SD Game, Fish and Parks,
Timeframe	Ongoing
Cost	\$5,000 to \$10,000
Notes	The City owns three of the Elm River dams and the Willow Creek Dam systems.

Section 3: Mitigation to reduce the impact of Wildfire/Drought.

Goal #1: Reduce the impact of wildfires, extreme heat and drought.

Project #1	Brown Park Ground Storage Replacement – The current ground storage tank is nearing its lifespan and is in disrepair. The current tank holds 5 million gallons, but current need exceeds current capacity. An upgraded and upsized tank is required. Estimates are currently at 7 million based on the city's growth.
Responsible Entity	Aberdeen
Priority	High
Funding Source	Aberdeen City Council , FEMA FMA, FEMA HMA, SD DANR SRF loan funds, USDA RD loan funds, USDA RD CF
Timeframe	1-3 years
Cost	\$50,000 to \$500,000
Notes	This would increase drought resistance through an increase in water storage, which allowed for increased fire protection and drought mitigation, especially during times in low water accumulation. Aberdeen's water comes primarily from the Elm River, and drought can significantly impact the city.

Project #1	Dakota Street Water Transmission Line – The line needs to be rebuilt due to degradation of the line. There have been several breaks in recent years, and replacement is no longer feasible. Replacement would be required to increase the water transmission system.
Responsible Entity	Aberdeen City Council , FEMA FMA, FEMA HMA, SD DANR SRF loan funds, USDA RD loan funds, USDA RD CF
Priority	High
Funding Source	Aberdeen City Council , FEMA FMA, FEMA HMA, SD DANR SRF loan funds, USDA RD loan funds, USDA RD CF
Timeframe	1-3 years
Cost	\$50,000 to \$500,000
Notes	This would increase drought resistance through an increase in water transmission and would also help to protect the water distribution system.

Project #1	Water storage expansion - Improve fire protection capabilities by constructing additional water supply and improving infrastructure to allow hookups to hydrants. An addition to the fire hall with a 2 X 10,000-gallon poly tank for water storage is needed for additional water storage in the city.
Responsible Entity	Claremont
Priority	High
Funding Source	Participating jurisdictions general funds, FEMA HMA, SD DANR SRF, USDA RD WEP, USDA RD CF
Timeframe	5 years
Cost	\$1,500,000 – 2,000,000
Notes	

Table 5.3: Removed, Completed and In Progress Mitigation Goals and Actions
Completed Mitigation Projects for Natural Hazards

COMPLETED	Kline Street Storm Sewer- This is the City's main conduit for Storm Water conveyance. The pipe ranges from 60" to 96". It is near Water and Sanitary Sewer infrastructure. Inflow and Infiltration is an issue when the Storm Sewer becomes overwhelmed from heavy rains, causing issues for downstream lift stations and the Wastewater Treatment Plant. Replacement of much of the Kline Street infrastructure has been completed over the past decade. The area that needs replacement is from 3rd Ave N. to 9th Ave N.
Responsible Entity	Aberdeen
Priority	High
Funding Source	City of Aberdeen
Timeframe	1-5 years
Cost	
Notes	

REMOVED	Missouri Water Pipeline - The City of Aberdeen's current water supply is vulnerable to drought conditions and not sufficient for future population and drought projections. The City is currently studying alternative water sources. The most available source appears to be the Missouri River, which would require a nearly 100-mile pipeline.
Responsible Entity	Aberdeen
Priority	
Funding Source	
Timeframe	
Cost	
Notes	This project was removed due to current funding sources and the progress that the project has made through other means.

Project IN PROGRESS	Groton Storm Shelter – Groton has been approved through FEMA for a storm shelter in their city park. This shelter will protect campers, pool and park goers, and residents who live in apartments nearby.
Responsible Entity	Groton Mayor , Groton City Council, SD OEM, FEMA
Priority	High
Funding Source	City General Funds, FEMA HMGP,
Timeframe	1-2 years
Cost	\$635,000
Notes	Project is currently in process at Groton's city park. This will protect the city's camping area, residential apartment buildings, and park goers.

