Flandreau Santee Sioux Tribe Pre-Disaster Mitigation Plan 2022-2026

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For: Federal Emergency Management Agency

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CHAPTER 1 | INTRODUCTION

INTRODUCTION

Flandreau Santee Sioux Tribe (Tribe or FSST) is vulnerable to natural hazards that have the possibility of causing serious threat to the health, welfare, and security of our citizens. The cost of response and recovery, in terms of potential loss of life or loss of property, from potential disasters can be lessened when attention is turned to mitigating their impacts and effects before, they occur or re-occur.

The Flandreau Santee Sioux Executive Council, in conjunction with the Federal Emergency Management Agency (FEMA), has agreed to produce this plan to assist the Tribe in their mission to mitigate losses from natural hazards throughout reservation and the communities located therein.

This plan is the first development of a Pre-Disaster Mitigation Plan (PDM) for the Tribe. The document will serve as a strategic planning tool for use by the Tribe in efforts to mitigate against future disaster events. The plan identifies and analyzes the natural disasters that may occur in the Tribe's jurisdiction in order to understand the Tribe's vulnerabilities and propose mitigation strategies that minimize future damage caused by those hazards. 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.

There have been 625 Major Presidential Disaster Declarations (all hazards) proclaimed in the United States, of those 625 declarations, 21 have occurred fully or partially within the state of South Dakota. With five of those declarations including all or portions of Moody County, the Tribe is no stranger to natural and man-made disasters. In order to prevent and reduce the cost that is incurred by businesses, citizens, and property owners from these disasters, the Flandreau Santee Sioux Tribe Pre-Disaster Mitigation Plan was developed. This plan identifies hazards that occur throughout the FSST reservation and mitigation projects that will aid in preventing and reducing the effects of those disasters on the property and lives within. Special consideration has been given to critical infrastructure through the reservation.

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.

AUTHORITY FOR 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 (a-d) requires that local governments, as a condition of receiving federal disaster mitigation funds, have a pre-disaster mitigation (PDM) plan in place that:

1. Identifies hazards and their associated risks and vulnerabilities;
2. Develops and prioritizes mitigation projects; and
3. Encourages cooperation and communication between all levels of government and the public.

The objective of this plan is to meet the hazard mitigation planning needs for the Tribe 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 Tribe PDM is a planning tool to be used by the Tribe, as well as other local, state, and federal units of government, in their efforts to fulfill federal, state, and local hazard mitigation planning responsibilities; to promote pre and post disaster mitigation measures, 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 our citizens, economy, environment, or the well-being of the Tribe. This plan will aid tribal 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 and risk of the Tribe's jurisdiction.

USE OF PLAN

The plan will be used to help the Tribe and their elected and appointed officials:

- Plan, design and implement programs and projects that will help reduce their community's vulnerability to natural hazards.
- Facilitate inter-jurisdictional coordination and collaboration related to natural hazard mitigation planning and implementation.
- Develop or provide guidance for local emergency response planning.
- Be compliant with the Disaster Mitigation Act of 2000.

SCOPE OF PLAN

- Provide opportunities for public input and encourage participation and involvement regarding the mitigation plan.
- Identify hazards and vulnerabilities within the Tribe jurisdictions.
- Combine risk assessments with public and emergency management ideas.
- Develop goals based on the identified hazards and risks.
- Review existing mitigation measures for gaps and establish projects to sufficiently fulfill the goals.
- Prioritize and evaluate each strategy/objective.
- Review other plans for cohesion and incorporation with the PDM.
- Establish guidelines for updating and monitoring the plan.
- Present the plan to the Flandreau Santee Sioux Executive Council for adoption.

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.

The primary focus of hazard mitigation actions must be at the point at which capital investment decisions are made and based on vulnerability. 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 a jurisdiction 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 Tribe. The plan supports, provides assistance, identifies and describes mitigation projects for the 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.

TRIBAL PROFILE

History

The Flandreau Santee Sioux Tribe is comprised primarily of descendants from the Mdewakantonwan and Wahpekute bands from the Isanti division of the Great Sioux Nation. They commonly refer to themselves as Dakota, which means friend or ally. The Isanti are comprised of four bands that lived on the eastern side of the Great Sioux Nation. They were a river-plains people who did some farming and buffalo hunting.

At the time of European contact, the Dakota lived in Minnesota and Wisconsin. After many years of semi-nomadic existence, due to pressure from white settlers, the Santee ceded their land and entered a reservation in 1851.

One of the most prominent figures of the Flandreau Santee Sioux was Chief Little Crow (1810-1863). Little Crow spent much of his life in Minnesota, where he was the head of a Santee band. He was a bold and passionate orator and established himself as a spokesman for his people. After becoming chief, around 1834, he sought justice for his people, but also tried to maintain relations with non-Indians.

In 1862, he led the uprising, now known as the Minnesota Santee Conflict or Dakota War of 1862, protesting starvation and the loss of promised land payments from the federal government. The uprising was crushed quickly, and Little Crow was killed the following year. Hundreds of other Indians were sentenced to death, but after some pardons were granted, thirty-eight (38) Dakotans were hung the day after Christmas that year in the largest mass hanging in U.S. history.

After the uprising against reservation life in Minnesota, the remaining Dakota survivors were exiled from Minnesota and taken as prisoners to Fort Thompson, South Dakota and Davenport, Iowa. In 1866, the two groups from Fort Thompson and Davenport were re-united at Santee Agency at the mouth of the Niobrara in Nebraska.

In 1869, twenty-five families settled in Flandreau and gave up their tribal rights and annuities at Santee and became citizens of the United States. In a clever move, they took advantage of the Homestead Act and acquired land in the area known as Prairie Coteau, along the Big Sioux River near the border of Minnesota.

Because many had converted to Christianity while in captivity, shortly after settling in 1873, they built a little Presbyterian Church and were joined by fifteen additional families. Today the church is one of the oldest continually used churches in South Dakota, located in present-day Flandreau.

The Flandreau Santee Sioux Tribe was formally organized and recognized under the authority of the Indian Reorganization Act of 1934. The Corporate Charter was approved by the Secretary of the Interior in April and duly ratified by tribal vote on October 31, 1936.

Today, the Tribe's history is on display at the Moody County Museum in the City of Flandreau and the Four Winds Cultural Center just north of the City on the Flandreau Indian School campus. Both locations contain a collection of artifacts, memorabilia, and other historical materials about the Dakota people.

Geographic Setting

The Flandreau Santee Sioux Indian Reservation is located in the eastern region of South Dakota and borders the eastern edge of Minnesota. The reservation contains approximately 2,500 acres located along and near the Big Sioux River in Moody County, South Dakota. This region is commonly referred to as the Prairie Coteau, which consists primarily of undulating or gently rolling hills.

FSST also owns ceremonial land in the Black Hills near Deadwood, South Dakota. However, this plan will focus on Flandreau reservation lands within Moody County.

Population and Housing

Due to the Covid-19 Pandemic, most data from the 2020 Decennial Census was not available for comparison. At the time of the drafting of this plan, 2020 Decennial Redistricting data for total population based on race and total housing occupancy status was available. The 2010 Decennial Census and the 2015-2019 American Community Survey 5-Year Estimates were used for all other data comparisons and conclusions.

The Flandreau reservation lies within Moody County in east-central South Dakota north of Minnehaha County, south of Brookings County, east of Lake County and immediately west of the Minnesota/South Dakota border. Estimated Tribal enrollment of on and off reservation members is 765, according to FSST staff, with 415 tribal members living within the reservation lands (2020 Decennial US Census Redistricting Data). Based on percentages from 2010 Census, it is approximated that 199 members are male and 216 are female, with approximately 8% of the population being older than age 65. Education levels of persons age 25 and older include 83% high school graduates and 13% with a bachelor's degree or higher (ACS Census Bureau).

According to the 2020 Decennial Census Redistricting Data (US Census), the Flandreau reservation holds a total of 160 housing units within the Flandreau reservation. Of those total units, 142 units are occupied with 18 left vacant.

In 2010, the total number of housing units was 156, with the majority of occupied housing units being renter occupied. Almost all vacant units were "for rent" units. The average household size is 3 persons for both owner and renter occupied households. Because total housing units and population in 2020 is relatively unchanged from 2010, it is likely that the housing trends listed from 2010 will continue through 2020.

The Tribe manages a total of 141 units within the reservation, with 100 of those being rental units. The unit types range from 35 single-family homes, 3 duplex homes, 2 fair market rent homes, 15 apartments (total of 51 low-income rental units), Tate Win Assisted Living Complex (23 rental units), and 6 Inkpa Duta Complexes (24 fair market rent units).

Table 1.1 shows the population and number of housing units of the Tribe, the City of Flandreau, and Moody County. The reservation's population and number of housing units has remained relatively the same since 2000 with minimal increases.

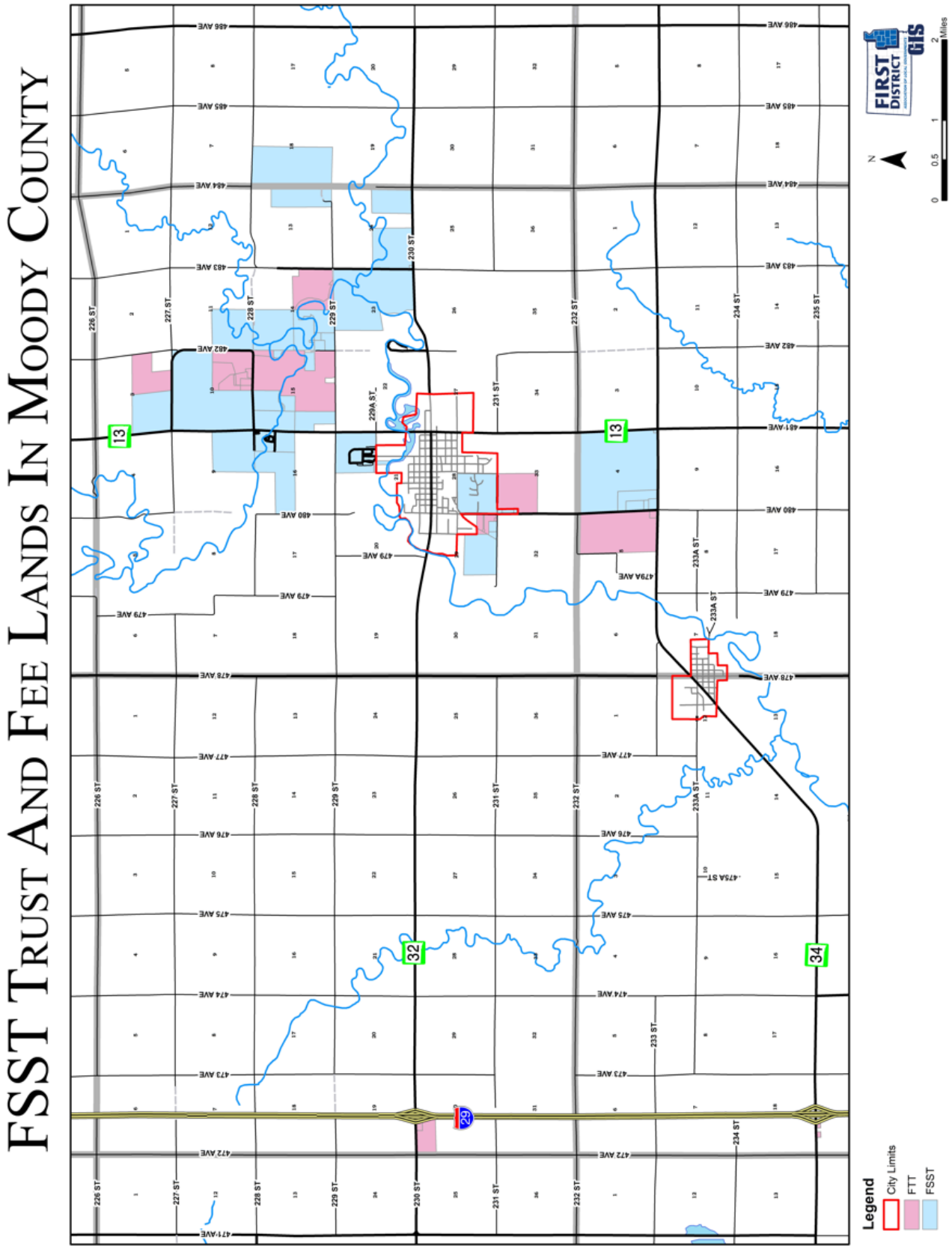
Table 1.1: Local Entities

Name	Population	Location	Housing Units
Flandreau	2,372	44 02' 57" N 96 35 43" W	1,072
Flandreau Santee Sioux Tribe	415	44 02' 26" N 96 35' 56" W	160
Moody County	6,336	43 58' 40" N 96 39' 50" W	2,728

Source: 2020 Decennial Census Redistricting Data (US Census), www.Lat-Long.com.

Figure 1.1 contains a map of the Flandreau reservation. The majority of reservation lands surround the City of Flandreau. Flandreau is the population center and county seat for Moody County, which is situated 7 miles east of Interstate 29 at the intersection of South Dakota Highway 13 and 32.

Figure 1.1: Political Map



Social and Economic Description

Most nearby communities have limited retail and service sectors, which provide basic needs to the Tribe's members. A large majority of Flandreau reservation residents work locally and have less than a fifteen-minute commute to work.

Major employers for the Flandreau reservation include the Flandreau Indian School, tribal government (administration, health care, education centers), and Royal River Casino. All of these employers are located within the city limits of Flandreau. Farming and leasing of acreages provides the Tribe with income as well.

As of 2019, the Tribe's unemployment rate was estimated at 7.4% (Census Bureau), which is a 30% decrease from the unemployment rate recorded by the DOI in 2005. However, the Tribe's unemployment rate is still three times higher than that of the State of South Dakota. Medium household income is estimated to be $41,250, which is an 8.4% increase from the median household income of $35,500 in 2005.

The Tribe reconstructed their traditional powwow grounds and now host the Flandreau Santee Sioux Annual Wacipi each summer. The event serves as a cultural and spiritual gathering place for Native Americans each summer and has grown into a major regional tourist activity.

The Tribe also developed a buffalo herd and continues to operate a farming operation in the rural area near the City of Flandreau.

Physical Description and Climate

The Flandreau reservation is centrally located along the eastern boundary of South Dakota in Moody County, with the Big Sioux River, Mud Creek and Flandreau Creek running through the reservation lands. The topography is generally smooth with a few rolling surfaces. The reservation is located within the region generally classified as mild and dry continental or Steppe with four well-defined seasons. The weather can be quite changeable with large day to day temperature variations, particularly from the fall to the spring. Days with severe winter cold and summer heat are typical.

Normally the temperature is moderate until the beginning of July, after which short, hot periods are experienced until the end of August. The freeze-free period is the number of days between the average last occurrence of freezing temperatures in the spring and the average first occurrence of 32 degrees F or lower in the fall. The length of the freeze-free period approximates the length of the growing season which ranges from 130 days or more between May 21st and September 21st. Topography and local weather conditions can produce subfreezing temperatures at the ground surface while the air temperature a few feet above the ground remains above 32 degrees F.

Annual average precipitation is 26.6 inches, with over 75% of the precipitation falling from May 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. Significant flash flooding can result from these downpours with over 3 inches of precipitation reported in a few events. Widespread heavy precipitation events of 1 to 2 inches can occur every few years and is most common from April through June and September through early November.

Average winter snowfall ranges up to 31.2 inches. The heaviest snowstorms often occur from late March through May or mid-October to mid-November. These storms can produce more than 12 inches of snow and are often made more severe as temperatures are warmer, and therefore the snow is heavier and more difficult to travel in and remove. These storms are often accompanied by high winds resulting in blizzard conditions. In spring these storms can coincide with the calving season resulting in livestock loss. Mid-winter snowstorms in general produce less than 6 inches of snow, but heavier amounts to 19 inches or more have occurred. Despite the generally lighter amounts and drier snow, high winds can result in blizzard conditions. Even without falling snow, in the colder conditions of mid-winter, high winds can pick up loose snow, resulting in local ground blizzards.

Severe thunderstorms are common from June into early September. Typically, the greatest hazards associated with these thunderstorms are very highs winds and large hail. Damage to structures and crops occurs every summer from these storms. Tornadoes have been reported but are relatively rare.

An important element of the climate in this area is the often-windy conditions. Average wind speeds range from 10 to 15 mph depending on the exposure of the location. The average and peak sustained winds tend to be stronger over higher more exposed terrain. The highest wind gusts often occur with thunderstorms during the summer, with gusts over 60 mph occurring every year. The highest sustained winds tend to occur in the spring and fall, with sustained winds over 40 mph occurring every year. Moody County reached straight line wind speeds in excess of 70 mph within the last ten years.

For the purposes of this hazard assessment and mitigation plan, weather is of interest when it threatens property or life and thus becomes a hazard. The National Weather Service (NWS) provides short-term forecasts of hazardous weather to the public. In addition to issuing tornado and severe thunderstorm watches, the NWS also produces regularly scheduled severe weather outlooks and updates on various forms of hazardous weather including heavy rain and winter storms.

Hydrology

The water drainage is concentrated entirely in the Big Sioux River Basin, which includes many smaller intermittent tributaries. Within all of Moody County there are 357.4 stream miles. Moody County is in the physiographic region of South Dakota known as the Prairie Coteau. In most places, the drop from the general upland to stream bottom is abrupt. This is most noticeable along the Big Sioux River where a drop ranging from 100 to 200 feet frequently occurs within a quarter or half-mile.

Transportation and Utility Infrastructure

There is limited data on the total number of road miles within Flandreau reservation. Moody County's road network is composed of a total of 1,036 miles including federal and state highways, county roads, township roads, municipal street systems, and private roads. The rural road system performs two basic functions: (1) providing general mobility for the residents in rural areas, and (2) accommodating the movements of agricultural products to market. The rural transportation system was not designed to accommodate large volumes of traffic on a daily basis. The transportation choices are limited to mostly private automobiles traveling over state highways and county roads.

South Dakota Highway 32 is one of the main east-west routes through the county. This highway connects the City of Flandreau with the north-south running Interstate 29. The main north-south route running through the Flandreau reservation is South Dakota Highway 13. This highway intersects Highway 32 in Flandreau and east-west Highway 34 to the south.

There is one small airport located in Flandreau. The airport is used primarily by local pilots, crop sprayers, and other light aircraft. The airport does not have any nav-aid or flight service capabilities. There are no major railroads in or near the Flandreau reservation.

The Big Sioux Community Water System serves the majority of all rural residences. The City of Flandreau operates its own municipal water system. Regarding wastewater disposal, Flandreau operates its own municipal wastewater collection and treatment system. Rural residences rely on individual septic tanks and drainfields. Electric power is provided to rural residents by Otter Tail Power and Sioux Valley Energy. The City of Flandreau operates their own municipal power system. MidAmerican Energy operates a natural gas transmission line through Moody County providing natural gas to businesses and residents in Flandreau. Telephone service is provided by Interstate Telephone Company (ITC), Wow!, Golden West, Century Link and Media Com. Cellular phone service is available in most parts of Moody County, but there are still places in the county where signals are weak.

Medical and Emergency Services

There is one hospital located in Flandreau (Avera Flandreau Medical Center) that serves the needs of the surrounding area. The Tribe does have the benefit of having the Flandreau Santee Sioux Tribal Health Clinic also located in Flandreau. This is an ambulatory facility of the Indian Health Service. The facility is unique in the fact that it offers medical and dental services to the tribal community. Also, there are two long-term care facilities in Flandreau: Edgewood Assisted Living and Riverview Healthcare Center.

The Tribe is governed by a seven-member Executive Committee or Tribal Council. The Tribe and the City of Flandreau have their own police departments that coordinate law enforcement services. The Moody County Sheriff and his deputies also provide law enforcement throughout the county.

The Emergency 9-1-1 Center in Flandreau provides 911 services to the Moody County Sheriff's Department and other area agencies as well. Those agencies include:

- Moody County Ambulance Service
- Moody County Emergency Management
- Three county volunteer fire departments (Flandreau, Colman, and Trent)
- South Dakota Highway Patrol

Drone Technology and Data Collection

The term “drone” refers to an unpiloted aircraft, also referred to as an unmanned aerial vehicle (UAV). Drones can range from being remotely controlled or fly autonomously relying on sensors or software to calculate its movements. Originally developed for military and aerospace industries, drones have gained popularity in the civilian consumer market because of their ability to enhance levels of safety and efficiency, while decreasing risk and potential loss of life.

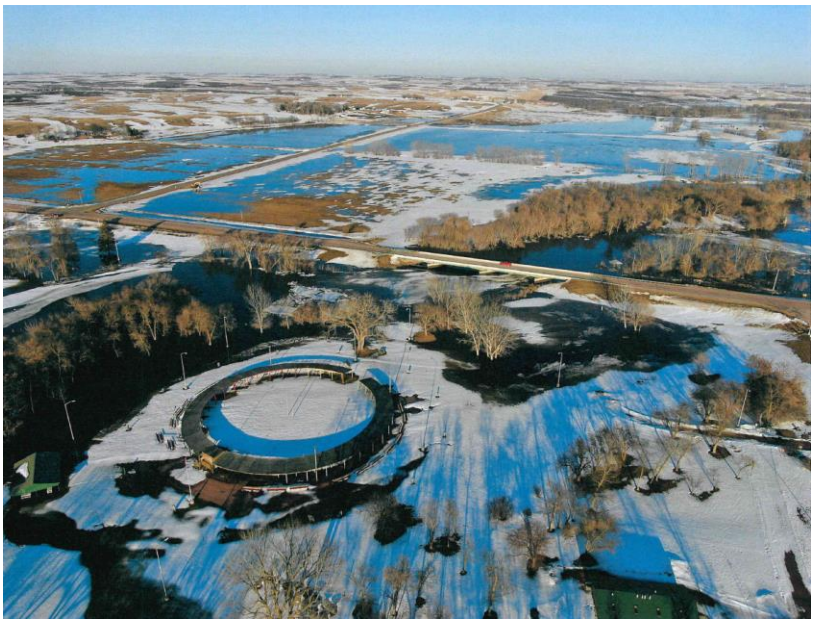
The Flandreau Santee Sioux Tribe purchased drone equipment to aid in disaster response. Drone technology offered the Tribe a low-cost and simple way to collect high-quality geospatial and aerial data after a disaster. The Tribe intends to use the drone to help disaster responders rapidly identify impacted areas, determine the extent of damage and size of affected area, and create safe access routes to the disaster area. The drone-collected data can also be used for future pre-disaster mitigation constructure and infrastructure projects, such as identifying locations for a tornado shelter or preventing structures from being placed in historically flood-prone areas.

