

Day County South Dakota



**NATURAL HAZARD MITIGATION PLAN
EXPIRES:**

**PREPARED BY:
NORTHEAST COUNCIL OF GOVERNMENTS
416 Production Street N. Suite 1, Aberdeen, SD 57401
(605) 626-2595**

TABLE OF CONTENTS

I.	INTRODUCTION	
	a. Introduction	2
	b. Purpose, Plan Use, Scope, Goals	3
	c. What is Hazard Mitigation	4
	d. County profile	6
II.	PREREQUISITES	
	a. Adoption by the Local Governing Body	12
	b. Multi-Jurisdictional Planning Participation and Adoption	12
III.	PLANNING PROCESS	
	a. Documentation of the Planning Process	15
	b. Selection of a Steering Committee	17
	c. Public Involvement	19
	d. Technical Review of Documents	20
	1. Review of 2015 Plan	21
IV.	RISK ASSESSMENT	
	a. Identifying Hazards	23
	1. Community Vulnerability	27
	2. Natural Hazards in Plan Jurisdiction	33
	b. Hazard Profile	34
	1. Dam Failure	38
	2. Drought and Wildfire	38
	3. Flood	39
	4. Hail	42
	5. High/Strong Winds	43
	6. Lightning	43
	7. Tornados	44
	8. Extreme Temperatures	44
	9. Winter Storms	45
	10. Thunderstorms	46
	c. Assessing Vulnerability: Overview	46
	d. Assessing Vulnerability: Addressing Repetitive Loss Properties	51
	e. Assessing Vulnerability: Identifying Structures	51
	f. Assessing Vulnerability: Estimating Potential Losses	54
	g. Assessing Vulnerability: Analyzing Development Trends	58
	h. Unique or Varied Risk Assessment	60
V.	MITIGATION STRATEGY	
	a. Mitigation Requirements and Overview	63
	b. Identification and Analysis of Mitigation Actions	64
	c. National Flood Insurance Program Participation	76
	d. Implementation of Mitigation Actions	77
VI.	PLAN MAINTENANCE PROCESS	
	a. Monitoring, Evaluating, and Updating the Plan	78
	b. Incorporation into Existing Planning Mechanisms	79
	c. Continued Public Involvement	83
	APPENDIX A: MITIGATION PLAN COMMITTEE MEETING MINUTES AND SIGN-IN	
	APPENDIX B: RESOLUTIONS OF ADOPTION	
	APPENDIX C: RISK ASSESSMENT WORKSHEETS	
	APPENDIX D: STORM EVENT HISTORY	

I. INTRODUCTION

CHANGES/REVISIONS TO INTRODUCTION:

Minor changes were made to the language in this section. Two maps of Day County were included. The overall format was not changed.

INTRODUCTION

The effects from natural and man-made hazards directly impact the safety and wellbeing of Day County residents. Historically, Day County residents have dealt with floods, high winds, severe summer storms with damaging thunderstorms producing hail and tornados, harsh winter storms with extreme cold and blizzards, wildfires, drought and hazardous materials spills. While most hazards cannot be eliminated the effects from them can be mitigated. Day County working in conjunction with South Dakota Office of Emergency Management and the Federal Emergency Management Agency (FEMA) and Northeast Council of Governments (NECOG) prepared this natural hazard mitigation plan (plan) to help guide and focus hazard mitigation activities.

This plan identifies the region's hazards to further understand its vulnerabilities. This knowledge will help identify solutions that can significantly reduce threat to life and property. The plan is based on the premise that hazard mitigation works. With increased attention to mitigating natural hazards, communities can do much to reduce threats to existing citizens and avoid creating new problems in the future. In addition, many mitigation actions can be implemented at minimal cost.

Mitigation planning is a process which identifies areas of vulnerability and potential risk in relationship to known natural hazards that occur in the planning area, followed by the creation of a strategy to reduce the likelihood of loss of life, loss or damage to property and infrastructure caused by natural hazards. With increased attention to mitigating natural hazards, communities can reduce threats to existing developments and prevent new risks by limiting and/or regulating future development. Many mitigation actions can be implemented at minimal or no cost. Improved focus on land use planning and smart design is one of the most effective mitigation tools for City and County governments.

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

This is not an emergency response or emergency management plan. Certainly, the plan can be used to identify weaknesses and refocus emergency response planning. Enhanced emergency response planning is an important mitigation strategy. However, the focus of this plan is to support better decision making directed toward avoidance of future risks and the implementation of activities or projects that will eliminate or reduce the risk for those that may already have exposure to a natural hazard threat.

PURPOSE OF THE PRE-DISASTER MITIGATION PLAN

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 of the Disaster Mitigation Act requires that local governments, as a condition of receiving federal disaster mitigation funds, have a natural hazard mitigation (plan) plan in place. The plan must:

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

The purpose of this plan is to meet the hazard mitigation planning needs for Day County and participating entities. Consistent with the Federal Emergency Management Agency's guidelines, this plan will review all possible activities related to disasters to reach efficient solutions, link hazard management policies to specific activities, educate and facilitate communication with the public, build public and political support for mitigation activities, and develop implementation and planning requirements for future hazard mitigation projects.

PURPOSE

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

PLAN USE

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

SCOPE

1. Provide opportunities for public input and encourage participation and involvement regarding the mitigation plan.
2. Identify hazards and vulnerabilities within the county and local jurisdictions.
3. Combine risk assessments with public and emergency management ideas.
4. Develop goals based on the identified hazards and risks.
5. Review existing mitigation measures for gaps and establish projects to sufficiently fulfill the goals.
6. Prioritize and evaluate each strategy/objective.

7. Review other plans for cohesion and incorporation with the mitigation plan.
8. Establish guidelines for updating and monitoring the plan.
9. Present the plan to Day County and the participating communities within the county for adoption.

LOCAL GOALS

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

- Protection of life before, during, and after the occurrence of a disaster;
- Protection of emergency response capabilities (critical infrastructure);
- Establish and maintain communication and warning systems;
- Protection of critical facilities;
- Government continuity;
- Protection of developed property, homes and businesses, industry, education opportunities and the cultural fabric of a community, by combining hazard loss reduction with the community's environmental, social, and economic needs; and
- Protection of natural resources and the environment, when considering mitigation measures.

LONG-TERM GOALS

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

WHAT IS HAZARD MITIGATION?

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

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

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

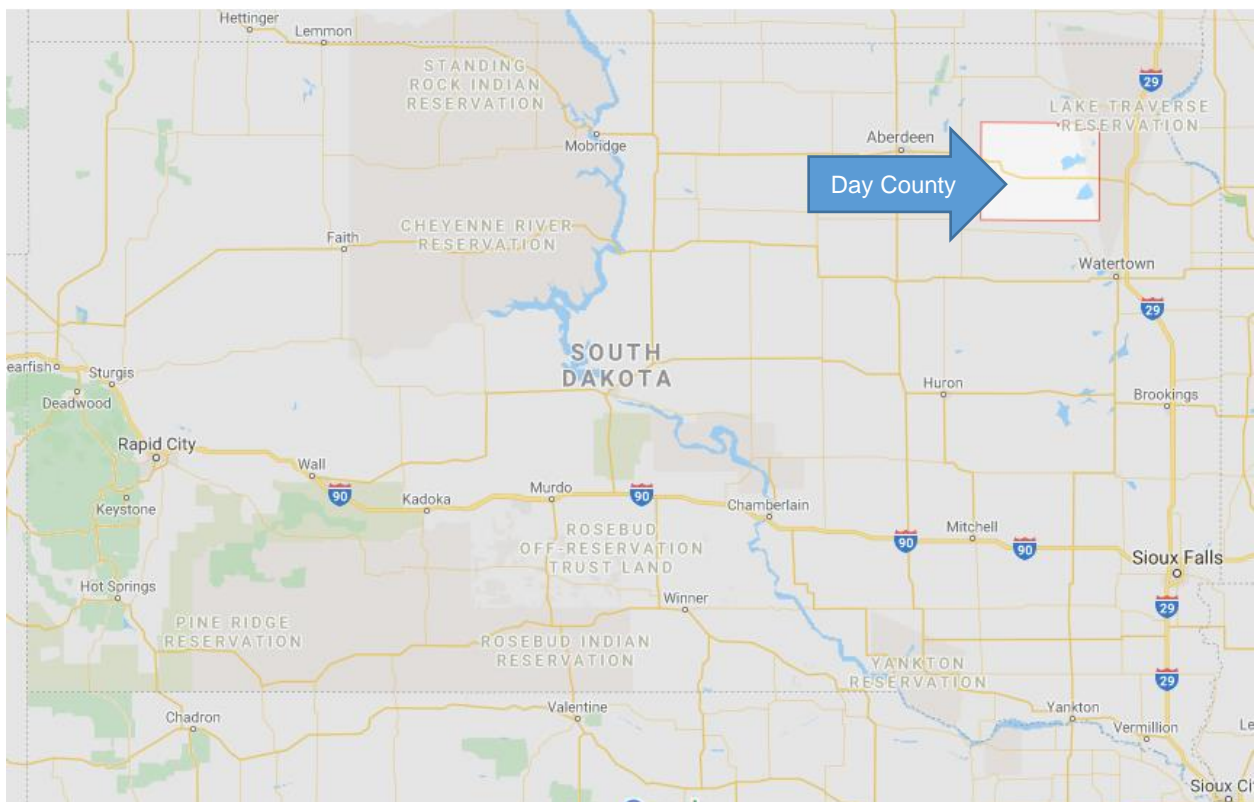
Previously, mitigation measures have been the most neglected programs within emergency management. Since the priority to implement mitigation activities is generally low in comparison to the perceived threat, some important mitigation measures take time to implement. Mitigation success can be achieved, however, if accurate information is portrayed through complete hazard identification and impact studies, followed by effective mitigation management. Hazard mitigation is the key to eliminating long-term risk to people and property in South Dakota from hazards and their effects. Preparedness for all hazards includes: response and recovery plans, training, development, management of resources, and mitigation of each jurisdictional hazard.

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

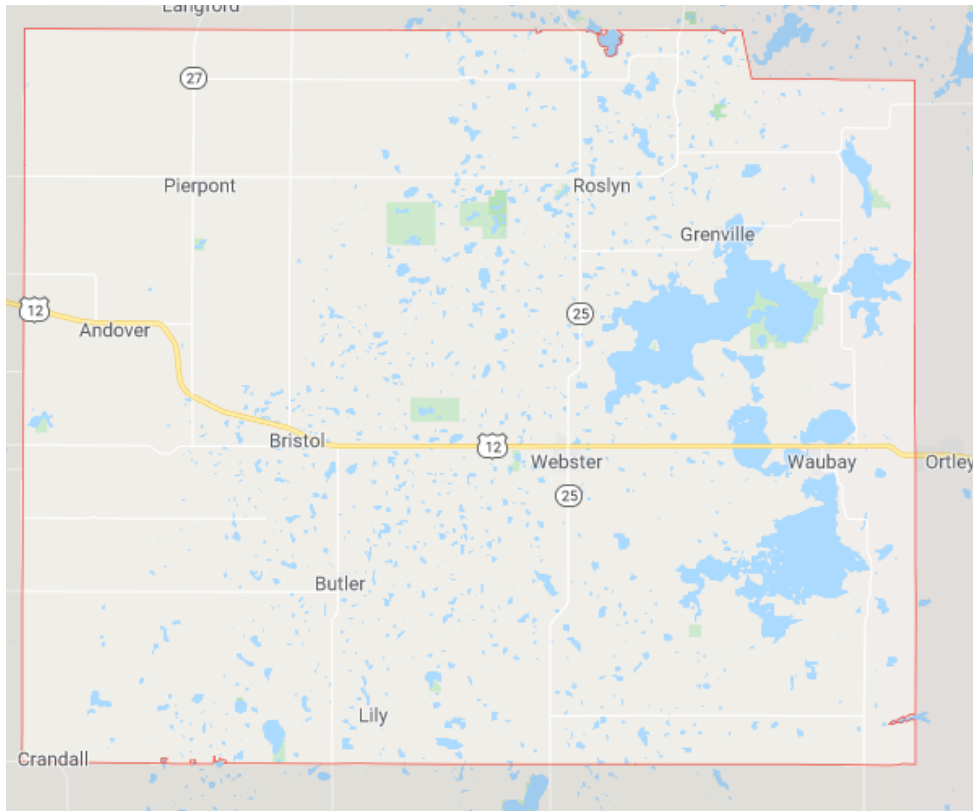
DAY COUNTY PROFILE

GEOGRAPHIC BACKGROUND

Day County is located in the Glacial Lakes Region of northeastern South Dakota. The 2010 Census population for Day County was 5,710. The geographic area includes 1,091 square miles, resulting in a population distribution of 5.2 people per mile. Tourism has a seasonal impact from May 1st to October 1st and increases the population significantly by two to three times the population. The seasonal concentration is largely centered on or near the various lakes in Day County, most of which lie in the eastern half of the county. The County is bordered by Brown, Marshal, Roberts, Grant, Codington, Clark and Spink Counties.



Map 1.2 South Dakota Map showing Day County



Map 2.2 Day County Map

Day County encompasses a number of jurisdictional entities including the municipalities of Webster, Waubay, Bristol, Pierpont, Grenville, Butler, Roslyn and Andover. The county also has 28 townships.

US Highway 12 bisects the county and receives the majority of commercialized traffic. This highway has been expanded to a four-lane divided highway from Interstate 29 to the City of Aberdeen in neighboring Brown County. The portion of Highway 12 that is located in Day County between Webster and Waubay has been raised nearly eight feet since 1999 due to the rising waters of Bitter and Rush Lakes. Other transportation routes in the county also receive a varying degree of commercial and tourism based traffic. South Dakota Highways 27 and 25 are the two primary north-south routes in the county while there are numerous county-maintained highways that serve the traffic in rural areas. The county roads receive a large volume of tourism-based traffic during the spring, summer, and fall especially in the lake areas of eastern Day County. All of these transportation routes are vitally important to the agricultural industry.

There are limited emergency services and medical services within the county. Law enforcement for the county is handled by Day County Sheriff's Office. The City of Webster also has a three-man police department. The South Dakota Highway Patrol has two troopers stationed in Webster. Ambulance service is provided to the county by Christensen Ambulance of Webster. Medical Care is offered at the Sanford Hospital in Webster as well as the Lake Area Clinic of Webster. Fire service is handled by six volunteer fire departments located throughout the county which participate in a county-wide mutual aid agreement.

The county has numerous lakes, sloughs, and small streams. During the major flooding in the 1990's many of the lakes increased in size and remain full today. All of the Waubay Chain Lakes have increased in size and many other sloughs in the County are now 20 to 35 feet deep.

Much of Day County is considered to be within a "closed basin". This means that under most circumstances, water does not have a direct drainage path to a river outside the closed basin. Instead, the water ponds until it can evaporate into the atmosphere. The Waubay Lakes Chain is part of the closed basin system. It is primarily located in Day County and is a 409 square mile closed sub-basin within the Big Sioux River Basin. The ten major lakes in this chain are glacial in origin and include: Bitter Lake, Blue Dog Lake, Enemy Swim Lake, Hillebrands Lake, Minnewasta Lake, Pickerel Lake, Rush Lake, Spring Lake, Swan Pond and Waubay Lake. There are also thousands of smaller lakes or depressions within the closed basin system. Some of these are temporary while others are permanent. Historically, there was no surface connection between any of the lakes in the chain; that has changed significantly in the last 20 years and now many of the lakes are connected on the surface.

The northeastern area of South Dakota is atop a flat area of high ground, with the sides higher than the normal drainage routes (i.e. the Big Sioux and James Rivers). Thus, water fills the Waubay Lakes Chain basin until it overflows, leaving the accumulated runoff without a natural outlet.

POPULATION DEMOGRAPHICS

According to the Census Bureau, in 2010 the County had a population of 5,710, a decline of 8.9 percent from the 2000 census. With only 5,710 people residing in 1,091 square miles translates to around 5.2 persons per square mile, classifying the county as rural. The City of Webster is the county seat and is situated at the intersection of US Highway 12 and South Dakota Highway 25.

City	2010 Population	Percent of County Population	Percent Population over Age 65
Webster	1,886	33%	
Waubay	576	10%	
Bristol	341	6%	
Roslyn	183	3%	
Pierpont	135	2%	
Andover	91	2%	
Grenville	54	1%	
Butler	17	.3%	
Unincorporated or rural areas	2,427	43%	
Day County	5,710		23%

* Totals may not equal 100% because of rounding.

Besides the communities, Day County also has 28 townships.

Township	Population	Township	Population
Andover	108	Morton	70
Bristol	58	Nutley	70
Butler	49	Oak Gulch	24
Central Point	88	Racine	75
Egeland	90	Raritan	75
Farmington	33	Rusk	118
Grenville	84	Scotland	34
Highland	60	Troy	39
Homer	39	Union	48
Independence	65	Valley	40
Kidder	79	Waubay	462
Kosciusko	167	Webster	264
Liberty	47	Wheatland	62
Lynn	41	York	34

According to the 2010 Census, the County is predominately white (88.1%) and 9.5% of the population is Native American. The County has a nearly 1-1 male to female ratio. There are 2,504 occupied housing units located within the 1,091 square miles located in Day County.

