Table 4.8.5H Rankings for Overall Severe Summer Weather Vulnerability

Hazard	Low	Low-Moderate	Moderate	Moderate-High	High
Tornado	14-22	23-31	32-40	41-49	50-59
Hail	15-22	23-30	31-38	39-46	47-55
Extreme Heat	14-19	20-25	26-31	32-37	38-42
Thunderstorm Winds	10-17	18-25	26-33	34-41	42-50
Lightning	12-17	18-23	24-29	30-36	37-43

Table 4.8.5F summarizes the vulnerability ranking for each hazard to determine the overall summer storm vulnerability ranking for Rolette County and the TMBCI Reservation. The numbers provide low-moderate rating across for Rolette County and the TMBCI which coincides with its data analysis that there is a potential for severe summer weather yet the county has been fortunate to not suffer many significant events.

Table 4.8.5I Rolette County/TMBCI Severe Summer Weather Vulnerability

Tornado	Hail	Extreme Heat	Thunderstorm Winds	Lightening	Overall Vulnerability Ranking
Low-Moderate	Low-Moderate	Low-Moderate	Low-Moderate	Low-Moderate	Low-Moderate

11.8% or 1,697 people of Rolette County's and TMBCI's population of 12,187 (2020 census) is over 65. The breakdown for people over 65 by city and the rural area is shown on Table 4.8.5M. The elderly are often more vulnerable becoming injured or death as a result of severe summer weather than the younger populations. Belcourt and Rolla have the greatest risk to severe summer storms because they have the largest population of the Rolette County cities. Rolla has the courthouse, day care centers, and a school. Belcourt has Tribal Government buildikngs, BIA agency buildings, a hospital, day cares, 6 schools and a college. Dunseith also has a high risk because of its population, two medical clinics, a school, and day care centers. St. John and Mylo both share a lower risk.

Table 4.8.5M Population living within Rolette County and the TMBCI Communities

Jurisdiction	Population (2020 Census)	Estimated Population over 65
Rolette County	12,187	1,697
Belcourt	2,132	266
Dunseith	599	141
Mylo	21	0
Rolette	484	131
Rolla	1,223	198
St. John	322	27
Rural	7,406	934

Source: data.census.gov (American Community Survey)

Loss Estimates

Loss estimates are based on data from National Climatic Data Center and the Risk Management Agency. Based on NCDC event narratives, typical damages from severe summer weather include livestock injury and death; crop loss; downed power lines and power poles; damage to roofs, windows, siding, gutters, outbuildings, and farm equipment; vehicle accidents; damage to cars apart from accidents (especially in the case of tornadoes and hail); and human fatalities and injuries.

Total combined damages from all six summer storm hazards in National Climatic Data Center records for Rolette County included an estimated $2,495,000 in property damage since 2000. Crop loss figures were also based on National Climatic Data Center records, totaled $235,000 since the year 2000.

Source:
https://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=38%2CNORTH+DAKOTA

Loss estimates from the years 2000 through 2017 are broken out by individual hazard in Tables 4.8.3A through 4.8.3F,

4.8.6 Critical Facilities in Hazard Prone Areas

The Storm Prediction Center has developed damage indicators to be used with the Enhanced Fujita Scale for different types of buildings. Building types that many state-owned buildings and critical facilities fall under are shown in Table 4.8.6A and Table 4.8.6B.

Table 4.8.6A Institutional Buildings

Damage Description	Wind Speed Range (expected in parentheses)
Threshold of visible damage	59-88 mph (72 mph)
Loss of roof covering (<20%)	72-109 mph (86 mph)
Damage to penthouse roof and walls, loss of rooftop HVAC equipment	75-111 mph (92 mph)
Broken glass in windows or doors	78-115 mph (95 mph)
Uplift of lightweight roof deck and insulation, significant loss of roofing material (>20%)	95-136 mph (114 mph)
Façade components torn from structure	97-140 mph (118 mph)
Damage to curtain walls or other wall cladding	110-152 mph (131 mph)
Uplift of pre-cast concrete roof slabs	119-163 mph (142 mph)
Uplift of metal deck with concrete fill slab	118-170 mph (146 mph)
Collapse of some top story exterior walls	127-172 mph (148 mph)
Significant damage to building envelope	178-268 mph (210 mph)

Source: Storm Prediction Center, 2013a.

Table 4.8.6B Metal Building Systems

Damage Description	Wind Speed Range (expected in parentheses)
Threshold of visible damage	54-83 mph (67 mph)
Inward or outward collapsed of overhead doors	75-108 mph (89 mph)
Metal roof or wall panels pulled from the building	78-120 mph (95 mph)
Column anchorage failed	96-135 mph (117 mph)
Buckling of roof purlins	95-138 mph (118 mph)
Failure of X-braces in the lateral load resisting system	118-158 mph (138 mph)
Progressive collapse of rigid frames	120-168 mph (143 mph)
Total destruction of building	132-178 mph (155 mph)

Source: Storm Prediction Center, 2013.

Many of the critical and special needs facilities, although adequate for most events may not be able to withstand 160-200 mph tornado or severe thunderstorm winds, as recommended by the Federal Emergency Management Agency. (Federal Emergency Management Agency, 2004) Most structures should be able to provide adequate protection from hail, but the structures could suffer broken windows and dented exteriors. Even if a structure performs well in the high winds, flying debris and falling trees may damage the building. Table 4.8.6C shows the damage indicators for a typical school building.

Table 4.8.6C School Building

Damage Description	**Wind Speed Range** (expected in parentheses)
Threshold of visible damage	55-83 mph (68 mph)
Loss of roof covering (<20%)	66-99 mph (79 mph)
Broken windows	71-106 mph (87 mph)
Exterior door failures	83-121 mph (101 mph)
Uplift of metal roof decking; significant loss of roofing material (>20%); loss of rooftop HVAC	85-119 mph (101 mph)
Damage to or loss of wall cladding	92-127 mph (108 mph)
Collapse of tall masonry walls at gym, cafeteria, or auditorium	94-136 mph (114 mph)
Uplift or collapse of light steel roof structure	108-148 mph (125 mph)
Collapse of exterior walls in top floor	121-153 mph (139 mph)
Most interior walls of top floor collapsed	133-186 mph (158 mph)
Total destruction of a large section of building envelope	163-224 mph (192 mph)

Source: Storm Prediction Center, 2013a.

Above ground infrastructure, namely overhead power lines, communications towers and lines, and structures, are very susceptible to summer storms. High winds and falling trees can damage this type of infrastructure and disrupt services. Therefore, even an indirect hit by a tornado or strong winds could disrupt regional electricity and possibly telephone services. Table 4.8.6D shows the Enhanced Fujita Scale Damage Indicators for electric transmission lines.

Table 4.8.6D Electrical Transmission Lines

Damage Description	**Wind Speed Range** (expected in parentheses)
Threshold of visible damage	70-98 mph (83 mph)
Broken wood cross member	80-114 mph (99 mph)
Wood poles leaning	85-130 mph (108 mph)
Broken wood poles	98-142 mph (118 mph)
Broken or bent steel or concrete poles	115-149 mph (138 mph)
Collapsed metal truss towers	116-165 mph (141 mph)

Source: Storm Prediction Center, 2013a.

Should an above ground facility such as a water treatment facility or a sewer lift station be damaged, water and sewer services could also be disrupted. Debris may also block roadways making transportation and commerce difficult if not impossible.

Table 4.8.6E Electrical Providers

	North Central Electric Co-op	**Ottertail Power**	**Northern Plains Electric Co-op**
Belcourt	X	X	X
Dunseith	X		
Rolla		X	
Rolette		X	

	North Central Electric Co-op	Ottertail Power	Northern Plains Electric Co-op
St. John		x	
Mylo		x	
Rural Rolette County/TMBCI			x

TMBCI and Rolette County Emergency Manager

4.8.7 Development in Identified Hazard Areas

The summer storm risk is assumed to be uniform countywide. Therefore, the location of development does not increase or reduce the risk necessarily. New development constructed to current building code standards may have a reduced risk of structural damages during a tornado or high wind event. Jurisdictions enforcing building codes or have building codes enforced by Rolette County include Rolette County, and the cities of Dunseith, Mylo, Rolette, Rolla, and St. John. Generally, newer structures are built to withstand strong winds; mobile homes, however, continue to be the exception. TMBCI enforcs tribal building codes within the Tribe's terroritory and jurisdiction, including the community of Belcourt.

4.8.6 Data Limitations and Other Key Documents

The data limitations related to the summer storm hazard include:

- Summer storm events are only recorded if observed and reported to the National Weather Service
- The rural nature of some areas in the county leaves them without weather spotters
- Only a limited number of weather observing stations are located in the county
- Historic lightning data is expensive to purchase for analysis

Other key documents related to the Summer Storm hazard include:

- North Dakota Emergency Operations Plan, Severe Storms Annex

4.9 Transportation Accident

Including Vehicular and Aircraft Accidents

Frequency	Likely	
Impact	Moderate-High	
Risk Class	B	
Seasonal Pattern	None	
Duration	Situation dependent, average: 1-6 hours; Could be weeks	
Speed of Onset	Minimal warning	

4.9.1 Description

A transportation accident, for the purposes of this plan, is any large-scale vehicular, or aircraft accident involving mass casualties (Rolette County has no railroads). Mass casualties can be defined as an incident resulting in a large number of deaths and/or injuries that reaches a magnitude that overwhelms the ability of local resources to adequately respond. In most disasters, death and injury represent one of the effects of the hazard while in transportation accidents, mass casualties are often the primary impact and focus of the event.

Federal and state highways, county and city roadways, airports, and air traffic routes all pass through Rolette County and the TMBCI Reservation. Major roadways in the county include State Highways 3, 5, 30, and 66. State Highway 5, a major east/west route in North Dakota passes through the Turtle Mountain Band of Chippewa Indians Reservation. Rolette County and the TMBCI Reservation has US Highway 281 which ends at the International Peace Garden in Dunseith. Rolette County Roads include 1,118 miles of gravel surface roads and 42 miles of paved surface roads. Multi-vehicular accidents are many times related to weather, either obscuring the vision of drivers or hindering their control of a vehicle. Fortunately, the North Dakota Department of Transportation 2013 study has indicated there are no structurally obsolete structures in Rolette County indicating the transportation is being maintained within the county.

Highways in Rolette County are in good maintenance condition. The 2019-2022 maintenance schedules for the Devils Lake ND DOT District depicts preventative maintenance on ND Highways 3 and 30. See Figure 4.9.1.

Source: http://www.dot.nd.gov/manuals/programming/STIP/draftstip2019-2022.pdf

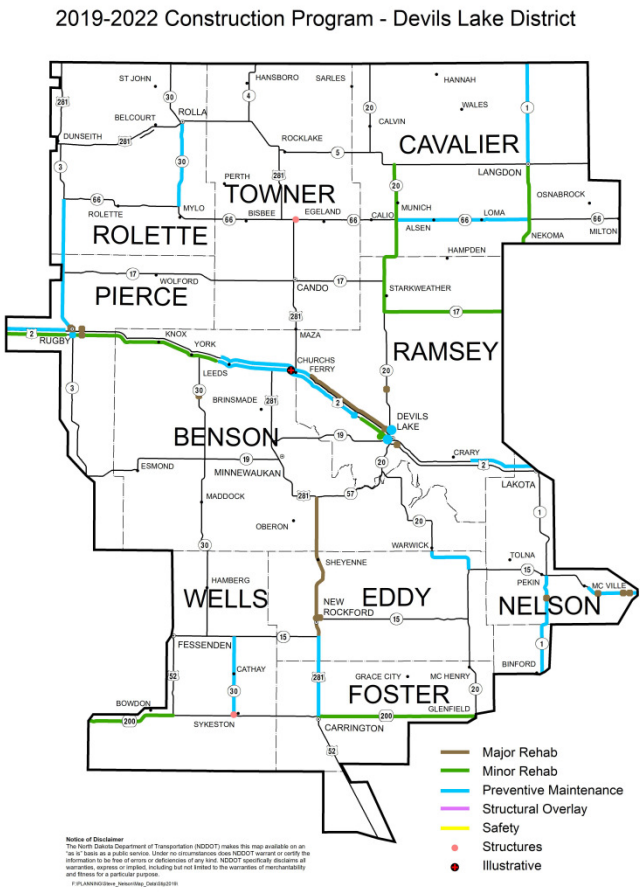


Figure 4.9.1, Devils Lake District Highway Maintenance Schedule, 2019-2022

There are no railroads in Rolette County.

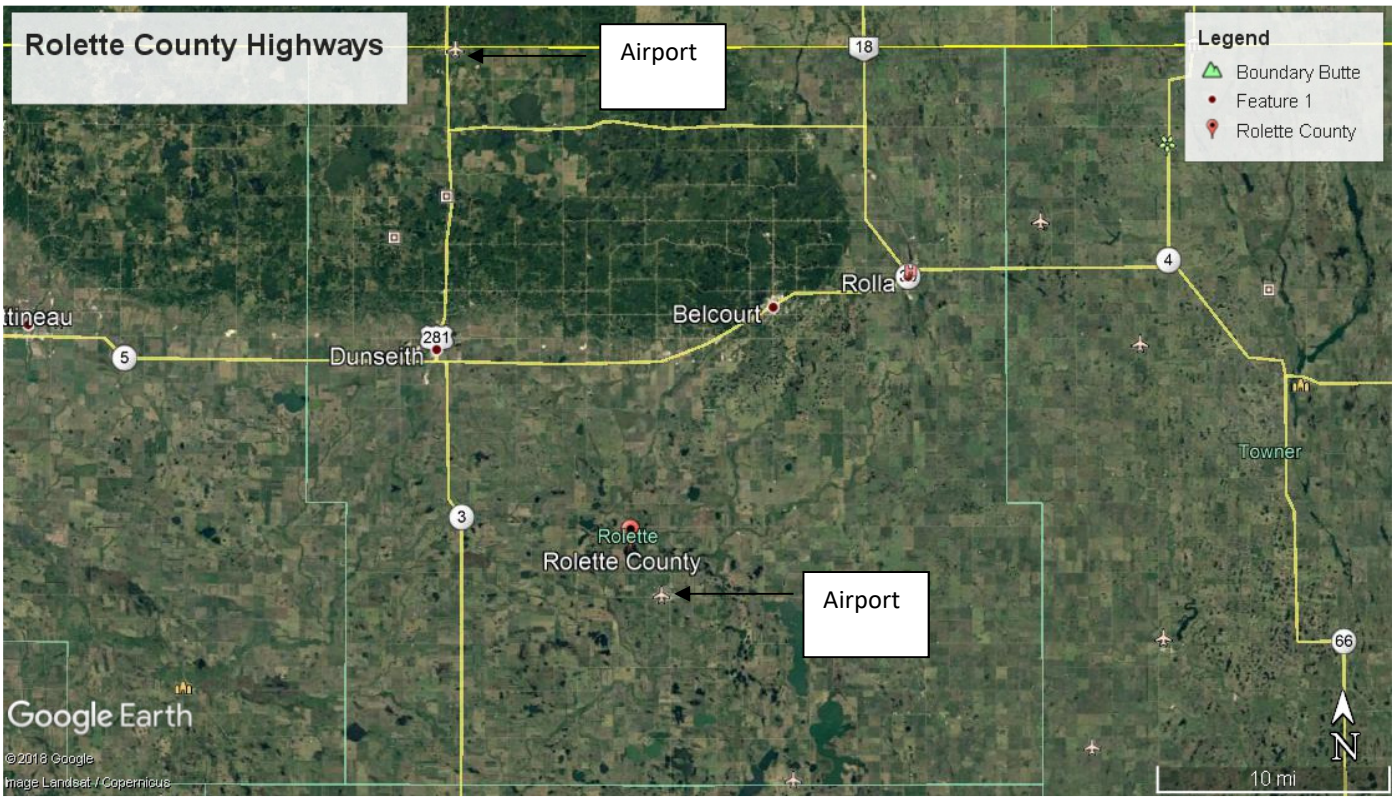
Aviation accidents can occur for a multitude of reasons from mechanical failure to poor weather conditions to intentional causes. The size of accidents also varies widely from single engine incidents to large commercial crashes. The location of the accident, such as a remote area versus a populated location, also plays an important role in the amount of destruction. Most aircraft accidents occur during takeoff or landing, and depending on the size of the aircraft, can be very serious events. Rolette County and the TMBCI have three airports; the Rolette Municipal Airport, the International Peace Garden Airport at Dunseith, and the Rolla Municipal Airport.

4.9.2 Geographic Location

Figure 4.9.2A shows the major transportation routes within the county and the TMBCI Reservation. Generally, those areas are at greater risk for a transportation accident, however, a mass casualty transportation accident cannot be ruled out anywhere in the county. Some risk exists county and reservation wide. The County highways are identified; the township roads which are feeder roads to the county system are shown also but not identified. Many of the township roads are minimum maintenance roads, used only for farmer field access. Also shown on this map are the airports and air strips in Rolette County and the TMBCI Reservation.

Figure 4.9.2A Rolette County and the TMBCI Transportation Routes

Source: Rolette County and Google Earth



4.9.3 Previous Occurrences

The history of transportation accidents in Rolette County and on the TMBCI Reservation consists primarily of small magnitude incidents, some with fatalities, but most with very little effect on the entire community. Traffic accidents along the roadways occur regularly, usually inconveniencing travelers, overwhelming local

emergency resources, and occasionally causing delays. Table 4.9.3A shows the traffic fatalities in Rolette County and on the TMBCI Reservation in 2020.

Table 4.9.3A Motor Vehicle Fatalities in 2021

Crashes	Fatality Crashes	Number of Fatalities	Injury Crashes
25	10	12	7

https://www.dot.nd.gov/divisions/safety/docs/crash-summary.pdf

Table 4.9.3C Fatal Aircraft Accidents

Date	Location	Fatalities	Additional Information
1978	Rural Rolette County	2	Crash of a small airplane

Source: National Transportation Safety Board, 2017, MHMP Committee

Table 4.9.3D Rolette County and the TMBCI Transportation Accident Declared Disasters and Emergencies

Declaration	Location	Date	Magnitude	Casualties	Damages
None					

4.9.4 Probability and Magnitude

Table 4.9.4A is a graphical representation of the range of events that can occur within the transportation accident hazard. Generally, the more frequent events have a low impact, and the high impact events occur less frequently. All types of events may not appear in the figure, but the information presented can assist when comparing hazards (high frequency, low impact events versus low frequency, high impact events) or when assessing the range of magnitudes possible from the transportation accident hazard. The beginning of this risk assessment chapter provides additional information on frequency and impact ratings.

Table 4.9.4A Hazard Frequency and Impact Ranges

Frequency	*No regional history*				Large Aircraft in Urban Area	
	No local history			Interstate Bridge Collapse		
	100 years		Mass Casualty Accident			
	50 years	Fatal Car Accident				
	Annually					
		Negligible	*Limited*	*Critical*	*Catastrophic*	
		Impact				

Lacking a history of vehicular accidents resulting in mass casualties, the probability of such can only be theorized and expressed qualitatively. The probability is increased during winter storms, periods of poor visibility from snow, smoke, or dust, during holiday festivities with more instances of drinking and driving, and during times of increased traffic volume. Vehicle accidents with minor damage and injuries occur regularly. Serious, fatal accidents are less frequent but still occur. On average, Rolette County and the TMBCI Reservation has less than one traffic fatality annually.

Any mass casualty incident that overwhelms the emergency response resources within the county and neighboring counties, such as a bus or plane crash, represents a high magnitude event.

4.9.5 Risk Assessment

Vulnerability Overview

Transportation accidents can almost always be expected to occur in specific areas, on or near airports, roadways, or other transportation infrastructure. The exception is air transportation accidents that can occur anywhere and at any time, even though safety precautions are in place. However, it is difficult to predict the magnitude of any specific event because these types of events are accidental and the circumstances surround these events will impact the extent of damage or injuries that occur.

Rolette County and the TMBCI is determined to have a low transportation infrastructure rating. The hazard rating was determined based on no railroad infrastructure. Rolette County and the TMBCI has one United States Highway, US 281.

The communities of Dunseith, Belcourt, and Rolla have the highest risk for transportation accidents. They have the highest population plus they are all located on US Highway 281/ ND Highway 5. These three cities have a high volume of traffic for several reasons. Rolla is the county seat and a major retail trade center for the county. Belcourt s West of Rolla, located within the TMBCI Reservation, which has multiple TMBCI programs and offices, the Quentin N. Burdick Memorial Hospital and Bureau of Indian Affairs Offices; and to the west of Belcourt is Dunseith, a major population center for the county. Beween Belcourt and Dunseith is the TMBCI Skydancer Casino and the TMBCI Tribal Headquarters, both located on US Highway 281 and ND Highway 5, which contributes a large volume. Mylo, Rolettte, and St. John have a lower risk because of they are more isolated and their traffic is localized. Dunseith is also the gateway for the 24-hour port of entry into Canada and also traffic for the International Peace Garden which increases its risk.

Daily Traffic Count

It is evident that the major highways, US 281 and ND Highways 5 and 3 have a greater amount of traffic than other routes. Therefore, have a greater risk of traffic accidents.

Table 4.9.5A Rolette County and the TMBCI Traffic Counts

Highway	Total Daily Traffic Count	Commercial Daily Traffic Count
US Highway 281 at Belcourt	4730	235
US Highway 281 at Canadian Border	490	170
US Highway 281 at junction North of Highway 5	3418	280
US Highway 281 at junction East of ND Highway 3	1085	245
ND Highway 5 at West junction of US Highway 281	1495	170
ND Highway 5 at East junction of US Highway 281	2310	156
ND Highway 3 at North Junction of ND Highway 66	1055	245
ND Highway 3 at South junction of ND Highway 66	1205	375
ND Highway 66 at junction of ND Highway 3	435	75
ND Highway 66 West of Rolette	445	75
ND Highway 66 East of Rolette	535	80
ND Highway 30 at junction of ND Highway 30	420	75
ND Highway 66 at Towner County line	420	240
ND Highway 30 at junction of ND Highway 66	520	100
ND Highway 30 at junction of US Highway 281	730	110
ND Highway 30 at North junction of US Highway 281	1430	85

(Source: ND Department of Transportation)

Data on cost estimates of previous vehicle events by county also provides some basis to draw conclusions on patters of traffic volumes. Table 4.9.5A is the NDDOT motor vehicle crash data and the associated costs for Rolette County and TMBCI for 2011. According to NDDOT Crash Summary for 2015, 10,531 of the crashes occurred in urban areas while 4,546 of the crashes occurred in rural areas. Of the fatality crashes, 14 occurred in urban areas while 97 occurred on rural roads.

Table 4.9.5A Rolette County and the TMBCI NDDOT Motor Vehicle Crash Data, 2016

Injuries	Fatalities	Crashes	Injury Costs	Fatal Costs	Costs
22	6	27	$672,250*	$3,623,661	$672,250*

*Estimated costs.

Source: http://www.ugpti.org/pubs/pdf/DP225.pdf

(Note: 2016 data is cited because more recent data is not available)

Belcourt and Rolla have the greatest risk for highway transportation accidents because of their traffic count and they have the largest population. St. John and Mylo both share a low risk to transportation accidents.

Table 4.9.5B Population living within Rolette County and on the TMBCI and its Communities

Jurisdiction	Population (2020 Census
Rolette County	12,187
Belcourt	1,510
Rolla	1,223
Dunseith	632
Rolette	484
St. John	322
Mylo	21

Source: https://www.census.gov/search-results.html?q

Loss Estimates

According to Medical and Economic Cost of North Dakota Motor Vehicle Crashes Report, by the Rural Transportation Safety and Security Center, Upper Great Plains Transportation Institute, North Dakota State University, a serious motor vehicle crash can have medical costs and substantial economic losses associated with death and injury. The costs of fatalities are based on the Value of a Statistical Life as reported by the U.S. Department of Transportation and does not include costs for medical expenses, property damages or other costs. The costs for non-incapacitating injury include wage and productivity losses, medical expenses, administrative expenses, motor vehicle damage, and employer's uninsured costs

from the Nation Safety Council. A crash resulting in a non-incapacitating injury averages $54,700 per crash; an incapacity injury averages $214,200 while a fatal crash averages $6,039,436. Using this data, Rolette County and the TMBCI had estimated injury costs from motor vehicle crashes in 2016 of $41,222,316. Source: http://www.ugpti.org/pubs/pdf/DP225.pdf

(Note: 2016 data is cited because more recent data is not available)

4.9.6 Critical Facilities in Hazard Prone Areas

Except in the very rare case of an aircraft, train, or vehicle crashing into a critical facility, the facilities should remain unaffected by a transportation accident. Should structures be affected, damages could vary in the tens or hundreds of thousands of dollars depending on the structure or structures impacted. Should an accident occur in a developed area, structural losses in the neighborhood of $296,000 (2 homes x $148,000/average housing unit) could be expected. A large commercial jet crash could potentially destroy an entire segment of a populated area for a loss of roughly $1,480,000 (assuming approximately 10 structures were destroyed). An accident involving a first response agency or blocking a primary transportation route could delay emergency services.

In most cases, infrastructure remains unaffected during transportation accidents. The most likely impact would be the closure of a major roadway due to a vehicular accident, thus resulting in travel inconveniences and long detours. Theoretically, an aircraft or vehicle can take out power lines, telephone lines, or other important pieces of infrastructure resulting in service disruptions.

4.9.7 Development in Identified Hazard Areas

Future development, particularly the associated increase in traffic, may increase the probability of a major transportation accident. Otherwise, the specific locations of where development occurs, except for possibly in the immediate vicinity of the airports should not significantly affect the vulnerabilities from this hazard.