The Tribe used drone equipment to capture images of widespread flooding from the Big Sioux River that occurred in March and April of 2019. Most of the land affected was pasture or agricultural-related. However, there were at least two rural, single-family residences that were completely surrounded by flood waters from Flandreau Creek.

Figure 1.2: 2019 Flood Event
228th Street North of FSST Powwow Grounds
(Aerial View Looking Northeast)

Figure 1.3: 2019 Flood Event
Area Northeast of FSST Powwow Grounds
(Aerial View Looking North from West Side of Powwow Grounds)

Figure 1.4: 2019 Flood Event
FSST Powwow Grounds
(Aerial View Looking East)



CHAPTER 2 | PREREQUISTES

ADOPTION BY LOCAL GOVERNING BODY

The local governing body that oversees the development of the Flandreau Santee Sioux Tribe Pre-Disaster Mitigation Plan is the Flandreau Santee Sioux Tribe Executive Council. The Council has tasked the Flandreau Santee Sioux Tribe Emergency Management Coordinator with the responsibility of ensuring that the PDM is compliant with Federal Emergency Management Agency (FEMA) Guidelines and corresponding regulations.

TRIBAL JURISDICTION PLAN PARTICIPATION

Requirement 201.6(c)(5). Local Mitigation Plan Review Tool – E1.
Requirement 201.6(c)(5). Local Mitigation Plan Review Tool – E2.

This plan serves the entire geographical area located within the boundaries of the Flandreau reservation. Because the Tribe often collaborates with Moody County and the City of Flandreau, both entities elected to participate in the planning process for the development of the Tribal PDM as partners. Table 2.1 shows the participating local jurisdictions.

Table 2.1: Plan Participants

Participants	Partners
Flandreau Santee Sioux Tribe	City of Flandreau
	Moody County

The Flandreau Santee Sioux Tribe will pass a resolution to adopt the new PDM plan. The date of adoption by resolution is shown in Table 2.2.

Table 2.2: Dates of Plan Adoption by Jurisdiction

Jurisdiction	Date of Adoption
Flandreau Santee Sioux Tribe	

Representatives from FSST, the city of Flandreau, Moody County, local fire departments, and local businesses were invited to the planning meetings. Those in attendance provided valuable perspective on the elements required for the plan. All representatives in attendance took part in the risk assessment exercise at the July 29th, 2021 kickoff meeting.

Representatives in attendance took information from the PDM planning meetings back to their respective councils/organizations and presented the progress of the plan development. Representatives of the PDM Team met with First District staff to provide feedback and oversight into the draft plan. Those participants identified in Table 2.1 that did not attend a PDM Planning Team meeting, participated in the planning process by reviewing information relevant to their communities and providing feedback by email or telephone conversations. A final meeting was held to make final comments and corrections and provide a motion to submit the plan to FEMA.

The Tribe also presented the Resolution of Adoption to their council and will pass the resolution upon FEMA approval of the PDM update. The Resolution is included in the Appendix.

Table 2.3 was derived to help define “participation” for adopting the plan. To be considered “participating”, the jurisdiction must have at least seven of the ten participation requirements fulfilled.

Table 2.3: Record of Participation

Nature of Participation	FSST
Attended Meetings or work sessions (a minimum of 1 meeting will be considered satisfactory).	■
Submitted inventory and summary of reports and plans relevant to hazard mitigation.	■
Submitted the Risk Assessment Worksheet.	■
Submitted description of what is at risk (including local critical facilities and infrastructure at risk from specific Hazards worksheet).	■
Submitted a description or map of local land-use patterns (current and proposed/ expected).	
Developed goals for the community.	■
Developed mitigation actions with an analysis/ explanation of why those actions were selected.	■
Prioritized actions emphasizing relative cost-effectiveness.	■
Reviewed and commented on draft Plan.	■
Hosted opportunities for public involvement (allowed time for public comment at a minimum of 1 tribal council meeting after giving a status report on the progress of the PDM update).	■

CHAPTER 3 | PLANNING PROCESS

BACKGROUND

The effort that led to the development of this plan is part of the larger, integrated approach to hazard mitigation planning in South Dakota that is led by the South Dakota Office of Emergency Management. Production of the plan was the ultimate responsibility of the FSST Emergency Management Coordinator, who served as the tribe's point of contact for all activities associated with this plan. Input was received from the PDM Planning Team that was put together by the Emergency Management Coordinator and whose members are listed below in Table 3.1.

The plan itself was written by an outside contractor, First District Association of Local Governments (First District) of Watertown, South Dakota, one of the state's six regional planning entities. The office has an extensive amount of experience in producing various kinds of planning documents, including municipal ordinances, land use plans, and zoning ordinances, and it is an acknowledged leader in geographic information systems (GIS) technology in South Dakota. First District assisted the Tribe in the development of their first PDM. The following staff members of the First District Association of Local Governments were involved in the production of 2022 plan. Payton Carda, Planner/Economic Development Officer, was the project manager of the plan. Carda attended the PDM Planning Team meetings as the plan was being developed. Amy Arnold, Geographic Information Systems Planner, produced all the maps for the plan. Luke Muller, Planner, directed the floodplain risk analysis (see next section) and completed the county land cover analysis discussed in the previous chapter.

Additional research and information gathering were provided by Payton Carda. Several other individuals at the state level provided additional support and information that was quite useful, which include:

- Marc Macy, South Dakota National Flood Insurance Program Coordinator – provided classification and information regarding value and number of flood insurance policies and claims, as well as guidance and direction as the plan was being developed.

- South Dakota State Fire Marshall Office – provided information on fire events in Moody County. The Flandreau Santee Sioux reservation is located within this county.

- Whitney Kilts, Department of Environment and Natural Resources, Dam Safety – provided information on dams located in Moody County. The Flandreau Santee Sioux reservation is located within this county.

- Greg Pollreisz, SD Department of Transportation – provided bridges and road mileage information within Moody County.

DOCUMENTATION OF THE PLANNING PROCESS

Methodology

Mitigation planning is a process that communities use to identify policies, activities, and tools to implement mitigation actions. The process that was used to develop this plan consisted of the following steps:

- Planning Framework
- Risk Identification and Assessment
- Mitigation Strategy
- Review of Plan
- Plan Adoption and Maintenance

Planning Framework

The planning framework component identified five objectives:

- Develop Plan to Plan;
- Establish PDM Planning Team
- Define Scope of the Plan;
- Identify Governmental Entities/Stakeholders; and
- Develop Mitigation Strategies

Funding from FEMA to prepare the mitigation plan was awarded to the Tribe in December 2020. Once funding was secured, the Flandreau Santee Sioux Emergency Management Coordinator and the First District acted as the initial PDM Planning Team in order to discuss the strategy to be used to develop the plan. The first task was to identify those entities/stakeholders that would have direct and indirect interests in the update of the PDM.

Prior to the first public informational meeting, the FSST Emergency Management Coordinator wrote emails to all the stakeholders, community organizations, municipalities, utility providers and emergency responders and concerned residents who might wish to volunteer their time and serve on a committee, and to those who would act as a resource for the PDM Planning Team. The Emergency Manager in the adjoining county (Moody County) were extended an invitation via email. The emails included a brief description of the PDM. Public input was solicited via notices regarding the PDM planning process in local media outlets and via the Internet.

Each individual who was contacted for the PDM Planning Team had at least one of the following attributes to contribute to the planning process:

- Significant understanding of how hazards affect the Tribe and participating jurisdictions.
- Substantial knowledge of the Tribe's infrastructure system.
- Resources at their disposal to assist in the planning effort, such as maps or data on past hazard events.

Table 3.1 lists the PDM Planning Team members and their attendance at the planning meetings, all of which were open to the public, that were held as the plan was being developed. An agenda was sent out to the PDM Planning Team prior to each meeting, and the meeting minutes were sent to them afterward to keep everybody informed of what was discussed and any decisions that were made.

Table 3.1: Participation in Plan Development

Invited				Meeting Attendance			
Last Name	**First Name**	**Entity Represented**	**Job Title**	**Meeting 1**	**Meeting 2**	**Meeting 3**	**Meeting 4**
Anderson	Scott	FSST Land Management	Land Manager				
Albers	Terry	Moody County Emergency Management	Emergency Director (2021)		■		
Allen	Mark	FSST Emergency Management	EM Coordinator	■	■	■	
Alvarez	Emily	FEMA Mitigation Division	Community Planner			■	
Arnold	Brian	FSST Police Department	Police Chief	■	■	■	
Bernard	Randy	FSST Land Management	Officer				
Charles	Jerrick	Moody County Emergency Management	Emergency Direction (2022)			■	
Edwards	Nicole	FEMA Mitigation Division	Tribal HMA Specialist	■	■		
Fischerman	Elizabeth	FSST Housing Authority	Executive Director		■	■	
Huston	Joan	FEMA Mitigation Division	Senior Tribal Mitigation Specialist	■	■		
Jacobs	Cynthia	FSST Health Center	Chief Executive Officer	■			
Kitto	Bill	FSST	Maintenance Director				
Kills-A-Hundred	Garrie	FSST Historic Preservation	Tribal Historic Preservation Officer		■		
Marshall	Shelli	FSST Housing	Housing Authority				
Nelson	Steve	Royal River Casino & Hotel	Compliance Officer	■			
Poller	Allen	FSST Police Department	Officer		■	■	
Reider	Anthony	FSST Executive Council	Executive Council President				
Schrader	Jon	FSST Executive Council	Executive Council Member				
Spade	Tim	FSST	Water Quality Specialist				

Leadership and guidance in the planning effort and at the planning meetings was provided by the First District staff and the Flandreau Santee Sioux Tribe Emergency Management Coordinator. An agenda was distributed to each PDM Planning Team member prior to each meeting, but free-flowing discussion was always encouraged. When PDM Planning Team members had questions about a topic of discussion, either First District staff or the Emergency Management Coordinator provided supporting information.

Generally speaking, the planning process associated with the plan's development was relaxed and informal. No subcommittees were formed, and all decisions were made by mutual consensus of the PDM Planning Team members - no votes were taken, or motions made. Everyone's opinion was respected, nobody was discouraged from voicing their opinion, and no one was made to feel any less important than anyone else.

As the PDM Planning Team was being assembled, arrangements were made for the first PDM Planning Team meeting, which took place over a public teleconference over Zoom on July 29th, 2021. An agenda was distributed to prospective PDM Planning Team members. The Appendix includes a copy of each meeting agenda, an attendance sheet from each meeting, and the minutes from each meeting.

Those who attended the July 2021 meeting for the PDM development were asked to volunteer to serve on the PDM Planning Team. The PDM Planning Team was tasked with fostering coordination between the various entities involved; reviewing the drafts and providing comments after First District Association of Local Governments staff drafted the plan. There were no external contributors such as contractors or private businesses.

The representatives were asked to share the progress of the plan at their entities' 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 at the tribal council and PDM Planning Team meetings were collected and incorporated into the plan. Representatives who did not attend a PDM Planning Team meeting were informed of meeting outcomes and provided comment during the drafting stages and as the First District continued to meet with the PDM Planning Team.

The public was provided several opportunities to comment on the plan during the drafting stages at the PDM Planning Team meetings and Executive Council meetings. There were several work sessions and public hearings held to keep the public updated and involved in the plan. Primarily, public input included the involvement in hazard assessment and mitigation projects. Those who were most involved were the representatives of the PDM Planning Team and representatives from the Executive Council. Table 3.2 identifies the location and date of each opportunity that was provided for the public to comment and how it was advertised.

The first meeting of the PDM Planning Team served to introduce the participants to the concept of mitigation planning; why the plan was being drafted and how the process would proceed in the months to come (scheduling, assigning responsibilities, etc.). The meeting also included a review of the main sections of the plan, which led to two important decisions. The PDM Planning Team decided that:

- Detailed information and data regarding the risk assessment was needed, detailed informative tables and maps would be helpful, and the mitigation strategy needed to be well thought out.

- The risk identification and assessment as well as the identification of critical infrastructure and local goals and objectives should be completed by the First District prior to the second meeting of the PDM Planning Team.

Table 3.2: Opportunities for Public Comment

Location of Opportunity	Date	Type of Participation		How Was Meeting Advertised	
		Executive Council Meeting	PDM Meeting	Public Notice	Website
Flandreau Santee Sioux Tribe	PDM Grant Application 2020				
	07/29/2021		■	■	
	10/20/2021		■	■	
	02/15//2022		■	■	■
	TBD		■	■	
Executive Council	3/14/2022	■		■	

Risk Identification & Assessment/Mitigation Strategy/Review of Plan
Requirement 201.6(c)(1). Local Mitigation Plan Review Tool – A1.
Requirement 201.6(b)(1). Local Mitigation Plan Review Tool – A3.
Requirement 201.6(b)(3). Local Mitigation Plan Review Tool – A4.

The Risk Identification and Assessment component identified three objectives: Collect and Organize Data, Develop GIS Data, and Analyze Data. The Mitigation Strategy component identified five objectives: Review other plans, Formation of Goals/Objectives, Compile existing resources to accomplish goals/objectives, Public development of Goals/Objectives, and PDM Planning Team development of goals/objectives. The development of PDM component identified three objectives: Writing of PDM, Public Review of PDM, and PDM Planning Team Review of PDM.

Based upon the discussions and information provided at the first meeting, the Planning Team determined that identification of Critical Infrastructure and discussion of the PDM Risk Assessment were a top priority to complete prior to formulation of Mitigation Strategies and other sections of the Plan. These items were discussed prior to the end of the first meeting. Before the second meeting, First District Staff created the Introduction, Pre-requisites, Risk Assessment, Mitigation Strategy, and Plan Implementation components of the PDM.

At the second meeting held in October 2021, staff members/representatives from FSST were asked to discuss development trends and develop mitigation goals. First District staff also conducted research regarding the history of disaster events affecting the Flandreau reservation in Moody County. Meeting dates are referenced in Table 3.2.

First District also conducted a technical review of existing documents. This review incorporated existing plans, studies, reports, technical information, zoning, and flood damage prevention ordinances into the PDM development. However, the Tribe was lacking many of these planning documents. Because of this, planning documents related to Moody County and the City of Flandreau were included since some reservation lands are located within these jurisdictions. Additionally, the 2020 Moody County PDM plan was used as a resource for the new FSST plan because most of the natural hazard profile research would be the same due to shared location. In addition to the PDM, the First District reviewed several other existing documents including but not limited to the State of South Dakota Hazard Mitigation Plan and Flood Insurance Rate Maps for the nearby local jurisdictions. A summary of the technical review and incorporation of existing plans is included in Table 3.3.

The list of hazards that the PDM Planning Team decided to focus on is presented in Chapter 4. A profile of each of the hazards was begun at this meeting. Discussion also occurred regarding the existing strategies being used to mitigate each hazard, with a particular emphasis on the critical and essential facilities within the community.

The PDM Planning Team also dealt with the Mitigation Strategy at the October 2021 meeting. Formation of the strategy began with a review of the results of the risk assessment, which led to discussion about the goals to be achieved with the mitigation plan. The list of goals is included in Chapter 5.

At the third PDM Team meeting held on February 15th, the PDM Planning Team reviewed the updates prepared by the First District. This included first a review of the hazards identified in the State of South Dakota Hazard Mitigation Plan. First District staff also provided an overview of the information regarding community history, critical facilities, risk identification, hazard vulnerability and mitigation goals identified by the Tribe.

At the meeting, the PDM Planning Team reviewed goals developed by the emergency management office and the list of proposed actions developed at the previous meeting. The rest of the meeting was spent reviewing the priorities and the mitigation actions identified by the participating entities. There was also discussion on how the plan would be implemented. It was emphasized that cooperation between the Tribe and the neighboring jurisdictions was especially important, and discussion occurred about how this could best be achieved. Representatives from the jurisdictions were made aware of the critical role they needed to play to ensure the success of the mitigation strategy, such as implementing specific mitigation actions. The Emergency Management Coordinator emphasized the importance of ensuring that no local decisions be made, or actions taken contrary to the goals of this plan. Additionally, responsible parties were identified for reporting on progress being made to implement the proposed mitigation actions, for evaluating the plan's overall effectiveness, and for getting the public more involved in the planning process.

At the end of the meeting the First District was instructed to conduct an internal review of the document and instructed to post the updated draft plan on the First District Association of Local Governments' website.

On March 14th, 2022, a preliminary draft of the plan was posted on the First District website. Notice was emailed to all of the participants and to the emergency manager in neighboring Moody County. Everyone who received an email copy of the plan draft was allowed forty-five days to comment on the draft prior to the fourth and final PDM Team meeting held on _____DATE.

The Emergency Management Coordinator and First District met with the Executive Council during the forty-five-day review period as a final opportunity to seek out public comment.

The fourth and final meeting of the PDM Planning Team was subsequently held on ___DATE to review and discuss the final draft as amended based upon comments from the planning team and community. *Final review and approval to FEMA - Insert meeting description/notes after meeting*.

Table 3.3: Record of Review (Summary)

Existing Program/Policy/Technical Documents	Referenced in Plan			
	Flandreau	Flandreau Santee Sioux	Moody County	
Comprehensive Plan	✓	NA	✓	Appendix E
Capital Improvement Plan	O	NA	NA	
Flood Damage Prevention Ordinance	✓	NA	✓	Pg. 45-47
Economic Development Plan	NA	NA	NA	Pg. 69-71
Local Emergency Operations Plan	C	C	✓	Pg. 19
Transportation Plan	C	BIA	✓	Pg. 9-10
Flood Insurance Studies or Engineering studies for streams	✓	✓	✓	Pg. 45-47
Hazard Vulnerability Analysis (by the local Emergency Management Agency)	✓	✓	✓	Pg. 22
Emergency Operations Plan	C	C	✓	Pg. 45
Zoning Ordinance	✓	NA	✓	Pg. 50-51
Site Plan Review	✓	✓	✓	Pg. 68
Subdivision Ordinance	✓	NA	✓	Pg. 51
Drainage Ordinance	NA	NA	✓	Pg. 51
Floodplain Ordinance	✓	NA	✓	Pg. 51
Existing Land Use maps	✓	NA	✓	Appendix E
State Hazard Mitigation Plan	✓	✓	✓	All Chapters

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 it in the mitigation plan.

C The jurisdiction is regulated under the County's policy/program/technical document.

BIA The jurisdiction is regulated under the Bureau of Indian Affairs' policy/program/technical document.

✓ The jurisdiction reviewed the program/policy/technical document.

CHAPTER 4 | RISK ASSESSMENT

IDENTIFICATION OF HAZARDS

Requirement 201.6(c)(2)(i). Local Mitigation Plan Review Tool – B1.

In this chapter, the hazards that were identified by the PDM Planning Team as having the most significance for the Tribe are analyzed. As part of the analysis, various maps and tables were produced and are included within this chapter. The planning participants began the risk assessment process by reviewing the State of South Dakota Hazard Mitigation Plan. The PDM Planning Team choose to review records of hazard events that have occurred throughout all of Moody County, due to the lack of recorded weather data that has occurred within FSST lands.

The PDM Planning Team reviewed records of hazard events that have occurred since 2000, relying primarily on data from the National Climatic Data Center's Storm Events Database. A summary of the findings for significant hazard occurrences from the past ten years is provided below in Table 4.1. The PDM Planning Team also identified potential hazards by observing development patterns, interviews from adjacent towns, public meetings, PDM work sessions, previous disaster declarations and research of the history of hazard occurrences located within Moody County.

Table 4.1: Significant Hazard Occurrences 2012-2021

Type of Hazard	# of Occurrences Since 2012	Source
Drought	13	NOAA & University of Nebraska-Lincoln
Wildfire/Forest Fire	104	State Fire Marshall's Office
Flood	32	NOAA
Hail	22	NOAA
Lightning	4	NOAA
Tornado	3	NOAA
Temperature Extremes	15	NOAA
Thunderstorm and High Wind	32	NOAA
Winter Storms	31	NOAA

Hazards were analyzed in terms of the hazard's probability of occurrence in the county. The PDM Planning Team were asked to complete worksheets that categorized hazards by the likelihood of occurrence for either their specific geographical location, or for county-wide risks.

Every possible hazard or disaster was evaluated and placed into one of three separate columns depending on the likelihood of the disaster occurring in the PDM 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 PDM jurisdiction any time in the future were placed in the Unlikely to Occur column. While man-made hazards were discussed briefly during the completion of the worksheets, the PDM Planning Team decided to eliminate man-made hazards from the PDM because those types of hazards are difficult to predict and assess due to wide variations in the types, frequencies, and locations. Types and scopes of manmade hazards are unlimited.

Due to the topographical features of Moody County and the nature of the natural hazards that affect the geographical area covered by this PDM, 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, with an emphasis on the High Probability hazards. All hazards in the Unlikely to Occur column will not be further evaluated in the plan. Table 4.2 is an adjusted list of hazards produced from the FEMA worksheets completed by the PDM Planning Team.

Table 4.2: Hazards Categorized by Likelihood of Occurrence

High Probability	Low Probability	Unlikely to Occur
Freezing Rain/Sleet/Ice	Drought	Dam Failure
Strong Winds	Extreme Cold	Earthquake*
Thunderstorm	Extreme Heat	Flood
Heavy Snow	Hail	Ice Jam
	Heavy Rain	Landslide
	Lightning	Subsidence
	Rapid Snow Melt	
	Tornado	
	Urban Fire	
	Wildfire	

* 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.