County	Median Family Income	Per Capita Income	% of People Below Poverty
Day	\$54,214	\$28,811	18.5%
South Dakota	\$66,825	\$27,516	14.0%
United States	\$67,871	\$29,829	15.1%

ECONOMIC PROFILE

The Day County economy has historically been very reliant upon agriculture. In recent years, tourism and tourism-related jobs have increased. Day County has many lakes, wetlands, and game production areas which provide an excellent habitat for fish and wildlife and many recreational opportunities. The decline in small family farms and the declining population in most of the Day County communities has forged a significant decline in employment within the farm industry.

CLIMATE

Day County, South Dakota is located almost entirely on the Coteau des Prairies. The western one-sixth of the county lies in the James Basin and in the extreme northwest corner of the county lies the Ancient Lake Dakota bed. The County is predominantly characterized by rolling to gently undulating landscape with some flat areas that mark the position of former Pleistocene lakes. In the James Basin, the topography is gently undulating or nearly level. The rolling topography of the Prairie Coteau is characterized by numerous basins called prairie potholes. These potholes are natural collecting areas for water. They reduce the extent of flooding of streams and rivers during spring runoff and periods of excessive precipitation. On the Prairie Coteau, drainage is predominantly internal. Streams generally connect two or more potholes and flow primarily during spring runoff or after periods of heavy rainfall. On the eastern side of

the county, a few streams drain eastward to the headwaters of the Big Sioux River. The western side streams flowing down the western edge of the Prairie Coteau. Streams flowing off the western edge of the Prairie Coteau flow into the James River. Land elevations range from 1,300 feet above sea level in the extreme northwestern part of the county to 2,010 feet in the northeastern part.

Like many of its surrounding counties, Day County has some of the greatest temperature variations in the world. In winter, the average temperature is 14 degrees Fahrenheit and the average daily minimum temperature is 4 degrees. The lowest temperature on record is -36 degrees. In summer, the average temperature is 69 degrees and the average daily maximum temperature is 83 degrees. The highest temperature recorded is 107 degrees. Normally the temperature is moderate between the months of March and June and again in September and October. The county has spells of extreme heat in July and August and extreme cold November through February. Annual average precipitation is 21 inches with over seventy-five percent of the precipitation falling from April through September. Precipitation can vary significantly from year to year and location to location within a given year. The heaviest most intense precipitation often occurs with localized downpours associated with thunderstorms in June through August. The heaviest 1-day rainfall on record is 3.5 inches in Webster on June 29, 1971. Thunderstorms occur about 36 days each year. The average seasonal snowfall is 31 inches. The greatest snow depth on record is 35 inches. On the average, 28 days of the year have at least one inch of snow on the ground. The number of such days varies greatly from year to year. The average relative humidity in midafternoon is about 60 percent. Humidity is high at night, and the average at dawn is about 80 percent. The prevailing wind is from the south-southeast. Average wind speed is 13 miles per hour and is highest in the spring.

TRANSPORTATION

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

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

1. Principal Arterials – serve longer strips of a statewide or interstate nature, carry the highest traffic volumes, connect larger urban areas, provide minimal land access, and include both interstate and non-interstate principal arterial highways.
2. Minor Arterials – interconnect the principal arterials, provide less mobility and slightly more land access, and distribute travel to smaller towns, and major resorts attracting longer trips.
3. Major Collectors – provide both land access and traffic circulation connecting county seats not served by arterials and connect intracounty traffic generators like schools, shipping points, county parks, and important mining and agricultural areas.

4. Minor Collectors – collect traffic from local roads and bring all developed areas within a reasonable distance of a collector road.
5. Local Roads – provide direct access to adjacent land and to the highest classified roads and serve short trips.

A Major Street Plan includes a current and future hierarchy of street classifications for use in identifying and prioritizing transportation needs of Day County.

NATIONAL FLOOD INSURANCE PROGRAM PARTICIPATION

Five jurisdictions located within Day County participate in the National Flood Insurance Program (NFIP): Day County, Waubay, Webster, Bristol, and Pierpont. The remaining towns currently do not participate in the NFIP: Table 1.4 was taken from the 2006 Plan. It lists population, latitude and longitude, elevation, and NFIP status of communities within the county. Population statistics were taken from Census 2010 and location and elevation were taken from Google Earth. NFIP status was provided by the FEMA Community Status Book Report.

Name	Pop. (2010)	Location	Elevation	NFIP
<i>Cities/Towns</i>				
Webster	1,886	45°20'1"N 97°31'10"W	1857 ft	Yes
Waubay	576	45°19'59"N 97°18'15"W	1818 ft	Yes
Roslyn	183	45°29'47"N 97°29'27"W	1864 ft	No
Pierpont	135	45°29'41"N 97°49'54"W	1506 ft	No
Grenville	54	45°27'59"N 97°23'24"W	1864 ft	Yes
Butler	17	45°15'29"N 97°42'49"W	1827ft	No
Bristol	341	45°20'43"N 97°45'3"W	1791 ft	Yes
Andover	91	45°24'38"N 97°54'13"W	1480 ft	No

Note: The Town of Lily has unincorporated since the last plan update.

II. PREREQUISITES

CHANGES/REVISIONS TO PREREQUISITES:

Tables were updated with current information. The overall format has not changed.

ADOPTION BY LOCAL GOVERNING BODY §201.6(c)(5)

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

MULTI-JURISDICTIONAL PLAN PARTICIPATION

This plan is a multi-jurisdictional plan which serves the entire geographical area located within the boundaries of Day County, South Dakota. Day County has seven incorporated municipalities. Most of the municipalities located within Day County elected to participate in the planning process and the update of the existing Day County Mitigation Plan. The participating local jurisdictions include the following municipalities:

Table 2.1: Plan Participants		
New Participants	Continuing Participants	Not Participating
None	Andover	Butler
	Bristol	
	Day County	
	Grenville	
	Pierpont	
	Roslyn	
	Waubay	
	Webster	

The non-participant include Butler who chose not to participate as well as the unincorporated communities of Holmquist, Lily, and Enemy Swim. The non-participating communities will be given the option to complete the requirements for the plan and to formally adopt the plan during the annual update of the plan.

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

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

Table 2.2: Dates of Plan Adoption by Jurisdiction	
Jurisdiction	Date of Adoption
Day County Commission	
Andover	
Bristol	
Butler	Not Participating
Grenville	
Pierpont	
Roslyn	
Waubay	
Webster	

All of the participating jurisdictions were involved in the plan update. Representatives from each municipality, and the County, attended the planning meetings and provided valuable perspective on the changes required for the plan. All representatives took part in the risk assessment by completing the risk assessment worksheets which are included as Appendix C and by profiling the risks.

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

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

Nature of Participation	Day County	Andover	Bristol	Grenville	Pierpont	Roslyn	Waubay	Webster
Attended Meetings or work sessions (a minimum of 1 meeting will be considered satisfactory).	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Submitted inventory and summary of reports and plans relevant to hazard mitigation.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Submitted Risk Assessment Worksheet.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Submitted description of what is at risk (including local critical facilities and infrastructure at risk from specific Hazards) Worksheet 3A	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Submitted a description or map of local land-use patterns (current and proposed/expected).	C	C	C	C	C	C	C	<input checked="" type="checkbox"/>
Developed mitigation actions with an analysis/explanation of why those actions were selected.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Prioritized actions emphasizing relative cost-effectiveness.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Reviewed and commented on draft Plan.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Hosted opportunities for public involvement (allowed time for public comment at a city council/county commission meetings after giving a status report on the progress of the Plan update)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

III. PLANNING PROCESS

CHANGES/REVISIONS TO PLANNING PROCESS:

The Planning Team tables were added to this section. Information on public comment at public meetings was added. Neighboring jurisdictions were invited to participate in the planning process. Information in several tables was updated. Overall format was not changed.

DOCUMENTATION OF THE PLANNING PROCESS

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

An information meeting was held at the Day County Courthouse on May 21, 2019 during the regular county commission meeting to inform the public about the required plan update and discuss the process for completing the update. The County also discussed and approved the contract for NECOG to complete the plan update. The Day County Emergency Manager worked with NECOG to organize resources. After the informational meeting was held, the municipalities were contacted and asked to start working on identifying priorities for mitigation projects for their jurisdictions and to assist with corrections and updates to the previous plan. NECOG provided one-on-one guidance to each of the municipalities who wanted to be included in the plan update. NECOG drafted a summary of the information provided to the representatives from each of the municipalities and emailed to the finance officer to be discussed at their regular City Council meetings. The meeting minutes for each of the meetings were published in the local newspaper.

One stakeholder meeting was held at the Day County Courthouse on February 19, 2020 to inform the public about the required Mitigation Plan update. The Day County Emergency Manager worked with NECOG staff to organize resources and email all the stakeholders, community organizations, municipalities, townships, and other interested parties. A press release was sent to the *Webster Reporter and Farmer and the Waubay Clipper*. The Day County Emergency Manager also posted a notice on the Day County Emergency Management Facebook page and posted information on the County’s website under the ‘Announcements’ section. A steering committee was formed from those persons who attended the public meetings. Only a few of them had previously served as planning committee members during the drafting of the last mitigation plan update; many of them were new to the planning and mitigation process.

After the first meeting, a date for the next meeting was set for March 18, 2020. There was also a Day County Township annual meeting planned for March 18, 2020 where the mitigation plan update was on the agenda. NECOG and the Day County Emergency Manager planned to attend that meeting as well to provide information and collect feedback from townships in Day County. Both of those meetings were cancelled due to the COVID-19 pandemic and the need to limit group meetings to 10 people or less and to maintain social distancing.

The planning process for the plan update did continue via phone calls and emails with local jurisdictions and planning team members. NEOCG also provided updates on the planning process to each jurisdiction to be read and discussed at their respective commission/council/board meetings, to allow for continued public input. The process allowed mitigation discussion to take place in the communities at their regular public meetings. This style of organization was anticipated to improve involvement from the entire board/council and also

allowed for participation from residents by bringing the information to them locally, rather than requiring people to travel. An added benefit to changing the planning format to working on an individual basis with each jurisdiction, is that the plan author was able to better educate the municipalities on their individual responsibilities to the planning process and also able to ensure that the entire council was being made aware of the mitigation planning process and provided plenty of opportunities to discuss mitigation strategies that best meet the needs of constituents.

These methods of notifying the public of the plan update process were determined to be the most likely way to create public awareness and public involvement in the process of updating the Mitigation Plan during the COVID-19 pandemic. The Day County Emergency Manager also kept the public informed of the process via Facebook page updates. The meeting agendas and sign in sheets from each of the planning meetings are included as Appendix A.

To ensure that the updated plan included everything required by FEMA, the committee meetings used the 2011 Local Mitigation Plan Review Tool to guide the discussions. The 2015 Mitigation Plan was then compared to the Planning Tool and any portion of the 2015 Mitigation Plan that was not needed to fulfill the new requirements was eliminated and deficiencies were noted as areas of focus. The Plan Author followed the direction provided at the FEMA G318 Mitigation Planning Workshop for Local Governments and also used the FEMA Multi-Hazard Mitigation How-To Guidance.

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

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

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

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

1-25-1.1. ...Each political subdivision shall provide public notice, with proposed agenda, that is visible, readable, and accessible for at least an entire, continuous twenty-four hours immediately preceding any official meeting, by posting a copy of the notice, visible to the public, at the principal office of the political subdivision holding the meeting. The proposed agenda shall include the date, time, and location of the meeting. The notice shall also be posted on the political subdivision's website upon dissemination of the notice, if a website exists. For any special or rescheduled meeting, the information in the notice shall be

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

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

[The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

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

Day County	Bryan Anderson, Emergency Manager
Day County	Bonnie Fosheim, Auditor
Day County	Dari Schlotte, Director of Equalization, Planning/Zoning Director
Andover	Trudy Smith, Finance Officer
Andover	Ilene Helmer, President
Bristol	Kim Danielson-Huwe
Butler	N/A- No representation at meetings
Grenville	Dally Sichmeller, Finance Officer
Pierpont	Audrey Johnson, Town President
Pierpont	Kent Holler, Utility Manager
Roslyn	Becky Lundquist, Finance Officer
Waubay	Kevin Jens, Mayor
Waubay	Julie Jorgenson, Finance Officer
Webster	Linda Hoberg, Finance Officer
Webster	Jim Grimes, City Council
Reporter and Farmer	Amanda Fangen

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

Table 3.2 Day County Commissioners Involved in the Plan	
Frank James	Commissioner
Richard Tobin	Commissioner
Linda Walters	Commissioner
Derek Sinner	Commissioner
Jim Tompkins	Commissioner

Table 3.3: Andover Town Board Members Involved in the Plan	
Ilene Helmer	President
John Grimsrud	Trustee
Charlene Voss	Trustee

Table 3.4: Bristol Town Board Members Involved in the Plan	
Chris Farrell	President
Kim Bell	Trustee
Rick Kroll	Trustee
Paul Orr	Trustee
Jerry Roitsch	Trustee

Table 3.5: Grenville Town Board Members Involved in the Plan	
Ron Grajczyk	President
Michael Gonzales	Trustee
Kellen Lesnar	Trustee

Table 3.6: Pierpont Town Board Members Involved in the Plan	
Audrey Johnson	President
Nichole Bertsch	Trustee
JaDee Dwight	Trustee

Table 3.7: Roslyn Town Board Members Involved in the Plan	
Tom Lee	President
Sheldon Huggett	Trustee
Spencer Huggett	Trustee

Table 3.8: Waubay City Council Members Involved in the Plan	
Kevin Jens	Mayor
Kathy Breske	Council Member
Robert Grebel	Council Member
Doug Herold	Council Member
Roger Johanning	Council Member
Eric Niles	Council Member

Table 3.9: Webster City Council Members Involved in the Plan	
Mike Grosek	Mayor
Josh Bartos	Council Member
Michael Dunse	Council Member
Jim Grimes	Council Member

Wayne Klungseth	Council Member
Dale Miller	Council Member
Derek Sinner	Council Member

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

An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities...to be involved in the planning process.

Before the first planning meeting was held, an email was sent to all neighboring emergency managers in the counties of: Marshall, Brown, Spink, Roberts and Codington Counties giving them opportunity to participate in Day County’s planning process and provide input on the plan’s content. After the plan was drafted it was emailed to all of the participants and to the emergency managers in the neighboring counties. Everyone who received an email copy of the plan draft was allowed 32 days to comment on the draft.

PUBLIC INVOLVEMENT [§201.6(b)(1)]

An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval.

The public was provided several opportunities to comment on the plan during the drafting stages, both at the Planning Meeting and at City Council and County Commission Meetings. The planning team only ended up meeting once during a work session. Additional work sessions were planned; however, they had to be cancelled because of the COVID-19 pandemic. However, the public still had the opportunity to comment on the plan at public meetings of all the jurisdictions participating in the plan (at county commission, city council, town board meetings). Regular updates were also provided on the Day County Emergency Manager’s Facebook page, asking the public for comments. Those who were most involved were the representatives from the municipalities and those previously mentioned as being instrumental in leading discussions. However, there a handful of individuals that were also interested in the planning process who participated in the meetings and provided comments. At each City Council and County Commission meeting, there was a public forum, which gives the public an opportunity to comment on anything on the agenda; however, no one from the public showed up to comment on the plan or to help with the plan update. The county and municipalities put the plan update on the agenda at their meetings. Table 3.9 identifies the location and date of each opportunity that was provided for the public to comment and how it was advertised.

After the plan was drafted it was posted on the Day County Website, City of Webster Website, and the *Reporter and Farmer* website, and emailed to all of the participants and to the emergency managers in the neighboring counties of: Brown, Clark, Codington, Grant, Marshall, Roberts, and Spink. Everyone who received an email copy of the plan draft was allowed 32 days to comment on the draft.

Table 3.9: Opportunities for Public Comment							
Location/Meeting	Date	Type of Participation			How Was Meeting Advertised		
		City Council Meeting	County Commission	Planning Meetings	Newspaper	Agenda	Website
Andover	4/6/20	X				X	NA
							NA
Bristol	4/6/20	X				X	X
Grenville	3/5/20	X				X	NA
	5/4/20	X				X	NA
Pierpont	3/2/20	X				X	NA
	5/4/20	X				X	
Roslyn	4/6/20	X				X	
	5/4/20	X				X	
Waubay	3/4/20	X				X	NA
	4/6/20	X				X	NA
Webster	3/2/20	X				X	X
	4/6/20	X				X	X
Day County	5/21/19		X		X		X
	1/7/20		X			X	X
	3/3/20		X			X	X
	4/7/20		X			X	X
Mitigation Planning	1/7/20			X	X		
Stakeholder Meetings	2/19/20			X	X		X
	5/14/20			X			X

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

Review and incorporation...of existing plans, studies, reports, and technical information.

The review and incorporation of existing plans, studies, reports and technical information was completed by the local jurisdictions and the plan author. Each of the communities were asked to provide a list of existing documents that they have available. Many of the smaller communities do not have such documents. Additionally, the 2015 Plan was used as a resource for the new plan because most of the natural hazard profile research had already been completed when it was drafted. In addition to the 2015 Plan, the plan author reviewed several other existing documents including but not limited to the South Dakota State Hazard Mitigation Plan, Day

County Hazmat Plan, Day County Shelter Plan, the City of Webster Zoning Ordinances and Comprehensive Plan, County Zoning Ordinances, the flood damage prevention ordinance, and Flood Insurance Rate Maps for the local jurisdictions, preliminary base line elevation data from FEMA. In Day County, all of the municipalities except for Webster are covered under the County Zoning Ordinances and Comprehensive Plan therefore they do not have their own individual zoning or planning documents. Enforcement of the county zoning is also managed by the County. A summary of the technical review and incorporation of existing plans is included in Table 3.6 provided on page 23.