4.9.8 Data Limitations and Other Key Documents

The data limitations related to the transportation accident hazard include:

- Difficulties in predicting the location and magnitude of future accidents

Other key documents related to the Transportation Accident hazard include:

- North Dakota Emergency Operations Plan, Transportation Annex
- TransAction II, North Dakota's Statewide Strategic Transportation Plan
- North Dakota Highway Safety Plan

4.10 Fire; Wildland Fire, Urban Fire, and Structure Collapse

Frequency	Highly Likely	
Impact	Critical	
Risk Class	A	
Seasonal Pattern	Wild land fires usually occur from April 15-October 31. Urban fires highest probability of risk is in the winter due to the higher demands of heating systems, increase use of portable heating units, etc.	
Duration	Averages 1 to 6 hours, length of time depends on location, resources available, how many acres or buildings are involved; what type of fire it is; how it started	
Speed of Onset	Minimal warning	

Fire is the result of three components: a heat source, a fuel source, and an oxygen source. When combined, these three sustaining factors will allow a fire to ignite and spread. Within a structure, a small flame can get completely out of control and turn into a major fire within seconds. Thick black smoke can fill a structure within minutes. The heat from a fire can be 100 degrees Fahrenheit at floor level and rise to 600 degrees at eye level. In five minutes, a room can get so hot that everything in it ignites at once; this is called flashover. (US Fire Administration, 2006)

The overall picture of fire safety information reveals that, per capita, the United States has one of the highest fire death rates in the industrialized world. In 2019 3,704 people died in fires in this country, and about 16,600 were injured. Since 2010 there has been a sharp improvement in preventing fires but the number of deaths and injuries have increased. Children under the age of 5 and the population over the age of 54 are at the highest risk of death in fires. On average, fire kills more Americans annually than all natural disasters combined. In 2020, 72 firefighters died from activities related to an emergency incident. Statistics show approximately 1.2 million fires are reported annually; many others go unreported, causing additional injuries and property loss. About $14.8 billion in direct property losses occur annually from structural fires. In 2019 the North Dakota fire death rate was 0.4 deaths per 1,000 fires and the North Dakota injury rate was 3.1 per 1,000

fires while the United States fire death rate per 1,000 fires was 2.6 deaths and the injury rate was 10.0 injuries per 1,000 fires.

Source: (US Fire Administration, 2022)

Figure 4.10.1A, Types of Fire Department Response Calls for North Dakota and the United States

North Dakota Incident Types

Emergency medical services (EMS)	60.9%
False alarms	12.1%
Good intent	10.0%
Fires	6.0%
Service calls	5.5%
Hazards	4.6%
Other	0.7%
Explosions	0.2%
Weather	0.1%

Table may not total 100 percent due to rounding.

National average incident types

EMS	64.6%
Good intent	11.3%
False alarms	8.3%
Service calls	7.4%
Fires	3.8%
Hazards	3.4%
Other	0.8%
Weather	0.2%
Explosions	0.1%

Table may not total 100% due to rounding.

Although structure fires are usually individual disasters and are not community-wide, the potential exists for widespread urban fires that displace several businesses or families and exceed local resources. Urban blocks, commercial structures, and apartment buildings are especially vulnerable. An urban fire that rages uncontrollably despite firefighting efforts and burns a large portion of a downtown area or an important structure could have significant economic impacts. Large fires of this nature have also been known to require significant community resources if lives are lost. Rolette County and the TMBCI have a smaller potential for large scale residential fires, commercial fires, natural gas explosions, and fires in public venues due to smaller population and being a mostly rural area. However there is the potential of agricultural chemical plant fires producing hazardous smoke and fumes.

The TMBCI and Rolette County have several fire departments protecting their response areas, these include; Belcourt TMBCI Fire Department, BIA Forestry, Dunseith Fire Protection District, Mylo Fire Department, Rolette Rural Fire Protection District, Rolla Volunteer Fire Department, and the Rugby Fire Protection District which is located in Pierce County but does serve part of Rolette County. These departments have mutual aid agreements in place. The fire departments are equipped to handle basic structural and wildland fires but are not trained and do not have the equipment to handle chemical, biological, radiological, nuclear, or explosive materials. The fire departments rely on the regional-paid departments of Fargo and Grand Forks.

Smoke detectors, automatic fire alarm systems, automatic sprinkler systems, fire doors, and fire extinguishers can all prevent deaths, injuries, and damages from fire. Automatic sprinkler systems are especially important in preventing a small fire from becoming a conflagration.

Structure collapse occurs when the forces of gravity or other external forces overcome the structural integrity of a building. The reasons for structure collapse can vary from poor construction to extreme winds to gas explosions to heavy snow loads. Structure collapse can trap occupants and damage valuable property. Urban fires and structure collapse can happen independently from other types of incidents.

A wildland/rural fire is an uncontrolled fire in a vegetated area. Wildland/rural fires are a natural part of the ecosystem. They have a purpose in nature and following years of fire suppression, many areas have built up fuels that can lead to larger, more intense fires.

Any flame source can trigger a wildland fire. Once ignited, ambient conditions dictate whether the fire will spread or not. Moist, cool, and calm conditions or a lack of fuels will suppress the fire, whereas, dry, warm, and windy conditions and dry fuels will contribute to fire spread. The terrain, accessibility, and capabilities of the fire agencies are also factors in the fire's growth potential. Problems with wildfire occur when combined with the human environment. People and structures near wildfires can be threatened unless adequately protected through evacuation, mitigation, or suppression.

According to the North Dakota Forest Service, the state experiences over 600 wildfires that burn in excess of 11,000 acres annually on average. In drought years, the numbers can be much higher.

https://www.ag.ndsu.edu/ndfs/documents/community-fire-planning-guidance.pdf.

The primary factors influencing these wildland fires include type, amounts, and conditions of fuel supply (vegetation), temperature, wind, precipitation patterns, humidity levels, topography, and the levels of human activity on the land.

The TMBCI Reservation and Rolette County experience a general wildfire season that runs from April 1st through October 31st. There are three critical periods during wildfire season: early spring prior to green-up, late summer due to higher temperatures and a potential lack of rainfall, and fall following heavy frosts until snowfall. The first peak occurs during the spring before vegetation turns green. This tends to be a very critical time due to the fuel buildup from the previous growing season, drying winds, decreasing humidity, warmer temperatures, and increased human activity outdoors. The month of April accounts for about 20% of the wildfire starts and over a third of the total acreage burned. The second peak in the fire season coincides with the increase in harvesting activities during mid to late summer. Temperatures remain hot, humidity is at its lowest, and precipitation has declined significantly. The third and final peak in fire season occurs between September 1st and October 31st when wildland fuels are fully cured out due to hard frosts, winds are frequent and high, humidity is low, and human activity remains high. Forty percent of the annual fire starts occur in this third peak, accounting for 50% of the annual burned acreage. This third fire season typically extends until a season-ending snowfall.

The charred ground and thick smoke plumes that can be produced by wildland fires can create other, cascading hazards. The heavy smoke may lead to unhealthy air conditions affecting those with respiratory problems and otherwise healthy people. Smoky conditions can also lead to poor visibility and an increased probability of transportation accidents. With vegetation removed and the ground seared from a wildfire, the area also becomes more prone to flash floods and landslides because of the ground‘s reduced ability to hold water. This can be especially problematic when wildland fires occur in the spring at the same time that flood risk is high in Rolette County and on the TMBCI Reservation.

Humans and human activity cause most of the wildland fires on the TMBCI Reservation and in Rolette County based on historical data. Many human acts of carelessness are demonstrated by loss of fire containment while attempting controlled burns of fields, ditches, and sloughs. Other sources of fire are related to agricultural and industrial activities; recreational activities such as hunting, camping, off-road vehicle travel, when conditions are right, occasionally along railroad right-of-ways (abandoned rail lines), and through the annual use of fireworks around the 4th of July. There are also natural causes of wildland fires such as lightning. Rolette County and the TMBCI Reservation no longer

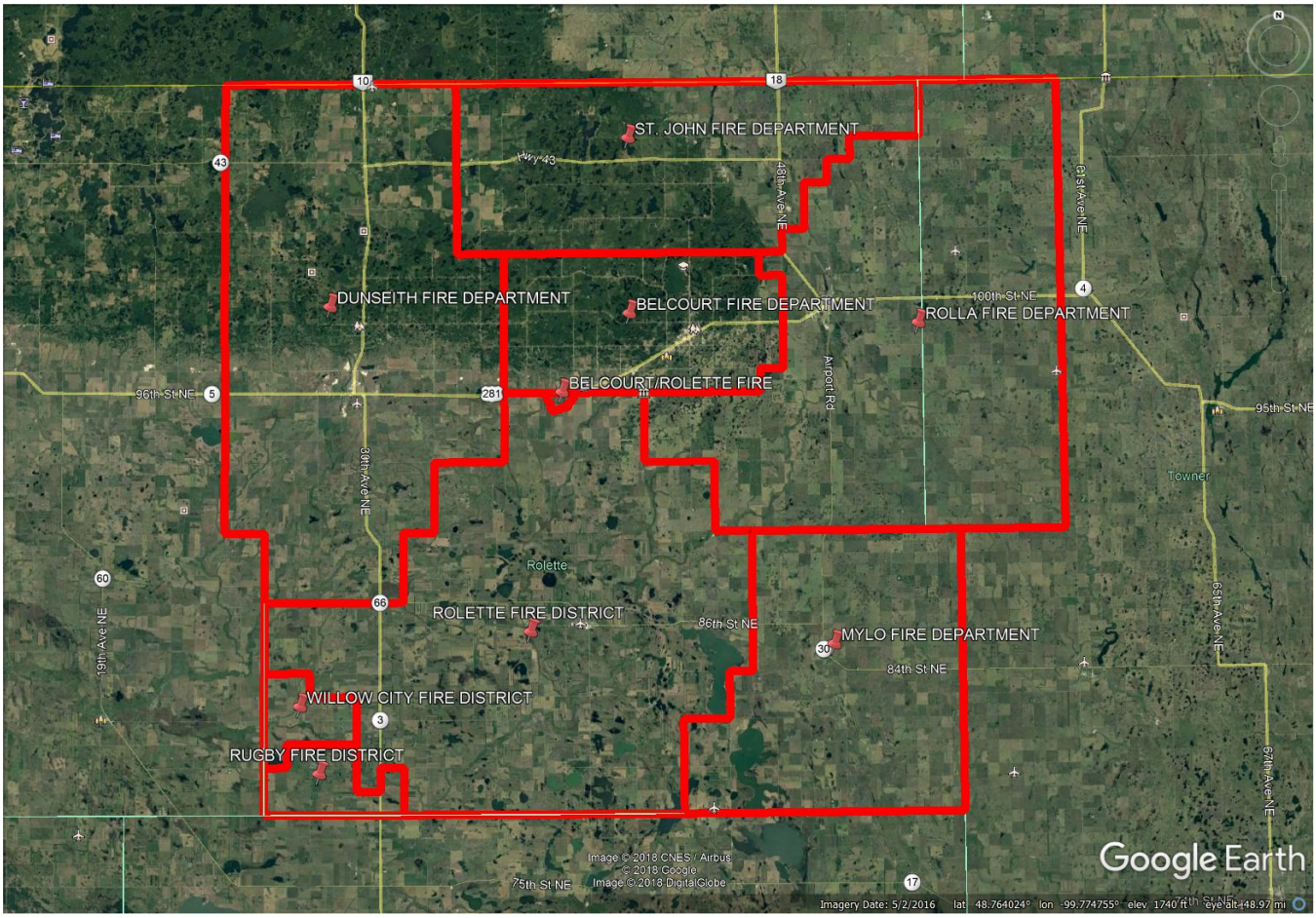
have railroads but the railroads maintain ownership of their right-of-ways resulting in grass growing in these right-of-ways.

Natural fuels, in contrast with irrigated, developed, or agricultural lands, can burn more readily, particularly on large tracts of natural fuels. Many of these tracts coincide with government lands. Rolette County has a number of large US Fish and Wildlife Service and ND Game and Fish Department tracts. Another group of large tracts of land containing natural fuels are the Conservation Reserve Program (CRP) acres. The US Department of Agriculture (USDA) Farm Service Agency's Conservation Reserve Program (CRP) is a voluntary program available to agricultural producers to safeguard environmentally sensitive lands. Producers enrolled in CRP establish long-term, resource-conserving covers to improve the quality of water, control soil erosion, and enhance wildlife habitat. In return, the Farm Service Agency provides participants with rental payments and cost-share assistance. Although the CRP benefits the environment in many respects, CRP lands may increase the fuels available and therefore the wildfire risk to nearby communities. As of January 1, 2020, Rolette County had 25,056 acres participating in CRP Programs. (fsa.usda.gov) A small percentage of the CRP acreage comes off of contract each year but some is commonly reinstated so there is expected to be little change in future years reducing the wildfire risk. About one-third of Rolette County's 577,280 acres or 192,426 acres are in the Turtle Mountains which is forested land, this includes the TMBCI Reservation. An additional roughly 14,113 acres of native grasslands and grassy areas exist in the county. The TMBCI Reservation has a land area 12 miles by 6 miles that is mostly woodlands or hay land. One to two tons of grass per acre is not uncommon, and when coupled with dry conditions and strong winds, both of which occur in the area, the potential for large wildland/rural fires exists. Rolette County and the TMBCI Reservation does not have contiguous grasslands as grasslands are broken up by tilled fields or forests. Wildland fire is a significant risk in Rolette County and on the TMBCI Reservation

Wildland fires can have devastating effects, such as the loss of livestock and wildlife, the destruction of habitat, agricultural crops, forage, and watersheds, the loss of personal and real property, valuable timber, and shelter belts, and the degradation of scenic and recreational areas. Secondary damage can occur with soil erosion, silting of streams and reservoirs, contamination of wells, flooding, and damage to utilities.

Limited resources on the TMBCI Reservation and in Rolette County necessitate the cooperation of various agencies to help share the responsibility for wildland fire mitigation and response operations.

Figure 4.10.1B, TMBCI and Rolette County Fire Districts
TMBCI Rolette County Fire Districts



Source: Rolette County Emergency Manager

Rolette County/TMBCI Fire Departments

Table 4.10.2A

Fire Department	Number of Firefighters	Department Type
Belcourt Rural Fire Department	27	4 Paid, 23 Volunteer
BIA Forestry	5	5 Paid
Dunseith Fire Protection District	18	Volunteer
Mylo Fire Department	11	Volunteer
Rolette Rural Fire Protection District	20	Volunteer
Rolla Volunteer Fire Department	31	Volunteer
Rugby Fire Protection District*	32	Volunteer
St. John Fire Protection District	10	Volunteer
Willow City Fire Protection District*	20	Volunteer

Source: Rolette County and TMBCI Fire Departments

*Fire Department headquarted in an adjacent county.

Table 4.10.2A lists the number of firefighters for each fire department that provides fire protection services on the TMBCI Reservation and in Rolette County. If one were to use the number of available fire fighters in relation to the population of the TMBCI Reservation and Rolette County, Fire Departments and other resources as the criteria for determining vulnerability; Belcourt with 7 fulltime firefighters and 8 volunteer, Rolette with 21 firefighters, and Rolla with 27 firefighters, have the least vulnerability while Mylo with 11 Firefighters, and Dunseith Fire Protection District and the St. John Fire Protection District with 10 firefighters have a higher vulnerability. The rural areas, especially in southwestern Rolette County which are served by Willow City and Rugby Fire Departments, have the greatest vulnerability because they are served by fire departments outside of their immediate areas and the time it would take for a fire department to arrive at the fire. However, a contradiction of this is evident in that the area served by Willow City and Rugby Fire Departments is in the farmland area of Rolette County. Vegetation type plays a large role giving the Belcourt region the greatest vulnerability in that it is located in the Turtle Mountains. However, with 23 paid firefighters between the Belcourt Fire Department and BIA Fire Department, that vulnerability is reduced.

The fire chiefs that participated in the planning meetings expressed that the cities have adequate fire protection. The fire chiefs also expressed that rural areas, because of distance from fire protection services, would benefit from a fire education program such as Firewise.

Table 4.10.2B Population living within Rolette County and TMBCI Communities

Jurisdiction	Population (2020 Census
Rolette County	12,187
Belcourt	1,510
Dunseith	1,223
Mylo	632
Rolla	484
Rolette	322
St. John	21

Source: https://www.census.gov/search-results.html?q

4.10.2 Geographic Location

Urban fires can occur anywhere but are generally most significant in downtown areas. Therefore, the cities are at the greater risk from urban fires. Structure collapses are possible on any given structure. Therefore, the risk of structure collapse is countywide.

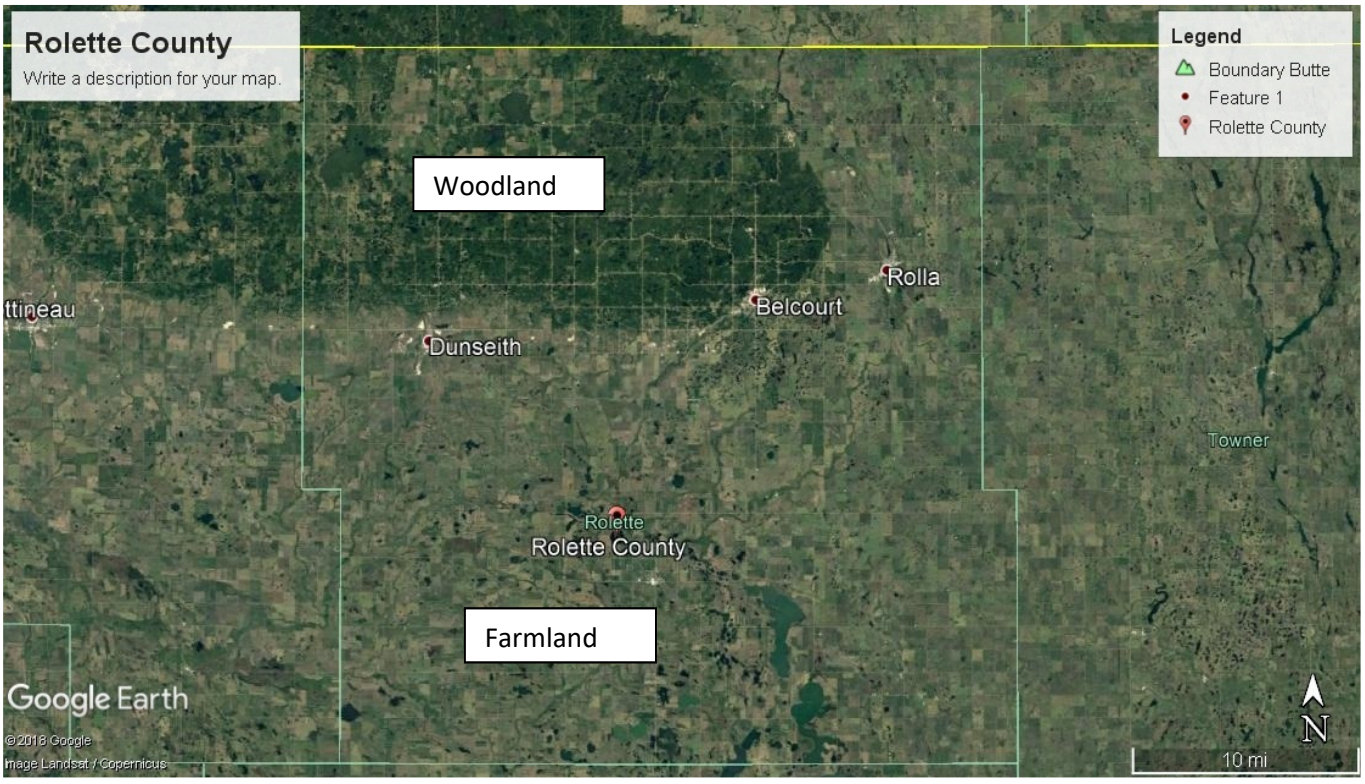
Land cover demonstrates the type of fuels available for wildfires. In the case of agriculture, the flammability depends on the crop, its condition at that point in the growing season, and whether or not the land is irrigated. Grasslands and shrub lands are not usually managed significantly and may contain a build-up of flashy fuels year round. Figure 4.10.4B shows the land cover in Rolette County and on the TMBCI. One may note Rolette County land cover is mainly cropland in the extreme eastern part of the county and the southern two-thirds of the county. The northwestern part of the county and the TMBCI includes the Turtle Mountains which consists of forests, shrubs, and tall grasses. This area is extremely vulnerable to wildfire damage. Cropland may be subject to wildland fire during harvest or haying operations. A hot equipment bearing or spark from equipment on dry crop residue

or hay may start a wildland fire. Structures located near government lands, CRP lands, or other non-irrigated vegetation is generally considered higher risk. The entire county and the TMBCI, however, is at some risk from wildfire.

North Dakota Forest Service in 2009 developed the wildfire risk by county based on wildfire occurrence, fire department response capabilities, and weather. In the Forest Action Plan Update of 2020 Rolette County and the TMBCI Reservation was determined to have a minor potential wildfire risk. Weather is a significant factor in the wildfire potential assessment. The Turtle Mountains receive about 10 inches of rainfall more than the surrounding drift prairie because of they rise 800 feet of elevation above the surrounding lands. Also the fire departments' capability is a factor.

In Rolette County and on the TMBCI Reservation, this would include the communities of Belcourt, Dunseith, Mylo, Rolette, Rolla, and St. John.

Figure 4.10.4B Land Cover



Source: Google Earth, 2017

4.10.3 Previous Occurrences

The North Dakota Fire Marshal's Office provides monthly fire data via their website. The 2022 Monthly Fire Counts

North Dakota 2022 Monthly Fire Counts (Year to date)

January	135
February	111
March	162
April	157
May	187
June	197
July	235
August	209
September	Not available
October	Not available
November	Not available
December	Not available
Total as of August	1,393

The dollar loss attributed to fire from January, 2022 through August,2022 is $36,191,667.00.

As a sample for the year, the total incidents reported for the month of August, 2022 were 2,882 with grass fire accounting for 28.57% of the fires, passenger vehicle fires, 11.43%, and 10.48% building fires. 227 of the 363 fire departments reported incident calls.

North Dakota Incident totals by type 2022 year to date (August 2022)

Fires	1,392
Rupture/explosions	59
Rescue (EMS)	19,098
Hazardous Conditions	1,180
Service	1,785
Good Intent	3,014
Severe Weather	40
Special Incident	146
False Calls	3,352
Total	30,066

Source: https://attorneygeneral.nd.gov/sites/ag/files/documents/August%202022.pdf

Table 4.10.1A, National Trends in fires, deaths, injuries and dollar loss

	2019 Statistics	Trend From 2010
Fires	1,291,500	-3.2%
Deaths	3,704	+24.1%
Injuries	16,600	-12.5%
$ Loss	$14.8 billion	+74.5%

Source: US Fire Administration, 2022

Wildland fires occur annually in Rolette County and on the TMBCI. Some have caused damages and others have not. The extent of damages often depends on the fire spread rate and the effectiveness of suppression and mitigation measures. The history of wildfires can be difficult to compile because of the various firefighting situations based on weather, vegetation and terrain.

The Rolette County Emergency Manager in meeting with various firefighting entities has compiled that between 2013 and 2017 there were 2,036 wildland fires or an average of 407.2 fires per year. With Rolette County having seven fire departments, each fire department has had an average of 291 wildland fires or 58 wildland fires per year.

Dunseith, Belcourt, BIA Forestry, Rolette, Rolla, and St. John Fire Departments have had the majority of the Wildland fires because of their proximity to the Turtle Mountains. BIA Forestry and Dunseith respectively respond the most to wildland fires.

Another source of information on historical occurrences and associated losses due to wildland fires is the SDA Risk Management Agency crop insurance claims as a result of fire. From the period from 2003 to 2012 (10 years), no crop insurance was paid as a result of wildland fire for Rolette County or on the TMBCI Reservation. There have been no emergency or disaster declarations for wildland fire in Rolette County or on the TMBCI Reservation.

Table 4.10.2A Rolette County/TMBCI Urban Fire or Structure Collapse Declared Disasters and Emergencies

Declaration	Location	Date	Magnitude	Casualties	Damages
None					

4.10.4 Probability and Magnitude

Table 4.10.4A is a graphical representation of the range of events that can occur within the urban fire and structure collapse hazard. Generally, the more frequent events have a low impact, and the high impact events occur less frequently. All types of events may not appear in the figure, but the information presented can assist when comparing hazards (high frequency, low impact events versus low frequency, high impact events) or when assessing the range of magnitudes possible from the urban fire and structure collapse hazard. The beginning of this risk assessment chapter provides additional information on frequency and impact ratings.

Table 4.10.4A Hazard Frequency and Impact Ranges

<table>
<tr><td rowspan="8">Frequency</td><td>No regional history</td><td></td><td></td><td rowspan="2">Large Occupied Building Collapse</td><td></td></tr>
<tr><td>No local history</td><td></td><td></td><td></td></tr>
<tr><td>100 years</td><td></td><td rowspan="2">Downtown Explosion & Fire</td><td></td><td></td></tr>
<tr><td>50 years</td><td rowspan="2">Fatal Fire</td><td></td><td></td></tr>
<tr><td>Annually</td><td></td><td></td><td></td></tr>
<tr><td></td><td>Negligible</td><td>Limited</td><td>Critical</td><td>Catastrophic</td></tr>
<tr><td></td><td colspan="4">Impact</td></tr>
</table>

The probability of a major urban fire or structure collapse is difficult to determine given only a limited history and recent improvements to building and fire codes. Older structures lacking automatic sprinkler systems are more likely to experience a major urban fire and those structures with large span roofs or not up to building code standards are more likely to collapse.