TYPES OF NATURAL HAZARDS IN THE PDM JURISDICTION AREA

Requirement 201.6(c)(2)(i). Local Mitigation Plan Review Tool – B1.

Some descriptions of the natural hazards likely to occur in FSST jurisdiction were taken directly from the 2020 Moody County PDM because the FSST reservation lies within the boundaries of Moody County. Most of the descriptions were revised for better clarity. For the purpose of consistency throughout the plan, additional definitions were included to reflect all the hazards that have a chance of occurring in the area and all the hazards are alphabetized. For all the hazards identified, the probability of future occurrence is expected to be the same for all the jurisdictions covered in the PDM.

Blizzards are a snowstorm that lasts at least three hours with sustained wind speeds of thirty-five miles per hour (mph) or greater, visibility of less than one-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 forty-five mph plus a great density of falling or blowing snow and a temperature of 10°F or lower. At least one blizzard should occur each year within Moody County.

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. The chance of drought events occurring annually is low.

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. Moody County has five (5) dams, with none of the dams having the potential to endanger lives or damage property. Dam failure was considered unlikely to occur by the PDM Planning Team, however, is detailed here because it was determined to be the most likely of the "Unlikely to Occur" hazards.

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. The Richter Scale measures earthquake intensity. The potential for an earthquake to occur within Moody County is less than 1% annually.

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 Moody County PDM jurisdiction area as temperatures below zero. The Wind Chill Chart is used to measure extreme cold. At least one extreme cold event should occur each year.

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 Moody County have a very wide range typically between 0 to 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. The Heat Index measures the impact of extreme heat on people and livestock.

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 Moody County.

1. Inundation flooding occurs most often in the spring. The greatest risks are realized typically during a rapid snowmelt, the time before ice is completely off all of the rivers.

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 the Big Sioux River and its tributaries. Heavy, slow-moving thunderstorms often produce large amounts of rain. The threat of flooding would be increased during times of high soil moisture.

National Flood Insurance Rate maps designate 100-year and 500-year floodplain zones. Areas subject to inundation by the 1-percent-annual-chance flood event are designated 100-year floodplain. Moderate risk areas within the 0.2-percent-annual-chance floodplain are designated 500-year floodplain. Moody County should anticipate having one flood event each year.

Freezing Rain/Ice occurs when temperatures drop below thirty 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, weaken 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. Moody County has a 100% potential for hail occurring each year.

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. At least one heavy rain event will occur in Moody County annually.

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 and 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. There is a 100% chance of lightning occurring in Moody County each year.

Severe Winter Storms deposit four or more inches of snow in a twelve-hour period or six inches of snow during a twenty-four-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 chance 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 PDM.

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 Moody County during the months from October to April. Average annual snowfall for within the county is about thirty inches. Accumulations in dry years can be as little as five to ten inches, while wet years can see yearly totals up to eighty inches. Snow is a major contributing factor to flooding, primarily during the spring months of melting.

Strong winds are usually defined as winds over forty miles per hour, are not uncommon in the area. Winds over fifty miles per hour can be expected twice each summer. Strong winds can cause destruction of property and create 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. Multiple strong wind events will occur throughout Moody County annually.

Subsidence is defined as the gradual caving in or sinking of an area of land. 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 PDM.

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

Wildfires 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 wildfire 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. The Keetch-Byram Drought Index assesses the risk of fire due to drought. Multiple wildfires will occur in Moody County annually.

Climate Change is a long-term change in the earth’s climate, especially a change due to an increase in the average atmospheric temperature. In particular, a change apparent from the mid to late 20th century onwards and attributed largely to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels. Rising temperatures may lead to more climate and weather hazards of greater intensity such as flooding, droughts, severe storms, and winter storms. Many scientists consider climate change a global phenomenon.

HAZARD PROFILE

Requirement 201.6(c)(2)(i). Local Mitigation Plan Review Tool – B1.
Requirement 201.6(c)(2)(i). Local Mitigation Plan Review Tool – B2.
Requirement 201.6(c)(2)(ii). Local Mitigation Plan Review Tool – B3.

A listing of weather events having occurred specifically within the Flandreau Santee Sioux Reservation is unavailable, due to lack of reporting. Additionally, the FSST lands are spread across several areas of Moody County. Therefore, each natural hazard section will list all weather events recorded within Moody County.

It should be stated that most of the hazards identified in the previous section have the potential of occurring anywhere in Moody County. A brief section about the history of each hazard's occurrence in the county is provided. Table 4.3 below shows all of the Presidential Disaster Declarations that have involved Moody County, including FSST. Information on previous occurrences – the location, the extent (i.e., magnitude or severity) of each hazard, and probability of future events (i.e., chance or occurrence) are listed individually by the type of hazard in the following tables.

Table 4.3: Presidential Disaster Declarations in South Dakota Including Flandreau Santee Sioux Nation

Date	Disaster Dec #	Type	Total Damage	FEMA Disaster Relief Costs
4/18/1969	257	Flooding	$4,599,306	
6/11/1984	717	Severe Storms and Flooding		
7/2/1992	948	Flooding, Severe Storms, and Tornadoes		
7/19/1993	999	Severe Storms, Tornadoes and Flooding	$53,068,748	
5/26/1995	1052	Flooding	$35,649,349	
1/5/1996	1075	Severe Winter Storm	$13,085,649	
1/10/1997	1156	Severe Winter Storm and Blizzard	$19,455,263	
4/7/1997	1173	Severe Winter Storm and Severe Flooding	$87,069,429	
5/17/2001	1375	Severe Winter Storm and Flooding		$5,097,840
7/9/2008	1774	Severe Storm and Flooding	$3,907,074	$4,716,310
5/13/2010	1915	Flooding	$8,127,856	$21,498,619
11/2/10	1947	Severe Storm and Flooding	$1,074,522	$1,079,972
5/13/2011	1984	Flooding	$7,154,975	$52,090,678
6/7/2019	4440	Severe Winter Storm, Snowstorm, and Flooding	$45,736,034	$67,597,521
11/18/2019	4469	Severe Storms, Tornadoes, and Flooding	$17,035,740	$24,424,135
4/5/2020	4527	Covid-19 Pandemic	Ongoing	$6,330,686

SOURCE: http://www.fema.gov/disaster/declarations

While the PDM Planning Team 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 report, but rather an overview of the hazard events which have occurred over the last ten years. The PDM Planning Team felt the hazard trend for the last ten years could be summarized in this section.

DAM FAILURE

Dam breach or failure is of lesser concern for the members of FSST than flooding. Moody County has a number of dam structures, which are not considered a risk to residents, but are used to control or regulate flow from one water body to another. The South Dakota Department of Environment and Natural Resources has identified five (5) dams in Moody County. They include Jacobs Dam, Bauske Dam, Loiseau Dam, Paulson Dam, and Warren Jackson Dam. Further, there is a spillway in the northern portion of Flandreau on the Sioux River however is not considered a high risk since there are no structures or people affected downstream.

4.4 Dam Locations in Moody County

Ownership Type	Location	Water Body
Private	NW1/4 SW1/4 5-T107N-R47W	Mud Creek - tributary
Private	SW1/4 NW1/4 8-T107N-R48W	Big Sioux River - tributary
Private	SW1/4 NE1/4 20-T107N-R48W	Big Sioux River - tributary
Private	SE1/4 SE1/4 31-T108N-R47W	Mud Creek - tributary
Private	SW1/4 NW1/4 2-T106N-R49W	Squaw Creek - tributary

DROUGHT

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 of 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.

The 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 fifty years a significant drought is experienced within Moody County, while many less severe droughts can occur at times every three years. Table 4.5 identifies the ten-year drought history for the County. Data regarding droughts is only available at the county level.

Table 4.5: Moody County 10-Year Drought History

Location	Date Start	Date End	Type	Crop Damage
Moody County	07/10/2012	07/17/2012	Moderate Drought	0.00K
Moody County	07/17/2012	09/04/2012	Severe Drought	0.00K
Moody County	09/04/2012	10/16/2012	Severe Drought to Extreme Drought	0.00K
Moody County	10/16/2012	11/13/2012	Extreme Drought	0.00K
Moody County	11/13/2012	04/16/2013	Severe Drought to Extreme Drought	0.00K
Moody County	04/16/2013	05/28/2013	Moderate to Severe Drought	0.00K
Moody County	09/24/2013	10/08/2013	Moderate Drought	0.00K
Moody County	06/02/2015	04/14/2015	Moderate Drought	0.00K
Moody County	07/18/2017	08/15/2017	Moderate Drought	0.00K
Moody County	10/06/2020	03/09/2021	Severe Drought	185.00K
Moody County	06/08/2021	07/13/2021	Severe Drought	255.00K
Moody County	08/03/2021	08/31/2021	Extreme Drought	11.00K
Moody County	09/07/2021	09/28/2021	Severe Drought	8.00K

SOURCE: http://droughtmonitor.unl.edu; http://www.ncdc.noaa.gov/stormevents

Major Drought Occurrences:

- **July 2012 to April 2013 –** Drought conditions continued over all the area with below normal rainfall keeping soil conditions dry. Stress on crops continued even though August was less hot than July, with temperatures averaging only a little above normal. Crop damage was quite evident, though the amount of reduced yields and other damage which might become evident at harvest was uncertain. While reported water supply problems were not extreme, many local governments had water use restrictions in place. Drought was generally listed as severe to extreme for the area and was being compared to the worst of the dust bowl years, though not yet over as long a time period. Below normal rainfall continued to aggravate existing long-term dry soil conditions, and stress on crops continued despite less hot weather than in July. Crop damage including certain reduced crop yields was very apparent, although the amount of yield reduction and other damage was still highly uncertain before harvest. Corn continued to be the crop suspected of enduring the most damage, with some recovery potential for soybeans in the less hot weather. The drought was also leading to local water use restrictions.

- **October 2020 –** Moderate drought evolved to severe drought conditions early in the month due to very warm and dry conditions. Precipitation continued well-below normal across southeast South Dakota, to around 50% of normal in Flandreau. Many areas experienced crop damage.

WILDFIRE

A strong possibility exists for simultaneous wildfire emergencies during droughts. While researching the hazard occurrences that have taken place in Moody County, it became evident that the information found on the NOAA website was incomplete. Therefore, other sources were contacted whenever possible. Specifically, NOAA had only one occurrence listed for wildfires in Moody County, but the State Fire Marshal's Office (SFMO) was contacted to verify that information. The SFMO information is derived from the reports submitted by the local fire departments who respond to the fires. Representatives from the SFMO explained that since many of the fire departments in the County are Volunteer Fire Departments many times wildfires are extinguished, and reports are never filed with the State. Thus, the information provided by the SFMO is not entirely complete either.

For the purpose of this PDM, we have used the numbers provided by the SFMO as a point of reference in determining the likelihood of a wildfire hazard occurrence within the jurisdiction. The information provided by SFMO identifies 47 structure fire responses, 50 vehicle fire responses, and 104 outside fire responses reported from 2011-2020. 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.

Additionally, SFMO provided information about the number of injuries and fatalities reported as a result of these fires. According to the records provided, from 2011 to 2020 one civilian injury, one civilian death, and zero fire service deaths or injuries were attributed to fires in Moody County.

Table 4.6 identifies the number of fire department responses to structural, vehicle, and outside fires that have been experienced within Moody County. It should be noted that the number of responses does not necessarily mean that there were 104 outside (wildfire) fires as some fires required multiple departments to respond. The data compiled by the SMFO is not discriminate enough to determine whether a fire can be classified as an urban fire or wildfire.

Table 4.6:
Moody County Structural, Vehicle and Outside (Wildfire) Department Responses

Year	Structural Fires	Vehicle Fires	Outside Fires	Total Fire $ Loss
2011	4	3	8	$191,000
2012	8	0	16	$119,500
2013	0	2	7	$3,500
2014	5	7	8	$0
2015	9	7	12	$40,000
2016	2	11	11	$26,000
2017	3	2	18	$71,000
2018	5	5	8	$66,500
2019	4	3	0	$111,000
2020	7	10	16	$191,000
Total	**47**	**50**	**104**	**$819,500**

SOURCE: South Dakota State Fire Marshal Office

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 quickly moving 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. Table 4.7 is a flood history in Moody County from 2012-2021. The table was narrowed down to only include flooding that occurred in proximity to the FSST lands.

Table 4.7: Moody County 10-year Flood History

Location or County	Date	Time	Property Damage	Crop Damage
Flandreau	05/06/2012	06:00	0.00K	0.00K
Flandreau	03/23/2018	04:00	0.00K	0.00K
Flandreau	04/01/2018	00:00	0.00K	0.00K
Flandreau	04/21/2018	09:00	0.00K	0.00K
Flandreau	04/23/2018	05:00, 09:00, 17:00	0.00K	0.00K
Flandreau	05/01/2018	00:00	0.00K	0.00K
Flandreau	06/25/2018	18:00	0.00K	0.00K
Flandreau	07/01/2018	00:00	0.00K	0.00K
Flandreau	07/20/2018	06:00	0.00K	0.00K
Flandreau Muni Airport	09/20/2018	16:00	0.00K	0.00K
Flandreau	09/21/2018	03:00	0.00K	0.00K
Flandreau	03/19/2019	01:00, 09:00	0.00K	0.00K
Flandreau	03/20/2019	11:00, 21:00, 23:00	0.00K	0.00K

Location or County	Date	Time	Property Damage	Crop Damage
Flandreau	04/01/2019	00:00	0.00K	0.00K
Flandreau Muni Airport	04/06/2019	06:00	0.00K	0.00K
Flandreau Muni Airport	04/16/2019	05:00	0.00K	0.00K
Flandreau	05/01/2019	00:00	0.00K	0.00K
Flandreau	05/28/2019	00:30	0.00K	0.00K
Flandreau	06/01/2019	00:00	0.00K	0.00K
Flandreau	07/02/2019	22:00	0.00K	0.00K
Flandreau	07/11/2019	11:00	0.00K	0.00K
Flandreau	07/12/2019	13:00	0.00K	0.00K
Flandreau	08/01/2019	00:00	0.00K	0.00K
Flandreau	08/18/2019	22:00	0.00K	0.00K
Flandreau	09/11/2019	05:30, 07:00, 08:00, 11:30	350.00K	100.00K
Flandreau Muni Airport	09/11/2019	23:00	5.00K	0.00K
Flandreau	10/05/2019	04:00	5.00K	0.00K
Flandreau	12/13/2019	19:00	0.00K	0.00K
Flandreau	03/08/2020	03:30	0.00K	0.00K
Storla	03/09/2020	06:00	0.00K	0.00K
Flandreau	03/27/2020	20:00	0.00K	0.00K
Flandreau	04/01/2020	00:00	0.00K	0.00K

SOURCE: http://www.ncdc.noaa.gov/stormevents

Major Flood Occurrences:

- **General History:** Typically, the most significant damage comes from poor runoff and saturated ground. However, ground saturation, rising water in potholes, ditches, and sloughs represent a higher historic problem. Flooding occurs primarily in the Sioux River Basin. Flooding, as a natural hazard, has been a part of the county's conflict with nature throughout history. Moody County has this river traversing near the communities of Egan, Flandreau, Trent, and the Flandreau Reservation. Several creeks feed into the river that can cause municipal flooding and township and county roads can be washed out. The spring flood danger period generally occurs during March and April. A wet fall, early freeze with saturated ground at the time of freezing, heavy winter precipitation, and warm rains during and after spring thaw add to the seriousness of the spring flooding situation. Spring flooding along the Big Sioux River in Moody County is a yearly event in that the normal winter snow melt is likely to push the river beyond flood stage.

    - **Flandreau –** The City of Flandreau experiences flooding 1 mile east of town affecting a city park, golf course, and some private residents. Preventative measures are taken until the water recedes since this is generally a yearly event based on snow and rain amounts.

- **Flandreau Santee Sioux –** The Tribe experiences flooding on properties along the Big Sioux River. Areas often affected are the Powwow Grounds and some private residences 2 miles north of Flandreau and some private residences 1 mile east of Flandreau. Preventative measures are taken until the water recedes since this is generally a yearly event based on snow and rain amounts.

- **Moody County –** Roads, culverts, and bridges are periodically affected by flooding either by sloughs or roads and bridges on the Sioux River. Erosion along bridge abutments is a continual problem.

- **September 2019 -** Spurred by a period of excessive precipitation from September 10-12 that resulted in 5 to 10 inches of rainfall in the middle to upper reaches of the Big Sioux River Basin, extreme rises occurred mid-month, with many basin locations reaching record stages. Recreational usage of the Big Sioux River, Split Rock Creek, and Skunk Creek (in Moody, Minnehaha, Lincoln, and Union counties) was banned for much of the remainder of the month. Numerous county roads and bridges were inundated, with a few farm outbuildings engulfed in water. Agricultural flooding was extensive.

HAIL

Table 4.8 indicates twenty-two (22) hail occurrences by location throughout Moody County since 2012. However, the information provided by the NOAA website was incomplete due to inconsistent reporting of damage after such hazards occurred. 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. Because of this, all Moody County recorded events were included in the table. One event in July of 2020 reported $137,000 in property damage. Since 2012 there have been 16 events with hail of at least one inch in diameter, including 1 event with hail exceeding 1.75 inches in diameter.

Table 4.8: Moody County 10-year Hail History

Location	Date	Time	Hail Magnitude	Property Damage	Crop Damage
Flandreau	03/19/2012	12:24	1.00 in.	0.00K	0.00K
Flandreau	03/19/2012	12:26	0.75 in.	0.00K	0.00K
Colman	05/05/2012	09:20	0.75 in.	0.00K	0.00K
Colman	05/05/2012	20:30	1.00 in.	0.00K	0.00K
Flandreau Municipal Airport	06/29/2012	16:40	0.75 in.	0.00K	0.00K
Flandreau Municipal Airport	06/29/2012	16:47	1.00 in.	0.00K	0.00K
Trent	06/22/2013	21:08	1.00 in.	0.00K	0.00K
Trent	07/19/2014	07:35	0.88 in.	0.00K	0.00K
Trent	07/19/2014	07:36	1.00 in.	0.00K	0.00K
Flandreau	07/24/2014	12:32	1.00 in.	0.00K	0.00K
Colman	06/03/2015	06:28	1.25 in.	0.00K	0.00K

Location	Date	Time	Hail Magnitude	Property Damage	Crop Damage
Flandreau	06/09/2015	17:57	0.88 in.	0.00K	0.00K
Colman	06/11/2017	05:05	1.00 in.	0.00K	0.00K
Flandreau	06/11/2017	05:20	1.00 in.	0.00K	0.00K
Flandreau	06/11/2017	05:23	1.00 in.	0.00K	0.00K
Trent	08/13/2017	16:56	1.75 in.	0.00K	0.00K
Colman	06/11/2019	15:00	0.75 in.	0.00K	0.00K
Flandreau	07/20/2020	18:55	1.00 in.	0.00K	137.00K
Flandreau	04/05/2021	18:45	1.00 in.	0.00K	0.00K
Colman	08/05/2021	18:15	1.00 in.	0.00K	0.00K
Colman	08/05/2021	18:43	1.50 in.	0.00K	5.00K
Colman	08/05/2021	18:53	1.50 in.	0.00K	0.00K

SOURCE: http://www.ncdc.noaa.gov/stormevents

LIGHTNING

The extent or severity of lightning 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 lightning also have the possibility of being struck by lightning. According to NOAA the lightning history for the past twenty years denotes four (4) occurrences where damage was reported (See Table 4.9); however, possibility exists that the information reported is incomplete. It is also important to note that while only four occurrences of lightening related damage was reported, lightning strikes are very common in all South Dakota counties and reservations.

Table 4.9: Moody County 20-year Lightning History

Location	Date	Time	Property Damage
Colman	06/03/2000	15:30	70.00K
Flandreau	06/10/2002	16:00	5.00K
Colman	09/30/2009	20:30	1.00K
Flandreau	5/10/2011	1:30	20.00K

SOURCE: http://www.ncdc.noaa.gov/stormevents

TORNADO

The annual risk for intense summer storms is very high. All areas of Moody County, including FSST lands, are 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. Between the years of 1956 and 2021, the County confirmed ten (10) tornadoes. Table 4.10 includes the tornado history in the County since 2000.

Table 4.10: Moody County 20-year Tornado History

Location	Date	Time	Type	Magnitude	Property Damage
Egan	06/24/2003	21:50	Tornado	F0	0.00K
Colman	09/16/2006	15:56	Tornado	F0	0.00K
Trent	06/05/2008	20:00	Tornado	EF1	10.00K

SOURCE: http://www.ncdc.noaa.gov/stormevents

Major Tornado Occurrences:

- **June 2008 –** Thunderstorms produced numerous events of tornadoes, large hail, and damaging winds over southeast South Dakota from late morning through the evening of June 5th. Near Trent, South Dakota, a tornado blew a 40 by 100-foot metal machine shed a quarter mile, destroyed an outbuilding, and damaged trees.

Each year, many storms and a few tornadoes affect Moody County. Summer storms usually produce a wide range of damage making damage estimates very difficult. A complete listing of all summer storms having occurred within Moody County, and more specifically FSST lands, is not possible due to inaccurate reporting. The National Weather Service reports online were the primary source for this information.

EXTREME TEMPERATURES

Extreme temperatures in Moody 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. Both types of extreme temperature occurrences have dangerous implications to humans, livestock, and critical structures and facilities if certain conditions are present. 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. Table 4.11 identifies dates and times of the temperature extremes. However, the location is not specifically identified in the table by jurisdiction due to the vast area across the State of South Dakota affected by extreme temperatures.