Project REMOVED	Groton Storm Shelter – Groton has storm shelter in the process of being constructed in their city park. Their ball field recently received an updated concession stand so there is no plans for a ball park saferoom at this time.
Responsible Entity	Groton
Priority	
Funding Source	
Timeframe	
Cost	
Notes	

Project #2	Code Enforcement - The City contracted with professional code enforcement to administer the codes in Groton.
Responsible Entity	Groton
Priority	
Funding Source	
Timeframe	
Cost	
Notes	Groton has contracted with a professional code enforcement service to administer the codes in Groton.

IMPLEMENTATION OF MITIGATION ACTIONS

Requirement: 201.6(c)(3)(iii) ... Does the plan contain an action plan that describes how the actions identified will be prioritized, implemented, and administered by each jurisdiction?

- C5-a.** The plan must identify who is responsible for administering each action, along with the actions' potential funding sources and expected timeframes for completion.
- C5-b.** The action plan must identify who is responsible for administering each action, along with the action's potential funding sources and expected time frames for completion.

Upon adoption of the updated Brown County Natural Hazard Mitigation Plan, each jurisdiction is responsible for implementing its mitigation actions. The planning required for implementation is the sole responsibility of the jurisdictions that participated in the plan update. All municipalities have indicated that they do not have the financial capability to move forward with projects identified in the plan currently, however, all will consider applying for funds through the State and Federal Agencies once funds are available. If and when the municipalities are able to secure funding for the mitigation projects, they will move forward with the projects identified. Since some of the local jurisdictions only had one mitigation action/goal, prioritization was not necessary. Jurisdictions with several mitigation projects will prioritize those projects in a manner that will ensure benefit is maximized to the greatest extent possible. A benefit cost analysis will be conducted on the project after the decision to move forward is made.

The 2027 Natural Hazard Mitigation Plan was approved after revisions were recommended by FEMA and made by the plan author. At that time, the plan was drafted under the requirements of the 2022 FEMA Mitigation version of the Crosswalk. Since then, FEMA has produced several planning documents to help aid in the development of local mitigation plans. Some of those documents include the Local Mitigation Planning Handbook from March 2013, and October 1, 2011, Plan Review Guide, and the Local Mitigation Plan Review Tool. Since disaster mitigation was a relatively new concept at that time, the same depth of planning was not utilized in the 2022 Plan as was used for the 2027 plan update. It is anticipated with the amount of time, energy, and professional guidance involved during the drafting process of the updated plan that the County has created a document that has validity and a clear purpose which will be more likely to fit in with the existing planning mechanisms that exist county-wide. Additionally, by involving most of the local jurisdictions and bringing the plan to the attention of neighboring communities, the planning process has brought more awareness of mitigation to residents in the County, which will encourage future involvement. This participation in the mitigation process will only add to the resiliency of Brown County in the future.

VI: PLAN MAINTENANCE

CHANGES/REVISIONS TO PLAN MAINTENANCE:

- Programs were updated to reflect suggestions from FEMA.

MONITORING, EVALUATING, AND UPDATING THE PLAN

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

- D2-a.** *The plan must identify how, when, and by whom the plan will be tracked for implementation over its five-year cycle.*
- D2-b.** *The plan must identify how, when and by whom the plan will be assessed for effectiveness at achieving its stated purpose and goals.*
- D2-c.** *The plan must identify how, when, and by whom the plan will be reviewed and revised at least once every five years.*

Brown County and all the participating local jurisdictions will incorporate the findings and projects of the Natural Hazard Mitigation Plan in all planning areas as appropriate. Periodic monitoring and reporting of the plan are required to ensure that the goals and objectives are kept current and that mitigation efforts are being carried out. Brown County Aberdeen and Groton have planning capabilities to incorporate the plan into current planning mechanisms. Although the other participating jurisdictions do not have the planning capabilities of the county, Aberdeen and Groton, they will review the plan annually. NECOG will assist the communities with implementing this requirement by following up with the participating jurisdictions for changes. In the past, the participating jurisdictions, excluding Brown County and Aberdeen and Groton, have not incorporated the plan into their planning.