Table 3.6 :Record of Review (Summary)

Existing Program/Policy/ Technical Documents	Local Jurisdiction							
	Andover	Bristol	Grenville	Pierpont	Roslyn	Waubay	Webster	Day County
Comprehensive Plan	NA	NA	NA	NA	NA	NA	NA	O
Growth Management Plan	NA	NA	NA	NA	NA	NA	NA	NA
Flood Damage Prevention Ordinance	NA	✓	NA	✓	NA	NA	✓	✓
Floodplain Management Plan	NA	NA	NA	NA	NA	NA	NA	✓
Flood Insurance Studies or Engineering studies for streams	NA	NA	NA	NA	O	NA	NA	✓
Emergency Operations Plan	NA	NA	NA	NA	✓	NA	C	✓
Zoning Ordinance	✓	C	✓	✓	✓	✓	✓	✓
Building Code		✓	C	✓	✓	✓	✓	C
Drainage Ordinance	NA	NA	NA	✓	✓	✓	✓	NA
Critical Facilities maps	NA	NA	✓	NA	NA	NA	NA	✓
Existing Land Use maps	NA	NA	✓	NA	✓	NA	✓	✓
Elevation Certificates	NA	NA	NA	NA	NA	✓	✓	✓
State Hazard Mitigation Plan	✓	✓	✓	✓	✓	✓	✓	✓
Bridge Improvement Plan	NA	NA	NA	NA	NA	NA	NA	✓
HAZUS	NA	NA	NA	NA	NA	NA	NA	NA

- NA : the jurisdiction does not have this program/policy/technical document
- O : the jurisdiction has the program/policy/technical document, but did not review/incorporate
- C : the jurisdiction is regulated under the County’s policy/program/technical document
- ✓ : the jurisdiction reviewed the program/policy/technical document

REVIEW OF THE 2015 PLAN

The planning committee reviewed and analyzed each section of the 2015 plan and sections were revised on an as needed basis as part of the update process. Most of the information was

relevant and could be remain in the plan. Specific areas that needed improvement or changes include the planning process, risk assessment, particularly the unique or varied risk and development trends sections, mitigation strategies and the existing planning documents.

As of early 2020, FEMA is in the process of updating the flood risk data and flood maps for Day County. It was anticipated that the flood risk review meeting would be in May 2020. However, with the uncertainty of the COVID-19 pandemic, it is anticipated that the FRR meeting will either be postponed or done via a virtual format.

IV. RISK ASSESSMENT

CHANGES/REVISIONS TO RISK ASSESSMENT:

- Almost all tables in this section were updated as necessary.
- Table 4.7 “Historic Lake Levels in Day County” is new to the Plan.
- The planning team created simplified risk assessment worksheets for plan participants to complete (See Appendix C for the completed worksheets)
- Probability of Future Events was added to Table 4.1 Significant Hazard Occurrences
- Many other elements of this section were also updated, including:
 - Overall Summary of Vulnerability
 - Hazard Profile
- Two elements of this section included significant updating and the addition of significant narrative that was new to this Plan. Those elements include:
 - Analyzing Development Trends
 - Unique or Varied Risk

IDENTIFYING HAZARDS [§201.6(c)(2)(i)]

Many websites have been further developed and updated since the drafting and of the previous Day County Plan in 2015, so the Planning Committee used some of those websites as resources for the updated plan. Specifically, the National Oceanic Atmosphere Administration (NOAA), the National Weather Service of Aberdeen and the United States Drought Monitor were used to research natural hazards and disasters that have occurred within the last 10 years within the geographic location covered under the Day County Mitigation Plan. A summary of the findings for significant hazard occurrences from the past 10 years is provided in Table 4.1:

Table 4.1: Significant Hazard Occurrences 2010-2019				
Type of Hazard	# of Occurrences Since 2010	# of Years	Probability of Future Events, as a %	Source
Blizzard (32) / Heavy Snow (13) / Ice Storm (2) /	47	10	100%	NOAA
Drought	8	10	80%	NOAA & US Drought Monitor
Wildfire/Structural Fire (Jan 1, 2007-December 31, 2018)	261	12	100%	NOAA & State Fire Marshal's Office
Flood	12	10	100%	NOAA
Flash Flood	2	10	20%	NOAA
Lakeshore Flood	3	10	30%	NOAA
Hail	47	10	100%	NOAA
Lightning	0	10	0%	NOAA
Funnel Cloud (1) Tornado (7)	8	10	80%	NOAA
Cold/Wind Chill (1)/ Extreme Cold/Wind Chill (22)	23	10	100%	NOAA
Excessive Heat (2)	2	10	20%	NOAA
Winter Storm	7	10	70%	NOAA
Strong/High Wind (8)/ Thunderstorm (54)	62	10	100%	NOAA

While researching the hazard occurrences that have taken place in Day County, it became evident that the information found on the NOAA website was incomplete. Therefore, other sources were contacted whenever possible. Specifically, NOAA only had no occurrences listed for wildfires in Day County. The State Fire Marshal's Office was contacted to verify fire information. Their office said their information is derived from the reports submitted by the local fire departments who respond to the fires. They also explained that since all of the fire departments in Day County are Volunteer Fire Departments many times wildfires are extinguished and reports are never filed with the State. Thus, the information provided by the State Fire Marshal's office is not entirely complete either.

For the purpose of this plan we have used the numbers provided by the State Fire Marshal's Office as a point of reference in determining the likelihood of a wildfire hazard occurrence within the jurisdiction. The information provided identifies 64 structure fires, 60 vehicle fires, and 137 other fires reported between 2007 and 2018. The cause of the outside fires is not listed, so it is not known for certain whether all or some of these fires resulted due to a natural hazard occurrence or as a result of human behavior. From 2007-2018 the total fire dollar loss accumulated was \$1,378,298. Additionally, the State Fire Marshal's office provided information about the number of injuries and fatalities reported as a result of these fires. According to their records, 3 fire-related injuries and 2 fire-related fatalities were reported from 2007 – 2018.

NOAA data also shows that there were only 2 periods of drought in the last 10 years. However, when looking at information from the US Drought Monitor, it shows several periods of abnormally dry or moderate drought. The plan author documented 8 periods in the last 10 years where Marshall County experienced significant periods (several months) where the drought monitor indicated the area was in a Moderate Drought (D1).

Lightning is also reported as zero occurrences in the NOAA database for weather events. Lightning is a common occurrence in Day County, with numerous storm events each year producing lightning. Lightning has been reported as the cause to numerous fires in this region and is especially dangerous during drought years. The County acknowledges that the information provided by NOAA for this particular hazard is inaccurate but does not have another source for more accurate information.

The NOAA database has numerous different categories for winter weather hazards to include: Blizzard, Extreme Cold, Heavy Snow, Winter Storm, Winter Weather, Cold/Wind Chill, Extreme Cold/Wind Chill. The number of days with events reported in Table 4.1 is the total reported for all of these categories. Due to the regular nature of winter weather events in Day County, local officials believe this number is underreported as well.

Table 4.2 is a list of natural hazards produced from the FEMA worksheets completed by each local jurisdiction located within Day County. Representatives from each community completed the worksheet for their geographical location, while representatives of Day County completed the worksheet for county-wide risks. All of the worksheets are included as Appendix C.

Table 4.2: Natural Hazards Categorized by Likelihood of Occurrence		
High Probability	Low Probability	Unlikely to Occur
Drought	Flash Flood	Avalanche
Extreme Cold	Earthquake***	Dam Failure
Flood	Ice Jam	Hurricane
Freezing Rain/Sleet/Ice	Extreme Heat	Volcanic Ash
Hail	Tornado	Volcanic Explosion
Heavy Rain	Urban Fire	Tsunami
Heavy Snow	Wildfire	Landslide
Lightning		Subsidence
Utility Interruption**	<p>***Earthquakes are marked with an asterisk because they occur but are so small that the effects are minimal. Thus, mitigation measures specifically for earthquakes are not a priority.</p> <p>** Utility interruptions are not a natural hazard but often occur as a result of natural hazards such as ice storms and strong winds.</p>	

Every possible hazard or disaster was evaluated and then the disasters were placed in three separate columns depending on the likelihood of the disaster occurring in the planning jurisdiction. Hazards that occur at least once a year or more were placed in the High Probability column; hazards that may have occurred in the past or could occur in the future but do not occur on a yearly basis were placed in the low probability column; and hazards or disasters that have never occurred in the area before and are unlikely to occur in the planning jurisdiction any time in the future were placed in the Unlikely to Occur column.

Due to the topographical features of the County and the nature of the natural hazards that affect the geographical area covered by this mitigation plan, most areas of the county have similar likelihood of being affected by the natural hazards identified. Only the natural hazards from the High Probability and Low Probability Columns will be further evaluated throughout this plan. All manmade hazards and hazards in the Unlikely to Occur column will not be further evaluated in the plan. Table 4.3 on page 27 identifies the hazards that will be addressed in the Mitigation Plan update throughout the planning process.

Hazards were identified for this plan in several ways, including: observing development patterns, interviews from towns and townships, public meetings, plan work sessions, previous disaster declarations, consulting the State Hazard Mitigation Plan and research of the history of hazard occurrences located within Day County.

Table 4.3: Overall Summary of Vulnerability by Jurisdiction

Natural Hazards Identified								
	Day Co	Andover	Bristol	Grenville	Pierpont	Roslyn	Waubay	Webster
Avalanche	NA	NA		NA	NA	NA	NA	NA
Dam Failure	L	NA		NA	L	NA	NA	NA
Drought	H	M	L	M	NA	L	L	M
Earthquake	NA	NA		NA	NA	NA	NA	NA
Extreme Cold	M	L	L	H	NA	M	M	H
Extreme Heat	H	L	L	L	NA	L	M	L
Flash Flood	H	NA			NA	L	M	M
Flood	H	L	L		L	NA	M	M
Freezing Rain/Sleet	M	M	H	H	NA	M	M	H
Hail	H	M	H	H	NA	M	M	H
Heavy Rain	H	M	H	H	L	L	H	H
Heavy Snow	H	M		H	L	M	H	H
Ice Jam	L	NA	L	L	NA	NA	M	L
Landslide	NA	NA	NA	NA	NA	NA	NA	NA
Lightning	M	H	L	M	NA	M	M	H
Rapid Snow Melt	H	H	M	H	L	L	H	M
Strong Winds	M	H	H	H	L	H	H	H
Subsidence	NA	NA		NA	NA	NA		L
Thunderstorm	M	M	L	L	NA	M	H	M
Tornado	H	H	L	H	L	H	M	H
Urban Fire	M	NA		H	NA	NA	M	H
Utility Interruption	H	M		H	L	M	M	H
Wildfire	M	NA	L	H	NA	H	M	L

- NA** : Not applicable; not a hazard to the jurisdiction
 Low vulnerability; little damage potential (minor damage to less than 5% of the jurisdiction)
- L** Medium Vulnerability; moderate damage potential (causing partial damage to 5-10% of the jurisdiction, and irregular occurrence)
- M** High Vulnerability; significant risk/major damage potential (for example, destructive, damage to more than 10% of the jurisdiction and/or regular occurrence)
- H** Jurisdiction did not fill out risk assessment worksheet

Day County Overall Summary of Vulnerability: Day County has identified that they are particularly vulnerable to Drought, Extreme Cold, Extreme Heat, Flash Flood, Flood, Freezing Rain/Sleet/Ice, Hail, Heavy Rain, Heavy Snow, Lightning, Rapid Snow Melt, Strong Winds, Thunderstorms, Tornados, Urban Fires, Utility Interruptions and Wild Fires. These hazards were given a rating of “H” for high risk or “M” for moderate risk in Table 4.3.

Flooding in particular, has caused much damage to both homes in Day County but also to County infrastructure such as roads. The County has raised road grades many times in the last few decades, but roads continue to go under water. The County was also hit with a severe ice storm in December 2016, which knocked out power for up to 10 days.

Andover Overall Summary of Vulnerability: Andover has identified that they are particularly vulnerable to Drought, Freezing Rain/Sleet/Ice, Hail, Heavy Rain, Heavy Snow, Lightning, Rapid Snow Melt, Strong Winds, Thunderstorms, Tornados, and Utility Interruption. These hazards were given a rating of “H” for high risk or “M” for moderate risk in Table 4.3. All of these hazards pose the risk of knocking down utility lines which results in loss of power. Due to the extreme weather conditions in Northeast South Dakota, the threat of losing power for even a few days can be deadly. During the winter months, an event that causes disruption of utilities can take days, even weeks to repair. Sometimes ices storms take out several miles of power lines and it takes weeks to repair the line and get them up and running again. With no power, many people are left without a source for heat which in turn increases the risk of people freezing to death in their homes. There is not a shelter in town and no public place for people to go in the event of power outages that last several days. There are also several people in the community that have life-preserving medical devices that require power for operation.

Andover also identified flooding as a high risk. The town currently has old sanitary sewer lines that are constructed of vitrified clay pipe that have a very high level of infiltration and inflow from high ground water and storm water. The high levels of water running through the sanitary sewer lines is aggravated with heavy rain events and rapid snow melt in the spring; which many times causes sewage to back up into homes. The City has applied for funding to install a storm sewer pipe that will discharge to the wastewater treatment facility.

Bristol Overall Summary of Vulnerability: Bristol has identified that they are particularly vulnerable to severe summer and winter storms, ice storms, blizzards, strong winds, heavy rain, flooding, freezing rain, and heavy snow. These hazards were given a rating of “H” for high risk or “M” for moderate risk in Table 4.3. All of these hazards pose the risk of knocking down utility lines which results in loss of power. Due to the extreme weather conditions in Northeast South Dakota, the threat of losing power for even a few days can be deadly. During the winter months, an event that causes disruption of utilities can take days, even weeks to repair. Sometimes ice storms take out several miles of power lines and it takes weeks to repair the line and get them up and running again. With no power, many people are left without a source for heat which in turn increases the risk of people freezing to death in their homes.

Runoff generated by the watershed is conveyed through Bristol via existing drainage infrastructure that includes enclosed storm sewer systems and culverts. There are also several low-lying areas where natural retention occurs and provides critical storage that collects and slows storm runoff. There are two separate discharge points where runoff leaves town. The first is located west of County Road 18 and 4th Avenue at a low-lying wetland area. The majority of storm flows that are routed through Bristol ultimately drain here. All of the enclosed storm sewers drain to this point through one of three separate systems located throughout town.

A series of wetland areas exist southeast of Bristol, within the watershed limits and are identified basins. These areas self-detain during the 100-year storm event. However, it is possible during a less frequent event such as a 500-year rainfall event, the wetland areas may overflow and run into town. A significant amount of surface runoff drains to Handke Jubilee Park from the south. The topography of the park allows runoff to pool, providing a resource for storm water detention. This slows runoff to downstream properties; however, the park is inundated quite often and unable to hold all of the water that drains there.

Grenville Overall Summary of Vulnerability: Grenville has identified that they are particularly vulnerable to drought, extreme cold, freezing rain/sleet/ice, hail, heavy rain, heavy snow, lightning, rapid snow melt, strong winds, tornados, urban fires, utility interruption and wild fires. These hazards were given a rating of “H” for high risk or “M” for moderate risk in Table 4.3. Many of these hazards pose the risk of knocking down utility lines which results in loss of power. Due to the extreme weather conditions in North Central South Dakota, the threat of losing power for even a few days can be deadly. During the winter months, an event that causes disruption of utilities can take days, even weeks to repair. Sometimes ice storms take out several miles of power lines and it takes weeks to repair the line and get them up and running again. In fact, after an ice storm in December 2016, the town was without power for about a week. With no power, many people are left without a source for heat which in turn increases the risk of people freezing to death in their homes.

Grenville had severe flooding in 1997 and 1998 which destroyed all but one of the low-lying residences in town. The City is not particularly vulnerable to flooding, since the 1997-98 flood events caused the homes to be removed. Only one home and a couple businesses are at risk of flooding, but it would take a significant event to cause those structures damage. The town does not have a publicly-owned water or sewer system. The water is provided directly to the residences from a rural water system; WEB Water Development Association, Inc. Sanitary sewer service is not provided by the City. Residents have privately owned septic systems which they are responsible for maintaining on their own. There is not a storm sewer system in town. The nearby Waubay Lake, which is part of the closed-basin chain lakes, is far enough away that it does not affect the developments in Grenville.

Pierpont Overall Summary of Vulnerability: Pierpont is located on a slough, so they are particularly vulnerable to high ground water table. In years where there is excess moisture, heavy rains, and heavy snow, they tend to have a lot of basements that fill up with water. The City has a sump pump ordinance that requires people to pump water into the streets rather than into the sanitary sewer system in order to prevent overloading the lift stations and the lagoon. All of the streets in town are gravel, so the high ground water table causes the roads to become very soft during wet years. The City has added additional culverts on the truck route to help keep the roads intact during high water events.

The Pierpont Dam is located one mile south of the Town of Pierpont. The dam is maintained and regulated by the State of South Dakota and the City does not see the dam as a significant hazard or threat. If the dam did breach or fail, it would flow south and west, not in the direction of the town of Pierpont. The dam was last inspected May 30, 2017. Inspections have noted some cracking and spalling of the concrete spillway along with several trees and brush growing on the embankment. Another inspection was planned for the Fall of 2019 on the spillway surface but because water was running over the spillway, an inspection wasn't able to be performed.