A realistic yet devastating urban fire or structure collapse scenario is the complete and rapid destruction of an occupied building. In this scenario, little warning might exist for occupants and many could become trapped.

Table 4.10.4A is a graphical representation of the range of events that can occur within the wildland fire hazard. Generally, the more frequent events have a low impact, and the high impact events occur less frequently. All types of events may not appear in the figure, but the information presented can assist when comparing hazards (high frequency, low impact events versus low frequency, high impact events) or when assessing the range of

magnitudes possible from the wildland fire hazard. The beginning of this risk assessment chapter provides additional information on frequency and impact ratings.

Table 4.10.4A Hazard Frequency and Impact Ranges

Frequency	*No regional history*					
	No local history			Wildfire Burning an Entire City		
	100 years		Wildfire Burning Many Residences			
	50 years	Wildfire Burning Farm Structures				
	Annually					
		Negligible	*Limited*	*Critical*	*Catastrophic*	
		Impact				

Wildland fires are usually an annual occurrence in Rolette County and on the TMBCI Reservation. The frequency and size of the fires depend on the ambient conditions and other factors. The probability of a damaging wildland fire that burns uncontrollably despite firefighting efforts is difficult to assess. Generally, the spring and fall months, particularly during droughts, create conditions favorable to wildfires. If the weather conditions and fuels allow, especially if the winds are strong, wildland/rural fires can grow rapidly with little warning. The probability of wildfires is slightly elevated during active ignition periods such as the Fourth of July holiday and before fire restrictions are in place.

Wildland fires burning hundreds or thousands of acres are possible in the region given the right conditions. Such fires would require extra firefighting resources and mutual aid. Of greater significance, however, is a wildland fire that spreads into communities, destroying structures and infrastructure which is possible in the Turtle Mountain region of Rolette County and the TMBCI.

4.10.5 Risk Assessment

Vulnerability Overview

Property and the population are at risk from urban fires and structure collapses. Property losses are usually covered by insurance, but can be devastating to the building occupants, particularly for primary residences. These types of events often do not result in community-wide disasters, unless the structure is critically important to the economy. Fires and

collapses that result in a significant loss of life or encompass the large part of a downtown or urban area would present the most significant challenges to local, tribal, and state government.

Depending on the time and location, a major structure fire could result in the loss of life either to firefighters or building occupants. The potential for this type of loss is difficult to determine due to advances in firefighter safety and the installation of sprinkler and alarm systems in many commercial and apartment structures. Those structures lacking smoke detectors are especially dangerous to the population. Should lives be lost, significant resources could be needed to recover from the event.

Economic values could be lost if a business district were destroyed in an urban fire or structure collapse. For example, facilities of large employers or central community structures such as grain elevators could lead to significant community losses. Most historic buildings lack sprinkler systems and would lose much of their historical value in a fire or collapse.

It is difficult to measure the vulnerability scale for each community in Rolette County and on the TMBCI Reservation. If one were to go by population and facilities, Rolla, Belcourt, and Dunseith have the greatest risk. However, Belcourt has a staffed fire department which reduces vulnerability. Rolla and Dunseith have excellent volunteer fire departments but would have to be rated at the greatest risk, followed by Belcourt and Rolette. Mylo and St. John have the least risk because of their low populations.

Homes, ranches, farms, and businesses can all be threatened by wildland fires, particularly those in rural areas surrounded by dry, natural fuels. Estimating damages can be rather difficult because future losses will be highly dependent on future fire characteristics and locations. History has shown that personal property losses can be much greater than just that of residences. Outbuildings, fences, equipment, livestock, pastures, hay bales, and crops are often additional losses. Generally, the land use is not expected to change much in the next ten years, so those areas that have historically been affected by wildland fires will probably continue to be at risk.

Generally, the population at risk can evacuate before a wildfire moves into their area. Occasionally when strong winds are in place, wildfires can move very rapidly and catch people by surprise, or people may just refuse to evacuate; fatalities and injuries are possible. In these types of situations, firefighters can also be at risk from rapidly moving wildfires. Many times, wildfire fatalities of the evacuating population occur when frantic drivers or poor visibilities due to smoke cause a traffic accident. According to the North Dakota Department of Transportation various lane/road closures have been necessary in the past due to reduced visibility resulting from smoke from wildland fires. In recent incidents, wildfire deaths have been attributed to landowners trying to protect their own property without adequate firefighting protective equipment.

Wildfires can certainly have an effect on the regional economy. Rapidly moving wildfires can result in livestock, feed, and crop losses. Additionally, ranches may also feel the economic impacts of losing miles of fences and outbuildings. The closures and restrictions in recreation areas could lead to tourism industry losses especially on the TMBCI Reservation or Rolette County which has the Peace Gardens as a major tourist attraction. Natural resources are often lost during wildfires, but since wildfires are an important part of the ecosystem, such losses are usually only financial. Depending on the location, historic losses could also occur. Impacts to social values could occur for those under evacuation orders and others supporting the firefighting effort. Fire restrictions may prevent campfires, hunting, and other recreational activities people often enjoy.

The wildlife fire risk to jurisdiction is based on wildfire occurrence, fire department response capabilities, and weather as determined by the North Dakota Forest Service. The wildland fire risk to Rolette County is considered Low in the farmland region of the county and high in the Turtle Mountain region of the county. There are several reasons the wildland fire risk is low in the farmland region. Rolette County and on the TMBCI Reservation agriculture is mainly raising crops resulting in large tracts of land being cultivated rather than being grassland or wooded acres. The grasslands and wooded lands are adjacent to rivers and streams and are not subject to large out of control wildland fires. The communities of Mylo, Rolette, and Rolla, are surrounded by cropland, reducing their vulnerability. The Turtle Mountains are considered at a higher risk because of the type of vegetation that grows there is intermixed grasses, shrubs, and woodlands. Dunseith and Belcourt are at a higher risk in that they are located in the wooded area of the Turtle Mountains. St. John is on the eastern edge of the Turtle Mountains so has some increased vulnerability. Rolette County fire departments and the Belcourt Fire Department, and the BIA Forestry Department are considered adequate to fight any wildland fire that may occur because of the number of fire fighters, the equipment they have, and their mutual aid agreements. In addition, the planning committee felt the response times are adequate for wildland fire response.

If one were to use the number of available fire fighters of the Rolette County Fire Departments and other resources as the criteria for determining vulnerability, Belcourt with paid full time firefighters from both the Belcourt Rural Fire Department and BIA Fire Department along with Rolette with 21 firefighters and Rolla with 27 firefighters, have the least vulnerability while Mylo with 11 Firefighters, and Dunseith Fire Protection District and the St. John Fire Protection District with 10 firefighters have a higher vulnerability. The rural areas, especially in southwestern Rolette County which are served by Willow City and Rugby Fire Departments, have the greatest vulnerability because they are served by fire departments outside of their immediate areas and the time it would take for a fire department to arrive at the fire. However, a contradiction of this is evident in that the area served by Willow City and Rugby Fire Departments is in the farmland area of Rolette County. Vegetation type plays a large role giving the Belcourt region the greatest vulnerability in

that it is located in the Turtle Mountains. However, with 23 paid firefighters that vulnerability is reduced.

The fire chiefs that participated in the planning meetings expressed that the cities have adequate fire protection. The fire chiefs also expressed that rural areas, because of distance from fire protection services, would benefit from a fire education program such as Firewise.

Loss Estimates

This vulnerability analysis involved the use of GIS to quantify the population and buildings at risk within wildfire risk zones. The SILVIS data is classified into 13 categories, based on 2010 Census housing unit density and percent of vegetation in the area. In both interface and intermix communities, housing units meet or exceed a minimum density of one structure per 40 acres. Intermix communities are areas where housing and vegetation intermingle and vegetation exceeds 50 percent. Interface communities are areas with housing in the vicinity of contiguous vegetation having less than 50 percent vegetation, and within 1.5 miles of an area that exceeds 1,325 acres and more than 75 percent vegetation. For the purposes of this plan, these areas were further classified into High, Moderate, and Low risk threat zones as follows:

High Risk Threat Zone (areas of various housing unit density within areas of high vegetation)

1. High Density Intermix
2. Medium Density Intermix
3. High Density Interface

Moderate Risk Threat Zone (areas of lower housing unit density within areas of high vegetation

4. Medium Density Interface
5. Low Density Intermix

Low Risk Threat Zone (either no vegetation, or no housing density)

6. Low Density Interface
7. High Density No Vegetation
8. Medium Density No Vegetation
9. Wild land Intermix
10. Uninhabited Vegetation
11. Uninhabited No Vegetation
12. Low Density No Vegetation
13. Wild land No Vegetation

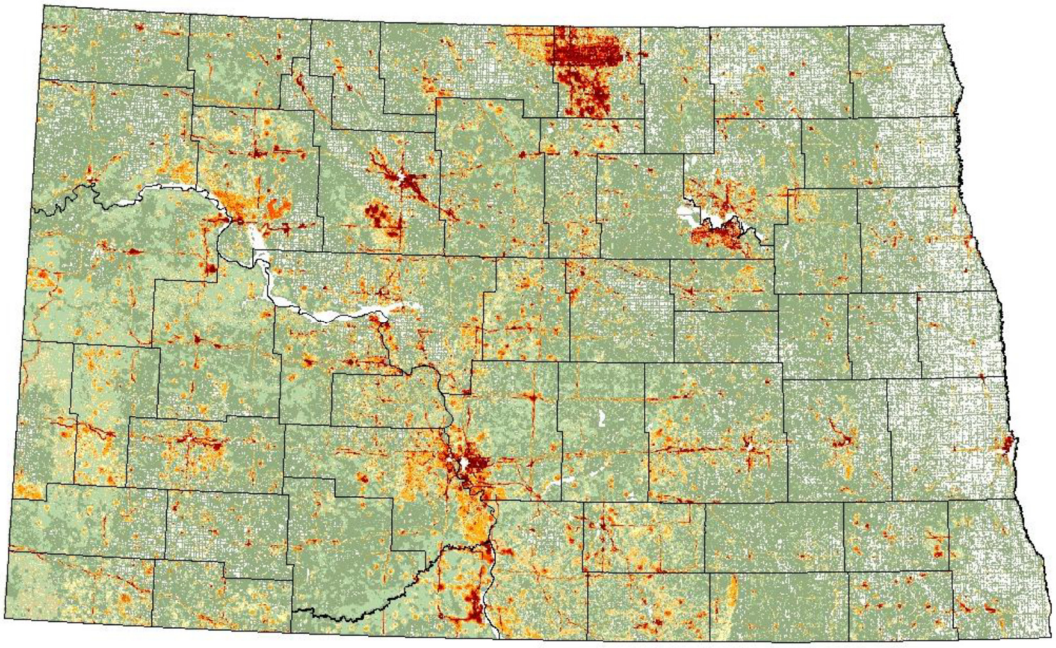
The SILVIS Census Blocks were selected within GIS. The total population and number of housing units within each zone was summarized based on 2010 Census Block data included in the SILVIS data set.

Table 4.10.5B Population and Housing Units in SILVIS High and Moderate Risk Threat Zones

Pop – in High Risk	Housing Units in – High Risk	Pop – in Moderate Risk	Housing Units- in Moderate	Total Population in High and Moderate Risk	Total Housing Units in High and Moderate Risk
2,286	959	5,816	2,123	8,102	3,082

Source: SILVIS Lab Wild land Urban Interface Data

To estimate losses an exposure analysis was used based on applying the average value of housing units in each county multiplied by the combined number of housing units in the High and Moderate risk categories. For the purposes of estimating potential loss, the total average value is used, as catastrophic fires tend to result in total loss of the structure. It is very unlikely that a wildfire would result in loss of all the structures potentially at risk within a given county, but the results provide an indication of where the highest losses from a fire in the Interface or Intermix areas could occur. There are 2,123 total housing units in High and Moderate Risk Categories in Rolette County, with a median housing value of $61,200, which equates to a total of $129,927,600 housing values in High and Moderate Risk Areas. These housing units are concentrated in the Turtle Mountain region.



North Dakota Fire Risk Index Based on West Wide Wildfire Risk Assessment

4.10.6 Critical Facilities in Hazard Prone Areas

Any building is vulnerable to structure fire and collapse. However, sprinkler systems can minimize fire losses. Those critical buildings that do not have a sprinkler system are at greater risk for fire losses. Like structure fire, structure collapses will likely result in or near structural losses. Using a general assumption, given improvements on construction methodologies over the years, the older the building or property, the more likely it is to succumb to a structural collapse. Flat roofs are also more susceptible to heavy snow loading and collapse.

Depending on the type of infrastructure, a fire or structure collapse could result in short-term disruptions while services are rerouted. In the case of a supporting facility, such as the water treatment plant or a lift station, long-term disruptions could be seen. For example, a fire at an electric substation may leave residents without power for several hours or days or a fire at or collapse of a water treatment plant may leave communities without water for days or weeks.

Residential structure fires occur regularly, but typically do not result in community-wide disasters. Therefore, the greatest impacts are from fires and collapses that occur in downtown areas or at large businesses or civil buildings.

Wildland fire can affect any vegetated part of Rolette County or on the TMBCI Reservation but is most prevalent in the abundant fuels of the Turtle Mountains.

Wildland fires have the greatest potential to threaten structures lacking defensible space. Defensible space is a buffer zone between a structure and flammable fuels. Irrigation, mowed areas, fuels thinning, roads, and waterways can serve as buffers to wildfires in some cases. The threat to a structure can truly only be assessed on a case-by-case basis. In many cases, critical facilities are located in developed communities, and therefore, are provided some measure of protection from the surrounding development and irrigated agricultural lands.

Often regional electric infrastructure passes through wildland and non-irrigated agricultural areas. In particular, electric substations and transmission lines and telephone lines can be buffered by or overhang natural fuels. A wildfire could disrupt electricity or communications should this infrastructure be damaged. Propane tanks also become hazardous infrastructure when a wildfire encroaches on a structure. Temporary disruptions or low flows on the public water system may occur if large amounts of water are used to fight a fire, particularly during periods of drought or peak usage times.

Other critical facilities that support government services and private utilities may also be located in areas vulnerable to wildland fire. Damages to such facilities may seriously disrupt emergency and essential services.

4.10.7 Development in Identified Hazard Areas

Nationally, fire officials are working toward improved and stricter fire codes in all buildings. Fire codes usually cover the bare minimum of protection when buildings are constructed or remodeled. Future development in communities lacking fire and building codes will be more vulnerable than development that has the appropriate fire suppression systems and building codes for snow loads and structural stability in place.

Remote, isolated, forested areas are becoming more popular places to live or to have a second home, as national trends show. Growth in these parts of Rolette County and on the TMBCI Reservation is an issue. Regulating growth in these areas is a delicate balance between protecting private property rights, promoting economic development, and promoting public safety. Future development could have a negative impact on the wildland fire vulnerabilities, putting more people and property in harm‘s way. Few Rolette County and TMBCI communities have requirements related to ingress and egress, building sites, densities, water supply, building materials, and fuels maintenance.

The projected population change in Rolette County from 2010-2025 is to have a decreasing population and therefore determined to have low risk in the farmland county region. The

TMBCI is projected to have a population increase and is located in the Turtle Mountains thus has and a higher risk to Wildland Fire.

4.10.8 Data Limitations and Other Factors

The data limitations related to the wildland/rural fire hazard include:

- Lack of a comprehensive, multi-agency, historic wildfire digital database containing information on start location, cause, area burned, suppression costs, and damages
- Lack of mapping of Community Reserve Program lands

Other key documents related to the Wildland Fire hazard include:

- North Dakota Emergency Operations Plan, Fire Annex
- North Dakota Forest Service, Building Sustainable Communities Through Forestry
- North Dakota Statewide Assessment of Forest Resources and Forest Resource Strategy
- Fire Management Plans for federal lands

4.11 CYBER ATTACK

Frequency	Highly Likely	
Impact	Critical	25-50% jurisdiction affected
Risk Class	A	High Risk
Seasonal Pattern	None	
Duration	Minutes to Weeks	
Speed of Onset	Minimal warning	

4.11.1 Description

A cyber-attack is the attack or hijack of information technology infrastructure critical to the functions controlled by computer networks such as: operating, financial, communications, and trade systems. Any cyber-attack that creates unrest, instability, or negatively impacts confidence of citizens/consumers can be considered cyber terrorism. Computer security incidents are an ongoing threat and require due diligence to address accordingly to mitigate any potential disruption to critical infrastructure. There are seven common types of cyber-attacks that governments, businesses, and people are at risk to, as described below (Crime Statistics Online [CSO], 2017).

- Socially engineered malware: A normally trusted site is compromised, and the attackers embed malware into the site. Users of the site are tricked into downloading malware onto their computers through a Trojan Horse.

- Password phishing attacks: Emails are designed to look like they are from trusted vendors and users are prompted to enter their passwords to access the content from the email. The site the user is taken to saves the password the user provides, which attackers can use to access the real site and the user's information.
- Unpatched software: Cyber attackers can access software on users' computers if the software patches are not up to date.
- Social media threats: Friend or application install requests are designed to mask malware or phishing attempts. Users who accept these requests are tricked into providing their email, downloading malware, or otherwise giving cyber attackers access to their computer and data.
- Advanced persistent threats: Cyber attackers gain access to an organization's data using phishing or Trojan Horse attacks. These attacks typically target multiple employees to trick at least one into providing their password or downloading the malware.
- Distributed Denial of Service: An attack in which multiple compromised computer systems attack a target, such as a server, website or other network resource and cause a denial of service for users of the targeted resource.
- Doxing: Discovering and releasing of personally identifiable information. To ensure a quick and proper response to cyber-attacks, systems vulnerable to cyber terrorism should have an incident response plan to minimize negative impacts.

To ensure a quick and proper response to cyber-attacks, systems vulnerable to cyber terrorism should have an incident response plan to minimize negative impacts.

4.11.2 Geographic Location

A cyber-attack could occur or impact any location in TMBCI/Rolette County. The impacts from a cyber-attack are not limited to the location of the targeted system and could have far-reaching impacts. Additionally, a cyber-attack that occurs outside of the county may still impact people, business, and institutions in the state, such as a breach at a nation-wide bank.

4.11.3 Previous Occurrences

TMBCI/Rolette County has not experienced a cyber-attack. The Local Emergency Planning Committee was not aware of any targeted attacks at a local level; however, they were aware of several state cyber-attacks as mentioned below:

Three large cyber-attacks occurred within the past five years that directly impacted North Dakota. In 2017, the University of North Dakota's (UND) website was hit with a cyber-attack that shut down its website. This type of offense was a Distributed Denial of Service (DDoS) attack. This type of attack compromises several computer systems to target a network source and flood it with connection requests, malformed packet, or incoming messages to slow down or crash the system. As a result, the UND.edu website became unresponsive, and the attack denied service to legitimate users or systems.

In 2018, a North Dakota Company experienced a phishing attack, which is a form of fraud where an attacker masquerades as a reputable entity or person in email or other communication channel. The attacker used phishing emails to distribute malicious links or attachments that can perform a variety of functions, including the extraction of login credentials or account information from victims. The company received over 150 phishing emails, and over a dozen employees were successfully phished. Personnel records were accessed, which included personally identifiable information.

The third attack was during the DAPL criminal protests. Unknown individual(s) released personally identifying information of law enforcement officers who assisted in the protest response with the intent to have others harass and/or intimidate them or their families. This attack was accomplished through a Doxing email, which publicly identifies or publishes private information about someone especially as a form of punishment or revenge.

On a national level in December 2020, United States government agencies and private corporations were victims of a nation-state espionage cyber-attack. Federal agencies including the Department of Homeland Security, Department of Agriculture, Energy and State were impacted. Additionally, hospitals have become the target of cyber-attacks with the number of attacks increasing over the last few years. On November 16, 2020, the federal government issued a cyber security warning to healthcare providers about "credible, ongoing, and persistent" threats. Five significant cyber-attacks occurred in 2020 affecting a breadth of system disruptions including patient information security breaches.
Source: Center for Internet Security, Beckers Health IT Review, 12/14/2020

4.11.4 Probability and Magnitude

Cyber attackers are persistent in targeting their intended victims, but there are also countermeasures for each type of cyber-attack. For the most common types of cyber-attacks, educating personnel and the public about the dangers of providing secure information online, ensuring all software patches are up-to-date, installing anti-malware programs, and having enhanced authentication systems (i.e., smartcards, biometrics) can help to reduce the probability of cyber-attacks (CSO, 2017). However, employing countermeasures does not guarantee the protection against all cyber-attacks. Impacts of cyber attacks range from theft of personal or business information to loss of functionality for communications and information systems to impacts on the physical world through cyber-attack vectors causing damage to infrastructure, systems, or people. Due to the prevalence and ever-changing tactics of cyber-attacks, the probability of attacks occurring in the future is high. Source: NDDES, 2018

Table 4.11.A Cyber-attack Consequence Analysis

Cyberattack Impacts	
Public	Often the public is unaware that an attack has occurred; many times, they are made aware only when it affects them personally (i.e. loss of personal identifying information [PII], financial issues due to exposure of personal financial information). Spread of misinformation related to the cyber incident may also affect the public.
Responders	In cyberattack incidents, responders span from law enforcement and the private sector. Law enforcement tends to focus on the forensics of the attack (i.e. tactics, techniques, and procedures [TTPs], where the threat originated, and who may be responsible for the attack. Law enforcement also pursues prosecution of cyber attackers when they are identified.
COOP	Continuity of operations could be greatly impacted by a cyberattack, which could lead to catastrophic consequences. Technological systems are relied upon in nearly all industries, including government, education, banking and financial institutions, utilities, health and medical organizations, public works and engineering, and a host of other sectors. Any incident that affects the functioning of these systems may negatively impact continuity of operations.
Delivery of Services	Delivery of services may be greatly impacted by a cyberattack due to the same factors that would negatively affect continuity of operations. In today's world, the delivery of goods and services is heavily reliant on technology for the facilitation of transactions. A cyber incident could significantly disrupt the delivery of goods and services to the extent upon which businesses and entities rely on technology for the delivery of their materials.

Cyberattack Impacts	
Property, Facilities, and Infrastructure	Property, facilities, and infrastructure are often the target locations for cyber attackers, and many times are damaged and/ or destroyed during an incident. These damages and potential destruction may have far-reaching consequences, including loss of power and electricity during severe winter or summer weather, or the malfunctioning or shutting down of critical utilities and facilities that operate systems including traffic control, police and fire dispatch, and response systems.
Environment	Cyberattacks have little impact on the environment unless the attack is specifically targeted at facilities or infrastructure where physical controls are affected, and release of potentially harmful chemicals or other agents is successful. For example, a cyberattack targeting a pipeline may contribute to the release of harmful chemicals into the environment.
State Economy	Increased, un-forecasted public and private costs due to response and recovery requirements, especially if the cyberattack targets personal financial information; loss of productivity and economic loss due to interrupted and/or delayed lawful activities. Tourism and travel industries may be affected. Additionally, attacks on the national informational or financial infrastructure could lead to significant declines in the national economy. Specific to North Dakota, attacks on cyber systems related to agriculture could lead to substantial direct losses in the state. Given the complexity of many cyberattacks the full economic impacts may never be known. Entities affected by cyberattacks may experience varying levels of economic impact. These impacts may include loss of production and/or services, repair or replacement of equipment (i.e. servers, electrical grids, fiber lines), and loss of stakeholders.
Public Confidence in the State's Governance	Social values and public confidence can be affected by any sort of homeland security incident, particularly one that occurs locally. Community members may not feel safe and may have lasting emotional impacts, especially if personal information is released or obtained by an attacker. Regardless of the level of response, it is likely that the public will display both positive and negative confidence in their government leaders. The focus of the government should be on public safety and ending a cyber-incident as quickly as possible. Often if a private sector entity is affected the government is unaware of the attack and do not have a role in protecting, responding or assisting the entity.

4.11.5 Risk Assessment Vulnerability Overview

All TMBCI/Rolette County agencies, businesses, and other organizations and institutions are vulnerable to the impacts of cyber-attacks. Increased awareness of these threats, preventative education about avoiding attacks, and enhanced counter-measures can protect all organizations from cyber-attacks, but if a cyber attacker is able to gain access to an organization's data or systems, then the organization is at a great risk of loss of functionality or services, or an impact on infrastructure, systems, or people. The city of Rolla and Tribal Headquarters at Belcourt are the government centers for the county and tribe and therefore have increased vulnerability to cyber-attack.

Loss Estimates

The loss of functionality of a system due to a cyber-attack can impact a business's revenue, an organization's ability to provide services, or physical infrastructure. The loss resulting from each attack will depend on the organization attacked and the scope of the attack. Based on attacks in the last five years, TMBCI/Rolette County organizations are at risk for minor loss of services and functionality but should be prepared to withstand more impactful attacks in the future. Loss estimates specific to TMBCI/Rolette County were not available; however, losses incurred in other cyber-attacks nationally and worldwide can assist in demonstrating the potential economic impact of an attack.

The 2017 WannaCry ransomware attack caused nearly $4 billion in financial and economic loss, while the 2017 NotPetya attack, originating in Ukraine, caused an estimated $300 million in economic losses for FedEx subsidiary TNT Express and another $300 million in losses for shipping company Maersk (TrendMicro 2018; North Dakota Trade Office 2018). Other loss estimates have been developed based on specific scenarios related to cybersecurity. In 2017, Lloyd's of London, an insurance underwriter, developed a plausible scenario for an attack on the Eastern Interconnection—one of the two major electrical grids in the continental United States—which services roughly half the country. A large-scale attack on the power grid in the United States could have devastating consequences; the 2003 Northeast Blackout, a widespread power outage affecting much of the Northeast, the Midwest, and parts of Ontario, caused economic losses between $4 billion and $10 billion. The Lloyd's of London scenario estimates economic losses of $243 billion in an attack on the Eastern Interconnection (Knake, 2017).