During implementation of mitigation strategies, the jurisdictions may experience lack of funding, budget cuts, staff turnover, and/or a general failure of projects. These scenarios are not a reason to discontinue and fail to update the Natural Hazard Mitigation Plan. A good plan needs to provide for periodic monitoring and evaluation of successes and failures and allow for appropriate changes to be made.

ANNUAL REPORTING PROCEDURES

The plan shall be reviewed annually, as required by the County Emergency Manager, or as the situation dictates, such as after a disaster declaration. The Brown County Emergency Manager will review the plan annually in November and ensure the following:

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

FIVE-YEAR PLAN REVIEW

Every five years the plan will be reviewed and completely updated. All information in the plan will be evaluated for completeness and accuracy based on new information. New

property development activities will be added and evaluated for impacts. New or improved sources of hazard related data will also be included.

In the future, if the County relies on grant dollars to hire a contractor to write the Plan update, the County will initiate the process of applying for and securing funding in the third year of the plan to ensure the funding is in place by the fourth year. The fifth year will then be used to write the plan update, which in turn will prevent any lapse in time where the county does not have a current approved plan on file.

The goals, aims, and mitigation strategies will be readdressed and amended as necessary based on new information, additional experience, and the implementation progress of the plan. The approach to this plan update effort will be the same as the one used for the original plan development. The Emergency Manager will meet with the Natural Hazard Mitigation Planning Committee for review and approval prior to final submission of the updated plan. The effectiveness of the plan will be determined by projects that are continuing current projects and completion of new projects. The plan review will be conducted at an open public meeting to allow for public input.

The Emergency Manager will meet with the Natural Hazard Mitigation Planning Committee for review and approval prior to final submission of the updated plan.

PLAN AMENDMENTS

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

INCORPORATION INTO EXISTING PLANNING MECHANISMS

Requirement: 201.6(c)(4)(ii): *Does the plan describe a process by which each community will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvements plans, when appropriate.*

- D3-a.** *The plan must describe the communities' process to integrate the plan's data, information, and hazard mitigation goals and actions into other planning mechanisms.*
- D3-b.** *The plan must identify the local planning mechanisms where hazard mitigation information/actions may be integrated. The identified list of planning mechanisms must be applicable to the plan participant(s) and not contradict the identified capabilities.*
- D3-c.** *A multi-jurisdictional plan must describe each participant's individual process for integrating information from the mitigation strategy into their identified planning mechanisms.*

Brown County and the participating jurisdictions will consider the mitigation requirements, goals, actions, and projects when it considers and reviews the other existing planning documents. Brown County, Aberdeen and Groton are the only jurisdictions that currently have comprehensive, or capital improvements plans. All the other jurisdictions are under the county for planning and zoning. Mitigation projects will be considered and prioritized in conjunction with non-mitigation projects, such as water and wastewater infrastructure improvements, new construction of schools, parks, etc.

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

The governing body of each municipality shall, no later than its first regular meeting in September of each year or within ten days thereafter, introduce the annual appropriation ordinance for the ensuing fiscal year, in which it shall appropriate the sums of money necessary to meet all lawful expenses and liabilities of the municipality....an annual budget for these funds shall be developed and published no later than December thirty-first of each year.