The City experiences strong winds several times a year. In 2005, a windstorm tore down several miles of power lines and the utility company has since buried some of the lines. Due to the extreme weather conditions in North Central South Dakota, the threat of losing power for even a few days can be deadly. During the winter months, an event that causes disruption of utilities can take days, even weeks to repair. Sometimes ices storms take out several miles of power lines and it takes weeks to repair the line and get them up and running again. With no power, many people are left without a source for heat which in turn increases the risk of people freezing to death in their homes.

Roslyn Overall Summary of Vulnerability: Roslyn has identified that they are particularly vulnerable to extreme cold, freezing rain/sleet/ice, hail, heavy snow, lightning, strong winds, thunderstorms, tornados, utility interruptions and wildfires. These hazards were given a rating of “H” for high risk or “M” for moderate risk in Table 4.3. All of these hazards pose the risk of knocking down utility lines which results in loss of power. Due to the extreme weather conditions in North Central South Dakota, the threat of losing power for even a few days can be deadly. During the winter months, an event that causes disruption of utilities can take days, even weeks to repair. Sometimes ices storms take out several miles of power lines and it takes weeks to repair the line and get them up and running again. With no power, many people are left without a source for heat which in turn increases the risk of people freezing to death in their homes. There is not a shelter in town and no public place for people to go in the event of power outages that last several days. There are also several people in the community that have life-preserving medical devices that require power for operation.

The nursing home in Roslyn can be used as a public storm shelter during a winter storm event that causes a prolonged power outage. The nursing home has 39 beds and is currently full and has a waiting list. The nursing home is one of the main employers in town and has an especially vulnerable population. The Town of Roslyn recognizes the important role of the nursing home and wants to ensure residents in town (both at the nursing home and otherwise) are safe.

The City of Roslyn is not particularly vulnerable to flooding, however, during heavy rain events, the low-lying areas in town fill up with water. The city does not have a storm sewer system, but they have recently updated the water tower, water distribution system, and sanitary sewer system.

Waubay Overall Summary of Vulnerability: The City of Waubay has identified that they are vulnerable to drought, extreme cold, extreme heat, flash flood, flood, freezing rain/sleet/ice, hail, heavy rain, heavy snow, ice jam, lightning, rapid snow melt, strong winds, thunderstorm, tornado, urban fire, utility interruption and wild fire.

The City of Waubay is located in the center of several lakes that are part of the Waubay chain lakes system. Over the past 17 years the levels of the lakes have risen significantly, which has caused the lakes to take over much of the land surrounding the community that was previously used for agriculture. The lakes have also compromised much of the road infrastructure in the area including city, county, and township roads as well as US Highway 12 was raised 7 feet in some areas. The initial grade raise was completed in 1997 over Rush Lake which is located on the west edge of Waubay. The grade was increased from an elevation of 1,805 feet to 1,811 feet. Subsequently the road was resurfaced which raised this part of Highway 12 another foot. The current elevation of Highway 12 in this area is 1,812 feet. The road was made into an expressway in 2003 and 2004, making it a four-lane highway. There are two 9 by 10 feet box

culverts on the west/center part of the highway that crosses Rush Lake and one 12 foot by 8 foot box culvert on the east end. There are also several pipes that run transverse through the road; all of which allow water to flow under the road to the other side.

Bitter Lake, which is located on the south side of the City of Waubay and dry in 1983, has since taken over more than 18,000 acres of land and is more than 30 feet deep in some areas. In July of 2011, the lakes hit record levels causing destruction to many homes that had been built in the area in the 1980's and 90's. The sanitary sewer system was compromised by the excessive water and many homes had to plug the sewer lines to prevent lake water from running into the system. Homeowner's had to evacuate due to lack of sewer service and lack of access to homes that were completely surrounded by lake water. The City took on a massive home acquisition project through FEMA and as many as 49 homes were acquired or relocated through the HMGP program. Bitter Lake, the southernmost lake of the Waubay chain-lakes continues to encroach on the City limits of Waubay and has completely covered the IP ponds at the wastewater treatment plant.

In 2020, lake levels continue to rise. They were at record or near record levels in the Fall of 2019. The City applied to acquire another 12 homes through the HMGP program. Many of the homes were on the north side of town along Blue Dog Lake.

The city is working with South Dakota State University on empty lots, previously bought out with HMGP dollars, to figure out a way to make them usable to the public.

The City has just finished up a project to relocate the lagoons to a higher location. The City also has several lift stations that are in jeopardy due to the encroaching waters of the lakes. One lift station (now located in Bitter Lake) has been compromised and is no longer operational.

The City has an established BFE of 1,810 and participates in NFIP. The City of Waubay and its residents would like to see the County and State work together on a water management plan or strategy, but have been told numerous times by governing officials that they will not be able to drain any of the water from Bitter Lake.

The City is also vulnerable to strong winds and have had events in the past 10 years with sustained winds of more than 100 mph. Trees were uprooted and buildings were ripped off their foundations. Many homes lost their roofs and utility lines were also torn down. They have received funding for a new storm shelter and anticipate constructing it in 2020.

Webster Overall Summary of Vulnerability: The City of Webster has identified that they are vulnerable to drought, extreme cold, flash flood, flood, freezing rain/sleet/ice, hail, heavy rain, heavy snow, lightning, rapid snow melt, strong winds, thunderstorm, tornado, urban fire and utility interruption. These hazards were given a rating of "H" for high risk or "M" for moderate risk in Table 4.3. Webster's biggest concern is utility interruption resulting from downed power lines. During the winter months, an event that causes disruption of utilities can take days, sometimes weeks, to repair. Without power, many people are left without a source for heat.

Additionally, the City has purchased a backup generator for their sewer lift station. This is critical because if the city loses power, the lift station can still function and prevent sewage from backing up into homes. The City does not have a backup generator for City Hall or the City Shop. The City feels their ability to prepare and respond to severe natural hazard events is greatly impaired if they are unable to operate at City Hall or access equipment at the City Shop.

Webster participates in NFIP and has an established base flood elevation of 1,810 feet. There is only one area of town that has development below the established BFE, which is located east of the intersection of Hwy 12 and Hwy 25, along Hwy 12. There is an open channel located north of the businesses in this area that is maintained as a natural drainage way. The City also has a storm sewer system that is maintained and improved as needed.

NATURAL HAZARDS IN THE PLAN JURISDICTION

Descriptions of the natural hazards likely to occur in the Plan Jurisdiction were taken directly from the 2015 Day County Mitigation Plan. Some of the descriptions were revised for better clarity. For the purpose of consistency throughout the plan, additional definitions were included to reflect all of the hazards that have a chance of occurring in the area and all of the hazards are alphabetized. For all of the hazards identified the probability of future occurrence is expected to be the same for all of the jurisdictions covered in the Plan.

Blizzards are a snow storm that lasts at least 3 hours with sustained wind speeds of 35 mph or greater, visibility of less than a quarter mile, temperatures lower than 20°F and white out conditions. Snow accumulations vary, but another contributing factor is loose snow existing on the ground which can get whipped up and aggravate the white out conditions. When such conditions arise, blizzard warnings or severe blizzard warnings are issued. Severe blizzard conditions exist when winds obtain speeds of at least 45 mph plus a great density of falling or blowing snow and a temperature of 10°F or lower.

Drought is an extended period of months or years when a region notes a deficiency in its water supply. Generally, this occurs when a region receives consistently below average precipitation. It can have a substantial impact on the ecosystem and agriculture of the affected region. Although droughts can persist for several years, even a short, intense drought can cause significant damage and harm the local economy. This global phenomenon has a widespread impact on agriculture.

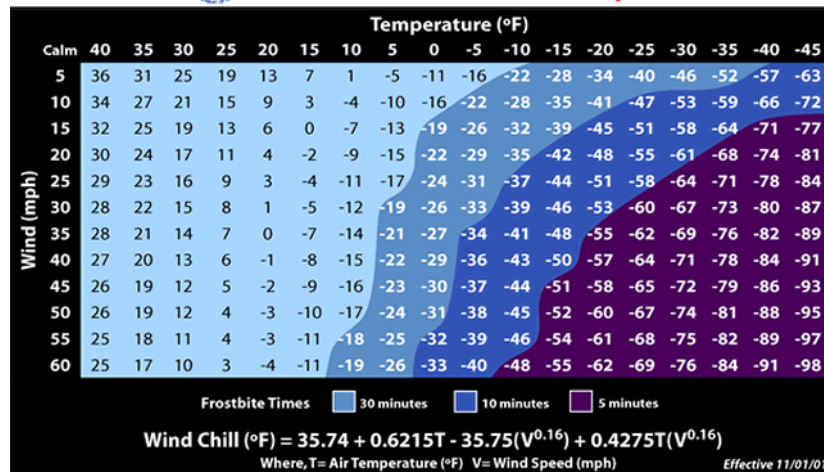
Dam Failure Dams function to serve the needs of flood control, recreation, and water management. During a flood, a dam's ability to serve as a control agent may be challenged. An excessive amount of water may result in a dam breach, simply an overflowing. Dams that are old or unstable, dams that receive extreme amounts of water, or dams that get debris pile-up behind their face may result in dam failure, a cracking and/or breaking. The County has two dams located on the very western edge of the county.

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

Extreme Cold What constitutes extreme cold and its effects can vary across different areas of the country. In regions relatively unaccustomed to winter weather, near freezing temperatures are considered "extreme cold," however, Eastern South Dakota is prone to much more extreme temperatures than other areas in the country. Temperatures typically range between zero degrees Fahrenheit and 100 degrees Fahrenheit, so extreme cold could be defined in the Day County plan jurisdiction area as temperatures below zero.



Wind Chill Chart



Extreme Heat, also known as a Heat Wave, is a prolonged period of excessively hot weather, which may be accompanied by high humidity. There is no universal definition of a heat wave; the term is relative to the usual weather in the area. Temperatures in Day County have a very wide range typically between 0-100 degrees Fahrenheit, therefore anything outside those ranges could be considered extreme. The term is applied both to routine weather variations and to extraordinary spells of heat which may occur only once a century.

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

1. Inundation flooding occurs most often in the spring. The greatest risks are realized typically during a rapid snowmelt, before ice is completely off all of the rivers. Day County is more vulnerable to inundation flooding than riverine flooding due to the large masses of water contained in the “prairie potholes” and the high ground water table; additionally, because there is only one small river/creek in the county, there is not much of a threat of riverine flooding.
2. Flash Flooding is more typically realized during the summer months. This flooding is primarily localized, though enough rain can be produced to cause inundation flooding in areas along rivers. Heavy, slow moving thunderstorms often produce large amounts of rain. Flash flooding is not very prevalent in Day County. According to the NOAA website only 9 flash flood events have occurred in Day County since 1950, though there are likely more events that were never reported.

Freezing Rain/Ice occurs when temperatures drop below 30 degrees Fahrenheit and rain starts to fall. Freezing rain covers objects with ice, creating dangerous conditions due to slippery surfaces, platforms, sidewalks, roads, and highways. Sometimes ice is unnoticeable and is then referred to as black ice. Black ice creates dangerous conditions, especially for traffic.

Additionally, a quarter inch of frozen rain can significantly damage trees, electrical wires, weak structures, and other objects due to the additional weight bearing down on them.

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

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

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

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

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

Severe Winter Storms deposit four or more inches of snow in a 12-hour period or six inches of snow during a 24-hour period. Such storms are generally classified into four categories with some taking the characteristics of several categories during distinct phases of the storm. These categories include: freezing rain, sleet, snow, and blizzard. Generally winter storms can range from moderate snow to blizzard conditions and can occur between October and April. The months of May, June, July, August, and September could possibly see snow, though the chances of a storm is very minimal. Like summer storms, winter storms are considered a weather event not a natural hazard, and thus will not be evaluated as a natural hazard throughout this plan.

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

Snow is a common occurrence throughout the County during the months from October to April. Accumulations in dry years can be as little as 5-10 inches, while wet years can see yearly totals

between 110-120 inches. Snow is a major contributing factor to flooding, primarily during the spring months of melting.

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

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

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

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

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

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

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

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

HAZARD PROFILE [§201.6(c)(2)(ii)]

Requirement §201.6 (c)(2)(i): [The risk assessment shall include a] description of the type of the... location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

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

Table 4.4: Latitude/Longitude of Communities within the County				
City	Population	Location	Elevation	Occupied Units
Andover	91	45° 24' 38" N 97° 54' 13" W	1480 ft	42
Bristol	341	45° 20' 43" N 97° 45' 3" W	1791 ft	150
Butler	17	45° 15' 298" N 97° 42' 49" W	1827 ft	9
Grenville	54	45° 27' 59" N 97° 23' 24" W	1864 ft	30
Pierpont	135	45° 29' 41" N 97° 49' 54" W	1506 ft	67
Roslyn	183	45° 29' 47" N 97° 29' 27" W	1864 ft	77
Webster	1886	45° 20' 1" N 97° 31' 10" W	1818 ft	878
Waubay	576	45° 19' 59" N 97° 18' 15" W	1857 ft	242
Day County	5710	NA	NA	2504
Population and Occupied Units information was collected from US Census Bureau website: http://factfinder2.census.gov				

Additionally, the extent (i.e., magnitude or severity) of each hazard, information on previous occurrences of each hazard and the probability of future events (i.e., chance or occurrence) for each hazard are addressed in the following tables. While the planning committee reviewed all hazard occurrences that have been reported in the last 100 years, the list for some of the hazards was extremely long. The information provided in the tables is not a complete history, but rather an overview of the hazard events which have occurred over the last ten to twenty years. The planning committee felt the hazard trend for the last 10 years could be summarized in this section and decided to include any new occurrence that have taken place since the previous plan was drafted. The complete 10-year history can be found in Appendix D.

DAM FAILURE

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

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

Day County has two dams identified by the National Inventory of Dams: Pierpont and Amsden Dams. Both dams are WPA structures built in the 1930s. Shortly after the completion of the Amsden Dam a tragedy resulting in the deaths of 6 people occurred. Due to the very sharp drop off under the water due to underwater gravel pits, unskilled swimmers were caught off guard and unable to swim back to shore on August 15, 1937. 6 people died that day.

Pierpont Dam is located on Mud Creek which feeds into the James River to the west. Pierpont Dam is just two miles south Town of Pierpont. Both dams were inspected May 30, 2017 and were found to be low risk. Amsden hold back Pickerel Creek and Mud Creek while the Pierpont Dam holds back Mud Creek. The locations of the dams are found in Table 4.5:

4.5 Dam Locations in Day County						
ID	Name	Owner	Hazard	Height	Storage	Maximum Discharge
SD00012	Pierpont	S&PL	L	24ft	1200	7000
SD00326	Amsden	GF&P	L	35ft	4815	3300

DROUGHT AND WILDFIRE

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

South Dakota's economy is closely tied to agriculture and only magnifies the potential loss which could be suffered by the state's economy during drought conditions. According to the NOAA data, Day County has experienced droughts in 2018. The US Drought Monitor indicates that the area experienced at least 6 periods of Abnormally Dry or Moderate Drought periods in the last 10 years. No instances of Severe, Extreme or Exceptional Drought were documented.

Location	Date	Intensity
Day County	August 2011 – April 2012	D0-D1
Day County	June 2012 – October 2012	D0-D1
Day County	October 2012 – February 2013	D1-D2
Day County	February 2013 – October 2013	D0-D2
Day County	October 2014 – May 2015	D0-D1
Day County	March 2016 – August 2016	D0-D1
Day County	September 2016 – December 2016	D0-D1
Day County	May 2017 – October 2018	D0-D1

Periods of Abnormally Dry weather or Moderate Drought can last anywhere from a few months to a year. The Spring of the year (March – May) tend to be wetter months and less susceptible to drought. When droughts or dry periods occur in the Fall and Winter (October – February), they tend to have less of an impact on crops because the growing season is typically over during the Fall and Winter.

A strong possibility exists for simultaneous emergencies during droughts. Wildfires are the most common. As mentioned on page 24 of this plan, the accuracy of the fire history is questionable, because the State Fire Marshal’s Office collects information from the County, thus the accuracy of the information reported relies on the local fire departments, some of which are volunteer fire departments that are responsible for filing the reports.

Day County has also implemented a controlled burn process. Whenever a landowner wants to start a controlled burn, they are required to call the Sheriff’s Office to report the controlled burn – where it will be located and when they plan to start. They are also required to call back in when the burn is over. This allows the Sheriff’s Office to know about these and prevents them from sending out a fire truck if someone else calls in to report a fire in that area. This process actually came out of some prior mitigation planning meetings.

FLOOD

Flooding is a temporary overflow of water onto lands not normally covered by water producing measurable property damage or forcing evacuation of people and resources. Floods can result in injuries and even loss of life when fast flowing water is involved. Six inches of moving water is enough to sweep a vehicle off a road. Disruption of communication, transportation, electric service, and community services, along with contamination of water supplies and transportation accidents are very possible.

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

The following information was taken from the 2015 Day County disaster mitigation plan and includes details for major past flooding events for Day County dating back to 1986. Day County has been a part of a number of past flooding events that have hit the region. They are too numerous to mention. However, several events are specific to the county and worth mention.