Table 4.11: Moody County 10-year History of Extreme Temperatures

Location	Date	Time	Type
Moody County	07/02/2012	11:00	Excessive Heat
Moody County	07/16/2012	11:00	Excessive Heat
Moody County	12/23/2013	01:00	Extreme Cold/Wind Chill
Moody County	01/23/2014	05:00	Extreme Cold/Wind Chill
Moody County	03/02/2014	02:00	Extreme Cold/Wind Chill
Moody County	01/16/2016	21:00	Extreme Cold/Wind Chill
Moody County	06/10/2016	11:00	Excessive Heat

Location	Date	Time	Type
Moody County	07/20/2016	12:00	Excessive Heat
Moody County	12/30/2017	08:00	Extreme Cold/Wind Chill
Moody County	01/01/2018	00:00	Extreme Cold/Wind Chill
Moody County	01/15/2018	00:00	Extreme Cold/Wind Chill
Moody County	03/03/2019	02:00	Extreme Cold/Wind Chill
Moody County	06/29/2019	12:00	Excessive Heat
Moody County	02/12/2020	19:00	Extreme Cold/Wind Chill
Moody County	02/13/2021	20:00	Extreme Cold/Wind Chill

SOURCE: http://www.ncdc.noaa.gov/stormevents

Major Extreme Temperature Occurrences:

- **July 2012 –** An excessive heat occurrence took place between July 2th-6th when record heat and high humidity affected southeast South Dakota. Heat indices rose to 110 degrees across the area.

- **July 2016 –** An excessive heat event took place when very hot and very humid weather, with daytime temperatures reaching the 95 to 100 degree range, brought the heat index to 100 to 115 degrees during the afternoon hours of July 19th-23rd. Emergency rooms at hospitals reported that an unknown number of people suffered heat stress, heat exhaustion, or dehydration, although no lasting heat related illnesses were reported. Dew points in the 70's over the area reflected the very high humidity, with dew points at a few places peaking at or just above 80 degrees.

- **March 2019 –** The coldest air in recent history started with an unusually strong and cold area of high pressure surged into the northern Plains. Winds were mainly a gusty 20 to 35 mph, and when coupled with temperatures from 10 to 20 below zero, produced a long duration of wind chills colder than 20 below zero. Coldest wind chills were recorded between 0400-0900 on March 3rd, reaching -47 at Flandreau. With these types of temperature extremes, the biggest concern for people is exposure because prolonged exposure means almost certain death.

- **February 2021 -** A massive arctic plunge into the Northern Plains brought almost a week of dangerous and life-threatening wind chills to the region. The worst conditions were recorded between February 13th-16th when wind chills occasionally dropped as low as 35 below to 55 below zero. Numerous record low maximum and minimum temperatures were established. The areal extent of the extreme cold in the central portions of the U.S. led to stress on the power grid, which necessitated several short-term rolling power outages impacting more than 10,000 customers during the peak of the cold. Over this period, wind chill values reached a minimum of -45 at Flandreau.

THUNDERSTORMS/HIGH WIND

Thunderstorms and high wind occurrences in Moody County are also very common. According to the National Climatic Data Center Storm Events database, Moody County experienced sixty-five (65) wind events from 2000-2021. Table 4.12 denotes the extent and severity of such hazards occurring in the last ten years. The Tribe continues to collaborate with Moody County to educate residents on the dangers of such storms through public service announcements and other printed media.

Table 4.12: Moody County 10-year History for Thunderstorms/High Wind

Location	Date	Time	Type	Mag (mph)	Property Damage	Crop Damage
Trent	03/19/2012	12:20	Thunderstorm Wind	52 kts. EG	5.00K	0.00K
Flandreau	05/05/2012	20:57	Thunderstorm Wind	63 kts. MG	0.00K	0.00K
Flandreau	05/05/2012	21:00	Thunderstorm Wind	65 kts. EG	1.000M	0.00K
Flandreau Muni Airport	05/05/2012	22:22	Thunderstorm Wind	61 kts. EG	5.00K	0.00K
Flandreau	09/04/2012	20:05	Thunderstorm Wind	52 kts. EG	0.00K	0.00K
Moody County	01/26/2014	12:00	High Wind	50 kts. EG	0.00K	0.00K
Flandreau	08/06/2015	18:45	Thunderstorm Wind	61 kts. EG	0.00K	0.00K
Flandreau	08/06/2015	18:57	Thunderstorm Wind	54 kts. MG	0.00K	0.00K
Trent	08/09/2015	18:17	Thunderstorm Wind	56 kts. EG	0.00K	0.00K
Moody County	02/19/2016	04:30	High Wind	36 kts. ES	0.00K	0.00K
Flandreau	06/03/2016	16:50	Thunderstorm Wind	52 kts. EG	0.00K	0.00K
Moody County	12/25/2016	23:00	High Wind	52 kts. MG	0.00K	0.00K
Colman	05/28/2017	17:45	Thunderstorm Wind	56 kts. EG	0.00K	0.00K
Colman	05/28/2017	17:45	Thunderstorm Wind	61 kts. EG	0.00K	0.00K
Flandreau	07/22/2017	01:09	Thunderstorm Wind	56 kts. EG	0.00K	0.00K
Flandreau	07/22/2017	01:21	Thunderstorm Wind	56 kts. EG	0.00K	0.00K
Colman	09/19/2017	22:18	Thunderstorm Wind	65 kts. EG	25.00K	0.00K
Colman	09/19/2017	22:21	Thunderstorm Wind	70 kts. EG	0.00K	0.00K
Flandreau Airport	06/15/2019	17:45	Thunderstorm Wind	55 kts. MG	0.00K	0.00K
Flandreau	07/20/2019	06:57	Thunderstorm Wind	61 kts. EG	0.00K	0.00K
Flandreau	07/20/2019	06:59	Thunderstorm Wind	61 kts. MG	0.00K	0.00K
Colman	08/17/2019	20:53	Thunderstorm Wind	56 kts. EG	0.00K	0.00K
Colman	08/17/2019	21:00	Thunderstorm Wind	52 kts. EG	0.00K	0.00K
Flandreau Muni Airport	08/17/2019	21:10	Thunderstorm Wind	65 kts. EG	100.00K	0.00K
Flandreau Muni Airport	06/06/2020	18:09	Thunderstorm Wind	55 kts. MG	0.00K	0.00K

Location	Date	Time	Type	Mag (mph)	Property Damage	Crop Damage
Colman	07/20/2020	18:40	Thunderstorm Wind	52 kts. EG	0.00K	0.00K
Sioux Falls Junction	7/20/2020	18:59	Thunderstorm Wind	52 kts. MG	0.00K	0.00K
Flandreau	7/20/2020	19:13	Thunderstorm Wind	52 kts. MG	0.00K	0.00K
Sioux Falls Junction	08/28/2020	01:17	Thunderstorm Wind	50 kts. MG	0.00K	3.00K
Trent	08/05/2021	19:15	Thunderstorm Wind	56 kts. EG	2.00K	0.00K
Sioux Falls Junction	09/16/2021	23:04	Thunderstorm Wind	54 kts. MG	0.00K	0.00K
Sioux Falls Junction	09/16/2021	23:17	Thunderstorm Wind	56 kts. MG	0.00K	0.00K

SOURCE: http://www.ncdc.noaa.gov/stormevents

Major Wind Occurrences:

- **May 2012** - Thunderstorm winds caused widespread damage in the south part of Flandreau. One occurrence of thunderstorm wind peak at 75 mph was recorded. Roofs on homes, apartment buildings, and other buildings were blown off or damaged. The roof of a large church was blown off, and parts of the roof damaged nearby homes. The Flandreau city office building had part of its south wall blown off, resulting in interior damage to ceiling tiles and insulation. Siding on other walls of this building and on numerous homes was damaged. Tree damage was widespread, including several trees blown down or uprooted. The winds blew down power lines, leaving parts of the city without power for almost three hours. The community experienced $1,000,000 in property damage as a result of the storm.

- As a strong upper-level wave pushed into the western Dakotas during the evening hours, isolated supercellular storms developed across central South Dakota and moved through areas west of the James River. The isolated storms produced hail up to golf ball size. Significant damage was caused to farm outbuildings.

WINTER STORMS

Freezing Rain/Sleet/Ice and Heavy Snow are components of winter storms and included under this profile. Table 4.13 shows just how common snow and ice storms are within Moody County. While such storms would be considered extreme in many parts of the State, 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 Tribe and are routine procedures in the Tribe 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 the storms identified in Table 4.13 were considered to have occurred countywide. Due to the multiple occurrences of winter storms each year, an exhaustive compilation is not possible.

Table 4.13 Moody County 10-year History of Snow and Ice Storms

Location	Date	Time	Type	Property Damage
Moody County	12/9/2012	10:00	Blizzard	0.00K
Moody County	02/10/2013	16:00	Blizzard	0.00K
Moody County	04/09/2013	03:00	Winter Storm	0.00K
Moody County	11/05/2013	13:00	Heavy Snow	0.00K
Moody County	12/03/2013	18:00	Winter Storm	0.00K
Moody County	01/16/2014	11:00	Blizzard	0.00K
Moody County	12/15/2014	08:00	Winter Storm	0.00K
Moody County	01/05/2015	11:00	Winter Storm	0.00K
Moody County	01/08/2015	14:00	Blizzard	0.00K
Moody County	11/30/2015	02:00	Winter Storm	0.00K
Moody County	12/01/2015	00:00	Winter Storm	0.00K
Moody County	12/15/2015	22:00	Heavy Snow	0.00K
Moody County	12/25/2015	20:00	Winter Storm	0.00K
Moody County	02/02/2016	07:00	Blizzard	0.00K
Moody County	03/23/2016	10:00	Winter Storm	0.00K
Moody County	11/18/2016	04:00	Winter Storm	0.00K
Moody County	12/16/2016	11:00	Winter Storm	0.00K
Moody County	01/24/2017	15:00	Winter Storm	0.00K
Moody County	02/23/2017	16:00	Blizzard	0.00K
Moody County	03/12/2017	17:00	Heavy Snow	0.00K
Moody County	03/23/2018	20:00	Winter Storm	0.00K
Moody County	04/13/2018	19:00	Blizzard	0.00K
Moody County	12/27/2018	09:00	Winter Storm	0.00K
Moody County	03/09/2019	04:00	Winter Storm	0.00K
Moody County	04/11/2019	03:00	Blizzard	840.00K
Moody County	01/17/2020	07:30	Blizzard	0.00K
Moody County	04/12/2020	00:00	Winter Storm	0.00K
Moody County	12/23/2020	09:00	Blizzard	0.00K
Moody County	01/14/2021	18:00	Blizzard	0.00K
Moody County	02/27/2021	22:00	Winter Storm	0.00K
Moody County	03/14/2021	21:00	Winter Storm	0.00K

SOURCE: http://www.ncdc.noaa.gov/stormevents

Major Winter Storm Occurrences:

- **April 2018** - The most intense storm of the month, in fact of many months, wrapped up across the central Plains on April 13, spreading a mix of wintry precipitation across the area, accompanied by numerous thunderstorms. Eventually, influx of colder air would change all precipitation over to snow and ushered in a record-breaking snowfall of 8 to 16 inches (some locations over 20 inches). Life threatening conditions developed during the late evening of April 13, as the earlier mix of rain, sleet, and snow changed to all snow, and brutal winds (gusting as high as 55 mph at Flandreau) whipped visibility to less than a quarter mile at times through the afternoon of April 14. State offices were closed, and schools cancelled on April 13. Travel was not recommended for much of the two-day period, if not impossible. Interstate 29 was closed from the North Dakota border to Sioux Falls 20:00 CST April 13 and remained closed until 08:00 CST April 15. A storm total snowfall of 10.5 inches was measured at Flandreau.

- **April 2019** - Blizzard conditions led to a shutdown of government offices and schools, and travel was not recommended due to the widespread whiteout conditions. Interstate 29 was closed from the evening of April 10 through noon on April 12. Storm-total snowfall from 4 to 8 inches occurred, with 5.4 inches at Flandreau. With winds gusting at times from 40 to 50 mph, many areas had snow drifts of several feet, making roads impassable. Ice accumulation of one-quarter to one-half inch occurred, resulting in scattered power outages as wind increased. At the peak, electric companies and cooperatives estimated as many as 25,000 customers were without power. Property damage costs include damage to utilities.

ASSESSING VULNERABILITY: OVERVIEW

Requirement 201.6(c)(2)(i). Local Mitigation Plan Review Tool – B1.
Requirement 201.6(c)(2)(i). Local Mitigation Plan Review Tool – B2.
Requirement 201.6(c)(2)(ii). Local Mitigation Plan Review Tool – B3.

Hazards were also analyzed in terms of the level of the community's vulnerability to the hazard. Vulnerability to the hazard is the susceptibility of life, property, and the environment to injury or damage if a hazard occurs. Representatives from the participating jurisdiction and the PDM Planning Team were asked to complete worksheets that rated their perception to vulnerability of hazards for either their specific geographical location, or for county-wide risks. A low vulnerability hazard is one that has very low damage potential to either life or property (minor damage to less than 5% of the jurisdiction). A "medium" vulnerability hazard is unlikely to threaten human life, although some people may be at risk, but may pose moderate damage potential (causing partial damage to 5% to 10% of the jurisdiction, on an irregular occurrence). A "high" vulnerability hazard may threaten human life, and more than ten percent of the jurisdiction may be at risk on a regular occurrence. Table 4.14 below is an overall summary of vulnerability by jurisdiction produced from the FEMA worksheets completed by the participating jurisdiction and PDM Planning Team. Also see Tables 5.1-5.12 for additional strategies and solutions that jurisdictions are taking to mitigate high-priority hazards.

Table 4.14: Overall Summary of Vulnerability

Type of Disaster	Flandreau Santee Sioux
Dam Failure	N
Drought	L
Earthquake	N
Extreme Cold	L
Extreme Heat	L
Flood	M
Freezing Rain/Sleet/Ice	M
Hail	L
Heavy Rain	L
Heavy Snow	L
Ice Jam	N
Landslide	N
Lightning	L
Rapid Snow Melt	L
Strong Winds	M
Thunderstorm	L
Tornado	L
Urban Fire	L
Wildfire	L

N : Not applicable; not a hazard to the jurisdiction

L : Low risk/vulnerability; little damage potential (minor damage to less than 5% of the jurisdiction)

M : Medium risk/vulnerability; moderate damage potential (causing partial damage to 5-10% of the jurisdiction, and irregular occurrence)

H : High risk/vulnerability; significant risk/major damage potential (for example, destructive, damage to more than 10% of the jurisdiction and/or regular occurrence)

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. The County's population is especially vulnerable to these conditions because people tend to leave their homes to get to places such as work, school, and stores rather than staying inside. Traffic is one of the biggest hazards in Moody 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. 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 fifty years a significant drought is experienced within the county, while less severe droughts have occurred as often as every three years.

Earthquakes occur in the area but have not had a great enough magnitude or intensity in the past ten 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 the County as it would anywhere else. Moody County does not have skyscrapers or very many tall buildings, but it also does not have codes in place that require homes or buildings to be retrofitted.

Extreme Cold temperatures often accompany a winter storm, so you may have to cope with power failures and icy roads. Whenever temperatures drop decidedly below normal and as wind speed increases, heat can leave your 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 damage are the largest vulnerabilities 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 Moody County.

Flooding can result in injuries and even loss of life when quickly moving 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.

Moody county is networked with a series of creeks and tributaries, which are part of the Big Sioux River watershed. This area receives several large thunderstorms per year that can cause intense rainfall for short periods of time, resulting in water feeding the Big Sioux River through its respective tributaries. In addition to flooding caused by rainfall, the area surrounding the Big Sioux River is subject to flood damage because of the possibility of extensive snowpack and subsequent spring snowmelt flooding.

There have also been past issues dealing with the maintenance and clearing of drainage channels in the area that have resulted in obstructions restricting the flow of water during a storm. Some residents live in the 100-year flood plain located in the Big Sioux River watershed.

Conditions, at times, make response and evacuation operations, very difficult, adversely affecting the safety of residents. The flooding of township roads is a concern for the entire county.

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. Moody County and 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. The 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 Moody County it may cause sewers to back-up 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 five to ten 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.

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 97 bridges and many more culverts throughout Moody County which are at risk for ice jams.

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 PDM.

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 five to ten inches of snow occur in Moody 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 the county. These lines are susceptible to breaking under freezing rain and icy conditions and severing during high blizzard winds. 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 one to three 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 twenty to forty-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, who account for approximately forty-seven 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 the municipalities 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 Moody 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.

Thunderstorms cause lightning and sometimes 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”.

Tornadoes 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 eleven a.m. to midnight. Within this time frame, most tornadoes occur between four p.m. and six p.m. 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 Moody 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 one to three 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 Moody County, wildfires can be easily spotted and are capable of being maintained. The 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 of risk in the 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 or tribe.

Moisture amounts have the biggest impact on fire situations. During wet years, fire danger is low. More controlled burns are conducted, and fewer mishaps occur. During dry years, severe restrictions are placed on any types of burns. For information on dealing with open/controlled burning within the county, see SDCL 34-29B and SDCL 34-35.

ASSESSING VULNERABILITY: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE

Requirement 201.6(c)(3)(ii). Local Mitigation Plan Review Tool – C2.

The Flandreau Santee Sioux Tribe does not participate in the National Flood Insurance Program (NFIP). However, the Tribe does have some fee lands outside of the reservation boundary that fall under the jurisdiction of Moody County.

Moody County participates in the National Flood Insurance Program (NFIP). The municipality of Flandreau, where Tribal headquarters are located, also participates in the NFIP. The County and Flandreau's initial involvement in the NFIP began as the communities were mapped between 1974 and 1977. These entities currently utilize the most recently updated flood hazard boundary map. The effective date for those maps was August 19, 2008. The map identifies Zone "A" of the flood hazard areas, without identifying elevations at risk 100-year and 500-year flood events. The municipality of Flandreau, as well as Moody County will continue to participate and ensure compliance of the participating local jurisdictions located within the floodplain.

Floodplain management requirements are administered by the Floodplain Administrator as described in Table 4.18 and follow floodplain regulations described in the local jurisdiction's zoning ordinance in the participating communities.

Table 4.15:
Communities Participating in the National Flood Program

Community Name	Community ID	Current Map Effective Date
Moody County	460235	8/19/08(M)
Flandreau	460062	8/19/08
Flandreau Santee Sioux	***Not Participating***	

The Moody County Emergency Management Office maintains the flood zone maps and utilizes DFIRMS for all planning mechanisms occurring in the unincorporated areas of the county; specifically, development of new structures. The community of Flandreau also has a designated floodplain administrator that requires elevation certificates and issues floodplain development permits for structures constructed within Zone A of the identified flood hazard areas. The DFIRMS are used to determine where the natural drainage occurs and ensures that new development will not interrupt the natural drainage. The Moody County Emergency Management Office has the DFIRMS in electronic format and thus will utilize and maintain the maps in the electronic format.

ADDRESSING VULNERABILTY: REPETITIVE LOSS PROPERTIES

Requirement 201.6(c)(2)(ii). Local Mitigation Plan Review Tool – B4

Due to various geomorphologic and topographical conditions, periodic flooding affects numerous areas in both incorporated and unincorporated areas of Moody County. Property adjacent to the Big Sioux River, as much of the Tribe's lands are, is most prone to flooding in Moody County. Residential development occurred adjacent to the Big Sioux River long before the initial flood hazard boundaries being identified in 1974. As a result, numerous structures already existed at the time of adoption of the first map and continue to be lived in today. Numerous structures are located within Flood Hazard Areas currently identified as Zone A. Many structures located within the County have experienced flooding or are required to be insured against flood due to their proximity to special flood hazard areas. The County has a total of 22 flood insurance policy holders. The vast majority of those policies insure residents adjacent to the Big Sioux River.

Table 4.16: National Flood Insurance Program Statistics

Community Name	Current NFIP Policies	Number of Claims Paid Since 1978	Total Value of Claims Paid	Policies for Structures in A-Zones	Repetitive Loss Properties
City of Flandreau	3	9	$75,293	2	0
Unincorporated areas of Moody County	10	32	$398,302	9	5
Totals	**13**	**41**	**$473,595**	**11**	**5**

SOURCE: South Dakota State NFIP Coordinator

The PDM Planning Team focused attention particularly on flood related issues. An issue of primary concern the number of times specific properties and structures on those properties flood. In Moody County there have been five incidences of repetitive loss claims throughout the unincorporated areas of the county, as compared to zero in the 2014 Moody County PDM. 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 ten-year period. A goal of the Tribe is to protect specific areas of the reservation from repeated flooding. This goal aims to protect properties prone to flood losses but does not discount the possibility that in some cases structures located in the floodplain may need to be removed.

ADDRESSING VULNERABILTY: SEVERE REPETITIVE LOSS PROPERTIES

Requirement 201.6(c)(2)(ii). Local Mitigation Plan Review Tool – B4.

The Flood Insurance Reform Act of 2004 identified another category of repetitive loss, severe repetitive loss, and defined it as "a single-family property (consisting of one-to-four residences) that is covered under flood insurance by the NFIP and has incurred flood-related damage for which four or more separate claims payments have been paid under flood insurance coverage with the amount of each claim payment exceeding $5,000 and with cumulative amount of such claims payments exceeding $20,000; or for which at least two separate claims payments have been made with the cumulative amount of such claims exceeding the reported value of the property. Although Moody County has five properties classified as "repetitive loss," there are no properties classified as "severe repetitive loss."

ASSESSING VULNERABILITY: IDENTIFYING STRUCTURES

Requirement 201.6(c)(2)(ii). Local Mitigation Plan Review Tool – B3.

One of the primary purposes of this PDM is identifying critical facilities, emergency shelters, and summer storm shelters and equipping those facilities with the means to provide the necessary energy for access to sanitation and maintain important functions during a natural hazard occurrence. In the event of a disaster as a result of severe summer of winter storms, a terrorist attack, or hazardous materials incident, the Tribe and participating entities will have the ability to prevent further loss of life by generator powered critical facility shelters.

Each participating entity was responsible for listing critical infrastructure within their communities. Table 4.17 is a list of critical facilities that would cause the greatest distress in the Tribe if destruction occurred. The information provided in Table 4.17 was compiled via survey of the participating communities. It should be noted that electrical transmission lines, transformers, and substations are generally not listed in Table 4.17 despite information being provided for them. They are displayed in Table 4.27.