4.11.6 Critical Facilities in Hazard Prone Areas

Ongoing work continues with the TMBCI and Rolette County and both TMBCI and Rolette County Emergency Management to identify and prioritize critical facilities, assets, systems, and networks that need to be protected. Identifying critical facilities to ensure considerations are made to reduce risk pre- and post-disaster remains a capability gap. TMBCI/Rolette County Critical Infrastructure is identified in Section Three of this plan. The North Dakota Statewide Technology Access for Government and Education network (STAGEnet) provides broadband connectivity, Internet access, video conferencing and other networking services to all state agencies, colleges and universities, local government, and K-12 including TMBCI/Rolette County. The county participates in multi-sector discussions and outreach through statewide IT Cybersecurity updates and stays informed of the ND Information Technology Department's Cyberanaylsis Response Unit activity. Securing Information technology resources, tribal and county assets, and critical facilities requires collaboration among stakeholders. Although tribal and county assets and critical facilities might not be directly impacted by a cyber-attack, a cyber-attack could result in loss of electronic communication, data transmission, and data storage to maintain function. Additionally, a data breach could impact critical functions as well as provide access to sensitive information. Facilities such as utilities, refineries, military systems, and water

treatment plants now rely on digital systems to operate and control their operations. This improved efficiency increases the vulnerability of critical facilities and state assets to a cyber-attack. There are current limitations to sharing levels of threat information outside the government sector, between agencies and levels of government, and within the private sector to those outside their organizations. The current operating environment and regulatory limitations present obstacles to sharing optimal levels of information. In addition to ND State Radio, TMBCI/Rolette County utilizes dispatch services through the Rolette County Dispatch Center.

4.11.7 Development in Identified Hazard Areas

Successful mitigation of cyber-attacks requires an understanding of the current risk posed by the hazard, combined with information relating to how that risk is expected to change in the future. It is also important to consider both the direct and indirect impacts from other hazards and how those may also influence future risk to cyber-attacks, as was experienced during the DAPL protests or attack on UND. In general, development should have little to no impact on a cyber-attack event. An increase in population could result in more people being impacted in the event of a cyber-attack. As detailed in Section 2, TMBCI has increased population growth while Rolette County has not experienced population growth since 2010, and expects this decrease in growth to continue based on future population projection.

If essential services, such as utilities, are disrupted due to a cyber-attack, the impacts would be more severe with a higher population. As operations continue to rely on digital infrastructure to operate, they will become increasingly vulnerable to cyber-attacks. To develop and maintain resilient cyber security capabilities, there must be cooperation between federal, state, local, tribal, non-governmental organizations, and private sector partners. Multisector discussions and outreach efforts increase emphasis on whole community participation in planning. Detecting highly structured malicious activity (via all threat vectors) directed against all critical infrastructure, key resources, and networks must be a priority. Law enforcement and intelligence assets should be leveraged to identify, investigate, and prosecute malicious actors. The ability to return 100% of life safety-critical system to operation within 24 hours is an ongoing State-set priority. The target goal for restoration of all other critical systems is within one week. Planning documents with processes for achieving these targets are complete but require updates and testing through exercises or real-world events.

4.11.8 Data Limitations and Other Key Documents

North Dakota Information Technology Department (NDITD) has cybersecurity and cyber-attack plans in place for state government systems, but no statewide or jurisdictional-level plan exists currently. Some key documents exist to inform this profile including but not limited to the following:

- TMBCI and Rolette County Emergency Operations Plans
- Cyber security Task Force Report
- Incident Prevention/Response/Notification Standard
- 2016 security assessment of the state's IT infrastructure by ManTech International Corporation
- 2017 North Dakota THIRA

4.12 Severe Winter Weather

Including Blizzards, Heavy Snow, Ice Storms, and Extreme Cold

Frequency	Highly Likely	
Impact	Catastrophic	
Risk Class	A	
Seasonal Pattern	Winter-November to March/April	
Duration	Averages 48 to 72 hours, Maximum 5 days, Minimum 12-14 hours	
Speed of Onset	12-24 hours, Advance Warning is possible with ample warning from National Weather Service but actual speed of onset will vary	

4.12.1 Description

Winter storms take many forms and vary significantly in size, strength, intensity, duration, and impact. The composition of a storm varies with the temperature, wind, and amounts of precipitation. Important factors in winter storms include temperature, wind, wind chill, rain, sleet, snow, and blowing snow. Exceptional winter storms can and do cause problems for the communities, residents, and travelers. Examples of these types of storms include blizzards, ice storms, heavy snow events, and extended extreme cold temperatures. While these types of events may not sound serious, the combinations of cold temperatures, wind, snow, wind chills, ice, and reduced visibilities can make these storms very deadly and costly.

The winter season can begin as early as September and last into May. The bulk of North Dakota's winter weather is from mid-November until early April. On average, there are

around 20 winter storms (ice storms, heavy snow events, winter storms, and blizzards) each year in North Dakota. Three to four of these storms reach blizzard intensity. As a result, North Dakota typically leads the nation in blizzard frequency. (National Climatic Data Center, 2017; National Weather Service, 2017)

Another hazard associated with Severe Winter Weather is prolonged periods of cold often associated with high winds, which produce life-threatening situations. This type of winter weather sometimes catches people unprepared, resulting in tragedy. Researchers have said that 70 percent of the fatalities related to ice and snow occur in automobiles and about 25 percent are related to people who have been caught off guard out in the storm. Ice storms with wind, or heavy snow without wind, have been extremely dangerous and costly to businesses, industries, state, tribal, and local governments, and citizens. Blizzards can last from less than 24 hours (in the fast moving storms) to more than four days (in the slower moving ones).

There are two major winter storm tracks that occur in the United States. The northern track produces the Alberta Low Pressure System, commonly called the "Alberta Clipper." This usually is a fast-moving storm producing blizzard conditions for a relatively short period of time. Extremely low temperatures usually follow storms of this nature. Alberta Lows have traveled as fast as 90 mph and have not been known to become stationary systems. The southern track produces the Colorado Low Pressure System. These types of storms move more slowly and more erratically. The Colorado Low has traveled as fast as 60 mph, but has also been known to stop and become stationary for as long as 18 hours. Both of these types of storm systems can become very deadly.

Winters in North Dakota can be harsh, and Rolette County the TMBCI Reservation is no exception. Winds, snow, and cold temperatures blast the region every winter. On average, the coldest month is January with average high temperatures in the lower teens and average low temperatures around -5°F. January temperatures are the coldest in northeastern North Dakota than anywhere else in the state. An average January temperature in Rolette County and on the TMBCI Reservation is about 4°F versus an average January temperature of 14°F in the southwestern corner of the state in Bowman County. In Rolette County and on the TMBCI Reservation, snow has fallen in all months except June, July, and August. Freezing temperatures/frost in late May is likely. Given these facts, most people in the region expect winter conditions, and lifestyles are not disrupted by snow and cold. Exceptional winter storms, though, can and do cause problems for the communities, residents, and travelers.

Blizzards

Blizzards, as defined by the National Weather Service, are a combination of sustained winds or frequent gusts of 35 mph or greater and visibilities of less than a quarter mile from falling or blowing snow for 3 hours or more. A blizzard, by definition, does not indicate heavy amounts of snow, although they can happen together. The falling or blowing snow usually creates large drifts from the strong winds. The reduced visibilities make travel, even on

foot, particularly treacherous. The strong winds may also support dangerous wind chills. North Dakota leads the nation in blizzard frequency with 3-4 blizzards on average annually.

Blizzard conditions can also exist without a major storm system being nearby. Strong surface winds can blow already fallen snow, which is known as a "ground blizzard." Visibility can be reduced to near zero even though the sun is shining and the tops of power poles and trees are seen easily. These conditions are extremely variable in duration, from hours to even greater than a day. Ground blizzards are usually accompanied by very cold temperatures and wind chill conditions, making them as potentially deadly as a conventional blizzard.

The impact of a severe blizzard with low visibility, heavy snow, and cold temperatures can bring the entire region to a standstill. Utility and communication systems are often interrupted. Road systems are rendered impassable which causes school, workplace, and commercial shutdowns. This in turn magnifies the emergency and medical management needs of the community. Rural residents are especially hard hit if they are not adequately stocked with food and fuel. The livestock industry can be severely impacted. The inability to get feed and water to livestock can become critical quickly. Dehydration is a major cause of livestock casualties. Cattle can't lick enough snow to satisfy their thirst; they die of lack of water before succumbing to cold or suffocation.

Heavy Snow

Other hazardous winter storms also exist that do not meet the criteria of a blizzard. Winter storms containing heavy amounts of snow, rapid snowfall rates, or enough wind to reduce visibilities and create hazardous road and outdoor conditions are an annual occurrence in the state. Six inches or more in 12 hours or eight inches or more in 24 hours constitutes conditions that may significantly hamper travel or create hazardous conditions. The National Weather Service issues warnings for such events. Smaller amounts can also make travel hazardous, but in most cases, only results in minor inconveniences. Heavy wet snow before the leaves fall from the trees in autumn or after the trees have leafed out in the spring may cause problems with broken tree branches and power outages.

Ice Storms

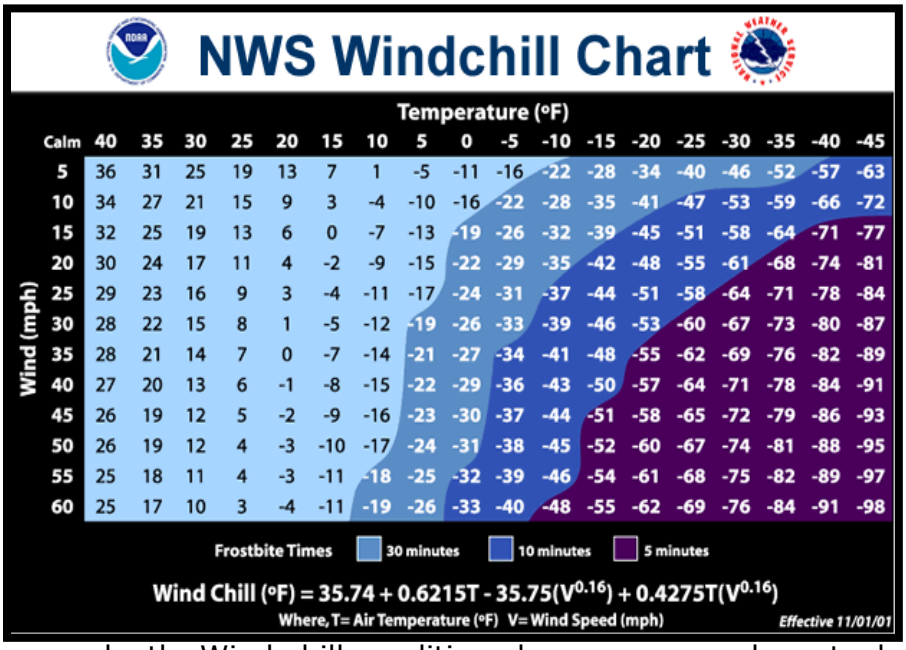
Ice storms develop when a layer of warm (above freezing), moist air aloft coincides with a shallow cold (below freezing) pool of air at the surface. As snow falls into the warm layer of air, it melts to rain, and then freezes on contact when hitting the frozen ground or cold objects at the surface, creating a smooth layer of ice. This phenomenon is called freezing rain. Similarly, sleet occurs when the rain in the warm layer subsequently freezes into pellets while falling through a cold layer of air at or near the Earth’s surface. Extended periods of freezing rain can lead to accumulations of ice on roadways, walkways, power lines, trees, and buildings. Almost any accumulation can make driving and walking hazardous. Thick accumulations can bring down trees and power lines.

Extreme Cold

Extended periods of cold temperatures frequently occur throughout the winter months in Rolette County and on the TMBCI Reservation. Heating systems compensate for the cold outside. Most people limit their time outside during extreme cold conditions, but common complaints usually include pipes freezing and cars refusing to start. The coldest temperature recorded in Rolette County and on the TMBCI Reservation is -41 degrees Fahrenheit set on January 28, 2004. When cold temperatures and wind combine, dangerous wind chills can develop.

Wind chill is how cold it "feels" and is based on the rate of heat loss on exposed skin from wind and cold. As the wind increases, it draws heat from the body, driving down skin temperature, and eventually, internal body temperature. Therefore, the wind makes it feel much colder than the actual temperature. For example, if the temperature is 0°F and the wind is blowing at 15 mph, the wind chill is -19°F. At this wind chill, exposed skin can freeze in 30 minutes. Wind chill does not affect inanimate objects. (National Weather Service, 2007) Figure 4.12.1A shows the current wind chill chart.

Figure 4.12.1A National Weather Service Wind Chill Chart



Source: National Weather Service, 2009.

The lack of adherence to simple but important and necessary precautions or even apathy can result in loss of property, injury, and even death. Wind chill conditions become very relevant when human tissue is exposed to the outside air. This can occur when people become stranded in a blizzard and attempt to walk to safety and become lost. Lowering of the body core temperature leads to the condition known as "hypothermia." Hypothermia has often been called "the killer of the unprepared.‖ It also claims the lives of many outdoor sports enthusiasts. This condition occurs when the body or "core temperature" is lowered. The blood is cooled, thereby

reducing the amount of oxygen which is carried to the brain, thus dulling the senses. The victim becomes fatigued, delirious, and loses dexterity and control of arms and legs. If the body core temperature continues to drop and nears 85°F, the victim eventually slips into unconsciousness. If treatment is not started immediately, the result is arrest of the circulatory and respiratory systems and death.

Winter storms can often be associated with other hazards. The most common hazards thought of during winter weather events are transportation accidents. Roadways become hazardous quickly during snow, blowing snow, and ice events. Most accidents involve passenger vehicles; however, an accident involving a commercial vehicle transporting hazardous materials is also possible.

Strong winds and ice or snow accumulations can take down utility lines. A long-term utility outage becomes more significant during extended cold periods as sheltering and cold weather exposure becomes more challenging. Accessing those in rural areas following heavy snow events to deliver supplies or provide emergency services can be difficult; the need for such services would be compounded by any long-term utility outage. In Rolette County and on the TMBCI Reservation, like many other North Dakota areas, severe winter seasons often translate to severe flooding potential in the spring.

The winter storm hazards, such as blizzards, ice storms, heavy snow, and extreme cold, usually occur on a regional or even statewide scale. As the historical record indicates, winter storms are a formidable hazard for all parts of the state.

4.12.2 Geographic Location

The winter storm hazards, such as blizzards, ice storms, heavy snow, and extreme cold, usually occur on a regional or even statewide scale. As the historical record indicates, winter storms are a formidable hazard for all parts of the state. In Rolette County and on the TMBCI Reservation, this would include the communities of Belcourt, Dunseith, St. John, Rolla, Rolette, and Mylo and the International Peace Gardens.

4.12.3 Previous Occurrences

Rolette County and the TMBCI Reservation experiences extreme winter weather events annually. A summary of some of the more significant events are shown in Table 4.12.3A.

Table 4.12.3A Significant Recent Winter Weather Events – Blizzard, Ice Storm, Heavy Snow

Source: National Climatic Data Center, http://www.ncdc.noaa.gov/stormevents/

Date	Type of Event	Reported Property Damages
02/25/2000	Winter Storm	0
02/26/2000	Winter Storm	0
04/13/2000	Winter Storm	0
04/14/2000	Winter Storm	0
11/02/2000	Winter Storm	0
11/07/2000	Winter Storm	0
12/28/2000	Winter Storm	0
05/07/2002	Winter Storm	0
12/17/2002	Winter Storm	0
01/17/2003	Winter Storm	0
04/01/2003	Winter Storm	0
04/02/2003	Winter Storm	0
12/27/2003	Winter Storm	0
01/24/2004	Winter Storm	0
02/10/2004	Winter Storm	0
01/01/2005	Winter Storm	0
11/14/2005	Winter Storm	0
02/10/2006	Winter Storm	0

Date	Type of Event	Reported Property Damages
02/28/2007	Winter Storm	0
03/01/2007	Winter Storm	0
12/23/2009	Winter Storm	0
01/22/2010	Winter Storm	0
01/16/2009	Winter Weather	0
01/05/2010	Winter Weather	0
01/04/2004	Cold/wind Chill	0
01/27/2004	Cold/wind Chill	0
01/13/2005	Cold/wind Chill	0
02/16/2006	Cold/wind Chill	0
12/05/2001	Heavy Snow	0
12/30/2006	Heavy Snow	0
11/06/2008	Heavy Snow	$20k
01/02/2009	Heavy Snow	0
02/13/2010	Heavy Snow	0
12/15/2010	Heavy Snow	0
12/20/2010	Heavy Snow	0
04/02/2011	Heavy Snow	0
02/25/2012	Heavy Snow	0

Date	Type of Event	Reported Property Damages
11/10/2012	Heavy Snow	0
03/04/2013	Heavy Snow	0
01/02/2015	Heavy Snow	0
12/22/2015	Heavy Snow	0
11/28/2016	Heavy Snow	0
12/05/2016	Heavy Snow	0
01/02/2017	Heavy Snow	0
		Total=$20k

Source: National Climatic Data Center, http://www.ncdc.noaa.gov/stormevents/

There have been four declared disasters or emergencies for severe winter weather events. The last declarations were DR-1157 in 1997, DR-1279 in 1999, DR-1879 in 2010, DR-1986 in 2011, and DR-4660 in 2022. DR-1157, DR-1879, and DR-1986 were specifically for snow removal assistance and DR 1279 included the effects of severe winter weather, severe storms, tornadoes, flooding, ground saturation, and mudslides. DR-4660 included damages for severe winter storm and flooding.

4.12.4 Probability and Magnitude

Table 4.12.4A is a graphical representation of the range of events that can occur within the winter weather hazard. Generally, the more frequent events have a low impact, and the high impact events occur less frequently. All types of events may not appear in the figure, but the information presented can assist when comparing hazards (high frequency, low impact events versus low frequency, high impact events) or when assessing the range of magnitudes possible from winter weather hazard. The impact categories and additional information is discussed in additional detail at the beginning of this Risk Assessment Chapter.

Table 4.12.4A Hazard Frequency and Impact Ranges

Frequency	*No regional history*				Extreme Isolation and Power Outages Statewide	
	No local history					
	100 years			Long Duration Blizzard		
	50 years	Heavy Snow	Winter Road Closures/Outage			
	Annually					
		Negligible	*Limited*	*Critical*	*Catastrophic*	
		Impact				

From December 2000 to January 2017, 26 blizzards, 8 extreme cold events, 5 heavy snow events (closing schools and/or roads and not included in another type), 1 ice storm, and 29 winter storms (involving a damaging combination of wind, snow, and/or ice and not included in another type). Table 4.12.3B shows the associated probabilities based on this historical record.

Table 4.12.4B Winter Weather Recurrence Intervals

Winter Weather Type	Recurrence Interval (estimated)
Blizzard	1-2 events/year
Extreme Cold	1 event/year
Heavy Snow (closing schools and/or roads and not included in another type)	1 event/year
Ice Storm	0-1 event/year
Winter Storm (involving a damaging combination of wind, snow, and/or ice and not included in another type)	2-3 events/year
Any of the Above	4-5 events/year

The severe blizzards and winter storms that result in the loss of life, extended road closures, long-term power outages, or significant isolation problems represent high magnitude winter weather events for Rolette County and on the TMBCI Reservation. Blizzard conditions continuing for 2 or more days and blocked roadways or power outages for a week or more both represent extreme winter weather conditions that are possible. These types of events present significant transportation, sheltering, and logistical challenges.

North Dakota's Living Snow Fence Initiative may help reduce future vehicle accidents and casualties caused by severe winter weather events. Living snow fences consist of trees and shrubs strategically placed to trap snow and prevent it from blowing across roadways and into underpasses. These plantings are typically located in the former locations of man-made snow fences installed by NDDOT District Engineers. The 1996/1997 winter storms illustrated the fact that the existing snow fence setback of 165 feet from the centerline of the road was inadequate. This distance was subsequently increased to 200 feet, and the added snow catch area provided by this change was needed during the 2008-2009 winter season.

4.12.5 Risk Assessment

Vulnerability Overview

The population of Rolette County and the TMBCI Reservation is most threatened by winter weather while driving or when electric service is lost. Transportation accidents and stranded vehicles are more common during poor road and visibility conditions and may result in injuries or death. Property losses are usually covered by insurance. In Rolette County and on the TMBCI Reservation, Electricity, Fuel Oil, and Propane are the most common home heating methods as depicted in Table 4.12.5A.

Table 4.12.5A Method of Heating Homes

Type of Heating Fuel	Number of Occupied Homes - 948	% of Homes
Utility gas	0	0
Bottled, tank, or LP gas	328	34.6
Electricity	390	41.1
Fuel oil, kerosene, etc.	191	20.1
Coal or coke	0	0
Wood	23	2.5
Solar	2	<1%
All Other fuels	16	1.7
No fuel	0	0.0

Source: US Census Bureau, 2015 Factfinder.census.gov and Multi-Hazard Planning Committee

This makes electric heat and propane important resources for home heat during severe winter weather. If electricity is lost due to a power outage, it may become a life threatening situation. If roads are blocked and propane is not deliverable to individual propane tanks, a serious condition may develop. In addition, electricity is still needed to run the blowers and heating systems regardless of the type of heat. Therefore, an extended power outage during winter may make many homes and offices unbearably cold. Additionally, during extended winter-time power outages, people often make the mistake of bringing portable generators inside or not venting them properly, leading to carbon monoxide poisoning. With poor road conditions, sheltering residents may present significant logistical challenges with getting people to heated facilities, feeding, and providing medical care. These situations, accompanied by stranded motorists that need to be rescued, represent significant threats to the population. As history has demonstrated, poorly built structures may also experience structural collapses resulting in property losses.

With respect to the economy, agriculture, transportation, and businesses in general may be affected. Winter is not a peak growing season, so agriculture may not be severely affected unless the storms arrive early or late in the growing season. The primary exceptions for agriculture are extreme cold temperatures during calving operations and keeping animals hydrated during blizzards. Ranchers must take precautions not to lose large numbers of calves and livestock during cold and snowy weather. This could have an impact on agricultural profits. Winter storms may slow transportation resulting in business closures and delivery delays. Schools often close temporarily if conditions warrant.

Perhaps the greatest threat to historical values from winter weather is the potential for pipes to freeze and burst during cold weather. Water can easily damage the interiors of structures and their contents, including items of historic value. When roads are impassable, social events may also be postponed or cancelled. The community of Belcourt on the TMBCI Reservation and the Rolette County communities of Rolette, Rolla, St. John, Dunseith and Mylo have adequate shelters identified to shelter their populations should the need arise according to the Multi-Hazard Mitigation Plan Planning Committee. The townships' population is mainly farmers who are deemed to be self-sufficient should a winter storm power outage occur. Most farmers have standby generators to provide electricity to their homes and farming operation during a winter storm power outage.

To refine and assess the relative vulnerability of Rolette County and the TMBCI Reservation to winter storm events, ratings were assigned to pertinent factors that were examined at the county level. These factors include: social vulnerability index, prior events, prior annualized property damage, building exposure valuation, population density, livestock exposure, crop exposure, and annualized crop loss. A rating value of 1-10 was assigned to the data obtained for each factor and then weighted equally and factored together to obtain overall vulnerability scores. The Social Vulnerability Index normally ranges from 1-5. To give the Social Vulnerability Index the same weight as the other factors, the numbers were multiplied by two. Overall vulnerability scores were sorted into rankings from low, low-

moderate, moderate, moderate-high, and high. Table 4.12.5A summarizes the calculated ranges applied to determine the overall vulnerability ranking based on the scores which ranged from 10 through 39.

Table 4.12.5A Rankings for Overall Severe Winter Storm Vulnerability

Low	Low-Moderate	Moderate	Moderate-High	High
10-15	16-21	22-27	28-33	34-39

The following are the data sources for the rating factors: Social Vulnerability Index for Rolette County from the Hazards and Vulnerability Research Institute at the University of South Carolina, National Climatic Data Center (NCDC) storm events (2000-2012), U.S. Census Bureau (2010), USDA's Census of Agriculture (2012), and the USDA Risk Management Agency (2003-2012). Table 4.12.5B shows the vulnerability ranking for Rolette County derived from the analysis of data from these sources. The overall vulnerability score is low-moderate for Rolette County, based on the rankings above.

Table 4.12.5B Rolette County and the TMBCI Winter Storm Vulnerability Ranking, Source, ND Multi-Hazard Mitigation Plan

Social Vuln. Rating	# of Events (2000-2003)	Property Damages	Annual Property Damage	Total Building Expos. ($000)	Pop. Density	Livestock Expos.	Crop Expos.	Crop Insurance Payments (2003-2012)	Crop Losses (2003-2012)	Annual Crop Losses	Vuln. Score
10	67	100,000	$7,692	$979,534	15.4	$13,779,000	$52,837,000		$0	$0	20

Low-Moderate

The materials used for home construction play a factor in severe winter storm/winter weather conditions home vulnerability. The building materials are shown in Table 4.12/5C.

Table 4.12.5C Structural Build of Rolette County and the TMBCI Residents' Home

	Wood Frame	Wood/Partial Brick	Steel	Other
Urban Residential Structures	99%	<1%	0%	<1%
Rural Residential Structures	99%	<1%	<1%	<1%
Rural Tax Exempt Structures	99%	<1%	<1%	<1%

Source: Estimates based on conservation with the Rolette County Tax Equalization Director

Manufactured homes are generally more susceptible to severe winter weather conditions due to freezing of water pipes if the home is not skirted properly and heating fuel use in extreme cold conditions. The number of manufactured homes is shown in Table 4.12.5D.