- June and July 1995- Severe flooding occurred throughout the county. Roads were being continually raised due to year after year flooding. In many cases township and county roads were being closed or abandoned.
- July 1996- Localized rain and runoff caused severe flooding throughout the county of the 4th consecutive year causing serious inundation issues on township and county roads. Township and county official had to continually determine essential routes and closing non-essential routes.
- April and May 1997 – Due to very heavy snows of nearly 100 inches during the 96-97 winter and a late April storm, heavy flooding once again occurred throughout the county generally affecting most townships, county roads, and city streets. Several homes located in the Waubay Lake proximity in the town of Grenville were abandoned. Damage to public infrastructure was severe.
- June and July 1998 - Once again heavy rains affected the entire county along with snowmelt caused serious inundation to roads that were repaired from 1993 to 1997. Governor Janklow utilized FEMA Public Infrastructure, Community Development Block Grant, and 404 Mitigation Funding to raise roads to elevations that would ensure roads remained out of water in future years. In 1999, this proved successful since no roads went under water despite spring flooding.
- March and April 2011 – A deep and extensive snowpack started melting across the area began to melt bringing many areas of flooding to Day County. Rising lake levels in northeast South Dakota also threatened and flooded many homes. Many lakes in the Waubay Chain lakes were at or near record levels.
- 2019 – Above average snowfall combined with spring snowstorms brought extensive flooding again to Day County. Roads and culverts were washed out or under water. Lake levels in the Waubay Chain lakes were at or near record levels again.

Due to flooding during the 1990s, the area was mapped by FEMA for NFIP as an area of special concern and a new base flood elevation (BFE) of 1810 was established for new development.

At the time of the drafting of the 2006 Day County Plan, Bitter Lake had increased in size and was starting to encroach on the land area about one half a mile south of Waubay. At that time homes and infrastructure on the south side of the City of Waubay had not been inundated and some people felt like the 1810 BFE was too high. That was in 2007. Since then, several more extremely wet years during 2009, 2010, and the worst in 2011, caused Bitter Lake to grow exponentially, and it was soon encroaching on the City limits of Waubay. Many homes became inundated, causing people to not have access to their homes and making the homes unlivable. Waubay has been part of the FEMA buy out process due to the flooding. The most notable lake shore flooding caused the expansion of Blue Dog, Bitter, Rush and Waubay lakes in 2011. Bitter Lake, for example, expanded an additional 3700 acres from its mid-1990s size. Extensive flooding has continued due to saturated land and continuous snow and rain. People in Day County talk about how they experience flooding by the inch, not the foot. The lake levels tend to

rise a few inches at a time but haven't gone down. The closed basin area of Day County does not experience flooding that moves downstream.

NFIP: [§201.6(c)(2)(ii)]

Day County was mapped in December of 2001. As of early 2020, FEMA is in the process of updating the flood risk data and flood maps for Day County. It was anticipated that the flood risk review meeting would be in May 2020. However, with the uncertainty of the COVID-19 pandemic, it is anticipated that the FRR meeting will either be postponed or done via a virtual format.

Specific areas that are or could be prone to flooding are designated in the DFIRMS which are available for purchase online found on the Map Service Center website. Day County and four communities within the county participate in NFIP including Bristol, Grenville, Waubay, and Webster. Communities that do not participate in NFIP include Andover, Butler, Pierpont, and Roslyn. While Bristol participates in NFIP they do not have a published DFIRM. There are no special flood hazard areas in Bristol and it is entirely Zone C and X.

There are currently 20 policies in force, with insurance in force totaling \$2,791,300.00. A combined total of 135 losses have been paid in Day County. Losses paid have a combined total of \$2,762,006.81. There have been 51 substantial damage claims in Day County since 1978.

Community Rating System Program:

Day County is not part of the Community Rating System program at this time. The Flood Plain Administrator is aware of the program but does not plan on participating at this time.

Day County is in the process of completing several mitigation activities. They recently (March 2020) submitted several HMGP applications to acquire and relocate several properties in Day County. They expect to hear back on those applications by midsummer 2020.

Other mitigation activities have included several road grade raises throughout the county – four road raises alone in the Fall of 2019 and more planned for 2020. Grade raises seem to be an ongoing project due to the high levels of water in the sloughs and lakes in Day County.

The City of Waubay completed several acquisition and relocation projects in 2011-2014 with the help of the HMGP funding awarded to them. The City of Waubay also submitted several HMGP applications in March 2020 to acquire and relocate several properties within City limits. Many of the homes were along Blue Dog lake on the northern end of the City. The City of Waubay is building a storm shelter to protect its citizens from tornados and other high wind events. Funding for the storm shelter came from HMGP.

These are just a few examples of how having a qualified Flood Plain Administrator is a mitigation activity in itself. 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.

CURRENT FLOODING CONDITIONS:

Flooding in Day County continues to be a challenge to the residents and property owners who are affected each year. Mitigation for flooding is always a priority. The current situation is almost at a maximum, which is a significant increase since 2015 when their last mitigation plan was completed.

Table 4.7 Historic Lake Levels in Day County				
Lake levels as recorded by SD DENR and reported on their website – https://apps.sd.gov/NR65LakeInfo/public.aspx . The measurements are in feet.				
Year	Bitter Lake	Waubay Lake	Blue Dog Lake	Rush Lake
1984	1770.3	1780.5	1800.2	1797.4
1997	1788.2	1799.8	1800	1799.8
2011	1802.98	1805.36	1805.8	1805.75
2013	1802.1	1802.53	1802.54	1802.68
2019	1803.49	1804.11	1805.2	1805.24
Record	1803.49 (10/22/19)	1805.36 (7/18/11)	1805.8 (6/3/11)	1805.75 (6/3/11)
It should be noted that the lake levels from 2019 were taken in the Fall, when lake levels are normally lower than they are in the spring and summer due to rainfall events and snow melt.				

The January 20, 2020 of *Reporter and Farmer* detailed the increasing water levels of the area lakes and the possible impact on the area. The land in Day County has been saturated due to previous wet weather and slow-moving water that roads need to be built up and, in some cases, rebuilt back up to be accessible. Many lakes in the area are at or within an inch of being at record levels. The increase in water levels has been rapid. Rush Lake’s level is currently at: 1805.24, increasing by over 4 feet from its level in October 2018 when it was at 1801. Its current record is 1805.75. Bitter Lake set a new record October 22, 2019 at a level of: 1803.49. Its previous record was: 1802.98. October of 2018, its level was 1800.46, showing that it also had increased by over 3 feet. There is concern that due to the back-fill of water into local lakes that once all the lakes even out, there is only a foot of difference between Waubay and Bitter Lake once the lake reaches a level of 1810. The County had already done 4 road raises in the Fall of 2019. There is also concern about roads sinking due to the saturation of land when thawing starts.

There were 14 HMGP applications for buyouts, relocations or elevations in Day County in the Spring of 2020. Twelve of the homes were within the City limits of Waubay and two of the homes in rural Day County.

Many Day County roads are currently under water due to flooding. Some roads may need to be raised up 5 or 6 feet to bring them out of the water. With lakes at near record levels, flooding of roads is only expected to get worse. From 1997 – 2011, the county raised multiple roads by several feet to bring them out of water. Now many of those roads need to be built back up again. Many township roads are also under water.

HAIL

NOAA reports there was hail 36 days over the last 11 years. 62 occurrences of hail were scattered throughout Day County. However, the information provided by the NOAA website was incomplete due to inconsistent reporting after such hazards occur regarding property damage and injuries. Obviously, with such a high number of occurrences it is reasonable to expect that at least some property or crop damage was sustained in the communities during some of the occurrences, even though the damage may not have been reported or recorded. It is possible that such damage was not reported because it was believed to be insignificant at the time, or because those responsible for reporting such information did not report to the proper agencies. Hopefully soon a method for collecting this data will evolve so that it can be made available to local governments for mitigation planning.

Storms have produced recorded hail measurements up to 2.5 inches in the last 10 years. It is reasonable to assume structures and crops have been damaged by this size of hail.

HIGH/STRONG WIND

Severe wind events are common in eastern South Dakota. Several times a year the residents of Day County can expect to experience strong winds in excess of 50 mph. Gusts of wind in excess of 100 mph have also been recorded for the area. Wind can also be a catalyst when combined with other events such as snow or fire. Adding to an already dangerous situation.

On October 26-27, 2010 a record breaking surface low pressure area moved across the Northern Plains and brought high winds to all of central and northeast South Dakota from the early morning of the 26th into the early evening of the 27th. Sustained northwest winds of 40 to 50 mph with gusts to 60 to 75 mph caused scattered property damage across the region along with blowing several vehicles off the road. Along with the high winds came snowfall of 1 to 5 inches which resulted in treacherous driving conditions. Several schools started late on the 27th due to the slippery roads and high winds.

The high winds, combined with slippery roads at times, vehicles off the road at several other locations across the region. Only minor injuries occurred with these incidents. The high winds damaged many traffic signs and signals, downed many power lines and poles, along with downing branches and several trees. As a result, several hundred customers were without power for a time across the area. The high winds caused roof and siding damage to many buildings along with damaging some fences. A shed was also completely destroyed near Sisseton.

On October 12, 2015, in advance of the first cold front, much above normal temperatures occurred on the 11th with highs in the 90s for many locations which brought about several records. Sisseton tied their all-time record high for October with 95 degrees. The extremely dry conditions, heat, low humidity, combined with the high winds brought extreme fire danger to the region on the 11th. Several fires occurred during the late afternoon and evening of the 11th. The first burst of high winds along a cold front on the 11th lofted a large amount of dust to over 5000 feet as it moved from west to east across the region. The visibility was reduced to a half mile at times in blowing dust across parts of central and northeast South Dakota. Some of the highest wind gusts include: 69 mph near Long Lake and 70 mph near Summit.

LIGHTNING

The extent or severity of lightening can range from significant to insignificant depending on where it strikes and what structures are hit. Water towers, cell phone towers, power lines, trees, and common buildings and structures all have the possibility of being struck by lightning. People who leave shelter during thunderstorms to watch or follow lightening also have the possibility of being struck by lightning. The lightning history for the past 10 years shows zero occurrences listed on the NOAA website. Since lightning is common in this region of the United States and in Day County it is evident that the information reported in the NOAA website is inaccurate and incomplete. Since no information was provided a table showing location, date, time, and magnitude was not included in the plan. It is reasonable to believe that lightning can occur anywhere in the County.

TORNADOS

The annual risk for intense summer storms is very high. All of Day County is susceptible to summer storms. Warning time for summer storms is normally several hours, sufficient for relocation and evacuation if necessary. However, tornadoes may occur with little or no warning.

The 10-year history for Day County may indicate that tornadoes do not occur very often and when they do the tornadoes many times they do not touch down or cause any damage. However, many of the neighboring counties have had severe damage caused by tornadoes so it is reasonable to expect that similar tornado events can occur in Day County.

An EF0 tornado went 0.31 miles south of Andover June 24, 2009. Several supercell thunderstorms that developed along a stationary front across central and northeast South Dakota brought very large hail up to the size of tennis balls, damaging winds up to 70 mph, along with a tornado. A tornado touched down briefly south of Andover with no damage reported. Although most of the tornadoes are classified an EF0 to EF1, the damage associated with weather that is likely to cause tornadoes can also be damaging also. NOAA has no record of damage costs.

On September 9, 2019, three tornadoes were observed in Day County as part of one storm. A couple of farmsteads did receive damage as a result of the tornadoes. No injuries were reported.

EXTREME TEMPERATURES

Extreme temperatures in Day County are common occurrences. It is expected that at least two times each year there will be extreme heat or extreme cold in the area. The following information was found on the NOAA website. It is possible that people in the area have adapted to this type of extreme temperatures and thus such weather events are not reported as often as they occur. It is also possible that the information has only in recent years been tracked or reported. Costs again were not calculated for the events. Some costs that can occur are frozen pipes, livestock losses, electrical outages, and loss of activities.

The location of these events is not specifically identified by jurisdiction due to the vast area across the State of South Dakota affected by extreme temperatures. February 19-20, 2008 arctic air along with blustery northwest winds brought extreme wind chills during the evening and early morning hours to northeast South Dakota. Wind chills ranged from 35 to 50 degrees below zero. The winds diminished in the early morning hours of the 20th allowing air temperatures to fall to record or near record lows across northeast South Dakota. Ten new record lows, ranging from 23 to 30 degrees below zero, were set for February 20th. Several water pipes were broken in Aberdeen and in Roslyn. In Roslyn, 225 people were without water for much of the day on the 20th as the water main broke during the night. Also, there were many vehicles that did not start along with late school starts or closings.

The counterpart to extreme cold is extreme heat which also has dangerous implications to humans, livestock, and critical structures and facilities if certain conditions are present.

Another temperature extreme occurrence took place in July 2011 when a large upper level high pressure area built over the region bringing very hot and humid conditions. This was the worst heat wave to hit the region since July 2006. Beginning on Friday July 15th and persisting through Wednesday July 20th, many locations experienced high temperatures in the 90s to lower 100s, with low temperatures in the 70s at night. In addition, humidity levels rose to extreme levels at times. Surface dew point temperatures in the 70s and lower 80s brought extreme heat index values of up to 110 to 125 degrees. The dewpoints were some of the

highest ever recorded in the region. The dewpoint at Aberdeen tied the previous record with 82 degrees. Sisseton also tied their record with 83 degrees. The prolonged heat took its toll on livestock with fifteen hundred cattle perishing during the heat. Numerous sports and outdoor activities were cancelled.

WINTER STORMS

Snow and ice storms are a common occurrence in Day County. While such storms would be considered extreme in many parts of the country, the consistent nature of such weather hazards are expected in this area. Thus, planning and response mechanisms for snow and ice storms are vital to the County and are routine procedures in Day County due to the common nature of such storms.

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

Table 4.13 is Day County’s Winter Storm History taken from the 2015 Plan which included “major storms over the past 30 years.” The first storm event actually predates the 2006 Plan by 37 years. In comparison to the table provided above, it is evident that the information is being reported and recorded more accurately now than in previous decades which is most likely a result of technology, internet, and a coordinated and focused effort to share information between agencies and local governments.

Table 4.8 Day County Storm Dates 2008 Plan		
Storm Event	Date	Location
Over 100 inches of snow accumulated, heavy livestock losses	Dec-Feb 1969	Eastern/Central South Dakota
Downed Power lines, school closures, livestock losses, closed roads	Nov-Dec 1996	Northeast SD
Second blizzard in 1 week, not as much snow as first storm, but wind gusts created zero visibility, buildings collapsed from snow, disaster declaration statewide, estimated damages over \$50M	Jan 1997	Statewide
Snow accumulations averaged 1-2 inches per hour, 50-60 mph winds, estimated 100,000 cattle lost, downed powerlines, National Guard was activated to help with snow removal and help power companies assess damage, estimated damages over \$40M	April 4-7 1997	Statewide

December 25, 2016 - An intense surface low pressure area moved from northeast Colorado to South Dakota from the 24th through the 26th. This storm was unusually warm for the region for late December and produced record breaking heavy rain along with flooding in some cases. Significant icing occurred across areas at or just below the freezing point, which resulted in widespread tree and power pole and line damage to the area.

Ice accumulations were significant across central and northeastern South Dakota with over an inch accumulation for some locations. High winds during this event increased the amount of power pole, line, and tree damage. The ponding of the heavy rain froze overnight once much colder air moved in.

High winds gusting to over 70 mph impacted the entire region on the 25th and 26th. The combination of snow and ice and high winds snapped or otherwise damaged hundreds of power poles, downed several thousand miles of power lines, damaged several hundred transmission structures and brought many substations down. Many roads were blocked by power lines. Overall, more than one hundred linemen worked to bring the power back.

Twenty-one counties encompassing 30 communities and 3 Indian reservations were impacted. Entire communities, thousands of homes and businesses, and ultimately over 12,000 people went without power. For some, power was not restored for 10 days despite tireless efforts. All power was restored by January 4th, 2017. Water and sewer systems shut down for several days for some communities and emergency shelters were necessary. Deuel, Day, Marshall, Roberts and Grant counties were the hardest hit. County and city governments were overwhelmed by ice accumulations and blizzard conditions and struggled with maintaining accessibility even for emergency traffic. Road conditions deteriorated to the point where it took up to several hours for emergency officials to respond to 911 calls.

December 28, 2019 - A strong winter storm created numerous impacts across central and northeast South Dakota from late on December 27th until early on the 30th. Snowfall amounts ranged from 6 to as much of 20 inches. The heaviest precipitation came in two waves, with the first wave arriving during the late evening of December 27th and continuing into December 28th. Behind this first wave of heavy snowfall, there was a period of light snow, drizzle, and freezing drizzle on Saturday the 28th for areas of northeast South Dakota. The second wave of precipitation was all snow and arrived on the evening of December 28th and continued into December 30th.

The winter storm evolved into a blizzard across much of the region. The combination of the snow and blowing snow severely impacted road conditions and travel across the region.

THUNDERSTORMS

Thunderstorms and high wind occurrences in the County are also very common. They can be extensive and severely hazardous. The County continues to educate residents of the dangers of such storms through public service announcements and other printed media as high winds have proven to be very damaging to property and crops. Although NOAA records the wind speeds, they do not always indicate a cost of the event, although according to the research, there was widespread damage.

ASSESSING VULNERABILITY: OVERVIEW

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

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

Blizzards are characterized by high winds, blowing snow, cold temperatures, and low visibility. Blizzards create conditions such as icy roads, closed roads, downed power lines and trees. Day

County's population is especially vulnerable to these conditions because people tend to leave their homes to get places such as work, school, and stores rather than staying inside. Traffic is one of the biggest hazards in Day County during a blizzard because people often get stuck, stranded, and lost when driving their vehicles which usually prompts others such as family and or emergency responders to go out in the conditions to rescue them.