Table 4.17: Critical Infrastructure in Flandreau Santee Sioux Nation

Jurisdiction/ Entity	Location	Address	Sector	Sub-sector	Name	Owner Type
FSST	City of Flandreau	403 W Broad Ave	Health Institution	Building	FSST Heath Center	Public
FSST	North of City of Flandreau	1132 N Crescent St	Education Institution	Building	Flandreau Indian School	Public
City of Flandreau	City of Flandreau	800 S Wind St	Population to Protect	Assisted Living Facility	Edgewood Healthcare	Private
FSST	Moody County	1 mile of 227th St 1 mile of 482nd Ave 1 mile 228th St	Transportation	Road	Tribal Highway	Public
FSST	City of Flandreau	607 S Veterans St	Population to Protect	Emergency Shelter	Royal River Casino & Hotel	Private?
FSST	City of Flandreau	1000 W Pipestone	Government Facility	Building	Maintenance Building/ Buffalo Mang/Natural Resources/Fitness Center	Public
FSST	City of Flandreau	1301 S Veterans St	Health	Building	FSST Fitness Center & Diabetes Office	Public
FSST	City of Flandreau	603 W Broad Ave	Government Facility	Building	FSST Headquarters	Public
FSST	City of Flandreau	503 W Broad Ave	Government Facility	Building	Wicoicaga Otipi Community Center	Public
FSST	Moody County	47223 SD Hwy 34, Colman	Food/Fuel	Building	Prairie Junction LLC	Private
City of Flandreau	City of Flandreau	2 Blocks N of Intersection of N Crescent St & E 1st Ave	Safety	Utility	Flandreau Dam	Public
FSST	City of Flandreau	1001 S Veterans St	Food/Fuel	Building	First American Mart	Private
FSST	City of Flandreau	606 S Center St	Population to Protect	Building	Tate Win Apartments	Public
FSST	City of Flandreau	100 Allen Dr	Government Facility	Building	FSST Housing Authority	Public
FSST	City of Flandreau	503 W Broad Ave	Government Facility	Building	FSST Education Office	Public
FSST	Moody County	3/4 mile north of the intersection of 229th St & SD Hwy 13	Population to Protect	Open Space	Powwow Grounds	Public
FSST	Flandreau	1301 S Veterans St	Health Institution	Building	Native Nations Cannabis	Private

ASSESSING VULNERABILITY: COMMUNITY CAPABILITIES

Requirement 201.6(c)(2)(i). Local Mitigation Plan Review Tool – B1.
Requirement 201.6(c)(3). Local Mitigation Plan Review Tool – C1.

Each community has a unique set of capabilities, including authorities, policies, programs, staff, funding, and other resources for accomplishing mitigation. One important step in assessing the vulnerability of a given community is to objectively review the capabilities to implement mitigation strategies and to identify limiting factors. Each community reviewed existing administrative documents, procedures, and policies. This helped the communities and planning team to evaluate how existing capabilities contribute to the vulnerability by reducing or exacerbating disaster impacts. Table 4.18 identifies whether each community has the specified administrative and technical capabilities, and who serves in such capacity. Table 4.19 encapsulates the efficacy of the specified planning mechanisms regarding disaster mitigation and to identify potential deficiencies in the specified plans.

Table 4.18: Administrative and Technical Capabilities

Administrative/Staff Composition	Local Jurisdiction		
	Flandreau Santee Sioux	***Flandreau***	***Moody County***
Board of Adjustment	Executive Council	Planning Commission	Elected Officials
Building Official	NA	Appointed	Appointed
Community Planner	NA	NA	Appointed
Elected Officials	Executive Council	Aldermanic	Commission
Emergency Coordinator	Appointed	NA	Appointed/Zoning Officer
Engineer/Highway Superintendent	NA	NA	Appointed
Floodplain Administrator	NA	City Administrator	Zoning Officer
GIS Coordinator	NA	NA	Appointed
Planning Commission	Executive Council	Appointed	Appointed
Zoning Officer	NA	City Administrator	Appointed
Grant Writing Capability (Yes/No)	Yes*	Yes*	Yes*
Non-profit organizations focused on environmental protection.	Yes**	Yes**	Yes**
Public-Private partnership initiatives addressing disaster-related issues.	No	No	No

NA: This Jurisdiction has nobody serving in this role.

* First District Association of Local Governments provides these services without cost.

** East Dakota Watershed Development District.

Table 4.19: Capabilities of Growth Guidance Instruments

Capabilities of Community Planning Mechanisms	*Flandreau Santee Sioux*	*Flandreau*	*Moody County*
Does the Future Land-Use Map identify natural hazard areas?	NA	Y	Y
Do the land-use policies discourage development or redevelopment within natural hazard areas?	NA	Y	Y
Does the plan provide adequate space for expected future growth in areas located outside natural hazard areas?	NA	Y	Y
Does the transportation plan limit access to hazard areas?	NA	N	N
Is transportation policy used to guide growth in safe locations?	NA	Y	Y
Are movement systems designed to function under disaster conditions (e.g. evacuation)?	NA	Y	Y
Are environmental systems that protect development from hazards identified and mapped?	NA	N	N
Do environmental policies provide incentives to development that is located outside protective ecosystems?	NA	N	N
Do environmental policies maintain and restore protective ecosystems?	NA	N	Y
Are the goals and policies of the comprehensive plan related to those of the FEMA Local Hazard Mitigation Plan?	NA	N	N
Is safety explicitly included in the plan's growth and development policies?	NA	Y	Y
Does the monitoring and implementation section of the plan cover safe growth objectives?	NA	N	N

Capabilities of Community Planning Mechanisms	*Flandreau Santee Sioux*	*Flandreau*	*Moody County*
Does the Zoning Ordinance conform to the comprehensive plan in terms of discouraging development or redevelopment within natural hazard areas?	**NA**	Y	Y
Does the zoning ordinance contain natural hazard overlay zones that set conditions for land use within such zones?	NA	Y	Y
Do rezoning procedures recognize natural hazard areas as limits on zoning changes that allow greater intensity or density of use?	NA	N	Y
Does the zoning ordinance restrict development within, or filling of, wetlands, floodways, and floodplains?	NA	Y	Y
Do the subdivision regulations restrict the subdivision of land within or adjacent to natural hazard areas?	NA	Y	Y
Do the subdivision regulations provide for conservation subdivisions or cluster subdivisions in order to conserve environmental resources?	NA	N	Y
Do the subdivision regulations allow density transfers where Hazard areas exist?	NA	N	N

NA: This jurisdiction does not have the specified document. However, the Tribe collaborates closely with the City of Flandreau and Moody County when development and land use is considered.
These plans were included in the Appendix.

ASSESSING VULNERABILITY: ESTIMATING POTENTIAL LOSSES

Requirement 201.6(b)(3). Local Mitigation Plan Review Tool – A4.
Requirement 201.6(c)(2)(ii). Local Mitigation Plan Review Tool – B3.
Requirement 201.6(d)(3)). Local Mitigation Plan Review Tool – D1.

As part of this Plan the Planning Team decided to include estimates for number of structures, value of structures, and the percentage of which are located within identified hazard areas. These estimates shall be used in multiple ways, including the comparison statistics for future development and disaster mitigation plans. Inconsistencies and missing information result from lack of existing mechanisms, plans, and technical documents available.

Moody County and the City of Flandreau have continued to enforce floodplain ordinances throughout the years. Any structures which would have been constructed during the last five years would either be floodproofed above BFE (in a manner consistent with the applicable ordinance) or placed upon property where it was determined the elevation was high enough to remove the property from the floodplain prior to construction. Though assessed values change every year, proportionally the number and/or percentage of lots with structures within the floodplain would not. Further new, more detailed information will be available for future iterations of this plan which will likely significantly affect the overall (economic) vulnerability of structures within floodplains of Moody County.

The assessor's office provided the assessed valuation of total structures on each property within the incorporated and rural areas of Moody County. The data provides a total value for structures of a certain use on each property. It was not possible to discern the value of structures per lot so the actual number of structures is based on the number of parcels with the specified use type. For the purposes of this plan only Residential, Commercial/Industrial, Agricultural, and Manufactured Homes were included. More specifically, all agricultural structures were included; only primary residential structures (houses, apartments, etc.) and not including sheds, lean-tos, and garages were included. All commercial or industrial structures were included, whether considered primary or accessory structures. Public or quasi-publicly owned structures and other structures for which the Department of Equalization did not have an assessed value were not included in the calculation. Structures throughout the incorporated and unincorporated portions of the county were reviewed based upon the DFIRM provided with the update to the flood hazard boundaries in 2008. The average value for structures of a given use-type was calculated and applied to the total number of properties identified within the floodplain to establish the value of structures within the floodplain. The information does not account for letters of map amendment or letters of map revision which may have been approved.

All properties with structures, whether owner occupied or not, were included in the valuations provided in Tables 4.20 and 4.21. The reports provided by the assessor's office did not include the number of people in each structure; thus, many of the tables are missing this information. The following tables also do not address information regarding religious, governmental, or utility structures. Although not included in Tables 4.20 and 4.21, the State of South Dakota Hazard Mitigation Plan incorporated HAZUS analysis accounting for potential losses to those structures within Moody County.

Table 4.20: Moody County (Rural Area)
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 Rural Areas	# in HA	% in HA
Residential	1,105	44	3.98%	$92,323,965	$3,676,248	3.98%	2,993	109	3.65%
Commercial/Industrial	23	1	4.35%	$9,716,858	$422,472	4.35%		0	0.00%
Agricultural	585	46	7.86%	$20,412,415	$1,605,079	7.86%		0	0.00%
Mobile Homes	54	6	11.11%	$1,892,840	$210,316	11.11%		15	0.50%
Total	**1,767**	**96**	**5.43%**	**$124,346,078**	**$5,914,115**	**4.76%**	**2,993**	**124**	**4.14**

Table 4.21: Flandreau 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	730	11	1.51%	$51,123,976	$770,361	1.51%	2,341	26	1.10%
Commercial/Industrial	132	9	6.82%	$10,825,319	$738,090	6.82%		0	0.00%
Agricultural	3	1	33.33%	$47,314	$15,771	33.33%		0	0.00%
Manufactured Home	35	0	0.00%	$917,241	$0	0.00%		0	0.00%
Total	**900**	**21**	**2.33%**	**$62,913,850**	**$1,524,222**	**2.42%**	**2,341**	**26**	**1.10%**

Notes:

 # in HA: Number of structures in hazard area was determined using aerial photography and DFIRM boundaries. Some structures included may have received LOMA's, removing them from the flood plain, since the effective date of the maps.

$ in HA: Value of structures in hazard area was estimated by determining the average value per structure and multiplying that value by the number of properties or structures used with a corresponding land use.

 # in [Jurisdiction]: The number of people was based on the 2010 Census.

 # in Hazard Area: The number of people in a hazard area was determined by multiplying the average household size of a given community as identified by the number of structures in the identified hazard area, and multiplying that number by the rate of occupancy for the community (All statistics from the US Census 2010).

As part of the State of South Dakota Hazard Mitigation Plan, data was prepared for specific hazard types. Although the data is not current, the modeling used in the plan would be difficult to replicate or improve upon. The following sections describing vulnerability to flooding and tornadoes is based largely on the corresponding sections in the State of South Dakota Hazard Mitigation Plan.

Flooding

All of Moody County is in the Big Sioux River Watershed, therefore Moody County was included within the Big Sioux Region in the State of South Dakota Hazard Mitigation Plan. The State Plan does not differentiate between flooding occurring in all of Moody County versus flooding occurring only on FSST lands. Based on its history of flood problems, the county was deemed a high priority jurisdiction in South Dakota's Plan. For that reason, HAZUS-MH analysis was performed in conjunction with the completion of the State's Plan. The results were based on flooding with a one percent chance of occurrence or commonly referred to as a "100-year flood" and display the potential base flood losses to the County. The full results of HAZUS-MH analysis for the County are displayed in Table 4.22.

FEMA updated the HAZUS modeling based on 2010 Census information as part of a nationwide study. Data from Moody County was extracted to produce a specified report for the purposes of this plan. Since no flood elevations have been established for any portion of Moody County, the HAZUS data, though not precise is the best available data for projecting flood losses in Moody County at the present time.

Table 4.22: HAZUS-MH Base Flood (1 Percent Chance) Loss Estimation Results (2019)

Building Damage	Loss Ratio*	Contents Damage and Inventory Loss	Total Economic Building Loss	Number of Displaced People	People Needing Shelter
$2,072,000	0.5%	$1,949,000	$4,220,000	216	9

SOURCE: State of South Dakota Hazard Mitigation Plan 2019. p 3-175; Table 3-45. South Dakota Office of Emergency Management.

*Loss ratio is the percent of the total building inventory value that could be damaged from flooding in any given year.

Tornado

As part of the State of South Dakota Hazard Mitigation Plan HAZUS-MH analysis was performed calculating potential building exposure to tornadoes in the state. Total value of structures lost due to tornadoes from 1950 – 2016 was calculated, inflated to current (2016) dollars. A loss ratio was then calculated by dividing the total damage by the total building exposure. Table 4.23 identifies data specific to the annualized losses from tornadoes for Moody County as identified in the State of South Dakota Hazard Mitigation Plan.

To provide additional insight into potential losses caused by tornadoes, historic loss data was also analyzed on a statewide scale. According to the National Climatic Data Center Storm Events database, there were 1,711 tornadoes in South Dakota between January 1950 and December 2016. Of those, 636 tornadoes rated as an F1 or higher. Total property damage for these events is estimated at $688 million. This suggests that South Dakota experiences 10 tornadoes, of F1 intensity or greater, and $11 million in losses each year. There were 18 deaths and 465 injuries in this time period, which averages out to approximately seven injuries each year. Of these storms, eleven resulted in major disaster declarations, with a total relief cost estimated at $165,245,996 in 2016 dollars. This averages out to $15.022 million (also in 2016 dollars) per major disaster. Based on the frequency of events, South Dakota averages one major disaster level tornado every 156 events or approximately every 6 years. The total historic losses and annualized losses by county are presented.

Table 4.23: Moody County Annualized Tornado Losses

Total Events 1950-2016	Total Property Damage (inflated) 1950-2016	Annualized Losses	Total Building Exposure	Loss Ratio
10	$840,270	$12,731	$752,929	1.116

SOURCE: State of South Dakota Hazard Mitigation Plan 2019. Appendix 3D-9; Table 10 and 12. South Dakota Office of Emergency Management.

ASSESSING VULNERABILITY: ANALYZING DEVELOPMENT TRENDS

Requirement 201.6(b)(3). Local Mitigation Plan Review Tool – A4.
Requirement 201.6(c)(3). Local Mitigation Plan Review Tool – C1.
Requirement 201.6(d)(3). Local Mitigation Plan Review Tool – D1.
Requirement 201.6(d)(3). Local Mitigation Plan Review Tool – D2.

The land use and development trends for the jurisdiction were identified by the representatives from the jurisdiction. At this time the Tribe does not have a comprehensive land use plan to identify future areas for development. However, the neighboring jurisdictions of Moody County and the City of Flandreau have adopted Comprehensive Land Use Plans with Future Land Use Maps. The Tribe works closely with the two aforementioned jurisdictions when new development is located outside of the Tribe's boundary.

Available undeveloped areas projected for residential, commercial, and industrial uses were reviewed. Based upon the projected density of development for each land use, the city of Flandreau identified the potential number of lots which could be created within flood hazard areas given current land use regulations and controls.

Flandreau has adopted the most recently prepared National Flood Insurance Program Flood Hazard and approved recommended ordinances for the proper regulation of property within the floodplain. No formal map or regulatory amendments have been made in the last five years. It is expected the planned portions of the communities with the floodplain will change when the updated floodplain boundaries identified by the RiskMap project are adopted. Table 4.24 identifies the projected vulnerability for the community of Flandreau since it has adopted a land use plan. Future Land Use Maps are included in Appendix F.

Table 4.24: City of Flandreau
Potential Floodplain Development – By Land Use Type

	Community Totals		Flood Hazard Area			
Land Use Category	Projected Development Density (Units/Acre)	Acres of projected future development	Acres of future development in Hazard Area	% Area for future development	Potential # of Lots for future development	# of Undeveloped Lots Already Appropriately Zoned
Residential	2.5	74	0.0	0.0	0.0	6
Commercial	1	3	0.0	0.0	0.0	0
Industrial	0.25	5	0.0	0.0	0.0	0

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UNIQUE OR VARIED RISK ASSESSMENT

Requirement 201.6(c)(2)(i). Local Mitigation Plan Review Tool – B1.
Requirement 201.6(c)(2)(ii). Local Mitigation Plan Review Tool – B3.
Requirement 201.6(d)(3). Local Mitigation Plan Review Tool – D1.

Vulnerability to all-natural hazards was considered by the participating entity and by the Planning Team. In community meetings, each team member rated its vulnerability to certain natural hazards. Specific information regarding the vulnerability of structures to flood and tornado was available. A detailed description of the Tribe's property vulnerability to flooding within the 100-year floodplain is not identified due to the reservation's lack of participation in the National Flood Insurance Program, therefore the city of Flandreau's vulnerability was referenced. Information compiled and utilized by the State of South Dakota in its State of South Dakota Hazard Mitigation Plan (2019) was included in the plan to describe the vulnerability of the tribe, Moody County as a whole, and the community of Flandreau to tornadoes. Less quantitative data is available regarding the potential impact of other natural hazards. Anecdotal information gathered from the meetings was used to generally assess the Tribe's vulnerability to certain hazards.

On the following pages, a hazard vulnerability map is shown for the Tribe (See Figure 4.1). The overall mitigation strategy and its goals are intended to minimize loss of life and injury; in addition to ensuring essential public services and the availability of emergency shelter in the event of natural hazards. Critical Infrastructure maps contained herein identify critical facilities which would provide essential services or prove most vulnerable to certain natural hazards. Since the major hazards facing the Tribe are not geographically based, winter storms and severe summer storms are as likely to occur in one part of Moody County as another. Similarly, wildfires can occur almost anywhere in Moody County, although they are more likely to occur in areas with extensive grassland cover or shrubs. While specific locations for above ground electrical distribution lines are not identified on the map(s), they are located throughout all of Moody County and are vulnerable to both flooding and severe weather.

Figure 4.1 Flandreau Santee Sioux Tribe Hazard Vulnerability Map (within Moody County)

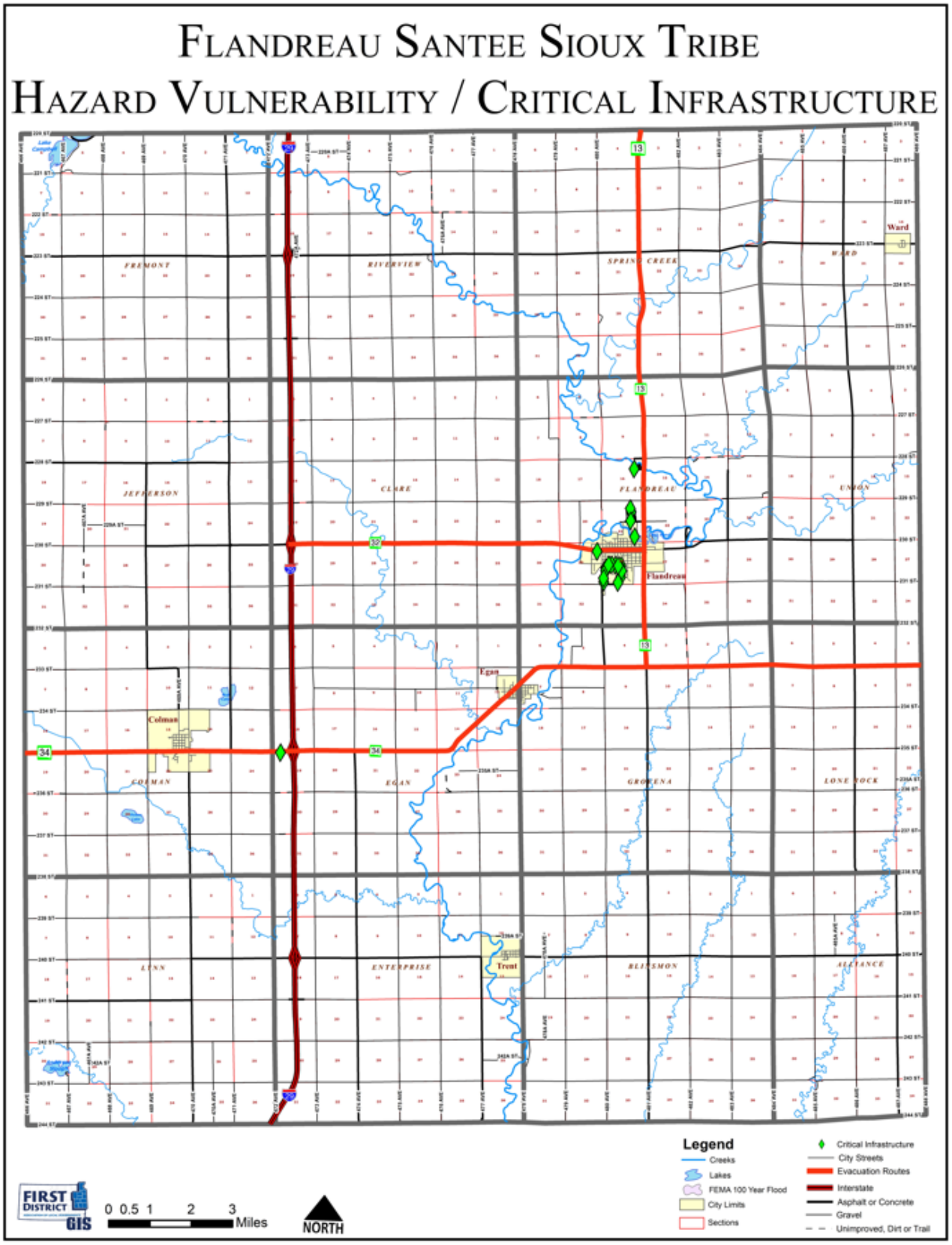
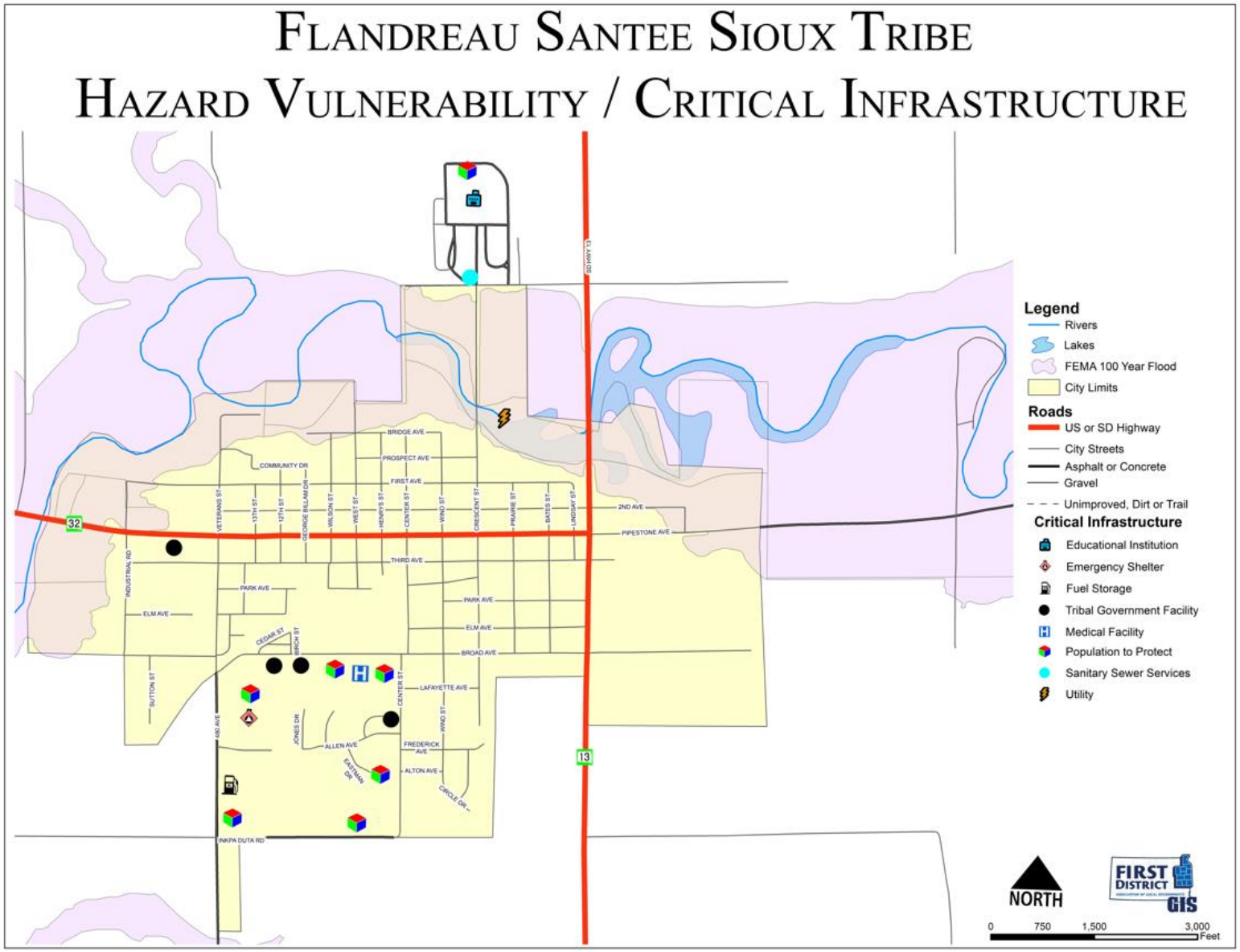