Table 4.12.5D Estimated Manufactured Homes (not affixed to the ground) Count in Rolette County and on the TMBCI

Community/Area	Number of Mobile Homes
Couture Township	2
Finnegan Township	1
Gilbert Township	3
Hillside Township	3
Holmes Township	3
Hutchinson Township	9
Leonard Township	10
Oxford Township	1
Shell Valley Township	1
Willow Lake Township	1
Dunseith	28
Mylo	0
Rolette	17
Rolla	9
St. John	8

Source: Rolette County Tax Equalization Director

The elderly and young are vulnerable to severe weather conditions. The location and size of the vulnerable population facilities are shown in Table 4.12.5E.

Figure 4.12.5E Vulnerable Populations

Figure 4.8.5G Vulnerable Populations

Schools	
Facility Name	**Population**
Turtle Mountain Community Elementary School	865
Turtle Mountain Community Middle School	350
Turtle Mountain Community High School	495
Turtle Mountain Community Tiny Turtles, Belcourt	25
Ojibwa Indian School, Belcourt	283
Dunseith Elementary School (charter)	243
Dunseith High School (charter)	221
Dunseith High School (charter)	221
Dunseith Day School	23
Mt. Pleasant Elementary School, Rolla	150
Mt. Pleasant High School, Rolla	96
Rolette Elementary School	110
Rolette High School	56
St. John Elementary School	291
St. John High School	122
Turtle Mountain Community Headstart, Belcourt	30
Turtle Mountain Community Headstart, Dunseith	20
Turtle Mountain Community Headstart, St John	20
St. Ann's School, Belcourt	43
Turtle Mountain Community College, Belcourt	498

Licensed Rolette County and TMBCI Child Care Providers	
Child Care Provider	**Number of Children**
Michelle Guilbert, Rolla	15
Jill Parisien, St. John	19
Rolla Community Day Care, Rolla	70
Nicole Mears, Rolla	10
Mary Medrud, Dunseith	7 + 2 school aged children
Lynn Regan, Rolla	18
Self-Declared Rolette County and TMBCI Child Care Providers	
Child Care Provider	**Number of Children**
Rosa Hawley, Dunseith	**5**

Source: Rolette County Human Service Program Administrator III and Emergency Manager

Rolette County Nursing Homes	
Name	**Number of Beds**
Rolette Community Care Center	42
Dunseith Community Nursing Home	25

Source: MHMP Committee

11.0 % or 1,612 people of Rolette County's and and the TMBCI population of 14,659 (July 1, 2016) is over 65 according to the United States Census Bureau. The breakdown for people over 65 by city and the rural area is shown on Table 4.12.5M. The elderly are often more vulnerable becoming injured or death as a result of severe winter weather than the younger populations. Belcourt and Rolla have the greatest risk to severe winter storms because they have the largest population of the Rolette County and TMBCI communities. Rolla has the courthouse, day care centers, and a school. Belcourt has a hospital, day cares, a retirement home facility, tribal and BIA programs and agencies, 6 schools and a college. Dunseith also has a high risk because of its population, two medical clinics, a school, and a day care centers. St. John and Mylo both share a lower risk.

Table 4.12.5M Population living within Rolette County and on the TMBCI communities

Jurisdiction	Population (2016 Estimates)	Estimated Population over 65
Rolette County	14,659	1,612
Belcourt	2048	211
Dunseith	799	88
Mylo	20	2
Rolette	611	67
Rolla	1,325	146
St. John	361	40
Rural	11,543	1,270

Source: https://www.census.gov/search-results.html?q

Jurisdiction	Population (2020 Census
Rolette County	12,187
Belcourt	1,510
Rolla	1,223
Dunseith	632
Rolette	484
St. John	322
Mylo	21

Loss Estimates

Based on NCDC event narratives, typical losses due to severe winter weather during the period from 2000 to 2018 include livestock injury and death, crop loss, vehicle accidents, downed power lines and utility poles, power outages, damaged and collapsed roofs, delayed traffic and commerce, frozen pipes, and human fatalities or injuries due to exposure or vehicle accidents. Damages from severe winter storm events in Rolette County and on the TMBCI included $80,000 in property damages, with no direct deaths or injuries reported.

Based on these numbers, Rolette County and the TMBCI Reservation could expect roughly $4,444.00 in average annual property damages from severe winter storms, mainly blizzards.

As mentioned previously, there were no crop insurance payments for insurable crops due to cold winter in Rolette County and on the TMBCI between 2003 and 2012. The reason for this is that Rolette County and on the TMBCI Reservation farmer's row crops that are suitable to the shorter growing season of the northern part of the state. According to the 2012 North Dakota Crop Insurance Profile Report issued by the USDA Risk Management Agency, 99 percent of Rolette County's and the TMBCI's insurable crops were insured in 2016. (Risk Management Agency, 2003-2012)

4.12.6 Critical Facilities in Hazard Prone Areas

Most structures usually remain unaffected by winter weather with the primary exceptions being heavy snow loads, frozen pipes, or other utility failure. Should the weight of the snow on the roof of a state-owned building or critical facility exceed its structural capability, the roof could collapse.

The critical facilities themselves generally are not threatened by winter weather events. Heavy snow loads on roofs, particularly large span roofs, can cause roofs to leak or even collapse depending on their construction. Extremely cold temperatures may cause pipes to freeze and subsequently burst, causing water damage. Probably the greatest issue for critical facilities during significant winter weather is the inaccessibility of such facilities due to poor roadways, utility outages, or dangerous wind chills. First responders such as fire, law enforcement, and ambulance may have a difficult time responding during poor road conditions or may not be able to provide certain services during electric outages. Those facilities with back-up generators are better equipped to handle a winter storm situation should the power go out.

Winter weather does pose a threat to critical infrastructure. Above ground power and telephone lines can be taken out by falling tree branches or thick ice accumulations. Following severe ice storms, power may take weeks to be restored. Water infrastructure may also be threatened by winter weather, particularly rapid freeze and thaw periods that cause underground water mains to burst. This could result in temporary disruptions of running water. The most difficult network to maintain is the road infrastructure. During periods of heavy snow, ice, or blizzards, roads can quickly become impassable, stranding motorists and isolating communities. Long term road closures during an extended cold period may diminish and threaten propane and fuel supplies.

Table 4.12.6A Electrical Providers

	North Central Electric Co-op	Ottertail Power	Northern Plains Electric Co-op
Belcourt	x	x	x
Dunseith	x	x	
Rolla		x	
Rolette		x	
St. John		x	
Mylo		x	
Rural Rolette County	x		x

4.12.7 Development in Identified Hazard Areas

Winter weather generally does not affect structures, but in some cases, heavy snow and ice can cause structural damages. Therefore, the vulnerability of future development depends on the integrity of the new construction. Those jurisdictions enforcing building codes reduce the vulnerabilities of future development from winter weather through those codes. Those jurisdictions lacking building codes could theoretically have new construction occur that is unable to withstand heavy snow and ice loads.

4.12.8 Data Limitations and Other Key Documents

The data limitations related to the winter weather hazard include:

- Lack of a countywide, multi-agency, historic winter weather database containing information on the winter weather conditions (snow depth, temperature, wind, snowfall rates, water content, and duration) and the associated problems (number of accidents, conditions of roadways, and services needed).

Other key documents related to the Winter Storm hazard include:

- North Dakota Emergency Operations Plan

4.13 Geologic Hazards

Including Landslide, Earthquake, and other Geologic/Mining Hazards

Frequency	Unlikely	
Impact	Limited	
Risk Class	D	
Seasonal Pattern	None	
Duration	Minutes to weeks	
Speed of Onset	Minimal warning	

4.13.1 Description

Geologic hazards in Rolette County and on the TMBCI Reservation usually do not cause severe damage, as other hazards may, but the potential exists for the occasional landslide that causes some loss.

Landslide

A landslide is the movement of rock, soil, artificial fill, or a combination thereof on a slope in a downward or outward direction. The primary causes of landslides are slope saturation by water from intense rainfall, snowmelt, or changes in ground-water levels on primarily steep slopes, earthen dams, and the banks of lakes, reservoirs, canals, and rivers (US Geological Survey). Other causative factors include steepening of slopes by erosion or construction, alternate freezing or thawing, earthquake shaking, volcanic eruptions, and the loss of vegetation from construction or wildfires. The saturation or destabilization of a slope allows the material to succumb to the forces of gravity or ground movement.

Many different types of landslides exist: slides, falls, topples, flows, and lateral spreads. Slides involve the mass movement of material from a distinct zone of weakness separating the slide material from the more stable underlying material. The primary types of slides are rotational slides and translational slides. Falls occur when materials, mostly rocks and boulders, fall abruptly from a steep slope or cliff. Falls are strongly influenced by gravity, mechanical weathering, and the presence of interstitial water. Topples are similar to falls, yet they pivot around a connection point at the base of the material and are most often caused by gravity or fluids in the cracks of the rocks. Flows typically have a higher percentage of water material embedded in them and behave more like a liquid than other types of landslides. The five primary categories of flows are: debris flows, debris avalanches,

earthflows, mudflows, and creeps. Lateral spreads usually occur on gentle slope or flat surfaces when liquefaction occurs and leads to fractures on the surface. Complex landslides involve any combination of these types (US Geological Survey).

Landslides are typically associated with mountainous regions, but they can also occur in areas of low relief. In these areas, the landslides are often the result of cut-and-fill failures (from roadway and building excavations), river bluff failures, lateral spreading, or mine collapse (US Geological Survey).

Landslides occur in natural and anthropogenic settings in Rolette County and on the TMBCI Reservation and are most commonly found within major river valleys and on engineered slopes along major transportation corridors.

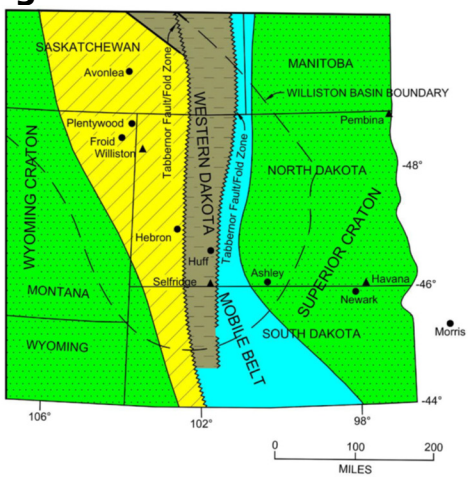
Riverbank slumping can be considered a form of landslide and is often found along the rivers in Rolette County and on the TMBCI Reservation. The riverbank soils are inherently weak, and natural forces are always moving river channels. Structures may artificially accelerated riverbank slumping and instability through activities such as placing homes and structures too close to the riverbank in a way that adds pressure to the bank and increases soil hydration through increased storm water runoff, using irrigation systems that saturate the soil and decrease its strength, adding weight to the riverbank with structures, retaining walls, and riprap, and planting shallow-rooted vegetation. Minimizing these types of activities and placing structures away from riverbanks can mitigate some, but not all, riverbank slumping (Cass County, 2010). Currently riverbank slumping is not considered an issue in Rolette County and on the TMBCI Reservation yet there is a potential that some structure may exist that could be subject to riverbank slumping.

Earthquake

An earthquake is the sudden movement of the Earth, caused by the abrupt release of strain that has accumulated over a long time. For hundreds of millions of years, the forces of plate tectonics have shaped the Earth‘s surface. Huge plates slowly move over, under, and past each other. Sometimes the movement is gradual. At other times, the plates are locked together, unable to release the accumulating energy. When the accumulated energy grows strong enough, the plates break free, thus, producing an earthquake (US Geological Survey).

Rolette County and the TMBCI Reservation is not an area known for its earthquake activity, however, hundreds of miles to the west in the Rocky Mountains is the Intermountain Seismic Belt and to the southeast is the New Madrid Seismic Zone. Neither of these areas is close enough to cause significant damages in Rolette County and on the TMBCI Reservation, however, relatively small earthquakes may occur in areas not recognized for regular earthquake activity. In addition, Western North Dakota is in the Western Dakota Mobile belt as illustrated in Figure 4.13.1A. If an earthquake occurs in this area, Rolette County and the TMBCI Reservation may feel some movement.

Figure 4.13.1A. Western Dakota Mobile Belt



Map showing the main basement geologic structures in North Dakota and the surrounding area. The map shows the major Precambrian Structural provinces (Superior Craton, Western Dakota Mobile Belt, and Wyoming Craton). Two deep faults, the Thompson Boundary Fault and the Tabbernor Fault/Fold Zone, extend north-south through the Western Dakota Mobile Belt in western North Dakota. All of these features are deeply buried beneath younger materials throughout the area.

Localities where earthquakes have occurred are noted on the map (round dots). Additionally, earthquakes have been reported felt at the locations shown by triangles.

All of the features shown on the map are buried beneath younger materials throughout the area and, because they are hidden and cannot be studied directly, the map is speculative. Other structural maps of the area, compiled by other geologists, differ from this one in various ways.

Source: North Dakota Geological Survey, 2007.

Geologists primarily measure earthquake severity in two ways: by magnitude and by intensity. Magnitude is based on the area of the fault plane and the amount of slip. The intensity is based on how strong the shock is felt and the degree of damage at a given location. The most commonly used scales are the Richter magnitude scale, moment magnitude scale, and modified Mercalli intensity scale (National Earthquake Hazards Reduction Program)

4.13.2 Geographic Location

An ongoing project at the North Dakota Geological Survey is the identification and mapping of landslide areas of the state, called the Landslide Inventory Mapping Program. As of 2010, 8,856 individual landslides and roughly 20% of the state were mapped in North Dakota. There is a low landslide incidence and susceptibility rating for Rolette County and on the TMBCI (less than 1.5% of area).

In general, landslides in Rolette County and on the TMBCI occur along natural slopes along major river corridors. They may also occur on engineered slopes along major transportation routes. Slide areas are found within the late Cretaceous Pierre Formation and glacial till deposits along with glacial lakebed deposits. Historically, landslides have occurred in Hutchinson Township along Highway 43 and at Willow Lake.

There are no recorded historical earthquakes in Rolette County and on the TMBCI. The peak horizontal acceleration (as a percentage of gravity) that has a 2% probability of exceedance in 50 years is 0-2%g for Rolette County and on the TMBCI (USGS). As a measure of how hard the ground shakes, the higher the value, the greater the hazard. When viewed on the

national scale, the North Dakota values are very low, and Rolette County and on the TMBCI is in the lowest rating category for the state. An expected acceleration of 0-2%g has perceived shaking of not felt to light, and no potential damage. (Pacific Northwest Seismic Network 2010)

In Rolette County and on the TMBCI Reservation, this would include the communities of Belcourt, Dunseith, St. John, Rolette, Rolla, and Mylo.

4.13.3 Previous Occurrences

Most geologic events in North Dakota go unnoticed or result in very little physical damage. Most landslide damages that do occur are to transportation infrastructure and lead to impacts such as road closures, detours, and road repairs. Occasionally, structures are involved.

A NDDOT report stated that some climatologists believe that the state is in a wet cycle that could potentially last up to 30 years. North Dakota landslides are in part caused by excessive ground moisture from the record snowfalls and rainfalls in this wet cycle. (Source: TransAction III Topic Summaries, North Dakota's Statewide Strategic Transportation Plan)

Table 4.13.3A lists Rolette County and the TMBCI disaster declarations resulting from geologic hazards, which included landslides and mudslides in the declaration.

Table 4.13.3A Rolette County and the TMBCI Geologic Declared Disasters

Declaration	Location	Date	Magnitude	Casualties[1]	Damages[1]
DR 1279 (for Severe Storms, Tornadoes, Snow and Ice, Flooding, Ground Saturation, Landslides, and Mudslides)	Rolette County TMBCI	6/8/1999 (incident period 3/1/1999 through 7/19/1999)	Not Reported	Not Reported	Disaster assistance over $100 million

[1] Damages are statewide, Rolette County and TMBCI damages are not available.

Source: North Dakota Department of Emergency Services, 2014.

4.13.4 Probability and Magnitude

Figure 4.13.4A is a graphical representation of the range of events that can occur within the geologic hazards. Generally, the more frequent events have a low impact, and the high impact events occur less frequently. All types of events may not appear in the figure, but the information presented can assist when comparing hazards (high frequency, low impact events versus low frequency, high impact events) or when assessing the range of magnitudes possible from the geologic hazards. The beginning of this risk assessment chapter provides additional information on frequency and impact ratings.

Table 4.13.4A Hazard Frequency and Impact Ranges

Frequency	*No regional history*				
	No local history				
	100 years		Landslide Damaging Roads		
	50 years	Earthquake Shaking Felt			
	Annually				
		Negligible	*Limited*	*Critical*	*Catastrophic*
		Impact			

Generally, the more frequent geologic hazard events have a low impact, and the high impact events occur less frequently. All types of events may not appear in the figure, but the information presented can assist when comparing hazards (high frequency, low impact events versus low frequency, high impact events) or when assessing the range of magnitudes possible from the geologic hazards. The beginning of this risk assessment chapter provides additional information on frequency and impact ratings.

Earthquake experts use probabilities when determining the seismicity of an area. Peak horizontal acceleration is the maximum horizontal acceleration experienced by a particle during the course of the earthquake motion. When acceleration acts on a physical body, the body experiences the acceleration as a force. Gravity is a commonly known force of nature, and therefore, the units of acceleration are measured in terms of g, the acceleration due to gravity. The peak ground acceleration with a 2% probability of exceedance in 50 years in Rolette County and the TMBCI Reservation is less than 2%g (US Geological Survey). To make sense of these values, at 1.4%g-3.9%g, the earthquake is felt by few and potential damage is none.

4.13.5 Risk Assessment

Vulnerability Overview

The primary threats to Rolette County and the TMBCI Reservation from the geologic hazards are to tribal, county, city, and township road systems and potentially structures. Landslide poses the greatest threat of the geologic hazards. Roadways may crumble or be buried following a landslide. Should buildings be located in such areas, losses could occur. Roads that are in the Turtle Mountains, near Ox Creek, Willow Creek, and other major bodies of water in Rolette County and on the TMBCI Reservation may be damaged by landslides. The cities and townships in the county are at very low risk.

The potential for significant earthquake losses in Rolette County and on the TMBCI Reservation is marginal.

Given the incompleteness of the landslide data, the hazard ratings are only broken into three levels:

- High – several areas of the county have identified landslide hazard areas
- Moderate – isolated areas of the county have identified landslide hazard areas
- Low – none of the county has identified landslide hazard areas

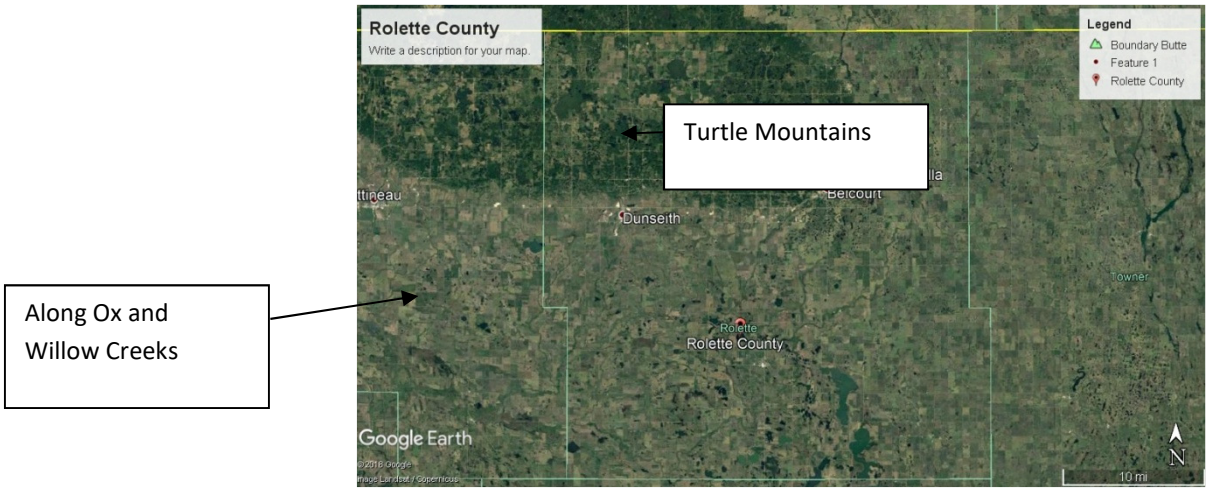
The earthquake rating was based on the potential peak horizontal acceleration with a 2% probability of exceeding in 50 years as follows:

- High – 8-10%g
- Moderate-High – 6-8%g
- Moderate – 4-6%g
- Low-Moderate – 2-4%g
- Low – 0-2%g

The overall geologic hazards rating is based on the combination of the landslide and earthquake hazards, with more weight given to the landslide hazard.

Rolette County and the TMBCI Reservation has a "Low" landslide and earthquake rating, and therefore a "Low" overall rating for geologic hazards risk to the county. The communities of Dunseith, St. John, Rolette, Rolla, and Mylo all share a low vulnerability.

Figure 4.13.5A, Areas with Landslide Risk



Loss Estimates

The 2011 North Dakota landslides cost $5.6 in emergency repairs and an estimated $14 million in permanent repairs for a total of nearly $20 million. Although these types of losses do not occur every year, similar losses are possible in any year when similar flood conditions are present.

The geologic hazard for the Rolette County and the TMBCI Reservation communities is basically equal for each community. The location of the cities does not make them susceptible to landslides and the earthquake vulnerability is the same.

4.13.6 Critical Facilities in Hazard Prone Areas

Most critical facilities and infrastructure in Rolette County and on the TMBCI Reservation are likely located outside of geologic hazard areas, such as landslide. The primary exception may be transportation infrastructure.

4.13.7 Development in Identified Hazard Areas

Existing and future development may be vulnerable to geologic hazards. Specific to landslide, most land use regulations in the county do not directly address the landslide hazard; however, some may restrict development on excessive slopes and soil types that are inherently more prone to landslides. Earthquake losses can often be mitigated through building codes. Those jurisdictions enforcing building codes reduce the vulnerabilities of future development from earthquakes through those codes. New and future development in those jurisdictions that have adopted and enforce the state building code should be better able to withstand geologic hazards. Rolette County and the TMBCI Reservation are considered a "Low" geologic hazard jurisdiction.

Increased populations add to the challenges of managing development in geologic hazard areas, especially in locations where landslide mapping has not been completed. Rolette County has had a population decrease whereas the TMBCI has had a population increase.

4.13.8 Data Limitations and Other Key Documents

Geologic hazards, particularly landslide hazard areas, are commonly influenced by local factors and are difficult to analyze at the countywide level. Continued study by the North Dakota Geological Survey should aid in identifying those areas at greatest risk and potentially in need of mitigation action.

Other key documents related to the geologic hazards include:

- North Dakota Emergency Operations Plan

4.14 SPACE WEATHER

Frequency	Possible	1-10% probability nest year, and 12% rise per decade
Impact	Critical	25-50 % of jurisdiction affected
Risk Class	B	Moderate-High Risk requires prompt action Address via mitigation and contingency plans
Seasonal Pattern	None Highest probability of occurrence is during or after another hazardous incident that has depleted resources	
Duration	Days to Weeks- Weeks to Months	
Speed of Onset	Minimal Warning Unpredictable and dependent on specific event	

4.14.1 Description

The NOAA Space Weather Prediction Center describes space weather as the condition in space that affects Earth and its technological systems. Space weather is a consequence of the behavior of the sun, the nature of Earth's magnetic field and atmosphere, and our location in the solar system. The active elements of space weather are particles, electromagnetic energy, and magnetic field. The Space Weather Prediction Center forecasts space weather to assist users in avoiding or mitigating the impacts of severe space weather. These are storms that originate from the sun and occur in space near Earth or its atmosphere. Most disruptions can be categorized into three types of events that can have environmental effects on Earth, as described below by the NOAA Space Weather Prediction Center:

• Geomagnetic storm - a major disturbance of Earth's magnetosphere that occurs when there is a very efficient exchange of energy from the solar wind into the space environment surrounding Earth.

• Solar flares - large eruptions of electromagnetic radiation from the sun lasting from minutes to hours. The sudden outburst of electromagnetic energy travels at the speed of light, therefore any effect upon the sunlit side of Earth's exposed outer atmosphere occurs at the same time the event is observed.

• Solar radiation storms- occur when a large-scale magnetic eruption, often causing a coronal mass ejection (CME) and associated solar flare, accelerates charged particles in the solar atmosphere to very high velocities.

These storms can affect critical facility infrastructure and technology in various ways, including blackouts, high-frequency radio disruptions, and disruptions to satellite navigation. NASA describes impacts of a geomagnetic storm on and near Earth as follows: Aurora Borealis and Aurora Australis, communications disruptions, radiation hazards to orbiting astronauts and spacecraft, current surges in power lines, critical degradation, and corrosion in oil pipelines.

4.14.6 Previous Occurrences

There are no recorded catastrophic space weather effects or declared emergencies or disasters in North Dakota, and none recorded for TMBCI Reservation/Rolette County. The nearest storm affected Montreal, Canada on March 13, 1989 when a geomagnetic storm took out their commercial electric power for 9 hours.