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

South Dakota's climate is characterized by cold winters and warm to hot summers. There is usually light moisture in the winter and marginal to adequate moisture for the growing season for crops in the eastern portion of the state. Semi-arid conditions prevail in the western portion. This combination of hot summers and limited precipitation in a semi-arid climatic region present a potential position of suffering a drought in any given year. The climatic conditions are such that a small departure in the normal precipitation during the hot peak growing period of July and August could produce a partial or total crop failure. In fact, South Dakota's economy is closely tied to agriculture only magnifies the potential loss which could be suffered by the state's economy during drought conditions. Roughly every 50 years a significant drought is experienced within the county, while less severe droughts have occurred as often as every three years.

Earthquakes can occur in the area but are very rare. Most do not have a great enough magnitude or intensity in the past 25 years to be reported. The magnitude and intensity of an earthquake is measured by the Richter scale and the Mercalli scale. An earthquake of noteworthy magnitude has not occurred in the County for decades, but it would be reasonable to expect that a large earthquake would have comparative impact on Day County as it would anywhere else. Day County does not have skyscrapers or very many tall buildings other than grain elevators, but it also does not have building codes in place that require homes or buildings to be retrofitted. If earthquakes were a regular occurrence in Day County, the County would be extremely vulnerable because of the lack of building requirements. Since the likelihood of an earthquake is minimal, the risk is also considered low.

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

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

Flooding: Floods can result in injuries and even loss of life when fast flowing water is involved. Six inches of moving water is enough to sweep a vehicle off a road. Disruption of

communication, transportation, electric service, and community services, along with contamination of water supplies and transportation accidents are very possible. The flooding of township and county roads is a concern for the entire county. Concern areas are addressed in the Mitigation Section of this plan.

Day County is more vulnerable to inundation flooding than riverine flooding due to the large masses of water contained in the “prairie potholes” and the high ground water table.

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

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

Heavy Rain causes damage to property such as homes and roads. Often when heavy rains occur in Day County it causes sewers to backup in homes due to excess water entering the wastewater collection lines. The excess water sometimes has no place to go and thus basements fill up with water which results in damage to water heaters, furnaces, and damage to living quarters for people who live in basement apartments. Roads and bridges can be washed out, thus causing traffic hazards for travelers and commuters. Many times, the roads have to be closed causing rural traffic to have to take alternate routes which can sometimes be an additional 5-10 miles out of the way. All areas of the County are vulnerable when heavy rains occur. Storm sewers are built for the typical storm and therefore do not accommodate for excessive or heavy rains. Another problem with heavy rain is that it only takes a few inches of rain to cause the Waubay chain lakes to rise. Most of the excess moisture flows to the southernmost lake, Bitter Lake, which has grown exponentially over the past two decades. Other lakes are affected too, and many of the lakes have developments around the shore.

Ice Jams cause damage to bridges, roads, and culverts due to water currents pushing large chunks of ice under or through small openings. There are no areas particularly vulnerable to ice jams.

Landslides have a low chance of occurring in Day County due to the topography of the area. Some areas around the lakes erode very quickly due to the extreme wave action caused by the very strong winds that are typical of the area. Many areas are rip rapped to preserve the shoreline, but many times the wave action is strong enough to wash away the rip rap.

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

One of lightning's dangerous attributes includes the ability to cause fires. Since the entire county is vulnerable to lightning strikes and subsequent fires, these fires will be treated under the fire section of this plan. Most injuries from lightning occur near the end of thunderstorms. Individuals who sought shelter leave those areas prior to the entire completion of the thunderstorm. Believing it is safe to freely move around, concluding lightning strikes catch them off guard.

Severe Winter Storms have a high risk of occurrence. Approximately five snowstorms each resulting in 5-10 inches of snow occur in the Day County area annually. Heavy snow can immobilize transportation, down power lines and trees and cause the collapsing of weaker structures. Livestock and wildlife are also very vulnerable during periods of heavy snow. Most storms can be considered to have occurred countywide. Due to the multiple occurrences of winter storms each year, an exhaustive compilation is not possible.

Additionally, winter storms often result in some forms of utility mishaps. High voltage electric transmission/distribution lines run the length of Day County. These lines are susceptible to breaking under freezing rain and icy conditions and severing during high blizzard winds. Within the county, particularly within Webster, there are fiber optics associated with phone transmissions that are the lifeline to communications. Any electrical complications bring associated risk of food spoilage, appliance burnout, loss of water, and potential harm for in-house life support users. Limited loss of power is not uncommon on an annual basis. A typical power interruption lasts from 1 to 3 hours. Most residents are prepared to deal with this type of inconvenience.

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

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

Populations at highest vulnerability for this type of hazard are rural homeowners, which account for approximately 57.6 percent of the county, and the elderly. As with any weather event, those dependent upon healthcare supplies and other essentials will also bear the brunt of highway closures and slowed transportation due to snow and ice. Emergency services will also be delayed during winter storms.

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

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

trees lose their stability and can be blown over or knocked down easily. Strong winds cause extreme wave action in the lakes which results in erosion of the shoreline and rip rap. Rip rap is often placed along the roadways to keep the waves from destroying the roads.

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

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

Tornados present significant danger and occur most often in South Dakota during the months of May, June, and July. The greatest period of tornado activity (about 82 percent of occurrence) is from 11 am to midnight. Within this time frame, most tornadoes occur between 4 pm and 6 pm. The annual risk for intense summer storms is very high. Often associated with summer storms are utility problems. High voltage electrical transmission lines run the length of Day County. These lines are susceptible to breaking during high winds and hail. Tall trees located near electrical lines can be broken in wind or by lightning strikes and land on electrical lines, severing connections. Any electrical complications bring associated risk of food spoilage, appliance burnout, loss of water, and potential harm to in-house life support dependents. Limited loss of power is common on an annual basis. Typical power interruptions last around 1 to 3 hours. Most residents are prepared to deal with this.

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

Since there are no remote forested regions in Day County, wildfires can be easily spotted and are capable of being maintained. Day County does not have any areas that are considered wildland-urban interface because property outside city limits is primarily agricultural land, thus, there are no urban interface areas at risk in Day County. In addition, fire interference with traffic on highways is not a major concern. The most important factor in mitigating against wildfires continues to be common sense and adherence to burning regulations and suggestions disseminated by the County. Day County does have a controlled burn permit process in place. Anyone wanting to perform a controlled burn needs to call the Day County Sheriff's Office to receive a free permit.

Moisture amounts have the biggest impact on fire situations. During wet years, fire danger is low. More controlled burns are conducted and less mishaps occur. During dry years, severe restrictions are placed on any types of burns. Hunting season brings thousands of hunters to the area. Shots have the potential to ignite dry grassland, hay bales, or storage areas. This is a risk that is addressed in hunting education and safety. ATV's also have the potential to ignite dry plants.

ADDRESSING VULNERABILITY: REPETITIVE LOSS PROPERTIES

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

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. Day County does not keep an official record of repetitive loss properties however; the State of South Dakota Office of Emergency Management (SDOEM) provided information showing that there are 27 properties that qualify as repetitive loss properties in Day County.

ASSESSING VULNERABILITY: IDENTIFYING STRUCTURES

Requirement §201.6(c)(2)(ii)(A): The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard area...

One of the primary purposes of this plan is identifying critical facilities and determining which are particularly at risk of damage from natural hazards. In the event of a disaster as a result of severe summer or winter storms, Day County and participating entities will have the ability to prevent further loss of life by generator powered critical facility shelters. The City of Webster has many structures that are vital to emergency operations including the County’s only hospital, a nursing home, the Day County Courthouse which also serves at the local emergency operations center when needed. Table 4.15 is a list of critical facilities that would cause the greatest distress in the county if destruction occurred. The table is organized alphabetically by location (column 1) and then alphabetically by structure name (column 5).

Table 4.15: Critical Structures in Day County

<u>Location</u>	<u>Value</u>	<u>Size (Sq Ft)</u>	<u>Type</u>	<u>Structure Name</u>	<u>Owner Type</u>
Andover			Govt Bldg	City Hall/Fire Dept	City
Andover			Govt Structure	Sewer Lift Station	City
Andover			Govt Structure	Sewer Lagoons	City
Bristol		400 Sq Ft	Govt Bldg	City Hall	City
Bristol		2500 Sq Ft	Govt Bldg	Community Center	City
Bristol		1800 Sq Ft	Govt Bldg	City Maintenance Shop	City
Bristol		75,000 gallons	Govt Structure	Water Tower 75,000 gal	City
Bristol		1250 sq ft	Govt Bldg	Fire Department	City
Bristol		30,000 sq ft	Private	Sun Dial Manor	Private
Bristol		2,000 sq ft	Private	First Savings Bank	Private
Bristol		Unknown	Private	Wheat Growers	Private
Bristol		Unknown	Govt Structure	City Park	City
Bristol		1,000 sq ft	Govt Bldg	Swimming Pool/Bath House	City
Bristol		Unknown	Govt Structure	Ball Field	City
Bristol		Unknown	Govt Structure	Sewer Lift Station	City
Bristol		10,000	Private Business	Fritz’s Furniture Outlet	Private
Bristol		7,500 sq ft	Govt Bldg	Activity Center/Old HS Gym	City
Butler	Not participating. No Info submitted	Unknown	NA	NA	NA
Grenville		Unknown	Govt Bldg	Longbranch Bar	City

Grenville		Unknown	Private	Grenville Sports Mart	Private
Grenville		Unknown	Govt Structure	City Wells	City
Grenville		Unknown	Govt Bldg	Fire Hall	City
Pierpont		1720 sq ft	Govt Bldg	City Storage	City
Pierpont		2,400 sq ft	Govt Bldg	Fire Hall	City
Pierpont		3,000 sq ft	Private	Community Bldg	Private
Pierpont		Unknown	Govt Structure	City Lagoon	City
Pierpont		2,000 sq ft	Private Business	Pierpont Service	Private
Pierpont		1,500 sq ft	Private Business	Pierpont Service	Private
Roslyn		3,648 sq ft	Govt Bldg	Fire Hall	City
Roslyn		13,500 sq ft	Private Non-Profit	Strand-Kjorsvig Community Home	PNP
Roslyn			Govt Structure	Water tower	City
Roslyn		Unknown	Govt Structure	Sewer Lift Station	City
Roslyn		Unknown	Govt Structure	Sewer Lagoon	City
Roslyn		1,300 sq ft	Govt Bldg	City Storage Garage	City
Roslyn		1,500 sq ft	Govt Bldg	Bus Shed	City
Roslyn		2,000 sq ft	Private Business	Community Oil	Private
Roslyn		540,000 sq ft	Private Structure	Roslyn Elevator	Private
Roslyn		3,362 sq ft	Govt Bldg	International Vinegar Museum	City
Roslyn		1,800 sq ft	Private Business	Jimmy J's	Private
Roslyn		7,800 sq ft	Private Business	Sioux Valley Coop	Private
Roslyn		10,400 sq ft	Private Business	Northside Properties	Private
Roslyn			Private Business	Strip Mall includes: Community Oil, Schmidt's Custom Meats, Howe's Salon and Feed Energy Co	Private
Roslyn		23,000 sq ft	Govt Bldg	Roslyn Event Center includes: Finance Office, Town Shop, Viking Fitness Center	City
Roslyn		14,000 sq ft	Private Business	Toad Tracks	Private
Roslyn			Govt Bldg	US Post Office	
Waubay	\$393,596	2,080 sq ft	Govt Bldg	City Hall	City
Waubay	\$232,285	3,645 sq ft	Govt Structure	Fire Hall	City
Waubay	\$104,598	2,448 sq ft	Govt Bldg	City Maintenance Shop	City
Waubay	unknown	1,500 sq ft	Medical Facility	Avera Clinic	Private
Waubay	\$755,498	80,000 gallons	Govt Structure	Water tower/Pump House	City
Waubay	unknown	Unknown	Govt Structure	Wastewater Lagoons	City
Waubay	\$339,807	Unknown	Govt Structures	Lift Stations (7)	City
Waubay	unknown	70,000 sq ft	Education	Waubay School	School
Waubay	\$171,191	N/A	Education	Athletic Field/ Park/ Lights/Bathrooms	School
Waubay	\$100,000	3,000 sq ft	School District	School Bus Shed/Fuel	District
Waubay	\$168,239	1,500	City	Waubay Library	City
Waubay	unknown	10,000 sq ft	Private	Elderly Housing 8-Plex	Private
Waubay	unknown	8,000 sq ft	Private	Elderly Housing 4-Plex	Private

Waubay	unknown	8,000 sq ft	Private	Elderly Housing 4-Plex	Private
Waubay	unknown	7,000 sq ft	Private	HR One Stop	Private
Waubay	unknown	3,000 sq ft	Private	Jorgenson Meat Market	Private
Waubay	unknown	1,200 sq ft	Private	LaBolt Farmers Market	Private
Waubay	Unknown	9,100 sq ft	Private	Dollar General	Private
Webster	1,491,873	2,089 sq ft	Govt Bldg	City Hall Library	City
Webster	428,339	600 sq ft	Govt Structure	Water Tank Tower	City
Webster	106,142	149 Sq ft	Govt Bldg	Equipment Storage	City
Webster	20,311	61 sq ft	Govt Bldg	Material Storage	City
Webster	40,211	121 sq ft	Govt Bldg	Restrooms & Warming House	City
Webster	8,251	25 sq ft	Govt Bldg	Pump Station #5 & Well House by Ambulance	City
Webster	386,250	2800 sq ft	Govt Bldg	Liquor Store	City
Webster	291,606	875 sq ft	Govt Bldg	Golf Club House	City
Webster	92,409	277 sq ft	Govt Bldg	Golf Cart Storage/ Shop	City
Webster	90,576	272 sq ft	Govt Bldg	Golf Cart Storage	City
Webster	46,978 (x4)	66 sq ft (x4)	Govt Bldg	Hangar #1-4	City
Webster	29,857	90 sq ft	Govt Bldg	Airport Waiting Area	City
Webster	153,411	460 sq ft	Govt Bldg	Hangar	City
Webster	393,000	550 gal	Govt Structure	Water Tank-blue WEB	WEB
Webster	389,538	545 sq ft	Govt Bldg	City Shop	City
Webster	1,339,000	2,285 sq ft	Govt Bldg	Fire Hall	City
Webster	2,720,634	3,809 Sq ft	Govt Bldg	Armory	City
Webster	11,110	33 sq ft	Govt Structure	Golf Course Pump House	City
Webster	8,888	27 sq ft	Govt Structure	Well House- Baseball Complex	City
Webster	5,995	18 sq ft	Govt Structure	Golf Course Storage	City
Webster	22,447	31 sq ft	Govt Structure	Cemetery Storage	City
Webster	76,289	229	Govt Bldg	Bus Barn-Community Transit	City
Webster	28,435	85 sq ft	Govt Structure	Baseball Concession	City
Webster	76,128	60 (x3)	Govt Structure	Rotating Siren (x3)	City
Webster	68,376	205 sq ft	Govt Structure	Concession/ Bathrooms (Baseball Complex)	City
Webster	84,593	254 sq ft	Govt Bldg	Airport Equipment Storage	City
Webster	39,745	56 sq ft	Govt Bldg	Restroom City Park	City
Webster	54,756	104 sq ft	Govt Bldg	Restroom/Concession-Soccer	City
Webster	17,900	54 sq ft	Govt Structure	Picnic Shelter	City
Webster	6,763	20	Govt Equipment	West field Scoreboard	City
Webster	231,000	670	Govt Equipment	Field Lighting (all fields)	City
Webster	11,054	15 sq ft	Govt Structure	Aeration Bldg-Lagoon	City
Webster	79,568	231 sq ft	Govt Equipment	Super AWOS Weather Unit	City
Webster	200,282	1824 sq ft	Govt Bldg	Police Department	City
Webster	20,997	600 sq ft	Govt Bldg	Dugout/Crow's nest	City
Webster	9,793	720 sq ft	Govt Bldg	Dugout/West Diamond	City

Webster	664,132	2233 sq ft	Govt Bldg	Bathroom/Concession – Pool	City
Webster	461,203	1073 sq ft	Govt Bldg	Pumphouse/Pool	City
Webster	272,659	NA	Govt Equipment	Waterslide	City
Webster	123,000	NA	Govt Equipment	Hwy 12 Light Poles	City
Webster	19,000	NA	Govt Equipment	Hwy 12 Signal Light	City
Webster	33,000	NA	Govt Equipment	Control Cabinet (Main St & 8 th Ave)	City
Webster	7,200	NA	Govt Equipment	Signal Poles	City
Webster	3,380	NA	Govt Equipment	8 Pedestrian Button Poles	City
Webster	19,000	NA	Govt Equipment	Main St & 8 th Ave Signal Poles	City
Webster	66,000	NA	Govt Equipment	Control Cabinet Hwy 12 Mast Arms/Signal Poles	City
Webster	446,321	5,936 sq ft	Govt Bldg	Old Guard Shop	City
Webster	50,000	120 sq ft	Govt Bldg	Lighting Vault Airport	City

The information provided in Table 4.15 was taken from the 2015 Mitigation Plan and all jurisdictions were asked to update the list as needed. The participants were instructed to think of structures that would cause the most devastation to their communities if the structures were to be lost in a natural hazard event, “In other words, list those structures that you cannot live/operate without.” Plan participants were then instructed to determine value of those structures. Most of the values provided are the insured values from the insurance policies. The plan author acknowledges that determining what is “critical” can mean something different to every community and that the information provided in the table is not comprehensive. However, the information provided by the plan participants in their worksheets was used a baseline and can be supplemented in future years during the annual plan review and/or during the 5-year update. By using information provided by the representatives from each community it also helps establish a sense of ownership in the mitigation plan. Finally, the plan participants were asked to identify which of the critical structures or facilities are particularly at risk of natural hazards.