Figure 4.1 Flandreau Santee Sioux Tribe Hazard Vulnerability Map (within City of Flandreau)



CHAPTER 5 | MITIGATION STRATEGY

MITIGATION OVERVIEW

Requirement 201.6(c)(3)(i). Local Mitigation Plan Review Tool – C3.
Requirement 201.6(c)(3)(ii). Local Mitigation Plan Review Tool – C4.
Requirement 201.6(c)(3)(iii) & (iv). Local Mitigation Plan Review Tool – C5.
Requirement 201.6(d)(3). Local Mitigation Plan Review Tool – D3.

The State Hazard Mitigation Plan addresses several mitigation categories including warning and forecasting, community planning, and infrastructure reinforcement. The Tribe and participating entities' greatest needs are mitigating high wind and flood hazards, backup generators for critical infrastructure, construction of storm shelters, and public awareness.

After the completion of the risk assessment (identification of hazards, probability of hazards and vulnerability to hazards), it was the mutual consensus of the PDM Planning Team that mitigation strategies of the PDM should focus on the following hazards: winter storms, severe summer storms, flooding, wildfires (urban/rural).

The PDM Planning Team first discussed and created goals, objectives, and priorities for the Plan. The PDM Planning Team completed the goal identification process by considering the tribe's and participating jurisdictions' vulnerability to each identified hazard, and the severity of the threat posed by each hazard. Much of the discussion focused on damage caused by past events, and what could be done to ensure that future damage will be lessened or eliminated. By reviewing neighboring jurisdictions' Comprehensive Land Use Plans, the participants also considered how future development might affect the Tribe's, Moody County's, and Flandreau's vulnerability to the hazards they face. When identifying goals, numerous activities or projects were identified with broadly defined benefits to the Tribe. Numerous actions were agreed by the PDM Planning Team to have broad reaching benefits but due to scope or varying levels of importance no specific cost, timeframe, or priority was assigned. Likewise, many infrastructure projects and policies throughout the community would mitigate hazards but were not located in the most vulnerable areas. All entities reviewed the activities/policies and corresponding problem statements to identify whether they applied to their respective jurisdiction. The results of the community review of those general activities/policies are displayed in Tables 5.1 – 5.12. Specific projects for each entity are listed in Table 5.13. Those projects intended to mitigate problems at a specific location are represented in Figures 5.1 to 5.7.

Principal Goals

1. **Reduce the loss of life, property, infrastructure, critical facilities, cultural resources and impacts from severe weather, flooding, and other natural disasters.**

2. **Improve public safety during severe weather, flooding, and other natural disasters.**

3. **Improve the Tribe's Emergency Preparedness and Disaster Response and Recovery capabilities.**

Mitigation Activities for Flooding Hazards

Goal #1: Protect specific areas of Flandreau Santee Sioux Tribe from flooding.
Goal #2: Educate and inform Flandreau Santee Sioux Tribe residents regarding flooding safety.
Goal #3: Reduce the extent to which utility interruptions affect areas during flooding events.

- **Actions/Projects to reduce flood risk through policy implementation (See Table 5.1)**

- **Actions/Projects to change the characteristics or impacts of flood hazards (See Table 5.2)**

- **Actions to reduce loss potential of infrastructure to flood hazards (See Table 5.3)**

Mitigation Activities for Severe Weather Hazards (Summer and Winter)

Goal #1: Increase public awareness and education on severe weather issues.
Goal #2: Improve public safety during severe weather.
Goal #3: Reduce the extent to which utility interruptions affect areas during severe weather situations.
Goal #4: Reduce crippling effects of winter storms, especially regarding smaller communities.

- **Actions/Projects to reduce severe weather risk through policy implementation (See Table 5.4)**

- **Actions/Projects to change the characteristics or impacts of severe weather hazards (See Table 5.5)**

- **Actions/Projects to reduce loss potential of infrastructure to sever weather hazards (See Table 5.6)**

Table 5.1: Actions/Projects to Reduce Flood Risk through Policy Implementation

Problem Statements	Actions	*Flandreau Santee Sioux*	*Flandreau*	*Moody County*
Public is unaware of scope of flood risk and existing emergency plans.	Public education. Disseminate information regarding how to deal with flooding. This would include transportation issues, home protection strategies, safety issues, and how to move forward after a flooding situation.	✓	✓	✓
	Encouraging homeowners in flood-prone areas to purchase flood insurance.	✓	✓	✓
Jurisdiction is unaware potential hydrologic impacts of drainage/ development projects.	Conduct necessary studies addressing drainage (storm water flow/runoff, etc).	✓	✓	✓
Residents are not eligible for flood insurance.	Consider participation in the National Flood Insurance Program.	✓		
Jurisdiction is unaware of opportunities to participate programs to assist in achieving mitigation goals.	Work to improve the level of communication and coordination with the State NFIP coordinator.	✓	✓	✓
Jurisdiction has no legal mechanism to regulate land use.	Adoption and enforcement of land use regulation.	✓		
Jurisdiction has little legal mechanism to regulate drainage.	Collaborate with County on enforcement of Moody County drainage ordinance.	✓		
Need to continue to regulate minimum construction standards.	Continue enforcement of building codes.	✓		
No technical analysis or identification of specific mitigation projects.	Identify and prioritize capital/structural mitigation projects that are cost effective and technically feasible.	✓	✓	✓

Table 5.2: Actions/Projects to Change the Characteristics or Impacts of Flood Hazards

Problem Statements	Actions	*Flandreau Santee Sioux*	*Flandreau*	*Moody County*
Portions of storm sewer system is not designed to 100-year flood event.	Installing or upgrading storm sewer piping.	✓	✓	
Inadequate warning for flooding on Big Sioux River.	Add additional stream gauges along river within the county.		✓	✓
Inadequate warning for flooding on Flandreau Creek.	Add additional stream gauges along river within the tribal lands.	✓		
Drainage patterns have changed, culverts are inadequate for conveyance of water.	Installing or enlarging drainage culverts.	✓	✓	✓
Certain streets have substandard or no curb and gutter.	Curbing and guttering of city streets to improve storm water flow.	✓	✓	
Capacity of rivers, streams, and retention areas is decreased due to accumulation of debris.	Clean out debris in drainage areas, tributaries, etc to improve water flow.	✓	✓	✓
Sanitary and/or storm sewer are vulnerable to back-up in flood event.	Install valves, plugs in sanitary and/or storm sewer system.	✓	✓	
Potential for development in flood prone areas.	Preservation and expansion of open space along the river and enhancement of existing berm areas.	✓	✓	✓
	Work with property owners to implement deed restrictions for open lots/vacant properties in the flood hazard areas to prevent development.	✓	✓	✓

Table 5.3: Actions/Projects to Reduce Loss Potential of Infrastructure to Flood Hazards

Problem Statements	Actions	*Flandreau Santee Sioux*	*Flandreau*	*Moody County*
Many roads were built prior to identification of flood hazard areas.	Replace and raise culverts.	✓	✓	✓
	Elevating roads in flood-prone areas.	✓	✓	✓
Some utility poles are located in areas vulnerable to flooding.	Flood-proof or replace utility structures in flood-prone areas.	✓	✓	✓
Structures constructed in the floodplain prior to identification of flood hazard areas.	Making structural retrofits to infrastructure.	✓	✓	✓

Table 5.4: Actions/Projects to Reduce Severe Weather Risk through Policy Implementation

Problem Statements	Actions	*Flandreau Santee Sioux*	*Flandreau*	*Moody County*
Public is unfamiliar with certain disaster preparation measures.	Public education. Disseminate information regarding how to deal with severe weather (summer/winter). Some of the issues that may be addressed within the information would include: safety issues on downed power lines, electrical and fire dangers, the necessity for generators and advice on using them, protecting property, survival strategies during storms, and purchasing of back-up power for various household and farming operations.	✓	✓	✓
Lack of data regarding vulnerability to winter storms.	Gather data to create a more precise loss estimate for winter storms.	✓	✓	✓
Lack of data regarding vulnerability to summer storms.	Gather data to create a more precise loss estimate for summer storms.	✓	✓	✓

Table 5.5: Actions/Projects to Change the Characteristics or Impacts of Severe Weather Hazards

Problem Statements	Actions	*Flandreau Santee Sioux*	*Flandreau*	*Moody County*
Certain areas and populations are not served by storm shelters.	Construct tornado safe rooms or community shelters.	✓		✓
	Construct storm shelters for tribal government employees, multi-family housing, and powwow grounds.	✓		
Critical facilities are vulnerable to power failure.	Install backup generators.	✓		✓
Sirens are out of date.	Ensure storm sirens meet federal standards.	✓	✓	✓
Certain areas are susceptible to snow drifting.	Survey areas in need of snow shelterbelts and plant trees accordingly.	✓	✓	✓
	Install or plant living snow fences.	✓	✓	✓
Certain areas of town cannot hear storm sirens and other emergency warning systems.	Construct new or improve existing warning systems.	✓	✓	✓

Table 5.6: Actions/Projects to Reduce Loss Potential of Infrastructure to Severe Weather Hazards

Problem Statements	Actions	*Flandreau Santee Sioux*	*Flandreau*	*Moody County*
Utility lines and structures are subject to failure in high wind, heavy rain, ice events.	Upgrading of utility lines.	✓	✓	✓
	Burial of utility lines when needed.	✓	✓	✓
	Require upgrading of overhead lines when age or disasters provide an opportunity.	✓	✓	✓
	Removal of trees near power lines.	✓	✓	✓
	Attachment of guy wires to dead-end poles.	✓	✓	✓
	Testing integrity of poles.	✓	✓	✓
	Usage of anti-galloping devices.	✓	✓	✓
	Making structural retrofits to facilities.	✓	✓	✓

Mitigation Activities for Fire and Drought Hazards

Goal #1: Increase firefighting capabilities.
Goal #2: Reduce the negative effects droughts have on Flandreau Santee Sioux Tribe.
Goal #3: Reduce the negative effects wildfires have on Flandreau Santee Sioux Tribe.

- **Actions/Projects to reduce fire and drought risk through policy implementation (See Table 5.7)**
- **Actions/Projects to reduce loss potential of infrastructure to fire and drought hazards (See Table 5.8)**
- **Actions/Projects to change the characteristics or impacts of fire and drought hazards (See Table 5.9)**

General Mitigation Activities

Technological (See Table 5.10):

Planning (See Table 5.11):

Administration/Coordination (See Table 5.12)

Table 5.7: Actions/Projects to Reduce Fire and Drought Risk through Policy Implementation

Problem Statements	Actions	*Flandreau Santee Sioux*	*Flandreau*	*Moody County*
Community becomes vulnerable to fire hazard while staff is being trained.	Find funding sources to pay for persons to fill positions while individuals are at training courses.	✓	✓	✓
Potential for development in areas vulnerable to wildfire or urban fire.	Collaborate with Moody County on county adoption and enforcement of property regulations in areas vulnerable to wildfire.		✓	✓
	Establish/require minimum fire suppression standards for subdivisions.		✓	✓
Community has no plan/policy for water rationing in emergency.	Develop water rationing measures that will be implemented during a drought situation (collaboration between city, county, and tribal governments).	✓	✓	✓
Public is unaware of benefits of conserving water.	Always educate residents on the benefits of conserving water, not just during a drought.	✓	✓	✓

Table 5.8: Actions/Projects to Reduce Loss Potential of Infrastructure to Fire and Drought Hazards

Problem Statements	Actions	*Flandreau Santee Sioux*	*Flandreau*	*Moody County*
Firefighting equipment becomes out of date quickly.	Ensure that fire departments are adequately equipped to respond to wildfires. – work with city	✓	✓	✓
Fire hydrants become unusable.	Have rural fire departments locate dry fire hydrants.		✓	

Table 5.9: Actions/Projects to Change the Characteristics or Impacts of Fire and Drought Hazards

Problem Statements	Actions	*Flandreau Santee Sioux*	*Flandreau*	*Moody County*
Reservoirs are vulnerable to silting and decrease in efficient provision of water services in emergency situations.	Dredge reservoirs to improve water quality. Reservoirs silt in and dredging, water can flow to more places, more quickly, and more easily.	✓	✓	✓
Dead or dry plant material creates fire hazard/ location changes seasonally and annually.	Burn areas to ensure a fire break rather than ignition fuel.	✓	✓	✓
Local economy is very dependent on corn/soybean production.	Educate farmers on the benefits of a diversified crop protection plan in the event of a drought.	✓	✓	✓
	Work with local farmers to investigate the use of more drought resistant crops.	✓	✓	✓

Table 5.10: Technological Activities

Problem Statements	Actions	*Flandreau Santee Sioux*	*Flandreau*	*Moody County*
Current data and software can become obsolete or out of date.	Continue utilizing a working computer aided mapping project for the County. This includes using overlays of drone imagery, GIS data, HazMat, and Roads.	✓		✓
	Enhance existing computer aided dispatch.	✓	✓	✓
	Use HAZUS software to estimate losses in flooding situations. Information may also be able to be used for other hazard areas.	✓	✓	✓
	Work with South Dakota State University to explore additional methods of estimating losses in natural hazards.	✓	✓	✓

Table 5.11: Planning Activities

Problem Statements	Actions	*Flandreau Santee Sioux*	*Flandreau*	*Moody County*
Maintenance of a mitigation plan is beyond the economic capability of this community.	Find funding to review and update the regional and local disaster mitigation plans on a five-year cycle.	✓	✓	✓
Disaster mitigation projects have not always been incorporated into other plans.	Incorporate disaster mitigation actions into appropriate local and regional plans – Master Plans, land use, transportation, open space, and capital programming.	✓	✓	✓
	Integrate disaster mitigation concerns into subdivision, site plan review, and other zoning reviews. In particular, require the consideration of downstream flooding impacts caused by new projects.	✓	✓	✓
	Integrate disaster mitigation concerns into transportation projects (e.g. drainage improvements, underground utilities, etc.).	✓	✓	✓
This community's mitigation projects are not coordinated with other communities' projects.	Develop a means for sharing information on a regional basis about successful disaster mitigation planning and programs.	✓	✓	✓

Table 5.12: Administration/Coordination Activities

Problem Statements	Actions	*Flandreau Santee Sioux*	*Flandreau*	*Moody County*
This community is not staffed, nor does it have funding mechanisms to apply for and administer funding sources for mitigation projects.	Identify and pursue funding that builds local capacity and supports grant-writing for mitigation actions identified in the PDM.	✓	✓	✓
Need to improve coordination of activities with other governmental jurisdictions and utility providers.	Increase communication/coordination between federal, state, regional, county, municipal, private, and non-profit agencies in the area of pre-disaster mitigation.	✓	✓	✓
	Maintain and enhance working relationships with the utility providers.	✓	✓	✓

After meetings with the participating entities and opportunities for public input, a series of mitigation goals were devised to best aid the Tribe in reducing and lessening the effects of hazards. Projects were carefully generated and discussed to determine if they meet the hazard mitigation needs of the Tribe. These projects were evaluated based on a cost/benefit ratio and priority. Although this PDM focuses on disaster mitigation rather than disaster preparedness, some communities discussed disaster preparedness projects as well. It was difficult for individual communities to recognize the difference between providing storm shelters and making sure the storm shelters function properly (for example). Actions considered in this category included the acquisition of emergency generators and erecting or replacing warning sirens in areas that currently are not well served.

Most of the mitigation actions proposed by the jurisdictions were identified by governmental personnel or PDM Planning Team members from the jurisdiction. Once each jurisdiction had its list of proposed actions complete, it was submitted to the First District. At the second PDM Planning Team meeting, the mitigation actions were reviewed. At the third PDM Planning Team meeting a final opportunity was given for the jurisdictions to add any additional actions or refine information relating to previously identified projects.

Although in some cases additional data will be necessary, 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. Table 5.13 is a presentation of the mitigation actions proposed by the PDM Planning Team and the Tribe. In addition to identifying the proposed actions, the table includes additional information about each action. Elected officials and staff of each jurisdiction were responsible for providing most of this information for actions in their community, but the other planning participants helped in this process. The following information is provided for each action:

- A statement regarding the specific problem the proposed action will mitigate.
- The local priority rating (discussed in the next section).
- The time frame to accomplish the action – “Short” means actions that are intended to be initiated within two years, “Medium” is for actions that should be started within five years, and “Long” is for actions that are not anticipated to be started for at least five years.
- The party(s) primarily responsible for implementing the action.
- The estimated cost - estimates for many of the actions were obtained from knowledgeable sources based on current information. Estimates are subject to change due to specific details of specific projects.
- Potential sources of funding (discussed below).
- The primary hazard being addressed.
- The goal corresponding to the action.

A High Priority Rating can be defined as a potential project that had received widespread support amongst the local governing body when asked during the planning process and would be first priority when planning future mitigation projects. A Medium Priority Rating also would receive general support amongst the governing body but was not a first priority project compared to those deemed a High Priority. Low Priority received the least amount of support, but still were believed to be a necessary action to take for hazard mitigation. Where estimated project costs were available, they were considered in establishing priorities. However, no formal cost benefit analysis was performed on any specific project. Ultimately the prioritization of these projects was based upon the perceived needs of the local jurisdiction.

Particular attention needs to be paid to sources of funding for the actions. Given the existing financial reality of tight tribal, county, and municipal budgets, some of the proposed actions realistically cannot be implemented without substantial grant assistance. With such assistance, it is likely that many of the high priority projects can be undertaken without placing an onerous burden on local budgets. Resources for some of the actions available from FEMA through the South Dakota Office of Emergency Management include the Hazard Mitigation Grant Program, Pre-Disaster Mitigation grant program, and Flood Mitigation Assistance grant programs. Other possible sources of funding include:

<u>Grant and loan programs/sources</u>

- Bureau of Indian Affairs
- Economic Development Administration
- Indian Community Development Block Grant program
- South Dakota Dept of Environment and Natural Resources
- South Dakota Dept of Transportation
- Tribal Transit Program
- US Department of Agriculture Rural Development Office

Table 5.13 Proposed Mitigation Activities

FLANDREAU SANTEE SIOUX TRIBE PROBLEM STATEMENTS	FLANDREAU SANTEE SIOUX TRIBE ACTIONS	PRIORITY RATING	TIMEFRAME	CONTACT	COST	FUNDING SOURCE	HAZARD	GOAL
Protect vulnerable populations in housing areas and main office.	Construct tornado shelter.	High	Medium	FSST Executive Committee	$100,000	HMGP, TRIBE, ICDBG	Severe Weather Hazards (Summer & Winter)	Improve public safety during severe weather situations.
Protect vulnerable populations in pow-wow grounds.	Construct tornado shelter.	Medium	Long	FSST Executive Committee	$100,000	HMGP, TRIBE, ICDBG	Severe Weather Hazards (Summer & Winter)	Improve public safety during severe weather situations.
Vulnerability to lose of power during an emergency event.	Purchase backup generator for vulnerable housing areas (assisted living facility & apartments).	High	Short	FSST Executive Committee	$50,000	HMGP, OEM, TRIBE	Severe Weather Hazards (Summer & Winter)	Improve public safety during severe weather situations.
Vulnerability to lose of power during an emergency event.	Purchase backup generator for local businesses.	Medium	Short	FSST Executive Committee	$10,000	HMGP, OEM, TRIBE	Severe Weather Hazards (Summer & Winter)	Improve public safety during severe weather situations.
Vulnerability to lose of power during an emergency event.	Purchase backup generator for tribal offices.	Medium	Short	FSST Executive Committee	$10,000	HMGP, OEM, TRIBE	Severe Weather Hazards (Summer & Winter)	Improve public safety during severe weather situations.