Other events impacting other parts of the world including in September 1859 when a solar super storm occurred and is one of the largest recorded geomagnetic storms in history. Other recorded space weather events occurred in May 1921, May 1967, and November 2003. (Eastwood et al., 2017)

4.14.3 Location and Extent

Space Weather is a threat to most communities because of reliance on critical infrastructure and technology. In TMBCI Reservation/Rolette County, this includes the communities of Belcourt, Dunseith, Mylo, Rolette, Rolla, and St. John. Mapping of utility and communications infrastructure is maintained by the individual services providers. The TMBCI and Rolette County Emergency Operations Plans also maintain lists of providers of public utilities in the county for electricity, propane distributors, and telecommunications.

Table 4.14A TMBCI Reservation/Rolette County Electrical Providers

	North Central Electric Co-op	Ottertail Power	Northern Plains Electric Co-op
Belcourt	X	X	X
Dunseith	X		
Rolla		X	
Rolette		X	
St. John		X	
Mylo		X	
Rural Rolette County/TMBCI Reservation			X

Table 4.14B describes the R1-R5 severity scale disturbances of the ionosphere caused by X-ray emissions from the sun from a radio blackout storm or solar flare. An event could affect high frequency radios and navigation.

Table 4.14B NOAA Space Weather Scale for Radio Blackouts

Scale	Description	Effect	Physical Measure	Average Frequency (1 cycle = 11 years)
R 5	**Extreme**	**High Frequency (HF) Radio:** Complete HF (high frequency**) radio blackout on the entire sunlit side of the Earth lasting for a number of hours. This results in no HF radio contact with mariners and enroute aviators in this sector. **Navigation:** Low-frequency navigation signals used by maritime and general aviation systems experience outages on the sunlit side of the Earth for many hours, causing loss in positioning. Increased satellite navigation errors in positioning for several hours on the sunlit side of Earth, which may spread into the night side.	X20 (2×10^{-3})	Less than 1 per cycle
R 4	**Severe**	**HF Radio:** HF radio communication blackout on most of the sunlit side of Earth for one to two hours. HF radio contact lost during this time. **Navigation:** Outages of low-frequency navigation signals cause increased error in positioning for one to two hours. Minor disruptions of satellite navigation possible on the sunlit side of Earth.	X10 (10^{-3})	8 per cycle (8 days per cycle)
R 3	**Strong**	**HF Radio:** Wide area blackout of HF radio communication, loss of radio contact for about an hour on sunlit side of Earth. **Navigation:** Low-frequency navigation signals degraded for about an hour.	X1 (10^{-4})	175 per cycle (140 days per cycle)
R 2	**Moderate**	**HF Radio:** Limited blackout of HF radio communication on sunlit side, loss of radio contact for tens of minutes. **Navigation:** Degradation of low-frequency navigation signals for tens of minutes.	M5 (5×10^{-5})	350 per cycle (300 days per cycle)
R 1	**Minor**	**HF Radio:** Weak or minor degradation of HF radio communication on sunlit side, occasional loss of radio contact. **Navigation:** Low-frequency navigation signals degraded for brief intervals.	M1 (10^{-5})	2000 per cycle (950 days per cycle)

Source: NOAA Space Weather Prediction Center, http://www.swpc.noaa.gov/NOAAscales/#GeomagneticStorms

* Flux, measured in the 0.1-0.8 nm range, in $W \cdot m^{-2}$. Based on this measure, but other physical measures are also considered.

** Other frequencies may also be affected by these conditions.

Consequence Analysis

The resulting consequences posed to individual sectors of a community from a Space Hazard Event include cascading effects to the general public including heat, water sanitation, groceries, communication and effects from loss of electricity particularly in temperature

extremes. First responders, COOP, delivery of services, property, infrastructure, the environment, the economy and confidence in leadership would likely be impacted.

4.14.4 Risk Assessment

Probability

There are no recorded catastrophic space weather events in North Dakota including on the TMBCI Reservation or Rolette County. According to the NERC's Geomagnetic Disturbance Reference Document, there are 200 days during the 11-year solar cycle with strong-severe geomagnetic storms, and approximately four days of extreme conditions.

Solar storms typically occur during solar maximum. The sun undergoes an 11-year cycle where the polarities of the North and South Poles reverse. Most solar storms occur during a four- to six-year period referred to as a solar maximum. Solar cycle 24 reached its maximum in April 2014, and peaked at an average sunspot number of 82, with no significant space weather events. Geomagnetic storms, solar radiation storms, and radio blackouts have the capability to all happen simultaneously, causing a "solar super storm."

The last major solar super storm was the Carrington super storm (described in previous occurrences) in September 1859. Solar super storms are likely to occur once every 500 years. Therefore, solar storm events severe enough to potentially impact the energy infrastructure are relatively rare. In general, space weather is considered to be high impact, low frequency events, meaning that they occur relatively rarely but can have serious impacts when they do happen.

Vulnerability Assessment

Space weather events occur at varying levels of intensity. Nearly all of the TMBCI Reservation and Rolette County relies on electricity for essential functions such as heat, running water, sanitation, communications, grocery stores and transportation. The impact of loss of power could range from inconvenience to critical. Emergency supplies can often hold the populations over temporarily but may take some time before arriving, in which case, individuals may need to rely on their own personal supplies. Agricultural areas of the state are also vulnerable to prolonged outage events as modern agricultural practices are reliant on energy, such as electric milking machines and irrigation pivots. Oil and gas operations rely heavily on utilities such as electricity and GPS to operate; the TMBCI Reservation and Rolette County have minimal oil and gas operations thus having a lower level of impact during a space weather event.

Counties with higher populations or higher levels of industry, such as agriculture and oil and gas production, would likely be impacted the most by a space weather event that disrupts utility services. TMBCI Reservation/Rolette County with a population of 12,187would experience a lower level of impact than ND's most highly populated county, Cass County with a population of 171,588. Market value of agricultural products sold will impact the

county's vulnerability during a space weather event. TMBCI Reservation and Rolette County rely strongly on the agricultural industry and according to the North Dakota Department of Commerce, has a market value of agricultural products sold of $453,000,000 which would impact the county's vulnerability.
Source: https://www.nass.usda.gov/Publications/AgCensus/2017.

The TMBCI Reservation/Rolette County communities of Belcourt, Dunseith, Mylo, Rolette, Rolla, and St. John have adequate shelters identified to shelter their populations should the need arise.

Table 4.14C Identified Community Shelters

Community	Shelter(s)	Capacity	Generator
Belcourt	Sky Dancer Casino		Yes
Dunseith	Catholic Church	100	
	City Hall	100	
	Dunseith Emergency Response Center	100	Yes
Mylo	New Salem Church	50	
	Mennonite Church Community		
	Galen Yoder Farm	500	Yes
Rolette	Rolette Memorial Hall	200	Yes
Rolla	Rolla School	500	No
St. John	St. John School	500	No
	Senior Citizens Center	50	No
	Catholic Church	50	No
	Presbyterian Church	25	No
	Crossroads	25	No

Source: 2022 TMBCI/Rolette County Emergency Managers

Assets and/or Critical Facilities at Risk

Most of the TMBCI Reservation and Rolette County facilities rely on electrical power to operate. Section 3 provides a summary by county of state-owned and operated facilities and critical facilities as well as other critical facilities. Electric power grids, a national critical infrastructure, continue to become more vulnerable to disruption from geomagnetic storms. For example, the evolution of open access on the transmission system has fostered the transport of large amounts of energy across the power system in order to maximize the

economic benefit of delivering the lowest cost energy to areas of demand. The magnitude of power transfers has grown, and the risk is that the increased level of transfers, coupled with multiple equipment failures, could worsen the impacts of a storm event.

An important aspect of this threat is the permanent damage to power grid assets and how that will impede the restoration process. Transformer damage is the most likely outcome, although other key assets on the grid are also at risk. In particular, transformers experience excessive levels of internal heating brought on by stray flux when GIC's cause a transformer's magnetic core to saturate and spill flux outside the normal core steel magnetic circuit. Previous well documented cases have involved heating failures that caused melting and burn through of large amperage copper windings and leads in transformers. Repairs generally cannot be conducted in the field and if damaged in this manner, they need to be replaced with new units which have a manufacture lead times of 12 months or more.

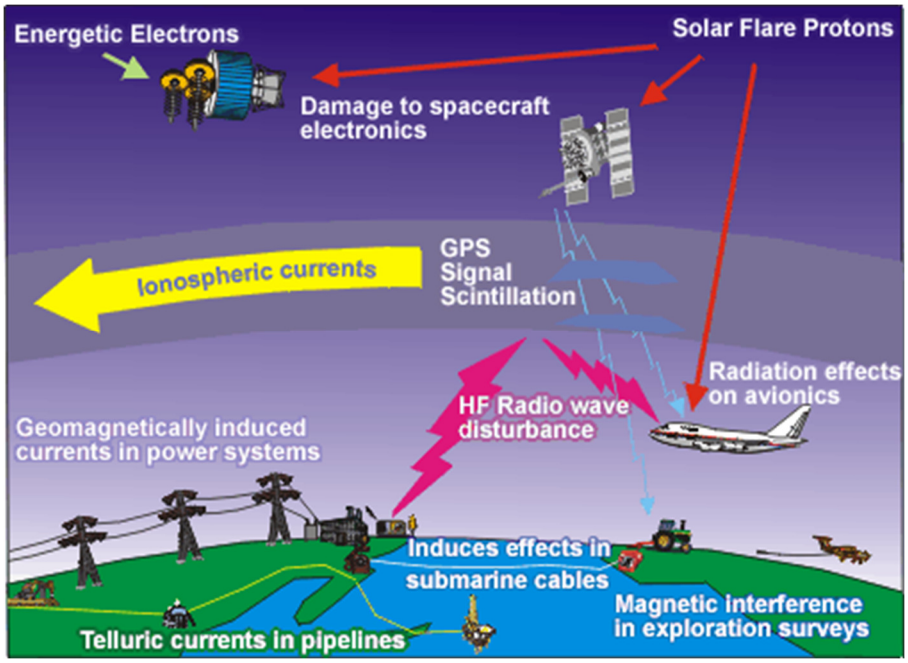
Utility or communication disruptions could also limit the ability to provide emergency services. For example, the medical facilities require electricity and water for certain types of medical equipment to work. Gas station pumps may not operate without electricity, and therefore, emergency vehicles may not have enough fuel during long term outages. Communications are vital to effective emergency operations and the lack of communication capabilities may significantly affect the abilities of emergency response organizations to respond to incidents. Special needs facilities may need to move occupants to alternate locations due their dependence on local utilities.

Many services rely on other utilities to operate. For example, the water supply pumps and sewer lift stations both require electricity to continue operations. One or both may go down during long-term electrical power outages. Propane, oil, and gasoline refills require the transportation network to be open since deliveries are done by truck. This interdependency can lead to more complex utility outage problems.

All Critical Facilities rely on electrical power. Many do not have back-up a back-up power source. If the back-up power sources were affected by a space-weather event, the critical facilities they support, these facilities could function in the short term. The loss of electricity for a short time would primarily affect structures heated by electricity or that are protected from seepage by sump pumps in areas with high water tables. Buildings completely dependent on electricity would be uninhabitable in winter months. In the event of a high-impact Space Weather Event it is probable that fuel outages would result in the eventual loss of function for critical facilities. In addition, perishable food and medicines would spoil in 12-24 hours.

Space Weather Effects on Technology

Figure 4.14A



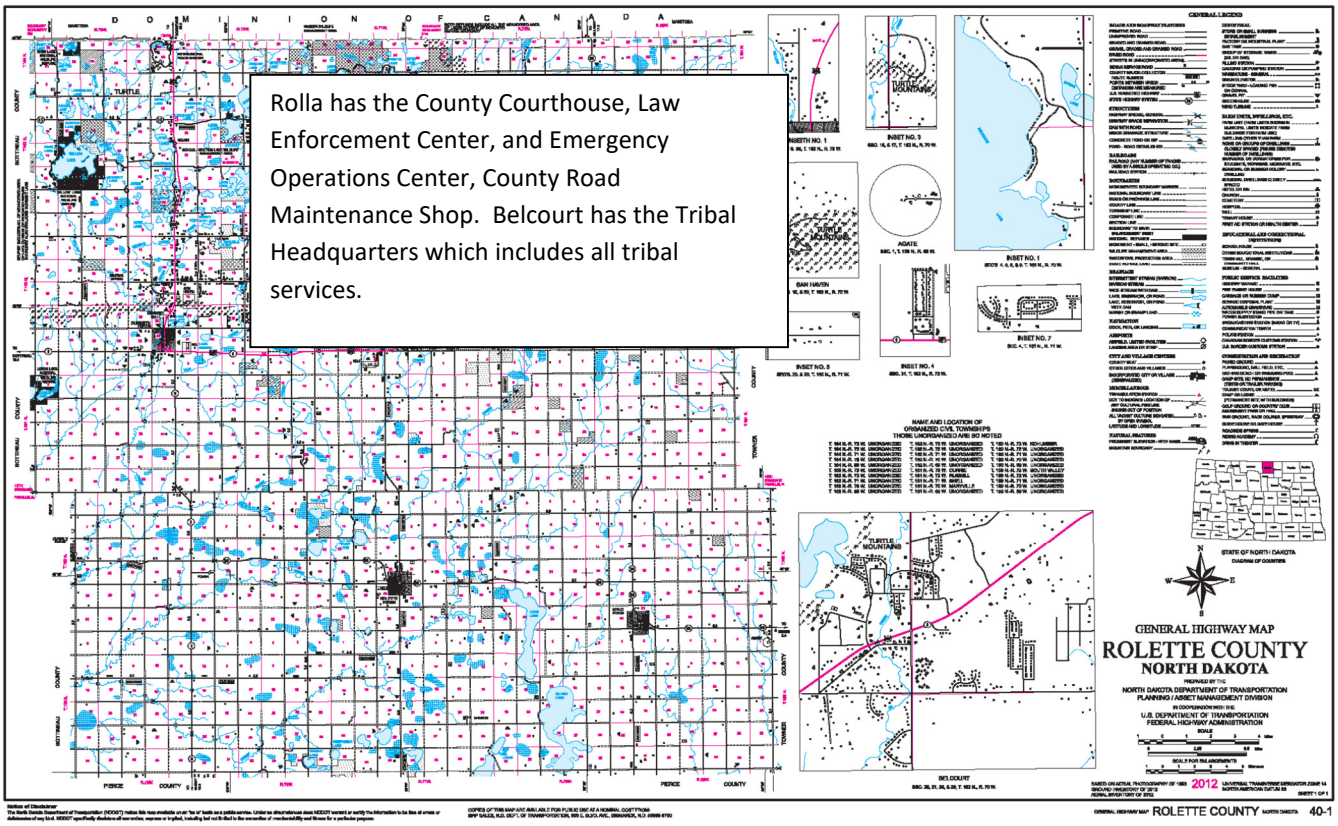
Source: Spaceweather.gc.ca/tach

Table 4.14D TMBCI Reservation/Rolette County Critical Facilities

Critical Facilities

Each jurisdiction identified its own critical facilities and infrastructure as part of the Local Emergency Operations Plan development. Those facilities are shown in Figure 3.1D, Critical Facilities, by jurisdiction.

Figure 3.1D, TMBCI/Rolette County Critical Facilities

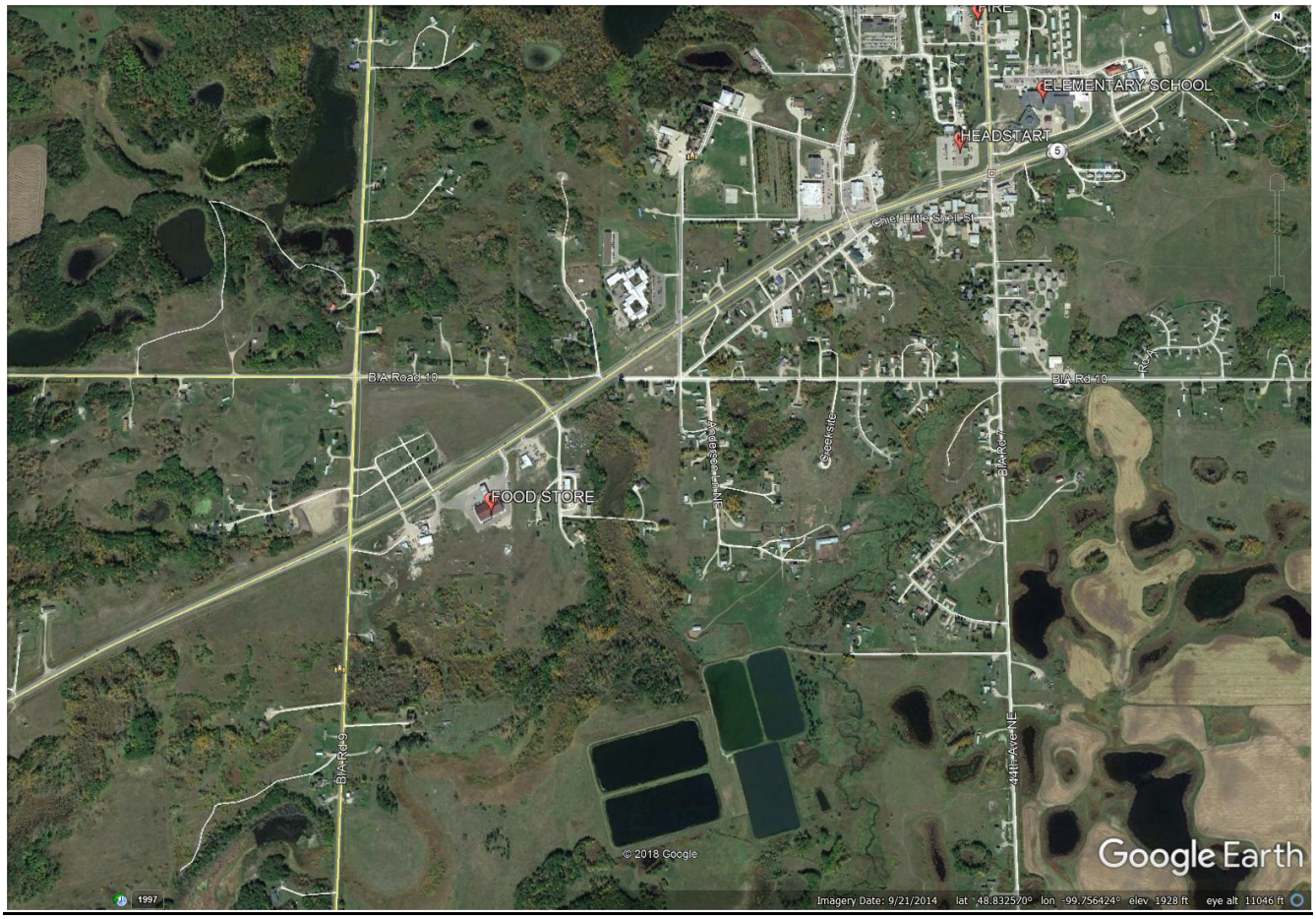


Refer to Figure 3.1C for Communications Tower locations.

Source: Turtle Mountain Band of Chippewa Indians/Rolette County Joint Multi-Hazard Mitigation Planning Committee

Figure 3.1E, Belcourt, Dunseith, Mylo, Rolette, Rolla, and St. John Critical Facilities

Belcourt



Dunseith

Map 1 of 4

Map 2 of 4


CHIEF LITTLE SHELL POW WOW GROUNDS 9720 US HWY 281 (DUNSEITH)
TMBCI TRIBAL YOUTH 9708 US HWY 281 GILBERT
TURTLE MT SUICIDE PREVENTION 9708 US HWY 281 GILBERT
97th St NE
Frontage Rd
5th Ave N
4th Ave N
Google Earth

Map 3 of 4


DUNSEITH WATER WELL 4
DUNSEITH WATER WELL 6
DUNSEITH WATER WELL 5
DUNSEITH WATER WELL 7
DUNSEITH WATER WELL 3
DUNSEITH WATER HOLDING TANK
DUNSEITH WATER PUMP HOUSE/WELL 1 & 2
DUNSEITH WATER HOLDING TANK
DUNSEITH WATER WELL 8
30th Ave NE
23rd Ave NE
© 2018 Google
Google Earth
Imagery Date: 9/21/2014 lat 48.829319° lon -100.054945° elev 1824 ft eye alt 5301 ft

Map 4 of 4

Mylo


66
3rd Ave
MYLO FIRE
2nd Ave
Madison St
Olive St
Robinson St
1st Ave
Main St
© 2018 Google
Google Earth
1997
Imagery Date: 9/21/2014 lat 48.635716° lon -99.616320° elev 1659 ft eye alt 3724 ft

Rolla

Map 1 of 2


HOSPITAL CLINIC
SCHOOL K-12
MEDICAL CLINIC
CO HEALTH
CO COURT HOUSE
FOOD STORE
FOOD STORE
ROLLA FIRE
ROLLA PD
ROLLA CITY HALL
CO SHERIFF
WATER TREATMENT PLANT
Main Ave W
1st Ave SW
2nd Ave SW
Monroe Dr
Well House Rd
56th Ave NE
99th St NE
© 2018 Google
Google Earth

Map 2 of 2

St. John

The planning team determined that the majority of people living in township rural areas generally have generators to provide electricity should electrical power fail. This does not apply to rural areas of the TMBCI Reservation where a few people have electric generators to use when electrical power fails. The need to provide emergency services is greater on the TMBCI Reservation than in other parts of Rolette County.

Table 4.14E TMBCI Reservation/Rolette County Electrical Providers

	North Central Electric Co-op	Ottertail Power	Northern Plains Electric Co-op
Belcourt	X	X	X
Dunseith	X		
Rolla		X	

	North Central Electric Co-op	Ottertail Power	Northern Plains Electric Co-op
Rolette		X	
St. John		X	
Mylo		X	
Rural Rolette County/TMBCI Reservation			X

Social values such as going from one place to another could be disrupted by a fuel shortage or transportation closure. Other social events may be cancelled due to the reliance on the utility services. Otherwise, ecological and historical values would remain unaffected.

Loss Estimates

Loss estimates from a space weather event specifically on the TMBCI Reservation and Rolette County are not available. In the case of a space weather event, losses will also occur in the economic sector, where a long-term event could cause loss in the agricultural or oil industries. Space weather impacts are not necessarily restricted to catastrophic effects. Insurance claim information suggests that the losses to the United States power grid from non-catastrophic disturbances from GICs may be $5 to $10 billion/year." Loss estimates are summarized in Eastwood et al., 2017.

4.14.5 Future Conditions

There are no impacts on future development to the TMBCI Reservation or Rolette County from space weather events.

Climate Change

Climate change will not impact space weather events. Since space weather originates from the sun, the changes in the earth's climate will not affect these events. Space weather, on the other hand does influence the earth's climate, but this effect is minimal (NOAA Space Weather Prediction Center).

Changes in Development

As detailed in Section 2, according to future population projections, Rolette County has experienced a population decrease since 2010 and expects this trend decrease to continue. Rolette County population decrease is projected to continue to decrease from about 1.3% to 1.4% from the 2020 Census by 2030. Whereas the TMBCI Reservation has seen a population increase since 2010; this is projected to continue. Increased development can put more people at risk to hazards across the state, so understanding future development trends is an important tool for hazard mitigation. Rolette County does not have a predicted increase in population over the next 10 years to add to the challenges of managing a utility outage or a disruption in navigation services resulting from a space weather event. The TMBCI Reservation population increase may cause difficulty in managing a utility outage or disruption in navigation services resulting from a space weather event.

The vulnerability of county assets and critical infrastructure to space weather events will remain the same in the future.

Mitigation

There are no known capabilities to mitigate the impacts of a space weather event on the TMBCI Reservation or Rolette County.

4.14.6 Summary / Conclusion

In summary space weather events, while unlikely, could severely impact The TMBCI Reservation and Rolette County. Utility infrastructure, such as electricity supply, GPS systems, satellites, and pipelines would be primarily impacted by a space weather event. Given the critical nature of the utility infrastructure in the day-to-day operations of the county, there would be many secondary impacts to the public, service provision, and the economy.

Potential Mitigation measures identified by the SHMT Space Weather Committee focused on:

- Educating the public about the potential consequences of geomagnetic and solar storms and radio blackouts
- Redundancies of the power grid system to mitigate any losses of power that could have life-threatening consequences

4.14.7 Data Limitations / References

Brief power outages occur regularly in on the TMBCI Reservation and in Rolette County but are not a normal event, understanding the specific problems and concerns of this hazard is the greatest limitation. Studies of the critical facilities would allow for a more in-depth discussion of their vulnerabilities; however, such data would likely be kept internal for security purposes. A record of the significant critical material or infrastructure outages and

shortages in the county and the associated impacts could help pinpoint vulnerable times and locations.

Other key documents related to the shortage or outage of critical materials or infrastructure and space weather hazards include:

- TMBCI/Rolette County Emergency Operations Plan
- North Dakota State Emergency Operations Plan, Shortage of Critical Materials Annex
- North Dakota Energy Emergency Response Plan Update, North Dakota State Energy Office, 2013
- NOAA Space Weather Prediction Center, http://www.swpc.noaa.gov/NOAAscales/
- NOAA A Profile of Space Weather, http://www.swpc.noaa.gov/primer/primer_2010.pdf
- Eastwood, J., Biffis, E., Hapgood, M., Green, L., Bisi, M., Bentley, R., Wicks, R., McKinnell, L., Gibbs, M., and Burnett, C. 2017. The Economic Impact of Space Weather: Where Do We Stand? Available https://onlinelibrary.wiley.com/doi/full/10.1111/risa.12765. • Electric power grid: https://www.swpc.noaa.gov/impacts/electric-power-transmission
- Weather and climate: https://www.swpc.noaa.gov/impacts/space-weather-impacts-climate

4.15 Ranking of Individual Community Hazards

Dunseith, Rolla, and St John	Mylo and Rolette
1. Flood	1. Flood
2. Wildland & Structure Fire	2. Severe Summer Weather
3. Severe Winter Weather	3. Severe Winter Weather
4. Severe Summer Weather	4. Wildland and Structure Fire
5. Cyberattack	5. Cyberattack
6. Infectious Disease	6. Infectious Disease
7. Drought	7. Drought
8. Hazardous Material	8. Hazardous Material
9. Dam Failure	9. Dam Failure
10. Space Weather	10. Space Weather
11. Terrorist/Criminal Attack	11. Terrorist/Criminal Attack
12. Geological Hazard	12. Geological Hazard
13. Civil Disturbance	13. Civil Disturbance
14. Transportation	14. Transportation

5. MITIGATION STRATEGY

Hazard mitigation, as defined by the Disaster Mitigation Act of 2000, is any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards. Studies on hazard mitigation show that for each dollar spent on mitigation, society saves an average of four dollars in avoided future losses. (Multi-Hazard Mitigation Council, 2005) Mitigation can take many different forms from construction projects to public education.