While the information may not be comprehensive it does give FEMA, SDOEM, and any other readers of the Plan an idea of how communities in rural South Dakota feel about certain structures. For example, FEMA may not view a City Park as a “critical” structure, however, in many small communities the City Park or baseball field is the hub of where activities take place and may also be the only thing that attracts tourists and people from outside the community. So it may be the case that without these “landmarks” the communities’ existence would be at stake. Likewise, a bar or any particular business may not be viewed by some as “critical”; however, often these places act as community gathering spots and are often one of the only sources of sales tax revenue that help support the town’s budget. Municipal owned bars or liquor stores are also an important revenue stream for municipalities.

ASSESSING VULNERABILITY: ESTIMATING POTENTIAL LOSSES

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

The information provided in the following tables was collected from the local jurisdictions by the representatives from each community. The Day County Emergency Manager provided the information for Day County and representatives from the private participating businesses as well

as the local jurisdictions provided information regarding their vulnerabilities. Inconsistencies and missing information result from lack of existing mechanisms, plans, and technical documents available to the communities and also a result of people who are serving their communities on a volunteer basis as opposed to many other areas in the nation which have larger communities who pay salaried professionals to represent them during the Plan drafting process. Each of the communities provided the best available data considering the lack of resources in which to access the information. Since this section of the plan is new, those jurisdictions that have submitted incomplete information in the 2015 Plan will be requested to provide more complete data during the next five-year update and review of the Plan.

The assessor's office provided the assessed valuation of all structures within the municipalities. All properties with structures, whether owner occupied or not were included in the valuations provided in Tables 4.16 through 4.26. The reports provided by the assessor's office did not include the type of structure (for example, a residential structure may be a house or an unattached garage); thus, many of the tables are missing this information. Some of the communities (local jurisdictions) can literally count every structure and every resident from their doorstep, which shows just how small and rural some of these communities are.

4.16 Day County Estimated Potential Dollar Losses to Vulnerable Structures									
Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in County	# in HA	% in HA	\$ in County	\$ in HA	% in HA	# in County	# in HA	% in HA
Residential	2,277	2,277	100%	\$190,959,446	\$190,959,446	100%	5710	5710	100%
Commercial	80	80	100%	\$11,299,312	\$11,299,312	100%			
Industrial									
Agricultural	1,121	1,121	100%	\$25,241,916	\$25,241,916	100%			
Religious									
Government									
Education									
Utilities									
Total	3,478	3,478	100%	\$227,500,674	\$227,500,674	100%	5710	5710	100%

4.17 Andover Estimated Potential Dollar Losses to Vulnerable Structures									
Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in HA	% in HA	\$ in City	\$ in HA	% in HA	# in City	# in HA	% in HA
Residential	101	101	100%	\$1,820,197	\$1,820,197	100%	91	91	100%
Commercial	10	10	100%	\$204,602	\$204,602	100%			
Industrial									
Agricultural	7	7	100%	\$158,385	\$158,385	100%			
Religious	1	1	100%			100%			
Government	2	2	100%			100%			
Mobile Homes	6	6	100%	68,664		100%			
Utilities									
Total	127	127	100%	1,846,459		100%	91	91	100%

4.18 Bristol Estimated Potential Dollar Losses to Vulnerable Structures

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in HA	% in HA	\$ in City	\$ in HA	% in HA	# in City	# in HA	% in HA
Residential	303	303	100%	\$2,374,734	\$2,374,734	100%	341	341	100%
Commercial	36	36	100%	\$1,840,519	\$1,840,519	100%			
Industrial									
Agricultural	2	2	100%	\$18,346	\$18,346	100%			
Religious									
Government									
Education									
Utilities									
Total	341	341	100%	\$4,233,599	\$4,233,599	100%	341	341	100%

4.19 Butler Estimated Potential Dollar Losses to Vulnerable Structures

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in HA	% in HA	\$ in City	\$ in HA	% in HA	# in City	# in HA	% in HA
Residential	22	22	100%	\$88,560	\$88,560	100%	17	17	100%
Commercial	1	1	100%	\$5,709	\$5,709	100%			
Industrial									
Agricultural	4	4	100%	\$11,112	\$11,112	100%			
Religious									
Government									
Education									
Utilities									
Total	27	27	100%	\$105,381	\$105,381	100%	17	17	100%

4.20 Grenville Estimated Potential Dollar Losses to Vulnerable Structures

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in HA	% in HA	\$ in City	\$ in HA	% in HA	# in City	# in HA	% in HA
Residential	87	87	100%	\$2,547,378	\$2,547,378	100%	54	54	100%
Commercial	6	6	100%	\$258,412	\$258,412	100%			
Industrial									
Agricultural	0	0							
Religious									
Government									
Education									
Utilities									
Total	93	93	100%	\$2,805,790	\$2,805,790	100%	54	54	100

4.22 Pierpont Estimated Potential Dollar Losses to Vulnerable Structures

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in HA	% in HA	\$ in City	\$ in HA	% in HA	# in City	# in HA	% in HA
Residential	130	130	100%	\$2,864,028	\$2,864,028	100%	135	135	100%
Commercial	16	16	100%	\$372,818	\$372,818	100%			
Industrial									
Agricultural	3	3	100%	\$120,448	\$120,448	100%			
Religious	1	0	100%			100%			
Government									
Education									
Utilities	1	0	100%	Unknown		100%			
Total	151	151	100%	\$3,357,294	\$3,357,294	100%	135	135	100%

4.23 Roslyn Estimated Potential Dollar Losses to Vulnerable Structures

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in HA	% in HA	\$ in City	\$ in HA	% in HA	# in City	# in HA	% in HA
Residential	165	165	100%	\$3,097,533	\$3,097,533	100%	183	183	100%
Commercial	21	21	100%	\$1,277,983	\$1,277,983	100%			
Industrial									
Agricultural	1	1	100%	\$3,921	\$3,921	100%			
Religious									
Government									
Education									
Utilities									
Total	187	187	100%	\$4,379,437	\$4,379,437	100%	183	183	100%

4.24 Waubay Estimated Potential Dollar Losses to Vulnerable Structures

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in HA	% in HA	\$ in City	\$ in HA	% in HA	# in City	# in HA	% in HA
Residential	537	537	100%	\$20,124,517	\$20,124,517	100%	576	576	100%
Commercial	54	54	100%	\$3,135,949	\$3,135,949	100%			
Industrial									
Agricultural	12	12	100%	\$303,187	\$303,187	100%			
Religious									
Government									
Education									
Utilities									
Total	603	603	100%	\$23,563,653	\$23,563,653	100%	576	576	100%

4.25 Webster Estimated Potential Dollar Losses to Vulnerable Structures

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in City	# in HA	% in HA	\$ in City	\$ in HA	% in HA	# in City	# in HA	% in HA
Residential	1454	1454	100%	\$64,780,191	\$64,780,191	100%	1,886	1,886	100%
Commercial	187	187	100%	\$23,944,152	\$23,944,152	100%			
Mobile Homes									
Agricultural	0			\$0	\$0				
Religious									
Government	33	33	100%	\$7,754,495	\$7,754,495	100%			
Education									
Utilities									
Total	1,674	1,674	100%	\$96,478,838	\$96,478,838	100%	1886	1886	100%

ASSESSING VULNERABILITY: ANALYZING DEVELOPMENT TRENDS

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

The land use and development trends for each jurisdiction were identified by the representatives from each of the jurisdictions. None of the communities in Day County are experiencing any growth at this time as all of the jurisdictions have experienced declining populations over the past 10 years and at this time are just trying to maintain the population they have. Additionally, most of the jurisdictions are not developing with the exception of Webster where there has been some change in the local businesses over the past 5 years. Due to the declining populations the smaller jurisdictions do not maintain plans for growth and development.

Day County

The Planning and Zoning Department in Day County handles all building permits located outside of city limits. They ensure structures are built in accordance with the zoning regulations. Residential houses on lakes need to be built at least 40 feet back from the ordinary high water mark. According to the Planning and Zoning Director, most lake homes are now built farther than 40 feet back or on a hill overlooking the lake. He attributed this to the flooding problems residents have seen with existing houses around lakes in Day County. All new development in areas of special concern must provide an elevation certificate stating that the building is at an elevation of 1810 feet.

In the past five years, the prominent themes in development in the rural areas of Day County have been residential developments around the lakes – the homes being built now are larger than ever before as the lots have also increased in value.

There have also been more Concentrated Animal Feeding Operations (CAFOs) in Day County. As the next generation of farmers return to the farm, operating a CAFO is often a way to support an additional family on the farm as land prices continue to increase and crop prices remain low. New or expanding CAFOs in Day County do require a permit from the County. CAFOs are prohibited in the floodplain with limited exceptions (smaller CAFOs in areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with

average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood.)

Town of Andover

Andover is currently undergoing a large project to fix some deficiencies with their sewer system. Like many small towns, Andover doesn't have a storm sewer system. The sanitary sewer system can't handle the storm water. The storm water drains into the lift station and treatment ponds, causing backup into people's homes. They have applied to the SD DENR for funding to install a storm sewer pipe that will discharge storm water into the wastewater treatment facility.

Like many other small towns, Andover's building permit process primarily focuses on setback requirements. There are no established floodplains in town.

Town of Bristol

Bristol finished up several significant City infrastructure projects about five years ago. They made improvements to their water, wastewater, lagoon and storm sewer systems. In 2019, they focused on cleaning up nuisance properties making improvements to sewer drain system. There was a new storm drain installed in an area where excess water was causing issues. The storm water would flow through yards and the new storm drain will prevent that from happening.

Town of Grenville

Grenville has recently installed water meters in town and made improvements to their water lines.

Grenville does have a building permit process. Depending on the size of the project, either the Finance Officer or the Town Board approves it, if the project meets property setbacks and other ordinances. City Officials said there is not much land around the lake that is within city limits available for development.

Town of Pierpont

Pierpont is currently undergoing two significant development projects to city infrastructure. They are replacing their water meters across town as their current system wasn't accurately reading all of the water being used. They are also undergoing a sewer improvement project with their sewer lines throughout town.

Town of Roslyn

In the last five years, Roslyn has developed a new City Park. They also annexed some land adjacent to town where a new strip mall was built that houses a handful of businesses. When annexing the property, the City had to expand their water and sewer lines to the property, but they are also now able to collect sales tax from the businesses located there. Roslyn uses the County's building permit process for any new developments; however, the Roslyn town board has the authority to approve or deny building permits.

City of Waubay

The City of Waubay has actually lost several homes to flooding over the last several years. They also have 12 more properties that have applied for home acquisition through the HMGP in 2020. Unfortunately, many of those people moved out of Waubay. The number of new homes built has not matched the pace at which homes are removed due to flooding.

As in most rural, South Dakota towns, new commercial development is quite slow. Towns are usually happy to be able to maintain their existing businesses. There is a new Dollar General store that was built recently.

In 2020, the City is finishing up a wastewater project, moving lagoons to higher elevation due to the rising lake water levels.

City of Webster

The City of Webster has various groups involved in planning and development. The City itself has zoning ordinances and considers all building permits. They also have a contracted code enforcement officer. They do require elevation certificates for any development in the floodplain. The base level elevation is 1,810 ft. They require an engineer to provide the elevation certificate.

The Webster Area Development Corporation works with new businesses starting up or existing businesses in Webster that are looking to expand. Several existing manufacturers in Webster have expanded their operations in the last few years. All of these expansions were added on to existing buildings. Otter Tail Power Company and Montana-Dakota Utilities Co. chose Webster to host their main laydown yard and offices for a transmission line construction project. The BSSE project's primary construction "laydown" yard will be located on the 90 acres north of Commerce Lane in Webster Industrial Park. With the help of City of Webster and Webster Scale, WADC constructed a new road to provide direct access to SD Hwy-25, which will not only be advantageous for BSSE but also for future development of the industrial park.

There is also a housing group in Webster, Day County Housing, actively looking for an area adjacent to town to develop for new housing. Preliminary work has been done and two different areas have been identified for development. Neither site is within a Special Flood Hazard Area. Webster is also building a new walking/recreation trail for its residents.

The City has also invested in its infrastructure by replacing water and wastewater lines. They have also applied for funding for sewer improvements and have talked about undergoing a storm sewer study.

UNIQUE OR VARIED RISK ASSESSMENT

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

Day County

The western part of the county does not face the flooding issues that the eastern side of the county due to the proximity to the glacial lakes. The Waubay Chain Lakes which are located on the eastern side of the county are surrounded by farms and housing developments. There are many roads throughout the county which have been affected or completely covered by the growing bodies of water. The western part of the county is affected by a high water table which eventually finds its way into basements of homes, especially after heavy rain events or rapid snow melt in the spring. Flooding caused by the glacial lakes is a unique risk that primarily affects the town of Waubay, though residents that live along the lakes, outside of city limits are also affected by flooding. The County also has many roads that are under water and closed due to high water conditions.

Most of the other natural hazards that were identified in the risk assessment have an equal chance of occurrence in most parts of the county and have similar risks throughout the county.

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.

Town of Andover

The problems in Andover mostly revolve around flash flooding due to inadequacies of their sewer system. They currently don't have a storm sewer system to drain water away from homes. As noted in the development trends, they are actively working a project to convert their current wastewater lines into storm sewer lines.

Town of Bristol

During high rain events or periods of rapid snowmelt, the park in Bristol does flood. High rain events also put stress on their lift station as it struggles to keep up for about 24 hours after a heavy rain.

Town of Grenville

Only small parts of Grenville have flooding issues, mostly on the east side of town closer to Waubay Lake. During an ice storm in December 2016, the town lost power for about a week. There is no winter storm shelter in Grenville. During times of no power, some people have backup generators for their homes, others take shelter with relatives or friends. The municipal-owned bar does have a backup generator, which does provide a place for people to warm up and take temporary shelter.

Town of Pierpont

Like many other towns in Day County, Pierpont has one corner of town that is at risk for flooding. The particular issue in Pierpont resides in the SE corner of town where the township and town limits intersect and have irregular boundaries. The town is at risk to windstorms and blizzards. While most people in town have basements to seek shelter, there are a few trailer homes in town and the town does not have a storm shelter. The City does have regulations that any trailer homes brought into town have to be 10 years old or newer. The City is fortunate to have a good volunteer fire department that can respond to any fires in or around Pierpont. They are also fortunate to have an excellent group of volunteers that are willing to help their neighbors in an emergency. There are also storm sirens in town.

Town of Roslyn

Roslyn is not at risk to flooding as many of the other communities in Day County. They do have one small area of town that will flood or hold water, particularly in the Spring after rapid snow melt or a heavy rain. They are also at risk to high wind events and experienced 100 mph straight line winds several years ago. They do have a good storm siren system and a good fire department. They also have a backup generator at their water tower in the event that power goes out.

City of Waubay

The greatest risk to the City of Waubay is flooding from the Waubay Chain Lakes. Bitter Lake, Little Rush Lake and Blue Dog Lake all surround the town and have rising lake levels. One of the City's sewer lift stations (now in Bitter Lake) has recently been compromised and is no longer functioning (as of April 2020).

The city is also at risk for high wind events and has a history of these events. In the Summer of 2015, a thunderstorm with high winds knocked out power in the town for two days. A similar event also happened in July 2008 and knocked down many trees and branches.

City of Webster

One area of Webster is located in the floodplain and at risk for flooding. Most of the area is undeveloped; however, there are some businesses on the south side of the area. Any new development in that area does require an elevation certificate.

There is also a campground in Webster and a trailer park. People living in these areas are at risk to tornados and other high wind events. The city does have two storm shelters where people can take shelter during one of these events.

V. MITIGATION STRATEGY

CHANGES/REVISIONS TO THE MITIGATION SECTION:

All projects now include additional information as to the Priority, Funding Sources, Timeframe, Oversight and Cost/Benefit.
Each jurisdiction reviewed their projects from the 2015 Plan and made changes and/or updates as necessary.

MITIGATION REQUIREMENTS

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

Requirement §201.6(c)(3)(ii): [The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard with particular emphasis on new and existing buildings and infrastructure.

MITIGATION OVERVIEW

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

After meetings with the local jurisdictions and opportunities for public input, a series of mitigation goals were devised to best aid the County in reducing and lessening the effects of hazards. Projects previously identified in the 2015 mitigation plan were carefully analyzed and discussed to determine which of the projects had enough merit to be included in the updated plan and to determine if the projects meet the hazard mitigation needs of the county. These projects were evaluated based on a cost/benefit ratio and priority. A *high* priority classification means that the project should be implemented as soon as possible and would minimize losses at a very efficient rate. A *moderate* classification means that the project should be carefully considered and completed after the high priority projects have been completed. A *low* priority means that the project should not be considered in the near future. However, it is a potential solution and should not be eliminated until further evaluation can be completed. Such projects may be completed in light of failures of all other projects striving toward the same goal.

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

DAY COUNTY MITIGATION ACTIVITIES FOR FLOODING HAZARDS

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

Action #1: Continue to manage floodplain by adhering to floodplain ordinance and enforcing regulation of floodplain development (ongoing).