FLANDREAU SANTEE SIOUX TRIBE PROBLEM STATEMENTS	FLANDREAU SANTEE SIOUX TRIBE ACTIONS	PRIORITY RATING	TIMEFRAME	CONTACT	COST	FUNDING SOURCE	HAZARD	GOAL
Lack of emergency shelter and services supplies.	Purchase and replenish emergency supplies (cots, first aid, etc).	High	Short	FSST Executive Committee	$20,000	HMGP, TRIBE	Severe Weather Hazards (Summer & Winter)	Improve public safety during severe weather situations.
Flooding and buckling of road has resulted in dangerous driving conditions.	Elevation and replacement of flood-prone road sections.	High	Long	FSST Executive Committee	$1,000,000	BIA, ICBDG, TTP, TRIBE	Flooding	Protect specific areas of FSST from flooding.
There are many culverts in FSST jurisdiction in a state of disrepair.	Replace or rehabilitate culverts.	Medium	Medium	FSST Executive Committee	Dependent on number.	BIA, ICBDG, TTP, TRIBE, HMGP	Flooding	Protect specific areas of FSST from flooding.
Certain areas of FSST jurisdiction cannot be accessed during flood events by road.	Elevate roads in flood-prone areas.	Medium	Long	FSST Executive Committee	$Unknown	BIA, ICBDG, TTP, TRIBE, HMGP	Flooding	Protect specific areas of FSST from flooding.
Areas of FSST, specifically the Powwow Grounds, located along the Big Sioux River is prone to flooding.	Add riprap along shoreline.	High	Short	FSST Executive Committee	$100,000	HMGP, TRIBE, ICDBG	Flooding	Protect specific areas of FSST from flooding.

FLANDREAU SANTEE SIOUX TRIBE PROBLEM STATEMENTS	FLANDREAU SANTEE SIOUX TRIBE ACTIONS	PRIORITY RATING	TIMEFRAME	CONTACT	COST	FUNDING SOURCE	HAZARD	GOAL
Areas of FSST, specifically the Powwow Grounds, located along the Big Sioux River is prone to flooding.	Conduct studies to addressing drainage improvements and implement flood prevention.	Low	Long	FSST Executive Committee	$100,000	HMGP, TRIBE, ICDBG	Flooding	Protect specific areas of FSST from flooding.

Figure 5.1: Flandreau Santee Sioux Tribe Potential Mitigation Project Map (within Moody County)

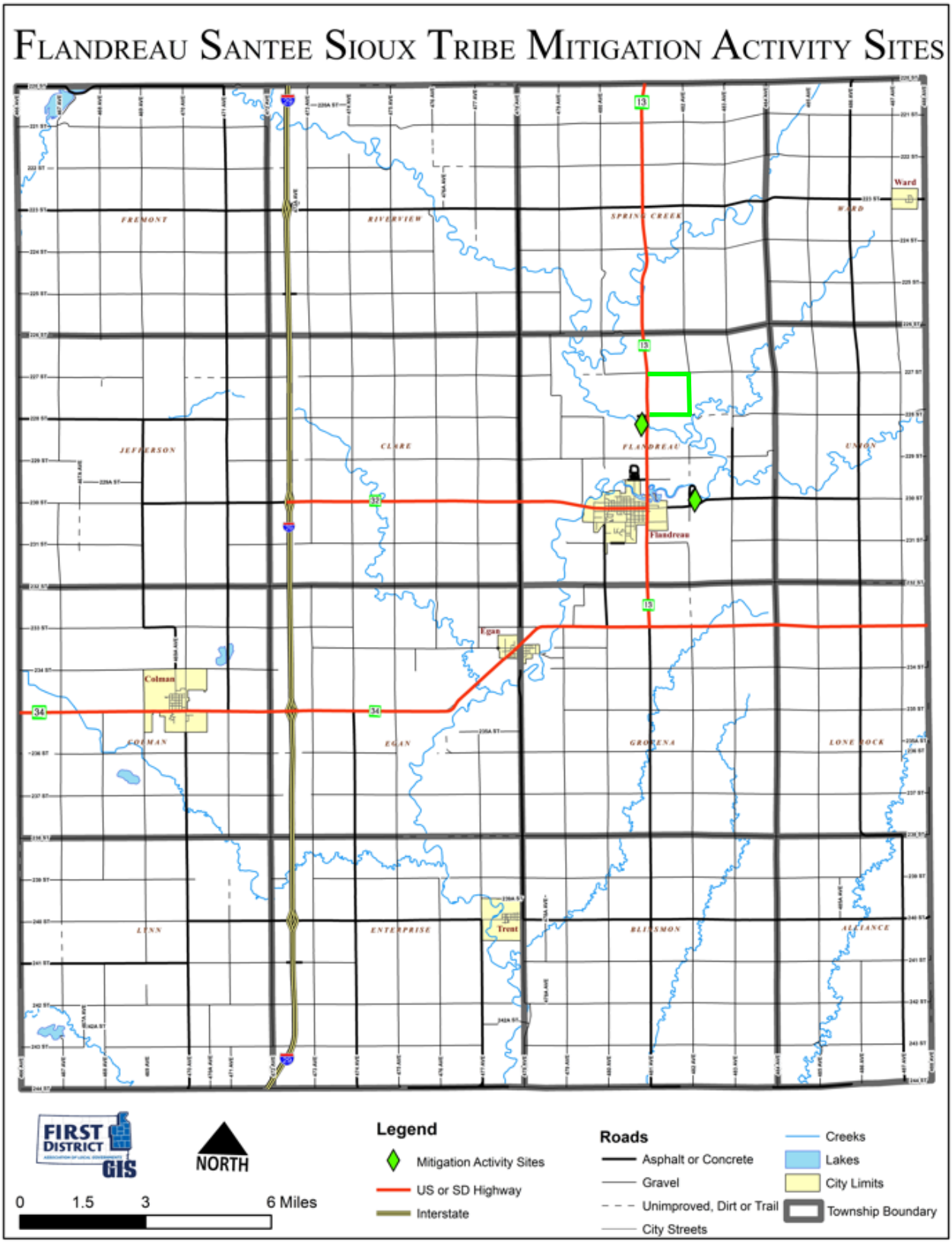
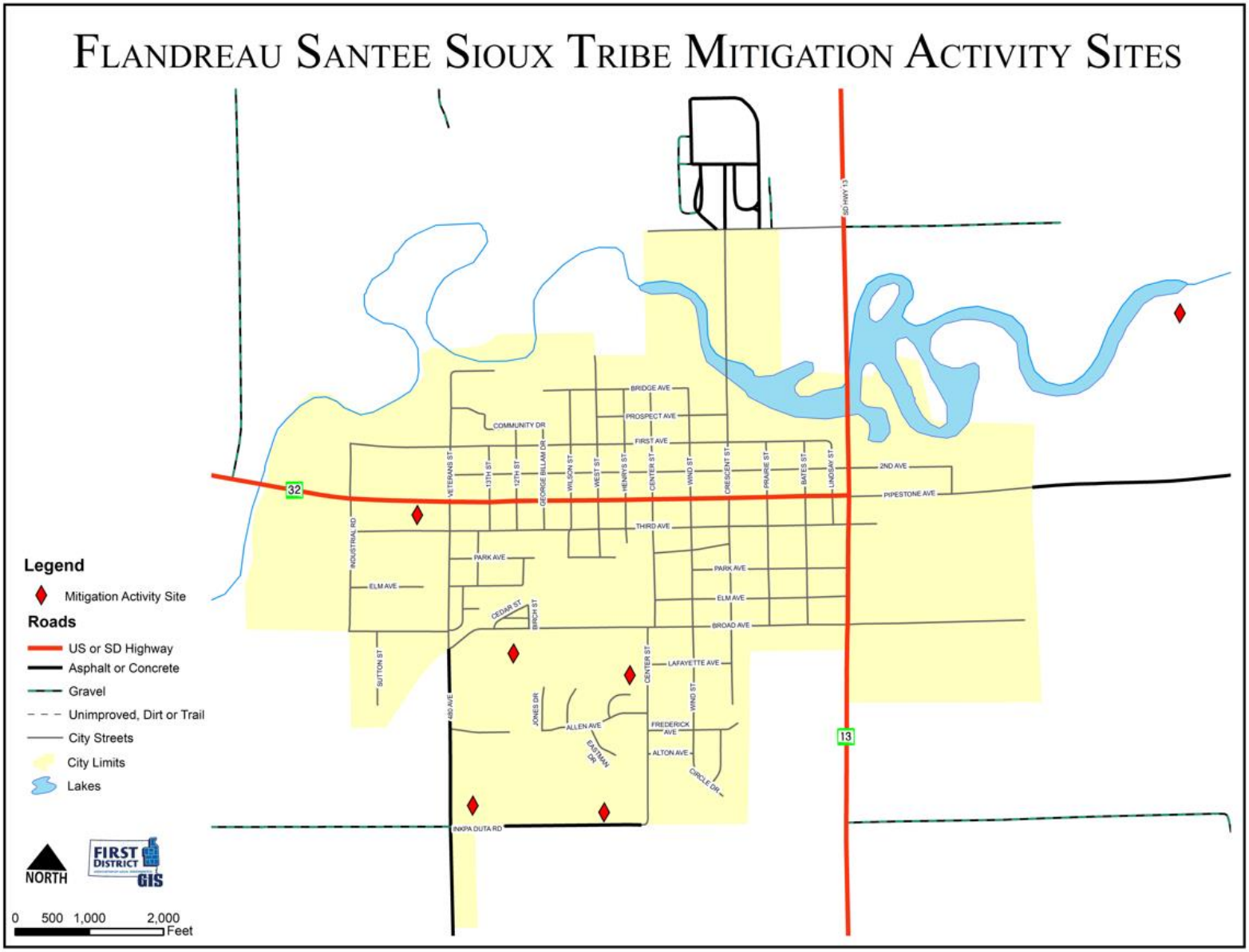


Figure 5.2: Flandreau Santee Sioux Tribe Potential Mitigation Project Map (within City of Flandreau)



IMPLEMENTATION OF MITIGATION ACTIONS

Requirement 201.6(c)(4)(ii). Local Mitigation Plan Review Tool – C6.
Requirement 201.6(d)(3). Local Mitigation Plan Review Tool – D3.

Upon adoption of the Flandreau Santee Sioux Tribe PDM, each jurisdiction will become responsible for implementing its own mitigation actions. The planning required for implementation is the sole responsibility of the local jurisdictions that have participated in the PDM update. All of the communities have indicated that they do not have the financial capability to move forward with projects identified in the PDM 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 communities are able to secure funding for the mitigation projects, they will move forward with the projects identified. A cost-benefit analysis will be conducted on an individual basis after the decision is made to move forward with a project.

From a practical standpoint the PDM required communities to reflect on past disasters, consider future disasters, and think about how or if future disasters would be handled differently, or better. Information from the 2020 Moody County PDM plan was incorporated during the drafting of the 2021 Flandreau Santee Sioux Tribe PDM plan. FEMA approved methodology and format utilized for the PDM plan is similar to Moody County and other neighboring counties.

CHAPTER 6 | PLAN MAINTENANCE

MONITORING, EVALUATING, AND UPDATING THE PLAN

Requirement 201.6(c)(4)(ii). Local Mitigation Plan Review Tool – C6.

The Tribe and all the participating local jurisdictions thereof will incorporate the findings and projects of the PDM in all planning areas as appropriate. Periodic monitoring and reporting of the PDM is required to ensure that the goals and objectives for the Tribe PDM are kept current and that local mitigation efforts are being conducted. Communities will establish an annual review of projects and infrastructure listed in the plan. As funding becomes available, projects are completed, or the inevitable new project needs to be added, communities will report to the FSST Emergency Management Coordinator. The Tribe should adopt a schedule to create an annual report for the FSST Emergency Management Coordinator to present to the Executive Council each year.

During the process of implementing mitigation strategies, the tribe 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 PDM. A good plan needs to provide for periodic monitoring and evaluation of its successes and failures and allow for appropriate changes to be made.

CONTINUED PUBLIC PARTICIPATION/INVOLVEMENT

Requirement 201.6(c)(4)(iii). Local Mitigation Plan Review Tool – A5.
Requirement 201.6(c)(4)(ii). Local Mitigation Plan Review Tool – C6.

During interim periods between the five-year re-write, efforts will be continued to encourage and facilitate public involvement and input. The PDM plan will be available for public view and comment at the FSST Headquarters located at 603 West Broad Avenue in Flandreau and the First District Association of Local Governments office. The PDM will also be available for review on the web at the First District Association of Local Governments homepage www.1stdistrict.org. Comments will always be received whether orally, handwritten, 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. Effort will be made to encourage tribes, cities, and counties to go beyond the minimum required to receive public input and engage stakeholders.

ANNUAL REPORTING PROCEDURES

Requirement 201.6(c)(4)(ii). Local Mitigation Plan Review Tool – C6.

The PDM shall be reviewed annually, as required by the FSST Emergency Management Coordinator, or as the situation dictates such as following a disaster declaration. The FSST Emergency Management Coordinator will review the PDM annually and ensure the following:

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

FIVE-YEAR PDM REVIEW

Requirement 201.6(c)(4)(i). Local Mitigation Plan Review Tool – A6.
Requirement 201.6(c)(4)(ii). Local Mitigation Plan Review Tool – C6.

Every five years the PDM will be reviewed, and a complete update will be initiated. All information in the PDM will be evaluated for completeness and accuracy based on new information or data sources. New property development activities will be added to the PDM and evaluated for impacts. New or improved sources of hazard related data will also be included.

In future years, if the Tribe relies on grant dollars to hire a contractor to write the PDM update, the Tribe will initiate the process of applying for and securing such funding in the third year of the PDM to ensure the funding is in place by the fourth year of the PDM. The fifth year will then be used to write the PDM update, which in turn will prevent any lapse in time where the Tribe does not have a current approved PDM 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 PDM. The approach to this PDM update effort will be essentially the same as the one used for the original PDM development.

The Emergency Management Coordinator will meet with the PDM Planning Team for review and approval prior to final submission of the updated PDM.

PLAN AMENDMENTS

Requirement 201.6(c)(4)(ii). Local Mitigation Plan Review Tool – C6.

PDM amendments will be considered by the FSST Emergency Management Coordinator, during the PDM's annual review to take place the end of each tribal fiscal year. The Tribe will be required to hold a public hearing and adopt the recommended amendment by resolution prior to considerations by the PDM Planning Team.

INCORPORATION INTO EXISTING PLANNING MECHANISMS

Requirement 201.6(B)(3). Local Mitigation Plan Review Tool – A4.

The Flandreau Santee Sioux Tribe does not have an existing comprehensive land use plan. Instead, the Tribe will consider the mitigation requirements, goals, actions, and projects when it considers and reviews the budget and other existing planning documents. Preparation of the budget is an opportune time to review the plan since budget preparations are a yearly task and typically consider any expenditure for the upcoming year at that time.

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

Federal

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

Title: Pre-Disaster Mitigation Program Agency: Federal Emergency Management Agency
Through the Disaster Mitigation Act of 2000, Congress approved the creation of a national program to provide a funding mechanism that is not dependent on a Presidential Disaster Declaration. The 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. The funding is based upon a 75% Federal share and 25% non-Federal share. The non-Federal match can be fully in-kind or cash, or a combination. Special accommodations will be made for "small and impoverished communities", who will be eligible for 90% Federal share/10% non-Federal. FEMA provides 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).

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 Assistant 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 *Water, power & sanitary systems *Draining & irrigation channels *Airports & parks *Schools, city halls & other buildings Private nonprofit organizations are groups that own or operate facilities that provide services otherwise performed by a government agency and include, but are not limited to the following: *Universities and other schools *Power cooperatives & other utilities *Hospitals & clinics *Custodial care & retirement facilities *Volunteer fire & ambulance *Museums & community centers

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

Title: Indian Community Development Block Grant Program Agency: US Department of Housing and Urban Development
The ICDBG Program provides eligible grantees with direct grants for use in developing viable Indian and Alaska Native Communities, including decent housing, a suitable living environment, and economic opportunities, primarily for low-and-moderate-income persons. The program regulations provide for two categories of grants: 1) Single Purpose - Grants awarded on an annual competition basis. 2) Imminent Threat - Noncompetitive, first come-first served, funding of grants to eliminate or lessen problems that pose an imminent threat to public heath or safety of tribal residents.

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.

APPENDIX

Appendix A - Resolution of Adoption

Appendix B - PDM Planning Team Meeting Records

Appendix C - Community Meeting Records

Appendix D - Hazard Identification/Vulnerability Worksheets

Appendix E - Comprehensive Land Use Maps

Appendix F - References

APPENDIX A | RESOLUTION OF ADOPTION

Flandreau Santee Sioux Tribe Resolution

APPENDIX B |
PDM PLANNING TEAM MEETING RECORDS

Flandreau Santee Sioux Tribe
Pre-disaster Mitigation Planning Team Kickoff Meeting
10:00 a.m. July 29th, 2021
Teleconference over Zoom

Public Notice

Flandreau Santee Sioux Tribe Pre-Disaster Mitigation Plan Meeting

Flandreau Santee Sioux Tribe will begin the process of developing a Pre-disaster Mitigation Plan. This plan identifies potential natural disasters, their impact, and possible projects to mitigate the impact of said disasters. The Flandreau Santee Sioux Tribe Pre-disaster Mitigation Planning Team will meet at 10:00 a.m. on Thursday, July 29th, 2021.

Based on current circumstances surrounding Covid-19, this meeting will be held virtually over Zoom. Instructions on how to listen, view, or participate online or telephonically may be found at https://association.1stdistrict.org/deuelpdm2020/ or by contacting Payton Carda at the First District Association of Local Governments @ (605) 882-5115. The public is welcome to attend. Questions or comments may be directed to FSST Emergency Management Coordinator, Mark Allen @ (605) 573-4272.

Flandreau Santee Sioux Tribe
Pre-disaster Mitigation Planning Team Kickoff Meeting
10:00 a.m. July 29th, 2021
Teleconference over Zoom

Agenda

- Introduction of PDM Team Members
- What is Mitigation Planning?
- Why is Flandreau Santee Sioux Tribe developing the Pre-Disaster Mitigation Plan?
- Discuss plan components
- Review timeline/scope

Flandreau Santee Sioux Tribe
Pre-disaster Mitigation Planning Team Kickoff Meeting
10:00 a.m. July 29th, 2021
Teleconference via Zoom

Meeting Minutes

7 individuals were in attendance:

Last Name	First Name	Organization
Allen	Mark	FSST Emergency Coordinator
Arnold	Brian	FSST Law Enforcement
Nelson	Steve	Local Business Representative
Huston	Joan	FEMA
Edwards	Nicole	FEMA
Jacobs	Cynthia	Indian Health Services
Carda	Payton	First District

Payton Carda from the First District Association of Local Governments welcomed those in attendance and had Team members introduce themselves and what entity they represented.

Carda provided an overview of what is mitigation planning and why the tribe was awarded a grant to develop a Pre-Disaster Mitigation (PDM) Plan. Carda also introduced the components to be included within the plan (risk assessment, vulnerability, proposed mitigation actions, etc.). She also discussed plan authority and purpose.

Carda provided an in-depth discussion of risk assessment and vulnerability for the Tribe, along with vulnerabilities and potential losses for critical infrastructure.

Planning Team representatives provided information regarding critical infrastructure and natural hazard risk/vulnerability within their own respective entities. A general discussion of developing Pre-Disaster Mitigation Plan started by defining work responsibilities, having the First District doing background and research, and the PDM Team providing oversight and guidelines throughout the process. The timeline and scope of project were reviewed.

Meeting adjourned at 11:00 a.m. Date and time for the next meeting to be scheduled later.

Minutes recorded by Payton Carda.

Flandreau Santee Sioux Tribe
Pre-disaster Mitigation Planning Team Meeting 2
1:00 p.m. October 20th, 2021
Teleconference via Zoom

Public Notice

Flandreau Santee Sioux Tribe Pre-Disaster Mitigation Plan Meeting

Flandreau Santee Sioux Tribe will continue the process of developing a Pre-Disaster Mitigation Plan. This plan identifies potential natural disasters, their impact, and possible projects to mitigate the impact of said disasters. The Flandreau Santee Sioux Tribe Pre-Disaster Mitigation Planning Team will meet at 1:00 p.m. on Wednesday, October 20th, 2021.

Based on current circumstances surrounding Covid-19, this meeting will be held virtually over Zoom. Instructions on how to listen, view, or participate online or telephonically may be found at https://association.1stdistrict.org/fsstpdm/ or by contacting Payton Carda at the First District Association of Local Governments @ (605) 882-5115. The public is welcome to attend. Questions or comments may be directed to FSST Emergency Management Coordinator, Mark Allen @ (605) 573-4272.