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 life and property (e.g., dams or levees). Second, are those which keep life and property away from the hazard (e.g., land use practices). Third, are those that do not address the hazard at all, but rather reduce the impact of the hazard on victims (e.g., insurance and warning systems).

Hazard mitigation measures must be practical, cost-effective, 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. If the cost of a flood control project exceeds the value of flood damages that could be prevented, community warning, evacuation, and other operational procedures may be the only available means of limiting the adverse impacts of a hazard. Such plans and procedures are not generally considered mitigation actions because they do nothing to reduce or limit the actual vulnerability of a community to a hazard; however, they may generate some savings in property losses or protect the population. For some hazards, there are no economic means of avoiding the effects of future damages, especially when it is virtually impossible to predict with any certainty the location, frequency, or severity of a hazard.

The primary focus of hazard mitigation actions must be at the point at which capital investment decisions are made. Capital investments, whether for homes, roads, public utilities, pipelines, power plants, chemical plants/warehouses, or public works, determine to a large extent the nature and degree of hazard vulnerability of a community. Accordingly, mechanisms such as zoning ordinances, which can be used to restrict new development in other high hazard areas, or building codes, which can ensure that new buildings are built to withstand the damaging forces or impacts of the hazards, are often the most useful mitigation approaches. The National Flood Insurance Program, for example, requires communities to adopt ordinances that control development and substantial improvements in floodplains as a condition for making flood insurance available in the community.

Once capital facilities are in place, very few opportunities will occur over the useful life of those facilities to correct any errors that may have been made in terms of their location or quality of construction with respect to hazard vulnerability. One opportunity that occasionally presents itself, however, is the instant depreciation of structures and facilities that accompanies the occurrence of a disaster. To replace damaged facilities, new capital

investment is required from such sources as insurance payments, governmental disaster assistance grants or loans, or other sources.

The development of a pre-disaster mitigation strategy allows TMBCI/Rolette County and the communities of Belcourt, Dunseith, St. John, Rolette, Rolla, and Mylo to create a vision for preventing future disasters, establish a common set of mitigation goals, prioritize actions, and evaluate the success of such actions. The mitigation strategy is based on the results of the risk assessment and recommendations by local officials and other stakeholders, including the public. The goals are broad, visionary, forward-looking statements that outline in general terms what the county and jurisdictions would like to accomplish. Goals are usually not measurable or fully attainable but rather ideals to which the county and communities should strive for as they develop and implement mitigation projects. The objectives link the goals and actions and help organize the plan for efficient implementation and evaluation.

All losses cannot be entirely mitigated, however, some actions can be taken, as funding and opportunities arise, that may reduce the impacts of disasters, thus, saving lives and property. Some mitigation actions were carried over from the TMBCI 2011 and the Rolette County 2019 Multi Hazard Mitigation Plans and new ones were added based on community input received. Others were eliminated because they are not considered mitigation, were deemed not cost-effective or feasible, or were completed. Projects identified by specific jurisdictions are listed with the name of the jurisdiction.

The framework of TMBCI/Rolette County's mitigation strategy has the following parts: purpose, goals, and objectives, which are defined as follows:

- The Purpose is an overarching philosophical or value statement regarding the primary function of the mitigation strategy.
- The Goals are broad and outline the overall direction of Rolette County and the TMBCI. Goals are usually not measurable or fully attainable but rather ideals to which the TMBCI and Rolette County and jurisdictions should strive for as they develop and implement mitigation projects.
- The Objectives link the goals and actions and help organize the plan for efficient implementation and evaluation.

5.1 Mitigation Purpose, Goals, and Objectives

The following is the overall hazard mitigation strategy for the TMBCI and Rolette County that includes a purpose statement, five goals, and multiple objectives.

Purpose: Minimize the vulnerability of the life and health of people, property, environment, and economy of Rolette County, TMBCI and their communities from the impacts of natural and technological hazards as well as adversarial threats.

2019 GOALS AND OBJECTIVES

Goal 1: Promote the use of mitigation measures that reduce the impacts of hazards.

Objective 1.1: Increase early warning capabilities.

Objective 1.2: Provide all hazards education on personal protection.

Objective1.3: Ensure the availability of First Responder Services to all Rolette County Citizens by providing the appropriate level of staffing, equipment, training, and coordination of services.

Objective 1.4: Reduce drifting snow and hazardous visibilities along key roadways.

Objective 1.5: Improve drainage in populated areas.

Objective 1.6: Improve roads and bridges to reduce losses on flood-prone roadways.

Objective 1.7: Construct and maintain sound flood control structures.

Objective 1.8: Store critical materials and supplies in the event of a shortage or outage.

Goal 2: Minimize losses from human-caused hazards.

Objective 2.1: Increase security at critical facilities.

Objective 2.2: Reduce the probability of large loss urban fire or structure collapses.

Objective 2.3: Improve the disaster resistance of new construction and improvements.

Objective 2.4: Protect critical infrastructure including water, electricity, storm sewer, sanitary sewer, and roads.

Objective 2.5: Designate hazardous materials transportation routes in Rolette County including the cities of Dunseith, St. John, Rolette, Rolla, and Mylo.

Goal 3: Save lives and reduce injuries.

Objective 3.1: Improve the disaster resistance of new construction and improvements including zoning and building construction code enforcement.

Objective 3.2: Raise awareness of personal mitigation activities through public education.

Objective 3.3: Reduce the probability of communicable Disease.

Goal 4: Protect the environment.

Objective 4.1: Prevent wildland fire ignitions and improve wildland fire response.

Objective 4.2: Monitor the storage, transportation, and use of Hazardous Materials.

Objective 4.3: Prevent environmental contamination including air, land, surface water, and ground water.

Goal 5: Work as a group in developing the Multi-Hazard Mitigation Plan to better the County.

Objective 5.1: Continue the Multi-Hazard Mitigation Planning Committee activities by meeting at least annually to review the Multi-Hazard Mitigation Plan and update the plan as necessary.

2023 GOALS AND OBJECTIVES

Goal 1: Promote the use of mitigation measures that reduce the impacts of hazards.

Objective 1.1: Increase early warning capabilities.

Objective 1.2: Provide all hazards education on personal protection.

Objective1.3: Ensure the availability of First Responder Services to all Rolette County and TMBCI Citizens by providing the appropriate level of staffing, equipment, training, and coordination of services.

Objective 1.4: Reduce drifting snow and hazardous visibilities along key roadways.

Objective 1.5: Improve drainage in populated areas.

Objective 1.6: Improve roads and bridges to reduce losses on flood-prone roadways.

Objective 1.7: Construct and maintain sound flood control structures.

Objective 1.8: Store critical materials and supplies in the event of a shortage or outage.

Goal 2: Minimize losses from human-caused hazards.

Objective 2.1: Increase security at critical facilities.

Objective 2.2: Reduce the probability of large loss urban fire or structure collapses.

Objective 2.3: Improve the disaster resistance of new construction and improvements.

Objective 2.4: Protect critical infrastructure including water, electricity, storm sewer, sanitary sewer, and roads.

Objective 2.5: Designate hazardous materials transportation routes in Rolette County including the cities of Dunseith, St. John, Rolette, Rolla, and Mylo.

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Objective 3.1: Improve the disaster resistance of new construction and improvements including zoning and building construction code enforcement.

Objective 3.2: Raise awareness of personal mitigation activities through public education.

Objective 3.3: Reduce the probability of communicable Disease.

Goal 4: Protect the environment.

Objective 4.1: Prevent wildland fire ignitions and improve wildland fire response.

Objective 4.2: Monitor the storage, transportation, and use of Hazardous Materials.

Objective 4.3: Prevent environmental contamination including air, land, surface water, and ground water.

Goal 5: Work as a group in developing the Multi-Hazard Mitigation Plan to better the County.

Objective 5.1: Continue the Multi-Hazard Mitigation Planning Committee activities by meeting at least annually to review the Multi-Hazard Mitigation Plan and update the plan as necessary.

5.2 Mitigation Actions

This section describes the intentions of Rolette County and the Turtle Mountain Band of Chippewa Indians to address county, tribal, and local vulnerabilities identified in the risk and capability assessments through specific mitigation actions that contribute to an overall mitigation strategy. Mitigation actions are specific activities that provide the detail on how Rolette County and TMBCI will accomplish identified objectives, and ultimately meet the mission and goals outlined in this plan. This section also reports on the status of previously identified mitigation actions as a measure of the progress that Rolette County and TMBCI are making toward its mitigation goals.

5.2.1 Evaluating 2010 Mitigation Actions

The updated Plan must identify the ongoing, completed, deleted, or deferred actions or activities from the previously approved Plan. It must also include any new actions identified since the previous Plan. The mitigation actions take into consideration the vulnerability and capability assessment, and are intended to address areas of high vulnerability or where capabilities should be strengthened. The Planning Team revisited the 2011 TMBCI and Rolette County 2019 mitigation actions during the planning process in 2022. The Planning Team was provided a summary table of the actions and instructed to provide a detailed status report including information on if the action was ongoing, completed, deferred, or should be deleted. The Planning team members validated or revised the TMBCI 2011 and Rolette County 2019 actions and then identified new mitigation actions for the plan.

A result of the action strategy update is a measure of progress towards meeting the Plan's goals. Table 5.2.1A below identifies the Rolette County mitigation objective title, action descriptions, and the 2022 status and status update. The 2011 TMBCI Hazard Mitigation Plan did not list clear defined mitigation goals, therefore the ID number in Table 5.2.1A corresponds with the 2022 Hazard Mitigation goals and objectives. The status update notes demonstrate that many of these actions are being implemented and helping to reduce future losses.

Table 5.2.1A: 2023 Status of Mitigation Actions from 2019 Rolette County Plan

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources	Project Status
1	Purchase mapping program	Flood, Severe Winter Storms, Severe Summer Storms, Shortage or Outage of Critical Materials, Communicable Disease, Wildland Fire, Urban Fire or Structure Collapse, Dam Failure, Hazardous Materials Release, Homeland Security Incident, Transportation Accident	Goal 1, Objective 1.3;	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	Rolette County 911 Coordinator and Emergency Manager	$2,000	911 Fees	Completed in 2020/21

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources	Project Status
2	Harden culverts into place	Flood, Severe Summer Storms	Goal 1, Objective 1.5; Goal 2, Objective 2.3, Objective 2.4	Rolette County	County Commission	$50,000	County funds, Mitigation Project funding	In progress, on-going
3	Train all first responders for hazardous materials awareness	Hazardous Materials Release	Goal 1, Objective 1.2; Goal 4, Objective 4.2	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	Emergency Manager	$15,000	Agency funding, County and City Commissions, Tribal Council	In progress, on-going
4	Plant living snow fences	Severe Winter Storms	Goal 1, Objective 1.4; Goal 2, Objective 2.4	Rolette County, TMBCI	County Commission	$25,000	ND Forestry Department, ND DOT, Mitigation Grant funding	In progress, on-going
5	Public awareness campaign of non-essential travel in winter weather	Severe Winter Storms	Goal 1, Objective 1.2; Goal 3, Objective 3.2	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	Emergency Manager, Sheriff's Department	Staff Time	County Commission, Tribal Council	In progress, on-going

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources	Project Status
6	Apply for grants for snow removal equipment for county and cities	Severe Winter Storms	Goal 1, Objective 1.4; Goal 2, Objective 2.4	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	County Commission	Staff time	County and City Commissions, Tribal Council, Mitigation Grant funding	In progress
7	Install 15 Warning sirens throughout the county and in each city.	Flood, Severe Winter Storms, Severe Summer Storms, Shortage or Outage of Critical Materials, Communicable Disease, Wildland Fire, Urban Fire or Structure Collapse, Dam Failure, Hazardous Materials Release, Homeland Security Incident	Goal 1, Objective 1.1	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	Emergency Manager, 911 Coordinator	$25,000	County and City Commissions, Tribal Council, Mitigation Grant funding	St. John and Peace Gardens are completed. Others are on-going.

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources	Project Status
8	Public awareness campaign to inform residents of the evacuation and shelter plan and locations also complete county exercise for plans	Flood, Severe Winter Storms, Severe Summer Storms, Shortage or Outage of Critical Materials, Communicable Disease, Wildland Fire, Urban Fire or Structure Collapse, Dam Failure, Hazardous Materials Release, Homeland Security Incident	Goal 1, Objective 1.2; Goal 3, Objective 3.2	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	Emergency Manager, Sheriff's Department	Staff Time	County Commission, Tribal Council	In progress, on-going

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources	Project Status
9	Public awareness campaign to make public aware of danger of unsupervised burning especially when burning bans have been issued and the fire index is high	Wildland Fire, Urban fire or Structure Collapse	Goal 1, Objective 1.2; Goal 3, Objective 3.2	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	Emergency Manager, Sheriff's Department, Fire Departments	Staff Time	County Commission, Tribal Council	Completed but an on-going process yearly.
10	Educate public about chemicals such as anhydrous ammonia and chlorine	Hazardous Materials	Goal 1, Objective 1.2; Goal 3, Objective 3.2; Goal 4, Objective 4.2	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	Emergency Manager, Sheriff's Department, Fire Departments	Staff Time	County Commission, Tribal Council	In progress, on-going
11	Education and outreach of the NFIP program to insurance agents, building permit office, and realtors in the county	Flood, Severe Summer Storms	Goal 1, Objective 1.2; Goal 3, Objective 3.2	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	Emergency Manager	Staff Time	County Commission, Tribal Council	In progress, on-going

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources	Project Status
12	Apply for fire grants to purchase updated equipment	Wildland Fire, Urban fire or Structure Collapse	Goal 1, Objective 1.3; Goal 2, Objective 2.2; Goal 2, Objective 2.4	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	Emergency Manager, Sheriff's Department	Staff Time	County Commission, Tribal Council	In progress by county fire departments yearly
13	Evaluate and assess capabilities of medical response and identify infrastructure and training needs, then implement the training needs	Communicable Disease, Homeland Security	Goal 1, Objective 1.3; Goal 3, Objective 3.3	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	Public Health, Emergency Manager,	Staff Time	County Commission, Tribal Council	In progress, on-going
14	Monitor dams Wakopa and Belcourt Lake during heavy rains and snowmelt	Dam Failure	Goal 1, Objective 1.7; Goal 2, Objective 2.4; Goal 4, Objective 4.4	Rolette County, TMBCI	Rolette County Water Board, Emergency Management	Staff Time	County Commission	In progress, on-going

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources	Project Status
15	Install Dry hydrants in Turtle Mountains that fire apparatus could refill tankers	Wildland Fire	Goal 1, Objective 1.3; Goal 2, Objective 2.4; Goal 4, Objective 4.1	Rolette County, TMBCI	Fire Departments located in Belcourt, Dunseith, and St. John	$10,000	County Commission, Tribal Council	In progress, on-going
16	Conduct an awareness campaign for individuals to prevent wildfire home damages	Wildland Fire	Goal 1, Objective 1.2; Goal 3, Objective 3.1, 3.2; Goal 3 Objective 4.1	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	Emergency Manager, All Fire Departments	Staff Time	County Commission, Tribal Council	In progress
17	Clean brush and trees on the outskirts of city to form firebreak	Wildland Fire	Goal 4; Objective 4.1	St. John	St. John City Council	$5,000	St. John City Council, ND Forestry Department	In progress

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources	Project Status
18	Install Security fence with motion sensor lighting to enclose city water tanks	Homeland Security, Communicable Disease	Goal 2, Objective 2.1	Cities of Dunseith, Mylo, Rolette, Rolla, and St. John TMBCI Reservation	City Councils of Dunseith, Mylo, Rolette, Rolla, and St. John TMBCI Tribal Council	$150,000	City Councils of Dunseith, Mylo, Rolette, Rolla, and St. John, Hazard Mitigation Grant funding TMBCI Tribal Council	In progress
19	Install generator hook-ups in 7 storm shelters at Peace Garden, Music Camp, Dunseith, 2 in Belcourt, Rolla, St. John.	Severe Summer Storm, Severe Winter Storm, Shortage or Outage of Critical Infrastructure	Goal 1, Objective 1.3	Cities of Dunseith, Mylo, Rolette, Rolla, and St. John, and International Peace Garden Staff TMBCI Tribal Council	City Councils of Dunseith, Mylo, Rolette, Rolla, and St. John TMBCI Tribal Council	$210,000	City Councils of Dunseith, Mylo, Rolette, Rolla, and St. John, International Peace Gardens, Hazard Mitigation Grant funding TMBCI Tribal Council	In progress
20	Install an 8” water main from the city water supply lines to each county airport.	Wildland Fire	Goal 1, Objective 1.3, Goal 4, Objective 4.1	Rolette and Rolla City Councils and Airport Authorities	Rolette and Rolla City Commissions and Airport Authorities	$500,000	Rolette and Rolla City Councils and Airport Authorities, Hazard Mitigation Grant funding	In progress

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources	Project Status
21	Install a 3" to 4.5" water hydrants at each county airport	Wildland Fire	Goal 1, Objective 1.3, Goal 4, Objective 4.1	Rolette and Rolla City Councils and Airport Authorities	Rolette and Rolla City Commissions and Airport Authorities	$30,000	Rolette and Rolla City Councils and Airport Authorities, Hazard Mitigation Grant funding	In progress
22	Install electronic Radar Speed Signs, solar powered	Transportation Accident	Goal 3, Objective 3.2; Goal 4, Objective 4.3	Cities of Dunseith, Mylo, Rolette, Rolla, and St. John, and International Peace Garden TMBCI Tribal Council	Cities of Dunseith, Mylo, Rolette, Rolla, and St. John, and International Peace Garden, TMBCI Tribal Council	Cost Share with ND DOT	ND DOT, City Councils of Dunseith, Mylo, Rolette, Rolla, and St. John, International Peace Gardens, Hazard Mitigation Grant funding,	TMBCI Tribal Council
23	Upgrade fire halls to house existing equipment	Wildland Fire, Urban Fire or Structure Collapse	Goal 1, Objective 1.3; Goal 2, Objective 2.2; Goal 4, Objective 4.1	All Fire Departments in the Cities of Dunseith, Mylo, Rolette, Rolla, and St. John. TMBCI Tribal Council	All Fire Departments in the Cities of Dunseith, Mylo, Rolette, Rolla, and St. John, TMBCI Tribal Council	$15,000,000	City Councils and Fire Departments in the Cities of Dunseith, Mylo, Rolette, Rolla, and St. John, TMBCI Tribal Council	Dunseith Fire and EMS has completed this project. The other eight fire departments are in progress.

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources	Project Status
24	Designate hazardous materials transportation routes in Rolette County including the cities of Belcourt, Dunseith, St. John, Rolette, Rolla, and Mylo.	Hazardous Materials Incident	Goal 2, Objective 2.5; Goal 4, Objective 4.2, 4.3	Cities of Dunseith, Mylo, Rolette, Rolla, and St. John, TMBCI Tribal Council	City Councils of Dunseith, Mylo, Rolette, Rolla, and St. John, Rolette County Emergency Management TMBCI Tribal Council	$10,000	City Councils of Dunseith, Mylo, Rolette, Rolla, and St. John, TMBCI Tribal Council and Rolette County Commission	Delete.
25	Purchase Water rescue equipment (jet skis, emergency response units)	Flood	Goal 1, Objective 1.3	Belcourt Fire Department, TMBCI Tribal Council	Belcourt Fire Department TMBCI Tribal Council	$500,000	Belcourt Fire Department TMBCI Tribal Council	Completed by Belcourt Fire Department TMBCI Tribal Council
26	Conduct a Public Awareness Campaign of AED and other medical supply locations	Communicable Disease	Goal 1, Objective 1.2; Goal 3, Objective 3.2	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	Public Health	Staff time	Public Health	In progress

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources	Project Status
27	Install an elevator at the storm shelter for handicapped Music Camp Campers and visitors at the International Peace Garden	Severe Summer Weather	Goal 1, Objective 1.3	International Peace Gardens and International Music Camp	International Peace Gardens and International Music Camp	$50,000 Hydraulic elevators have an average cost of $20,000 - $30,000 for the elevator itself, with installation pushing the total cost to around $40,000 - $45,000.	International Peace Gardens and International Music Camp	RTLE, Memorial Hall done. Others to be identified, therefore in progress
28	Construct or modify existing airplane hangars so they can be heated for cold weather wildland fire suppression	Wildland Fire	Goal 1, Objective 1.3; Goal 4, Objective 4.1	Rolette and Rolla City Councils and Airport Authorities	Rolette and Rolla City Commissions and Airport Authorities	$200,000	Rolette and Rolla City Councils and Airport Authorities, Hazard Mitigation Grant funding	In Progress

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources	Project Status
29	Hire a consultant to develop a Community Wildfire Protective Plan	Wildland Fire	Goal 1, Objective 1.2, 1.3; Goal 4, Objective 4.1	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	Emergency Management	$30,000	County Commission, Tribal Council, Hazard Mitigation Grant	In progress
30	Purchase and install a new county radio repeater and equipment for radio tower when the Statewide Interoperable Radio Network goes into effect	Flood, Severe Winter Storms, Severe Summer Storms, Shortage or Outage of Critical Materials, Communicable Disease, Wildland Fire, Urban Fire or Structure Collapse, Dam Failure, Hazardous Materials Release, Homeland Security Incident, Transportation Accident	Goal, Objective 1.3	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	Rolette County 911 Coordinator, Sheriff, and Emergency Manager	$150,000	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John, Hazard Mitigation Grant	Completed in 2020/21

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources	Project Status
31	Stockpile county emergency provisions such as food, water, general medical supplies, blankets, cots for 1,000 people placed in shelters or instructed to shelter in place	Flood, Severe Winter Storms, Severe Summer Storms, Shortage or Outage of Critical Materials, Communicable Disease, Wildland Fire, Urban Fire or Structure Collapse, Dam Failure, Hazardous Materials Release, Homeland Security Incident, Transportation Accident	Goal 1, Objective 1.3; Goal 3, Objective 3.3	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	Emergency Manager	$200,000	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	Completed

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources	Project Status
32	Establish a cyber security program for 911 communications with alternate carriers using United Telephone, Midco, Verizon, ATT, and SRT as backups in case the main network is breached	Flood, Severe Winter Storms, Severe Summer Storms, Shortage or Outage of Critical Materials, Communicable Disease, Wildland Fire, Urban Fire or Structure Collapse, Dam Failure, Hazardous Materials Release, Homeland Security Incident, Transportation Accident	Goal 1, Objective 1.3	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	911 Coordinator	$50,000	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John, and United Telephone, Midco, Verizon, ATT, and SRT	Completed by Rolette County 911 but in on going for other entities

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources	Project Status
33	Establish a cache of mass casualty medical supplies.	Flood, Severe Winter Storms, Severe Summer Storms, Shortage or Outage of Critical Materials, Communicable Disease, Wildland Fire, Urban Fire or Structure Collapse, Dam Failure, Hazardous Materials Release, Homeland Security Incident, Transportation Accident	Goal 1, Objective 1.3; Goal 3, Objective 3.3	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	Emergency Manager	$200,000	Rolette County, TMBCI, Cities of, Dunseith, Mylo, Rolette, Rolla, and St. John, TMBCI Tribal Council	Rolette County Public Health is working on this project, therefore is on going

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources	Project Status
34	Identify locations of drainage issues in communities for mosquito control and establish proper drainage.	Communicable Disease	Goal 1, Objective 1.3; Goal 3, Objective 3.2, 3.3	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	Emergency Manager and Public Health	$20,000	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John, TMBCI Tribal Council	In progress
35	Establish a Firewise Program	Wildland Fire	Goal 1, Objective 1.1, 1.3; Goal 2, Objective 2.4; Goal 3, Objective 3.2; Goal 4, Objective 4.1	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	Emergency Manager	$1,00000	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	In progress
36	Implement a West Nile Virus Awareness Campaign	Communicable Disease	Goal 1, Objective 1.2; Goal 3, Objective 3.2, 3.3	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	Emergency Manager, Public Health	Staff Time	Rolette County, TMBCI, Cities of, Dunseith, Mylo, Rolette, Rolla, and St. John	In progress

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources	Project Status
37	Conduct a water conservation awareness program	Drought, Shortage or Outrage of Critical Materials	Goal 1, Objective 1.2; Goal 3, Objective 3.2; Goal 4, Objective 4.3	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	Emergency Manager, Public Works, Rural Water	Staff Time	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	In progress
38	Assess roads that are subject to landslide or slumping damages and make necessary repairs	Geologic Hazards, Transportation Accidents	Goal 1, Objective 1.6; Goal 2, Objective 2.3, 2.4	Rolette County and TMBCI	County Commissioners	Staff Time	Rolette County and Turtle Mountain Band of Chippewa Indians Reservation	In progress
39	Evaluate the status of Building Codes	Flood, Severe Winter Storms, Severe Summer Storms, Wildland Fire, Urban Fire or Structure Collapse	Goal 2, Objective 2.2, 2.3; Goal 3, Objective 3.1	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	Emergency Manager	Staff Time	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	In progress. County Auditor and City Auditors, completed on the TMBCI Reservation

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources	Project Status
40	Evaluate zoning ordinances in the county and in the cities	Flood, Wildland Fire, Urban Fire or Structure Collapse, Dam Failure, Hazardous Materials Release	Goal 2, Objective 2.2; Goal 3, Objective 3 .1; Goal 4, Objective 4.1, 4.2	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	Emergency Manager	Staff Time	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	In progress County Auditor and City Auditors
41	Purchase and equip an Incident Command trailer	Flood, Severe Winter Storms, Severe Summer Storms, Wildland Fire, Urban Fire or Structure Collapse, Dam Failure, Hazardous Materials Release, Homeland Security Incident, Transportation Accident	Goal 1, Objective 1.3	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	Emergency Manager	$200,000	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	In progress

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources	Project Status
42	Obtain supplies for established shelters	Flood, Severe Winter Storms, Severe Summer Storms, Wildland Fire, Urban Fire or Structure Collapse, Dam Failure, Hazardous Materials Release, Homeland Security Incident, Transportation Accident	Goal 1, Objective 1.8	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	Emergency Manager	$150,000	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	Completed
43	Construct an Indoor Shooting Range for law enforcement	Homeland Security	Goal 1, Objective 1.3; Goal 2, Objective 2.1	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	Sheriff's Office	$2,000,000	Homeland Security Grant	In progress

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources	Project Status
44	Conduct training for Law Enforcement Officers and instructors in the indoor shooting range	Homeland Security	Goal 1, Objective 1.3; Goal 2, Objective 2.1	Rolette County, TMBCI, Cities of Dunseith, Mylo, Rolette, Rolla, and St. John	Sheriff's Office	$200,000	Homeland Security Grant	In progress
45	Establish a Fire Department at the International Peace Gardens and equip with 2 Brush Units 1 2,000 gallon water tender, plus equipment, PPE's, and a fire station	Wildland Fire; Urban Fire, Structure Collapse	Goal 1, Objective 1.3; Goal 2, Objective 2.1, 2.2	Rolette County, TMBCI	Rolette County Emergency Manager	$900,000	SAFER Grant, Multi-Hazard Mitigation Grant	In progress, had a meeting with Port Authorities in the spring of 2022
46	Training for the Peace Garden Volunteer Fire Department Volunteers	Wildland Fire; Urban Fire, Structure Collapse	Goal 1, Objective 1.3; Goal 2, Objective 2.1, 2.2	Rolette County, TMBCI	Rolette County Emergency Manager	$100,000	SAFER Grant, Multi-Hazard Mitigation Grant	In progress

The table below represents the Multi Hazard Mitigation Projects developed in 2011 by the Turtle Mountain Band of Chippewa Indians and the status of the projects.