Action #2: Continue NFIP participation (ongoing).

Project #1: Identify properties that would be good candidates for acquisition or relocation.

Priority:	High
Funding sources:	County, State, FEMA
Timeframe:	Ongoing
Oversight:	County
Cost/Benefit:	TBD for each individual property

Project #2: Acquire and/or relocate properties that are compromised by the Waubay Chain Lakes.

Priority:	High
Funding sources:	County, State, FEMA
Timeframe:	Ongoing
Oversight:	County
Cost/Benefit:	TBD for each individual property

Project #3: Identify roads that need grade raises

Priority:	High
Funding sources:	County, State, FEMA
Timeframe:	Ongoing
Oversight:	County
Cost/Benefit:	TBD

Project #4: Use HAZUS software to determine flood risk throughout the county.

Priority:	High
Funding sources:	County, State, FEMA
Timeframe:	Ongoing
Oversight:	County
Cost/Benefit:	Cost approximately \$11,500

Project #5: Project was removed as it was determined to be not feasible.

(Study for water management in Day County. Participants want to know if it is feasible to route water to the Big Sioux River.)

Project #6: Add automatic lake level monitoring systems on Pickerel Lake, Lake Enemy Swim, Blue Dog Lake, Bitter Lake, Waubay Lake and Lynn Lake.

Priority:	High
Funding Sources:	County, State, FEMA
Timeframe:	1 – 2 years
Oversight:	County
Cost/Benefit:	\$11,100 total for 1 year (\$1,500 per site to purchase each system plus \$350/year for maintenance)

** Actions 1 and 2 are ongoing and therefore were not changed. Project 6 was added to this section.

DAY COUNTY MITIGATION ACTIVITIES FOR WINTER AND SUMMER STORM HAZARDS

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

Project #1: Obtain generator for power outage emergencies due to ice storms, strong winds, blizzards, or tornados to provide essential services for residents of the county.

Priority:	High
Funding sources:	County, State, FEMA
Timeframe:	Ongoing
Oversight:	County
Cost/Benefit:	TBD

Project #2: Conduct educational awareness on developing a family disaster plan and obtain funding for disaster kits

Project #3: Prepare vulnerable populations for severe weather, including assisting special needs facilities in acquiring NOAA weather radios and coordinating with facilities regarding sheltering needs. Increase the number of public buildings and businesses in all municipalities and county to install NOAA weather radios. The County has also recently enacted an alert text system and will continue to educate residents about the availability and participation in this campaign.

**The Alert Text System was added to Project 3#, although the plan author did advise that these projects are not mitigation. While it is good measure to ensure people are educated and informed these types of activity fall under the category of preparedness.

MITIGATION ACTIVITIES FOR DAM FAILURE

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

Project #1: Develop policies regarding development in hazard prone areas below the dam.

Priority:	High
Funding sources:	County, State, FEMA
Timeframe:	Ongoing

Oversight: County
Cost/Benefit: TBD

Project #2: Review existing laws, building codes, and land development ordinances to determine if new legislation or amendments are needed.

Priority: High
Funding sources: County, State, FEMA
Timeframe: Ongoing
Oversight: County
Cost/Benefit: TBD

Project #3: Ensure that the floodplain is regulated and ensure compliance with existing land use and growth plans.

Priority: High
Funding sources: County, State, FEMA
Timeframe: Ongoing
Oversight: County
Cost/Benefit: TBD

Project #4: Consider repairs on the spillway of the Pierpont Dam.

Priority: Ongoing
Funding Sources: County, State, Federal
Timeframe: Ongoing
Oversight: County and State
Cost/Benefit: 2008 Study estimated repair costs at \$419,000

**No changes were made to this section.

MITIGATION ACTIVITIES FOR WINTER STORM HAZARDS

The goal and project associated with this section was removed due to completion of projects and because Codrington Clark Electric participates in the State Hazard Mitigation planning efforts and rural electrics are covered under that plan.

MITIGATION ACTIVITIES FOR WILDFIRES/DROUGHT

Goal #1: Reduce the impact of wildfires and drought

Project #1: Increase landowner participation in taking proactive measures to reduce the risk of wildfire.

Priority: High
Funding sources: County
Timeframe: Ongoing
Oversight: County
Cost/Benefit: Low Cost

Project #2: Promote educational programs for fire prevention.

Project #3: Promote continued efforts to put smoke alarms in residences, businesses, and facilities.

Project #4: Educate and assist the public in developing defensible space around homes and farm buildings.

Project #5: Continue enforcement of the County's burn ban permit process.

Priority:	High
Funding sources:	County
Timeframe:	Ongoing
Oversight:	County
Cost/Benefit:	Low Cost

MITIGATION ACTIVITIES FOR MAN-MADE HAZARDS

This section was removed as the plan focuses on natural hazards, not man-made hazards.

TOWN OF ANDOVER MITIGATION GOALS AND ACTIONS

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

Project #1: Removed due to completion.

(Install siren system to warn people of tornado and severe weather. The City is currently in the process of securing funds for installing the sirens. This project will likely be completed in 2013.)

Project #2: Install stationary generators at the City Hall/Fire Hall to ensure access to city equipment during loss of power and at the lift station to prevent sewage backup into homes during power failure.

Priority: Medium

Funding Sources: HMGP, State, Local

Timeframe: TBD

Oversight: Town of Andover

Cost: TBD

Goal #2: Reduce the impact of flooding in the community

Project #1: Install storm sewer throughout town. The town has hired an engineer and a study was conducted on the current wastewater system. The wastewater system has significant infiltration and inflow due to the age of the old clay tile pipes. The City has started a project to replace the wastewater collection lines throughout town and expand lagoon system to allow for total retention. The old wastewater lines will be used for storm sewer once the project is complete.

Priority: High

Funding Sources: Town of Andover, SD DENR

Timeframe: 1 – 2 years

Oversight: Town of Andover

Cost/Benefit: Project cost \$1,168,750

CITY OF BRISTOL MITIGATION GOALS AND ACTIONS

Goal #1: Reduce the impact of severe storms and flooding in the community

Project #1: This project was removed due to completion.

(Construct additional storm sewer and make improvements to existing storm sewer lines in town.)

Project #2: Continue to enforce the floodplain ordinance and continue participation in NFIP.

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

Project #3: Construct storm shelter for summer storms and high wind events

Priority:	Moderate
Funding sources:	City, State, FEMA
Timeframe:	TBD
Oversight:	City
Cost/Benefit:	TBD

TOWN OF GRENVILLE MITIGATION GOALS AND ACTIONS

Goal #1: Reduce the impact of flooding within the community

Project #1: Continue to pursue better understanding and education on the NFIP in order to effectively manage the floodplain by enforcing the floodplain ordinance and encourage participation in NFIP.

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

TOWN OF PIERPONT MITIGATION GOALS AND ACTIONS

Goal #1: Reduce the impact of dam failure in the community

Project #1: Conduct a feasibility study for dam repairs at the Pierpont Dam and make necessary repairs.

Priority:	Ongoing
Funding Sources:	Town, State, Federal
Timeframe:	Ongoing
Oversight:	Town and State
Cost/Benefit:	2008 Study estimated repair costs at \$419,000

Goal #1: Reduce the impact of flooding within the township

Project #1: Address flooding and drainage issues throughout the township by conducting a hydrology study to determine if culvert resizing and/or grade raises are necessary.

Priority:	Ongoing
Funding Sources:	Town, Township, State, FEMA
Timeframe:	Ongoing
Oversight:	Town
Cost/Benefit:	TBD

TOWN OF ROSLYN MITIGATION GOALS AND ACTIONS

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

Project #1: This project was removed due to completion.

(Obtain a generator to provide power to the community center and the nursing home to provide essential services during power outage.)

Project #2: Obtain NOAA weather radios for the nursing home to ensure they have access to severe weather alerts and warnings in the event of power outage.

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

Project #3: Continue participation in the mitigation planning process to ensure all practical measures of mitigation are implemented and continue to gain knowledge of future mitigation actions that can be implemented.

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

CITY OF WAUBAY MITIGATION GOALS AND ACTIONS

Goal #1: Reduce the impact of flooding in the community

Project #1: Continue floodplain management and participation in NFIP.

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

Project #2: Continue enforcement of floodplain ordinance and adhere to building codes.

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

Project #3: Identify flood prone properties and possible participants for HMGP acquisition and relocation.

Priority:	High
Funding sources:	City, State, FEMA
Timeframe:	Ongoing
Oversight:	City
Cost/Benefit:	TBD for each individual property

Project #4: This project has been removed due to completion.

(Relocate the current sewer lagoon ponds that have been compromised by Bitter Lake).

Project #5: Continue enforcement of sump pump ordinance.

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

Goal #2: Reduce the impact of winter/summer storms in the community

Project #1: Construct storm shelter adjacent to firehall for summer storms and high wind events

Priority:	High
Funding sources:	City, State, FEMA
Timeframe:	1 – 2 years
Oversight:	City
Cost/Benefit:	\$672,139 total project costs

Project #2: This project has been removed as it is no longer a priority since a new storm shelter is being built.

(Obtain generator for school building to be used as a storm shelter in the event of power outage.)

CITY OF WEBSTER MITIGATION GOALS AND ACTIONS

Goal #1: Reduce the effects of severe storms (winter and summer) within the City

Project #1: Purchase generators for city buildings to ensure basic services can be provided in the event of power outage.

Priority: Low
Funding Sources: HMGP, State, Local
Timeframe: TBD
Oversight: City of Webster
Cost: TBD

Goal #1: Reduce the impact of heavy rains and flooding on the community

Project #1: Continue participation in NFIP and compliance with floodplain ordinance

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

Project #2: Continue regulation of floodplain and building codes for new homes and businesses.

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

Project #3: Inspect storm sewers and determine if repairs or additional or larger pipe is necessary.

Priority: High
Funding sources: City, State, Federal
Timeframe: 1 – 3 years
Oversight: City
Cost/Benefit: TBD

PRIORITIZATION OF MITIGATION ACTIVITIES

Requirement 201.6(c)(3)(iv) & Requirement 201.6 (c)(3)(iii)

Many of the plan participants only had one mitigation goal and one action. Many who participated had a very specific goal in mind that they were trying to achieve, including improving their knowledge of NFIP, floodplain management and continued enforcement of their floodplain to mitigate future flooding problems. Additionally, because small rural towns and townships continuously have problems accomplishing capital improvements project due to very small budgets caused by limited ability to generate revenue. Obviously, when only one project is identified, that project becomes the priority and the only other consideration to make is budgeting for the 25 percent local match requirement. Those communities that have more than one action listed prioritized based on the number of people who would benefit from the project and also by the estimated or approximate total project cost. Some projects may be too large of an undertaking and therefore those projects were moved down the priority list. The plan participants were instructed that a complete Benefit Cost Analysis would be required at the time of application and the plan author advised that specific details of each project could be analyzed in closer detail during the application period.

NATIONAL FLOOD INSURANCE PROGRAM PARTICIPATION

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

Day County participates in the National Flood Insurance Program. There are four communities located in Day County that do not participate in NFIP. Those communities are: Andover, Butler, Pierpont, and Roslyn. All of the other jurisdictions participate in NFIP. Those who participate include Bristol, Grenville, Waubay, Webster, and Day County. The county will continue to participate and ensure compliance of the participating local jurisdictions located within the flood plain.

5.1 DAY COUNTY NFIP PARTICPATION	
Participants	Non-participants
Day County	Andover
Bristol	Butler
Grenville	Pierpont
Waubay	Roslyn
Webster	

The Day County Director of Equalization maintains the flood zone maps and utilizes DFIRMS for all planning mechanisms occurring in the county; specifically, development of new homes, businesses and all new construction, including new Concentrated Animal Feeding Operations (CAFOs). The planning and zoning department is responsible for issuing elevation certificates in areas of special concern and flood plain development permits. New structures located in areas of special concern must have the first story at an elevation of 1810' or above. The DFIRMS are used to determine where the natural drainage occurs and ensures that new development will not interrupt the natural drainage. The maps have also been a vital asset to the County in the recent drainage discussions that have taken place within the County. The Planning and Zoning

Department and Day County Emergency Management have access to the DFIRMS in electronic format and thus will utilize and maintain the maps in the electronic format.

The maps Day County uses were completed in 2001. FEMA is in the process of updating the FIRM flood maps using digital topography technology (LiDAR) and the Risk MAP process. The maps are updated, in part, because better technology has become available to produce more accurate data. Flood risk also changes over time due to land development, erosion, increasing storm intensity, wildfires and other causes. The preliminary data is currently being developed in Day County and the Flood Risk Review meeting was tentatively planned for May 2020. Because of the COVID-19 pandemic, it is likely that the FRR meeting will get postponed or perhaps it will change to a virtual format.

IMPLEMENTATION OF MITIGATION ACTIONS

Requirement: §201.6(c)(3)(iii): [The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

Upon adoption of the updated Day County Plan, each jurisdiction will become responsible for implementing its own mitigation actions. Those who did not participate or adopt the Plan will be required to coordinate all mitigation actions with the County. The planning required for implementation is the sole responsibility of the local jurisdictions and private businesses that have participated in the plan update. All of the municipalities have indicated that they do not have the financial capability to move forward with projects identified in the plan at this time, however, all will consider applying for funds through the State and Federal Agencies once such funds become available. If and when the municipalities are able to secure funding for the mitigation projects, they will move forward with the projects identified. Since most of the local jurisdictions only had one mitigation action/goal, prioritization was not necessary. The City of Webster, Waubay, and Day County had several mitigation projects and thus, 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 an individual basis after the decision is made to move forward with a project. Many of the projects included continuing enforcement of floodplain ordinance and other regulatory actions that are ongoing. These projects will continue to be ongoing and therefore were not prioritized.

VI. PLAN MAINTENANCE

CHANGES/REVISIONS TO PLAN MAINTENANCE:

The entire Monitoring section in the 2006 Plan was only two paragraphs. Both of those paragraphs are still included in the Plan Maintenance section of the updated plan; however everything else in this section is new.

MONITORING, EVALUATING, AND UPDATING THE PLAN

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

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

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

ANNUAL REPORTING PROCEDURES

The plan shall be reviewed annually, as required by the County Emergency Manager, or as the situation dictates such as following a disaster declaration. The Day 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 a complete update will be initiated. All information in the plan will be evaluated for completeness and accuracy based on new information or data sources. New property development activities will be added to the plan and evaluated for impacts. New or improved sources of hazard related data will also be included.

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

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

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

PLAN AMENDMENTS

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

INCORPORATION INTO EXISTING PLANNING MECHANISMS

Requirement: §201.6(c)(4)(ii): [The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.

Webster is the only jurisdiction located in Day County that has a comprehensive or capital improvements plan. All of the other jurisdictions do not have the resources, staff, funding, or need for such planning mechanisms. The Day County Comprehensive plan includes all of the municipalities except the City of Webster. The City of Webster and Day County will consider the mitigation requirements, goals, actions, and projects when it considers and reviews the other existing planning documents such as the capital improvements plan. The Webster mitigation projects will be considered and prioritized in conjunction with non-mitigation projects, such as water and wastewater infrastructure improvements, new construction of schools, libraries, parks, etc.

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

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 of the local jurisdictions except Webster lack planning mechanisms in which to incorporate the mitigation actions identified in this plan, it was determined that each year when

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

POTENTIAL FUNDING SOURCES

Although all mitigation techniques will likely save money by avoiding losses, many projects are costly to implement. None of the local jurisdictions have the funds available to 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 Day 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:

<p>Title: Pre-Disaster Mitigation Program Agency: Federal Emergency Management Agency</p> <p>Through the Disaster Mitigation Act of 2000, Congress approved the creation of a national program to provide a funding mechanism that is not dependent on a Presidential Disaster Declaration. The Pre-Disaster Mitigation (PDM) program provides funding to states and communities for cost-effective hazard mitigation activities that complement a comprehensive mitigation program and reduce injuries, loss of life, and damage and destruction of property.</p> <p>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.</p> <p>FEMA provides PDM grants to states that, in turn, can provide sub-grants to local governments for accomplishing the following eligible mitigation activities: State and local hazard mitigation planning, Technical assistance (e.g. risk assessments, project development), Mitigation Projects, Acquisition or relocation of vulnerable properties, Hazard retrofits, Minor structural hazard control or protection projects Community outreach and education (up to 10% of State allocation)</p>

<p>Title: Flood Mitigation Assistance Program Agency: Federal Emergency Management Agency</p>

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

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

Title: Hazard Mitigation Grant Program

Agency: Federal Emergency Management Agency

The Hazard Mitigation Grant Program (HMGP) was created in November 1988 through Section 404 of the Robert T. Stafford Disaster Relief and Emergency 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 governments overall mitigation strategy for the disaster area and comply with program guidelines. Examples of projects that may be funded include the acquisition or relocation of structures from hazard-prone areas, the retrofitting of existing structures to protect them from future damages; and the development of state or local standards designed to protect buildings from future damages.

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

Title: Public Assistance (Infrastructure) Program, Section 406

Agency: Federal Emergency Management Agency

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

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

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

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

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

Title: SBA Disaster Assistance Program

Agency: US Small Business Administration

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

Title: Community Development Block Grants

Agency: US Department of Housing and Urban Development

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

Local

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

Non-Governmental

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

CONTINUED PUBLIC PARTICIPATION/INVOLVEMENT

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

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

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

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