Since all the local jurisdictions except Brown County Aberdeen, and Groton lack planning mechanisms in which to incorporate the mitigation actions identified in this plan, it was determined that each year when the budget is prepared the municipalities will also consider the mitigation actions at that time. The local jurisdictions will post a permanent memo to their files as a reminder for them to incorporate their annual review of the mitigation actions identified into the budget preparation process. This does not require the projects to be included in the budget; it is a reminder to city officials that they have identified mitigation projects in the Plan that should be considered if the budget allows. Review of the plan will be completed annually with NECOG sending a worksheet for Emergency Managers to review.

POTENTIAL FUNDING SOURCES

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

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

Federal

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

Title: Building Resilient Infrastructure and Communities
Agency: Federal Emergency Management Agency

Through the Disaster Mitigation Act of 2000, Congress approved the creation of a national program to provide a funding mechanism that is not dependent on a Presidential Disaster Declaration. The Building Resilient Infrastructure and Communities (BRIC) program provides funding to states and communities for cost-effective hazard mitigation activities that complement a comprehensive mitigation program and reduce injuries, loss of life, and damage and destruction of property.

The funding is based upon a 75% Federal share and 25% non-Federal share. The non-Federal match can be fully in-kind or cash, or a combination. Special accommodations will be made for "small and impoverished communities", who will be eligible for 90% Federal share/10% non-Federal.

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

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

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

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

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

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

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

The HMGP can be used to fund projects to protect either public or private property, so long as the projects in question fit within the state and local government's overall mitigation strategy for the disaster area and comply with program guidelines. Examples of projects that may be funded

include the acquisition or relocation of structures from hazard-prone areas, the retrofitting of existing structures to protect them from future damage; and the development of state or local standards designed to protect buildings from future damage.

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

Title: Public Assistance (Infrastructure) Program, Section 406

Agency: Federal Emergency Management Agency

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

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

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

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

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

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

Title: SBA Disaster Assistance Program

Agency: US Small Business Administration

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

Title: Community Development Block Grants

Agency: US Department of Housing and Urban Development

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

Title: Drinking Water, Sanitary, & Storm Sewer Funding
Agency: Department of Agriculture and Natural Resources

South Dakota's Department of Agriculture and Natural Resources allocates funding for South Dakota's Water, Wastewater and Stormwater projects. These projects are intended to improve and maintain infrastructure through grants, principal forgiveness and low interest loans.

Title: Water and Environmental Programs
Agency: US Department of Agriculture and Rural Development

South Dakota's USDA Rural Development programs allocate funding for South Dakota's Water, Wastewater and Stormwater projects. These projects are intended to improve and maintain infrastructure through grants, principal forgiveness and low interest loans. Communities with a population of 10,000 residents or less are the focus of this program.

Title: Community Facilities Funding
Agency: US Department of Agriculture Rural Development

Community Facilities Funding from USDA is an affordable option for communities to provide facilities for their community. The funding is a mix of grant and loan funds which is based on the median income of the population. These grant and loan funds can be used to assist jurisdictions in projects in primarily rural areas that have a population of less than 20,000 residents. Funding can be used to purchase, construct, and/or improve essential community facilities, purchase equipment and pay for related project expenses.

Local

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

Non-Governmental

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

CONTINUED PUBLIC PARTICIPATION/INVOLVEMENT

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

D1-a. *The plan must describe how the participant(s) will continue to seek public participation after the plan has been approved and during the plan's implementation, monitoring, and evaluation.*

During interim periods between the five-year reviews, efforts will be continued to encourage and facilitate public involvement and input. The plan will be available for public view and comment at the Brown County Emergency Management Office located at 124 S. 1st St. Aberdeen SD and the NECOG office at 416 Production St. N. Ste #1 Aberdeen SD. Comments will always be received whether orally, written or by e-mail. All ongoing workshops and training courses will be open to the public and appropriately advertised. Ongoing press releases and interviews will help disseminate information to the public and encourage participation.

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

Annually, Emergency Management will work with each participating jurisdiction to fill out a worksheet reviewing hazards that occurred, damages that happened, mitigation measures used, and projects completed. A review of the worksheets will occur with the next mitigation plan update.