Flandreau Santee Sioux Tribe
Pre-disaster Mitigation Planning Team Meeting 2
1:00 p.m. October 20th, 2021
Teleconference via Zoom

Agenda

- Introduction
- Review of Risk Assessment & Critical Infrastructure
- Develop Mitigation Goals and Objectives
- Discuss Mitigation Activities
- Questions
- Next Steps in PDM Draft Process

Flandreau Santee Sioux Tribe
Pre-disaster Mitigation Planning Team Meeting 2
1:00 p.m. October 20th, 2021
Teleconference via Zoom

Meeting Minutes

9 people were in attendance:

Last Name	First Name	Title
Allen	Mark	FSST Emergency Coordinator
Arnold	Brian	FSST Law Enforcement
Poller	Alan	FSST Law Enforcement
Albers	Terry	Moody County EM
Fischerman	Elizabeth	FSST Housing Authority
Kills-a-Hundred	Garrie	FSST Historic Preservation
Huston	Joan	FEMA
Edwards	Nicole	FEMA
Carda	Payton	First District

First District Association of Local Governments, Planner, Payton Carda welcomed those in attendance and had new Team members introduce themselves and what entity they represented.

Carda provided a summary and review of the items discussed at the previous meeting. Then provided an overview of the community profile information and information sources.

Carda assisted the Planning Team in developing mitigation strategy goals and objectives for the Tribe. The group then proposed mitigation actions and activities. Heavily discussed were projects related to flooding and shelter for vulnerable areas of the reservation. Garrie mentioned the Tribe was working with students from South Dakota State University to conduct a drainage study at the Powwow Grounds.

The last item discussed was how the Tribe has used drone imagery equipment for past natural hazard events and how it could continue to benefit the Tribe in the future.

Lastly, Carda described the plan drafting process in more detail and expects to have a rough draft available for review at the next meeting.

Meeting adjourned at 2:30 p.m. Date and time for the next meeting to be scheduled later.

Minutes recorded by Payton Carda

Flandreau Santee Sioux Tribe
Pre-disaster Mitigation Planning Team Meeting 3
10:00 a.m. Flandreau 15th, 2022
Teleconference via Zoom

Public Notice

Flandreau Santee Sioux Tribe Pre-Disaster Mitigation Plan Meeting

Flandreau Santee Sioux Tribe will continue the process of developing a Pre-Disaster Mitigation Plan. This plan identifies potential natural disasters, their impact, and possible projects to mitigate the impact of said disasters. The Flandreau Santee Sioux Tribe Pre-Disaster Mitigation Planning Team will meet at 10:00 a.m. on Tuesday, February 15th, 2022.

Based on current circumstances surrounding Covid-19, this meeting will be held virtually over Zoom. Instructions on how to listen, view, or participate online or telephonically may be found at https://association.1stdistrict.org/fsstpdm/ or by contacting Payton Carda at the First District Association of Local Governments @ (605) 882-5115. The public is welcome to attend. Questions or comments may be directed to FSST Emergency Management Coordinator, Mark Allen @ (605) 573-4272.

Flandreau Santee Sioux Tribe
Pre-disaster Mitigation Planning Team Meeting 3
10:00 a.m. Flandreau 15th, 2022
Teleconference via Zoom

Agenda

- Introduction
- Review of Previous Meeting Discussions and Plan Development History
- Review of the PDM Preliminary Draft
  - Plan Authority and Purpose
  - Community Profile
  - Plan Process
  - Risk Assessment
  - Review of Goals and Objectives
  - Project Identification
  - Plan Maintenance
- Questions
- Next Steps in PDM Draft Process

Flandreau Santee Sioux Tribe
Pre-disaster Mitigation Planning Team Meeting 3
10:00 a.m. February 15th, 2022
Teleconference via Zoom

Minutes

7 people were in attendance:

Last Name	First Name	Organization
Charles	Jerrick	Moody County Emergency Manager
Allen	Mark	FSST Emergency Coordinator
Alvarez	Emily	FEMA
Arnold	Brian	FSST Law Enforcement
Poller	Alan	FSST Law Enforcement
Fischerman	Elizabeth	FSST Housing Authority
Carda	Payton	First District

First District Association of Local Governments, Planner, Payton Carda welcomed those in attendance and had new Team members introduce themselves and what entity they represented.

Payton Carda of First District provided an overview of the changes to the Pre-Disaster Mitigation Plan receive since the last meeting. A draft plan was provided to all PDM Planning Team members a week before the meeting and Carda reviewed the content of each section with the Team. Plan discussion and comments were received from those in attendance.

Carda informed the Planning Team that First District and the FSST Emergency Coordinator would meet with the Executive Council in March. After this meeting, a final draft of the plan will be posted online for public review.

The Planning Team decided to meet the middle of April, after the 45-day review period, to approve the plan and recommend submission to FEMA. Date and time for the next meeting to be scheduled at a later date.

Meeting adjourned at 10:45 a.m.

Minutes recorded by Payton Carda.

Flandreau Santee Sioux Tribe
Pre-disaster Mitigation Planning Team Meeting 4
_____TIME _____DATE
Teleconference via Zoom

Public Notice

Flandreau Santee Sioux Tribe
Pre-disaster Mitigation Planning Team Meeting 4
_____TIME _____DATE
Teleconference via Zoom

Agenda

- Final Review of PDM Plan
- Recommendation of Approval and Submission to FEMA

Flandreau Santee Sioux Tribe
Pre-disaster Mitigation Planning Team Meeting 4
_____TIME _____DATE
Teleconference via Zoom

Minutes

____ people were in attendance:

Last Name	First Name	Organization

APPENDIX C | EXECUTIVE COUNCIL MEETING RECORDS

Appendix C includes Public Notice, Agenda, and "Sign-in Sheet" from meetings held at the community level for the Flandreau Santee Sioux Tribe Pre-Disaster Mitigation Plan. A special meeting was scheduled with the following community:

Town	**Date**
FSST Executive Council	____TBD

At all of the previously described meetings each individual in attendance was asked to identify the probability of each specific hazard's occurrence. Following discussion on each individual hazard, Council members categorized these hazards as high probability to occur, low probability to occur, or unlikely to occur. The result was recorded on a master sheet for the community. Next, each individual in attendance was asked to identify the community's vulnerability to each specific hazard. Following discussion on each individual hazard, Council members classified the community's vulnerability to each hazard as high vulnerability, low vulnerability, or noted that the hazard was not a hazard in the jurisdiction. The result was recorded on a master sheet for the community. Finally, the Executive Council was asked to identify critical infrastructure within the community. A master infrastructure list was compiled for the jurisdiction (Table 4.15).

Council members then reviewed the goal statements for the Pre-Disaster Mitigation Plan and considered whether certain general activities applied to their community (Tables 5.1 – 5.12). The Council members were then asked to identify potential hazard mitigation projects for their towns. Members then discussed among themselves and staff before determining a timeframe for these projects to be completed in (short-term, medium-term, long-term). Finally, members assigned a priority level (high, medium, low) to each project. The Council President was asked to work with First District Staff to identify who would be in charge of the potential projects and what a projected cost would be. All projects identified at those meetings are included in Table 5.13.

Flandreau Santee Sioux Tribe
Executive Council Meeting
_____TIME _____DATE
Teleconference via Zoom

AGENDA

Flandreau Santee Sioux Tribe
Executive Council Meeting
_____TIME _____DATE
Teleconference via Zoom

SIGN-IN SHEET

Flandreau Santee Sioux Tribe
Executive Council Meeting
_____TIME _____DATE
Teleconference via Zoom

MINUTES & PUBLIC COMMENT

APPENDIX D |
HAZARD IDENIFICIATION/VULNERABILITY WORKSHEETS

Appendix D includes master worksheets for Hazard Identification and Vulnerability for jurisdictions compiled as described in Appendix C. Lists were gathered by Flandreau Santee Sioux Tribe Emergency Coordinator for Tribe at the meetings described below:

Entity	**Date**
FSST Executive Council	TBD
Flandreau Santee Sioux	July 29, 2021

Master worksheets for Hazard Identification and Vulnerability for jurisdictions below. The probability of each hazard event differs from each community and overall county area based upon the local governing body opinions of the probability of an event occurring. Appendix D represents a subjective analysis of opinions regarding hazard identification and vulnerabilities by residents of the communities. The empirical data regarding probability of hazards is discussed in the hazard profile in Chapter 4.

Flandreau Santee Sioux Tribe PDM
Worksheet #1 (Planning Team)
Risk Assessment Worksheet – Hazard Identification

What is the probability of occurrence of the following hazards?

Hazard	**High Probability to Occur** (At least once in a year)	**Low Probability to Occur** (Hazards that may have occurred in the past or could occur in the future but do not occur on a yearly basis)	**Unlikely to Occur** (Hazards or disasters that have never occurred in the area before and are unlikely to occur)
Dam Failure			**X**
Drought		**X**	
Earthquake			**X**
Extreme Cold		**X**	
Extreme Heat		**X**	
Flood			**X**
Freezing Rain/Sleet/Ice	**X**		
Hail		**X**	
Heavy Rain		**X**	
Heavy Snow	**X**		
Ice Jam			**X**
Landslide			**X**
Lightning		**X**	
Rapid Snow Melt		**X**	
Strong Winds	**X**		
Subsidence			**X**
Thunderstorm	**X**		
Tornado		**X**	
Urban Fire		**X**	
Wildfire		**X**	

Flandreau Santee Sioux Tribe PDM
Worksheet #2 (Planning Team)
Risk Assessment Worksheet – Hazard Vulnerability

How vulnerable is the community from the following hazard? In other words, if the hazard occurs is there a potential to impact the community? If so, what would be impacted?

Hazard	**High Vulnerability** Significant risk/major damage potential (for example, destructive, damage to more than 10% of the jurisdiction and/or regular occurrence)	**Medium Vulnerability** Moderate damage potential (causing partial damage to 5-10% of the jurisdiction, and irregular occurrence)	**Low Vulnerability** Little damage potential (minor damage to less than 5% of the jurisdiction)	**NA** Not a hazard to the jurisdiction
Dam Failure				**X**
Drought			**X**	
Earthquake				**X**
Extreme Cold			**X**	
Extreme Heat			**X**	
Flood				**X**
Freezing Rain/Sleet/Ice		**X**		
Hail			**X**	
Heavy Rain			**X**	
Heavy Snow			**X**	
Ice Jam				**X**
Landslide				**X**
Lightning			**X**	
Rapid Snow Melt			**X**	
Strong Winds		**X**		
Subsidence				**X**
Thunderstorm			**X**	
Tornado			**X**	
Urban Fire			**X**	
Wildfire			**X**	

Flandreau Santee Sioux Tribe PDM
Worksheet #1 (Executive Council)
Risk Assessment Worksheet – Hazard Identification

What is the probability of occurrence of the following hazards?

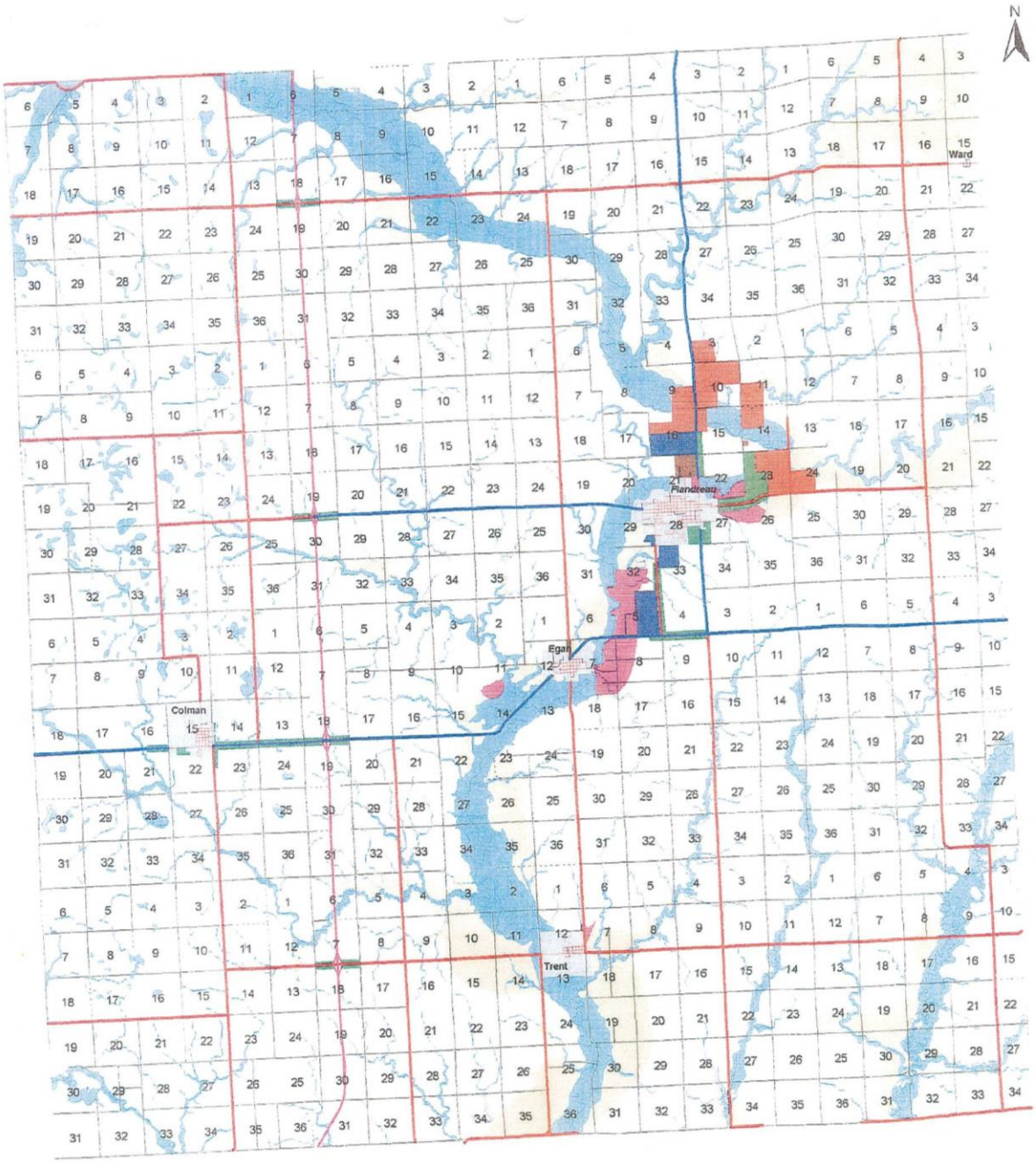
Hazard	**High Probability to Occur** (At least once in a year)	**Low Probability to Occur** (Hazards that may have occurred in the past or could occur in the future but do not occur on a yearly basis)	**Unlikely to Occur** (Hazards or disasters that have never occurred in the area before and are unlikely to occur)
Dam Failure			X
Drought		X	
Earthquake			X
Extreme Cold		X	
Extreme Heat		X	
Flood			X
Freezing Rain/Sleet/Ice	X		
Hail		X	
Heavy Rain		X	
Heavy Snow	X		
Ice Jam			X
Landslide			X
Lightning		X	
Rapid Snow Melt		X	
Strong Winds	X		
Subsidence			X
Thunderstorm	X		
Tornado		X	
Urban Fire		X	
Wildfire		X	

Flandreau Santee Sioux Tribe PDM
Worksheet #2 (Executive Council)
Risk Assessment Worksheet – Hazard Vulnerability

How vulnerable is the community from the following hazard? In other words, if the hazard occurs is there a potential to impact the community? If so, what would be impacted?

Hazard	**High Vulnerability** Significant risk/major damage potential (for example, destructive, damage to more than 10% of the jurisdiction and/or regular occurrence)	**Medium Vulnerability** Moderate damage potential (causing partial damage to 5-10% of the jurisdiction, and irregular occurrence)	**Low Vulnerability** Little damage potential (minor damage to less than 5% of the jurisdiction)	**NA** Not a hazard to the jurisdiction
Dam Failure				X
Drought			X	
Earthquake				X
Extreme Cold			X	
Extreme Heat			X	
Flood				X
Freezing Rain/Sleet/Ice		X		
Hail			X	
Heavy Rain			X	
Heavy Snow			X	
Ice Jam				X
Landslide				X
Lightning			X	
Rapid Snow Melt			X	
Strong Winds		X		
Subsidence				X
Thunderstorm			X	
Tornado			X	
Urban Fire			X	
Wildfire			X	

APPENDIX E | COMPREHENSIVE LAND USE MAPS



MOODY COUNTY
COMPREHENSIVE LAND USE PLAN
FUTURE LAND USE MAP

ROADS
- Asphalt/Concrete
- Gravel
- Primitive/Unimproved
- I-29

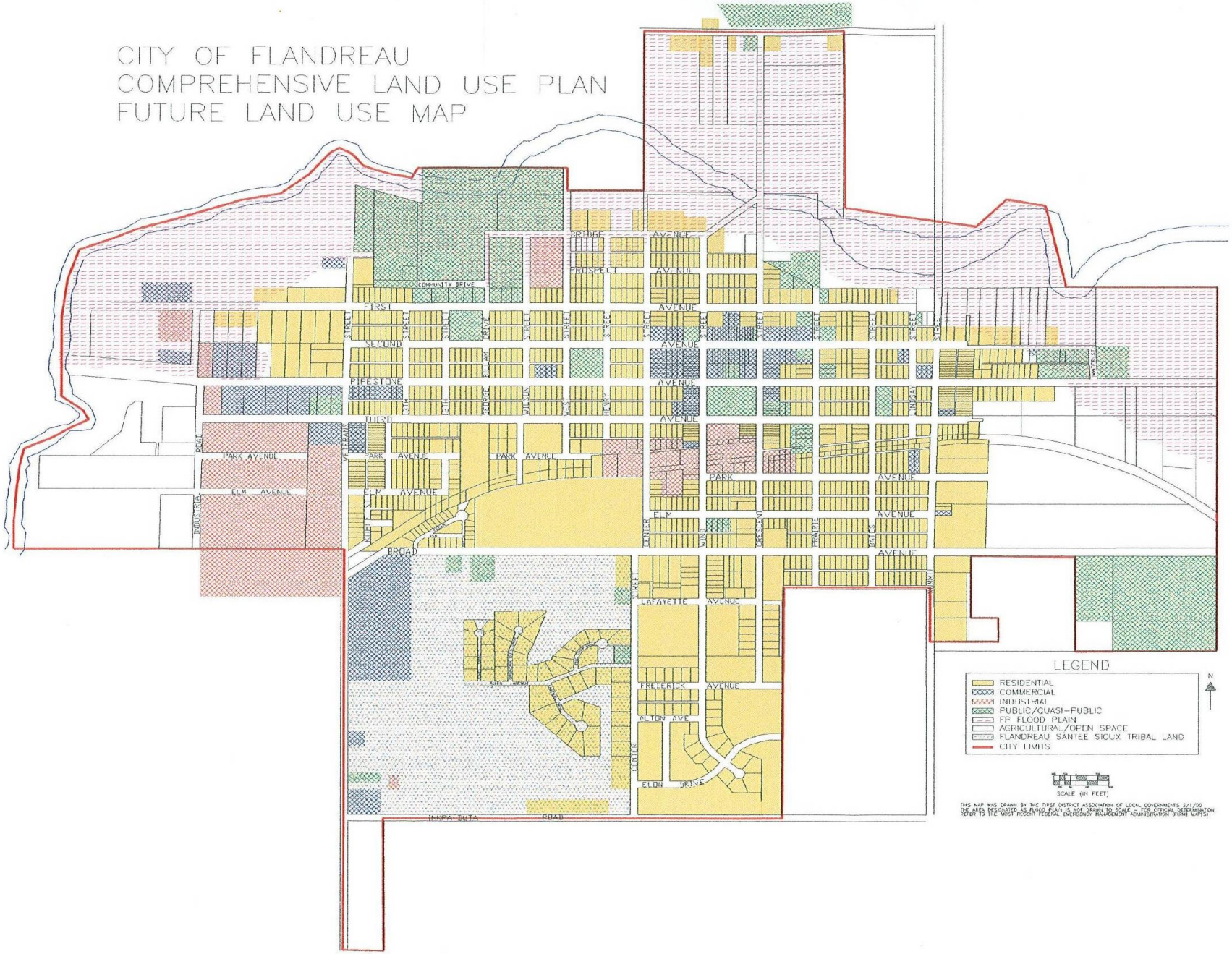
WATER
- River/Stream
- Lake

AREAS OF DEVELOPMENT TRANSITION
- Transition Areas
- Flandreau Santee Sioux Tribe Fee Lands
- Flandreau Santee Sioux Tribe Trust Lands
- U.S. Government Land

AREAS OF DEVELOPMENT OPPORTUNITY
- Incorporated municipality

AREAS OF DEVELOPMENT STABILITY
- AGRICULTURAL LANDS

AREAS OF DEVELOPMENT LIMITATION
- Shallow Aquifer
- Wellhead Protection Area
- One-Hundred Year Flood Plain


CITY OF FLANDREAU
COMPREHENSIVE LAND USE PLAN
FUTURE LAND USE MAP
BRIDGE AVENUE
PROSPECT AVENUE
COMMUNITY DRIVE
FIRST AVENUE
SECOND AVENUE
PIPESTONE AVENUE
THIRD AVENUE
PARK AVENUE
ELM AVENUE
ROAD
LAFAYETTE AVENUE
FREDERICK AVENUE
ALTON AVE
ELON DRIVE
INKPA DUTA ROAD
LEGEND
RESIDENTIAL
COMMERCIAL
INDUSTRIAL
PUBLIC/QUASI-PUBLIC
FF FLOOD PLAIN
AGRICULTURAL/OPEN SPACE
FLANDREAU SANTEE SIOUX TRIBAL LAND
CITY LIMITS
N
SCALE (IN FEET)

APPENDIX F | REFERENCES

Moody County Comprehensive Land Use Plan and Zoning Ordinance – First District Association of Local Governments, 2014.

City of Flandreau Comprehensive Land Use Plan and Zoning Ordinance - First District Association of Local Governments, 2000.

Moody County Pre-Disaster Mitigation Plan, 2020-2025.

Local Hazard Mitigation Planning Tool. 2011. Federal Emergency Management Agency.

NFIP Flood Insurance Rate Maps.

State of South Dakota Hazard Mitigation Plan. South Dakota Office of Emergency Management. 2019.