ID #	Action (Project)	Hazard Mitigated	Project Status
1	Amend and strengthen zoning and building codes	Flood, Severe Summer Weather, Severe Winter Weather, Fire	On going
2	Regulate future development in SFHA	Flood	On going
3	Adopt Floodplain Ordinance	Flood	Completed
4	Place stream gauges along Ox Creek	Flood	Completed
5	Develop all hazard warning system; warning and sirens and integrate social media	Flood, Severe Summer Weather, Fire, Dam Failure, Hazardous Materials Release	On going
6	Bury power lines	Severe Summer Weather, Severe Winter Weather	Delete
7	Purchase a sandbag filler	Flood, Dam Failure	Completed
8	Purchase safety equipment: SCBA, Combustible Gas Indicator	Hazardous Material Release, Flood, Fire	Completed but necessary to update and replace equipment as needed.
9	Provide training for first responders; OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) training	Hazardous Materials Release	On going

ID #	Action (Project)	Hazard Mitigated	Project Status
10	Create a Tribal Hazard Mitigation Officer position to monitor projects	All Hazardous	Deleted – Not feasible as entities with mitigation complete their own projects. Will eventually become a duty under the Tribal Emergency Manager (to monitor for reporting purposes only)
11	Standardize GIS data and establish GIS database warehouse	All Hazardous	Completed
12	Acquire or relocate structures in high hazard areas	Flood, Fire, Hazardous Materials Release	On going
13	Install beaver deceivers at the mouth of each culvert	Flood	Completed but is On going
14	Anchor propane tanks	Hazardous Materials Release, Flood, Severe Summer Weather, Dam Failure	Delete
15	Anchor mobile homes	Severe Summer Weather	Delete

ID #	Action (Project)	Hazard Mitigated	Project Status
16	Encourage defensible space within WUI	Fire	On going
17	Acquire enclosed snow cat for rural access in extreme weather.	Severe Winter Weather	Completed
18	Implement a public awareness campaign focused on mitigation strategies for community residents	All Hazardous	On going
19	Implement SKYWARN – Weather Spotters	Severe Summer Weather	On going
19	Implement the Firewise Program	Fire	On going
20	Promote the NFIP and increase the number of policy holders	Flood, Dam Failure	Delete – Not feasible (residents want the tribe to pay for their insurance if we are recommending it) Insurance agents would do this.
21	Participate in NWS Storm Ready Program – Weather Safety	Severe Summer Weather, Severe Winter Weather	On going
22	Plant living snow fences	Severe Winter Weather	Future project
23	Create shelter belts	Severe Winter Weather	Future project
24	Build a retention pond for Ox Creek overflow	Flood	Future project
25	Remove debris and vegetation from Ox Creek	Flood	Completed but is on going
26	Acquire hazmat cleanup equipment, road barriers, and response trailer	Hazardous Materials Release	On going

ID #	Action (Project)	Hazard Mitigated	Project Status
27	Replacement dam embankment	Dam Failure, Flood	Completed in 2017
28	Construct community safe room/evacuation center	Severe Summer Weather, Severe Winter Weather, Flood, Dam Failure, Fire, Hazardous Materials, Cyber Attack, Space Weather	On going
29	Retrofit older tribal buildings	Fire	On going
30	Build new fire station further from floodplain	Fire, Flood	In Progress, future project
31	Replace culverts along Ox Creek to manage stream flow	Flood	Tribal culverts completed. State Highway still left to complete

5.2.2, 2023 Mitigation Actions

A number of new actions and revisions to ongoing actions were identified during the 2023 planning process and are identified in the Table 5.2.2A below with the action description, hazard mitigated, the goal & objective ID, affected jurisdictions, the lead agency, the coordinating agencies, potential funding sources, cost and implementation timeframe. The actions were given an Action ID # for tracking purposes and are listed in order of the primary goal and objective they are designed to help achieve. The related goal and objective are also indicative of how each action contributes to the overall mitigation strategy. The Implementation Timeframe column indicates that many of the recommended mitigation actions can be implemented in the short term while others must be viewed as long-term measure. Although some of these projects may not be eligible for FEMA funding, the TMBCI and Rolette County may secure alternate funding sources to implement these projects in the future.

This list is designed to give the TMBCI and Rolette County a tool in project management and coordination. During the risk analysis phase of the multi-hazard mitigation plan, the emergency managers have the lead in coordinating with all appropriate agencies to facilitate the planning process; however, once a hazard has been identified for mitigation, the emergency managers step back from the leadership role and will assume the role of team participant. The lead role in project development shifts to the tribal or county department or jurisdiction responsible for project management, such as the Road department. TMBCI, Rolette County and city officials have been through many disaster declarations in the past ten years. Through the response and recovery process they have become experts in determining the potential impact of many of the categories involved. Support was given by the North Dakota Department of Emergency Services, as well as consulting with neighboring counties to determine the most appropriate course of action.

The projects are divided into three catagories, joint projects to be completed by both Rolette County and TMBCI, Rolette County projects, and TMBCI projects.

Table 5.2.2A Joint Projects, Rolette County and TMBCI

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources
1	Harden culverts into place	Flood, Severe Summer Storms	Goal 1, Objective 1.5; Goal 2, Objective 2.3, Objective 2.4	Rolette County and TMBCI	County Commission and TMBCI Road Department	$50,000	County funds, Tribal Funds, Mitigation Project funding
2	Train all first responders for hazardous materials awareness and Hazwopper where appropriate	Hazardous Materials Release	Goal 1, Objective 1.2; Goal 4, Objective 4.2	Rolette County, TMBCI, communities of Dunseith, Mylo, Rolette, Rolla, and St. John	Emergency Managers	$15,000	Agency funding, County and City Commissions, Tribal Council
3	Plant living snow fences and shelter belts for snow retention	Severe Winter Storms	Goal 1, Objective 1.4; Goal 2, Objective 2.4	Rolette County, TMBCI	County Commission, TMBCI Natural Resources	$25,000	ND Forestry Department, ND DOT, Mitigation Grant funding

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources
4	Public awareness campaign of non-essential travel in winter weather	Severe Winter Storms	Goal 1, Objective 1.2; Goal 3, Objective 3.2	Rolette County, TMBCI, communities of Dunseith, Mylo, Rolette, Rolla, and St. John	Emergency Managers, Sheriff's Department, Bureau of Indian Affairs/TMBCI Law Enforcement, KEYA Radio, Rolette County Facebook Page	Staff Time	County Commission, Tribal Council
5	Apply for grants for snow removal equipment for county, communities, and TMBCI Roads	Severe Winter Storms	Goal 1, Objective 1.4; Goal 2, Objective 2.4	Rolette County, TMBCI, Communities of Dunseith, Mylo, Rolette, Rolla, and St. John	County Commission, TMBCI Road Department	Staff time	County and City Commissions, Tribal Council, Mitigation Grant funding

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources
6	Public awareness campaign to inform residents of the evacuation and shelter plan and locations also complete county and tribal exercise for plans	Flood, Severe Winter Storms, Severe Summer Storms, Shortage or Outage of Critical Materials, Communicable Disease, Wildland Fire, Urban Fire or Structure Collapse, Dam Failure, Hazardous Materials Release, Homeland Security Incident	Goal 1, Objective 1.2; Goal 3, Objective 3.2	Rolette County, TMBCI, communities of Dunseith, Mylo, Rolette, Rolla, and St. John, K	Emergency Managers, Sheriff's Department	Staff Time	County Commission, Tribal Council

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources
7	Public awareness campaign to make public aware of danger of unsupervised burning especially when burning bans have been issued and the fire index is high	Wildland Fire, Urban fire or Structure Collapse	Goal 1, Objective 1.2; Goal 3, Objective 3.2	Rolette County, TMBCI, Communities of Dunseith, Mylo, Rolette, Rolla, and St. John, KEYA Radio, Rolette County Facebook Page	Emergency Manager, Sheriff's Department, Fire Departments	Staff Time	County Commission, Tribal Council
8	Educate public about chemicals such as anhydrous ammonia and chlorine	Hazardous Materials	Goal 1, Objective 1.2; Goal 3, Objective 3.2; Goal 4, Objective 4.2	Rolette County, TMBCI, Communities of Dunseith, Mylo, Rolette, Rolla, and St. John	Emergency Manager, Sheriff's Department, Fire Departments	Staff Time	County Commission, Tribal Council

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources
9	Education and outreach of the NFIP program to insurance agents, building permit office, and realtors in the county	Flood, Severe Summer Storms	Goal 1, Objective 1.2; Goal 3, Objective 3.2	Rolette County, TMBCI, Communities of Dunseith, Mylo, Rolette, Rolla, and St. John	Emergency Manager	Staff Time	County Commission, Tribal Council
10	Apply for fire grants to purchase updated equipment	Wildland Fire, Urban fire or Structure Collapse	Goal 1, Objective 1.3; Goal 2, Objective 2.2; Goal 2, Objective 2.4	Rolette County, TMBCI, Communities of Dunseith, Mylo, Rolette, Rolla, and St. John	Emergency Manager, Sheriff's Department, Fire Departments	Staff Time	County Commission, Tribal Council

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources
11	Evaluate and assess capabilities of medical response and identify infrastructure and training needs, then implement the training needs	Communicable Disease, Homeland Security	Goal 1, Objective 1.3; Goal 3, Objective 3.3	Rolette County, TMBCI, Communities of Dunseith, Mylo, Rolette, Rolla, and St. John	Rolette County Public Health, IHS/TMBCI Public Health, Emergency Managers,	Staff Time	County Commission, Tribal Council
12	Monitor dams Wakopa and Belcourt Lake during heavy rains and snowmelt	Dam Failure	Goal 1, Objective 1.7; Goal 2, Objective 2.4; Goal 4, Objective 4.4	Rolette County, TMBCI	Rolette County Water Board, TMBCI Natural Resources, Emergency Management	Staff Time	County Commission, Tribal Council

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources
13	Install Dry hydrants in Turtle Mountains that fire apparatus could refill tankers	Fire	Goal 1, Objective 1.3; Goal 2, Objective 2.4; Goal 4, Objective 4.1	Rolette County, TMBCI	Fire Departments located in Belcourt, Dunseith, and St. John	$10,000	County Commission, Tribal Council
14	Conduct an awareness campaign for individuals to prevent wildfire home damages by establishing defensible space within WUI	Fire	Goal 1, Objective 1.2; Goal 3, Objective 3.1, 3.2; Goal 3 Objective 4.1	Rolette County, TMBCI, Communities of Dunseith, Mylo, Rolette, Rolla, and St. John	Emergency Managers, All Fire Departments, TMBCI Natural Resources	Staff Time	County Commission, Tribal Council

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources
15	Install generator hook-ups in 7 storm shelters at International Peace Garden, Music Camp, Dunseith, 2 in Belcourt, Rolla Fire Department /City Hall, St. John Senior Center, Rolette Memorial Hall, and install generators.	Severe Summer Storm, Severe Winter Storm, Space Weather	Goal 1, Objective 1.3	Communities of Dunseith, Mylo, Rolette, Rolla, and St. John, and International Peace Garden Staff, TMBCI Tribal Council	City Councils of Dunseith, Mylo, Rolette, Rolla, and St. John and TMBCI Emergency Manager	$210,000	City Councils of Dunseith, Mylo, Rolette, Rolla, and St. John, TMCI Tribal Council, International Peace Gardens, Hazard Mitigation Grant funding

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources
16	Install electronic Radar Speed Signs, solar powered	Transportation Accident	Goal 3, Objective 3.2; Goal 4, Objective 4.3	Communities of Dunseith, Mylo, Rolette, Rolla, and St. John, TMBCI Tribal Council and International Peace Garden	Communities of Dunseith, Mylo, Rolette, Rolla, and St. John, and International Peace Garden, and TMBCI Law Enforcement, TMBCI Road Department	Cost Share with ND DOT	ND DOT, City Councils of Dunseith, Mylo, Rolette, Rolla, and St. John, , International Peace Gardens, TMBCI, Hazard Mitigation Grant funding
17	Upgrade fire halls to house existing equipment	Fire	Goal 1, Objective 1.3; Goal 2, Objective 2.2; Goal 4, Objective 4.1	All Fire Departments in the Communities of Mylo, Rolette, Rolla, and St. John, Belcourt, TMBCI Tribal Council	All Fire Departments in the communities of Belcourt, Mylo, Rolette, Rolla, and St. John	$15,000,000	City Councils and Fire Departments in the Communities of Belcourt, Dunseith, Mylo, Rolette, Rolla, and St. John

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources
18	Support Belcourt's completed project or purchase and maintain Water rescue equipment (jet skis, emergency response units)	Flood	Goal 1, Objective 1.3	TMBCI, Rolette County	Emergency Managers of Rolette County and TMBCI	$500,000	Fire Departments in the Communities of Mylo, Rolette, Rolla, and St. John, TMBCI Tribal Council
19	Conduct a Public Awareness Campaign of AED and other medical supply locations	Communicable Disease	Goal 1, Objective 1.2; Goal 3, Objective 3.2	Rolette County, TMBCI, communities of Belcourt, Dunseith, Mylo, Rolette, Rolla, and St. John	Rolette County Public Health, IHS/TMBCI Public Health	Staff time	Public Health

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources
20	Hire a consultant to develop a Community Wildfire Protective Plan	Fire	Goal 1, Objective 1.2, 1.3; Goal 4, Objective 4.1	Rolette County, TMBCI, communities of Dunseith, Mylo, Rolette, Rolla, and St. John	Rolette County and TMBCI Emergency Management Departments	$30,000	County Commission, Tribal Council, Hazard Mitigation Grant
21	Establish a cyber security program for 911 communications with alternate carriers using United Telephone, Midco, Verizon, ATT, and SRT as backups in case the main network is breached	Flood, Severe Winter Storms, Severe Summer Storms, Shortage or Outage of Critical Materials, Communicable Disease, Wildland Fire, Urban Fire or Structure Collapse, Dam Failure, Hazardous	Goal 1, Objective 1.3	Rolette County, TMBCI, communities of Dunseith, Mylo, Rolette, Rolla, and St. John	911 Coordinator	$50,000	Rolette County, TMBCI, communities of Dunseith, Mylo, Rolette, Rolla, and St. John, and United Telephone, Midco, Verizon, ATT, and SRT

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources
		Materials Release, Homeland Security Incident, Transportation Accident					
22	Establish a cache of mass casualty medical supplies.	Flood, Severe Winter Storms, Severe Summer Storms, Communicable Disease, Fire, Urban Fire or Structure Collapse, Dam Failure, Hazardous Materials Release, Homeland Security Incident, Transportation Accident	Goal 1, Objective 1.3; Goal 3, Objective 3.3	Rolette County, TMBCI, communities of Dunseith, Mylo, Rolette, Rolla, and St. John	Rolette County and TMBCI Emergency Managers	$200,000	Rolette County, TMBCI, Communities of Dunseith, Mylo, Rolette, Rolla, and St. John

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources
23	Identify locations of drainage issues in communities for mosquito control and establish proper drainage.	Communicable Disease	Goal 1, Objective 1.3; Goal 3, Objective 3.2, 3.3	Rolette County, TMBCI, communities of Dunseith, Mylo, Rolette, Rolla, and St. John	Rolette County and TMBCI Emergency Managers, and Rolette County/ IHS/TMBCI Public Health	$20,000	Rolette County, TMBCI, Communities of Dunseith, Mylo, Rolette, Rolla, and St. John
24	Establish a Firewise Program	Fire	Goal 1, Objective 1.1, 1.3; Goal 2, Objective 2.4; Goal 3, Objective 3.2; Goal 4, Objective 4.1	Rolette County, TMBCI, communities of Dunseith, Mylo, Rolette, Rolla, and St. John	Rolette County and TMBCI Emergency Managers, TMBCI Fire Department	$1,000	Rolette County, TMBCI, communities of Dunseith, Mylo, Rolette, Rolla, and St. John

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources
25	Implement a West Nile Virus Awareness Campaign	Communicable Disease	Goal 1, Objective 1.2; Goal 3, Objective 3.2, 3.3	Rolette County, TMBCI, communities of Dunseith, Mylo, Rolette, Rolla, and St. John	Rolette County and TMBCI Emergency Managers, and Rolette County/ IHS/TMBCI Public Health	Staff Time	Rolette County, TMBCI, Communities of Dunseith, Mylo, Rolette, Rolla, and St. John
26	Conduct a water conservation awareness program	Drought, Shortage or Outrage of Critical Materials	Goal 1, Objective 1.2; Goal 3, Objective 3.2; Goal 4, Objective 4.3	Rolette County, TMBCI, Communities of Dunseith, Mylo, Rolette, Rolla, and St. John, TMBCI Tribal Council	Rolette County and TMBCI Emergency Managers, Public Works, Rural Water, TMBCI Natural Resources	Staff Time	Rolette County, TMBCI, Communities of Dunseith, Mylo, Rolette, Rolla, and St. John
27	Assess roads that are subject to landslide or slumping damages and make necessary repairs	Geologic Hazards, Transportation Accidents	Goal 1, Objective 1.6; Goal 2, Objective 2.3, 2.4	Rolette County and TMBCI	County Commissioners, TMBCI Road Department	Staff Time	Rolette County and TMBCI

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources
28	Update Building Codes	Flood, Severe Winter Storms, Severe Summer Storms, Fire	Goal 2, Objective 2.2, 2.3; Goal 3, Objective 3.1	Rolette County, TMBCI, Communities of Belcourt, Dunseith, Mylo, Rolette, Rolla, and St. John	Rolette County and TMBCI Emergency Managers, TMBCI TERO Department, TMBCI Housing Authority, TMBCI Law and Policy Department	Staff Time	Rolette County, TMBCI, Communities of Belcourt, Dunseith, Mylo, Rolette, Rolla, and St. John
29	Update zoning ordinances in the county, on Tribal Lands, and in the communities concentrating on SFHA	Flood, Fire, Dam Failure, Hazardous Materials Release	Goal 2, Objective 2.2; Goal 3, Objective 3 .1; Goal 4, Objective 4.1, 4.2	Rolette County, TMBCI, Communities of Dunseith, Mylo, Rolette, Rolla, and St. John	Rolette County and TMBCI Emergency Managers, TMBCI TERO Department, tMBCI Housing Authority, TMBCI Law and Policy Department	Staff Time	Rolette County, TMBCI, Communities of Dunseith, Mylo, Rolette, Rolla, and St. John

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources
30	Purchase and equip an Incident Command trailer	Flood, Severe Winter Storms, Severe Summer Storms, Wildland Fire, Urban Fire or Structure Collapse, Dam Failure, Hazardous Materials Release, Homeland Security Incident, Transportation Accident	Goal 1, Objective 1.3	Rolette County, TMBCI, Communities of Dunseith, Mylo, Rolette, Rolla, and St. John	Emergency Manager	$200,000	Rolette County, TMBCI, Communities of Dunseith, Mylo, Rolette, Rolla, and St. John

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources
31	Develop all hazard warning system; warning and install 15 warning sirens and integrate social media	Flood, Severe Summer Weather, Fire, Dam Failure, Hazardous Materials Release	Goal; 1. Objective 1.1	Rolette County, TMBCI, communities of Dunseith, Mylo, Rolette, Rolla, and St. John	County and TMBCI Emergency Managers, 911 Coordinator	$25,000 to $50,000 per siren	Multi Hazard Mitigation Grants
32	Install beaver deceivers at the mouth of each culvert vulnerable to being dammed up by beavers.	Flood	Goal 1, Objective 1.5, 1.6, 1.7 Goal 2, Objective 2.4	Rolette County, TMBCI, communities of Dunseith, Mylo, Rolette, Rolla, and St. Jo	TMBCI Road Department, Rolette County Road Supervisor, TMBCI Natural Resources Department	$10,000	Multi Hazard Mitigation Grant
33	Conduct an awareness campaign to encourage people to anchor propane tanks	Hazardous Materials Release, Flood, Severe Summer Weather, Dam Failure	Goal 1, Objective 1.2 Goal 3, Objective 3.2	Rolette County, TMBCI, communities of Dunseith, Mylo, Rolette, Rolla, and St. John	Rolette County and TMBCI Emergency Managers, KEYA Radio	$1,000	Tier II Funds

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources
34	Conduct an awareness campaign to encourage people to Anchor mobile homes	Severe Summer Weather	Goal 1, Objective 1.2 Goal 3, Objective 3.2	Rolette County, TMBCI, communities of Dunseith, Mylo, Rolette, Rolla, and St. John	Rolette County and TMBCI Emergency Managers, KEYA Radio	$1,000	
35	Implement a public awareness campaign focused on mitigation strategies for community residents	All Hazards	Goal 1, Objective 1.2 Goal 3, Objective 3.2	Rolette County, TMBCI, communities of Dunseith, Mylo, Rolette, Rolla, and St. John	Rolette County and TMBCI Emergency Managers, KEYA Radio	$ 0, Staff time	
36	Implement SKYWARN Weather Spotters	Severe Summer Weather	Goal 1, Objective 1.1, 1.2, Goal 3, Objective 3.2	Rolette County, TMBCI, communities of Belcourt, Dunseith, Mylo, Rolette, Rolla, and St. John	Rolette County and TMBCI Emergency Managers, KEYA Radio	$ 0	

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources
37	Conduct an awareness campaign to promote the NFIP and increase the number of policy holders	Flood, Dam Failure	Goal 1, Objective 1.2 Goal 3, Objective 3.2	Rolette County, TMBCI, communities of Dunseith, Mylo, Rolette, Rolla, and St. John	Rolette County and TMBCI Emergency Managers, Insurance Agencies	$ 0	
38	Participate in NWS Storm Ready Program – Weather Safety	Severe Summer Weather, Severe Winter Weather	Goal 1, Objective 1.2 Goal 3, Objective 3.2	Rolette County, TMBCI, communities of Dunseith, Mylo, Rolette, Rolla, and St John	Rolette County and TMBCI Emergency Managers	$1,000	Funding from affected jurisdiction

ID #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources
39	Construct community safe room/evacuation center, combine storm shelters and shelter in place.	Severe Summer Weather, Severe Winter Weather, Flood, Dam Failure, Fire, Hazardous Materials, Cyber Attack, Space Weather	Goal 1, Objective 1.1, 1.2	TMBCI, Communities of Dunseith, Mylo, Rolette, Rolla, and St John, International Music Camp	Rolette County and TMBCI Emergency Managers, International Music Camp Staff	$150,000	Hazard Mitigation funding
40	Clear vegetation at road intersections	Transportation	Goal 2, Objective 2.4	Rolette County, TMBCI	TMBCI and Rolette County Road Department ND DOT	$25,000	Multi Hazard Mitigation Grant, ND DOT