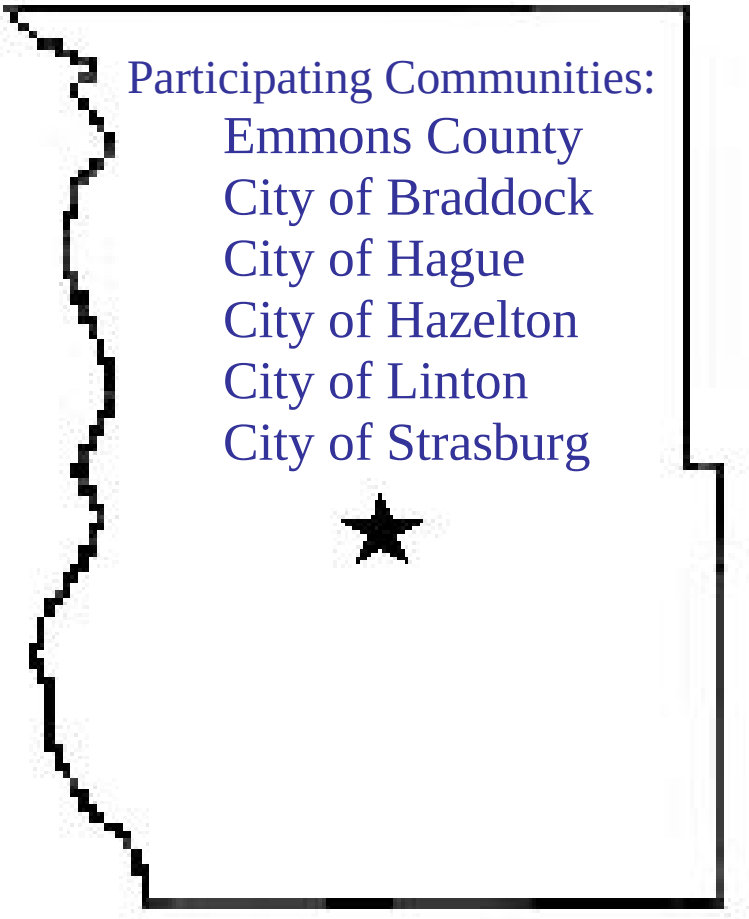
Emmons County
Multi-Hazard Mitigation Plan



FEMA Approved: (Insert Date)

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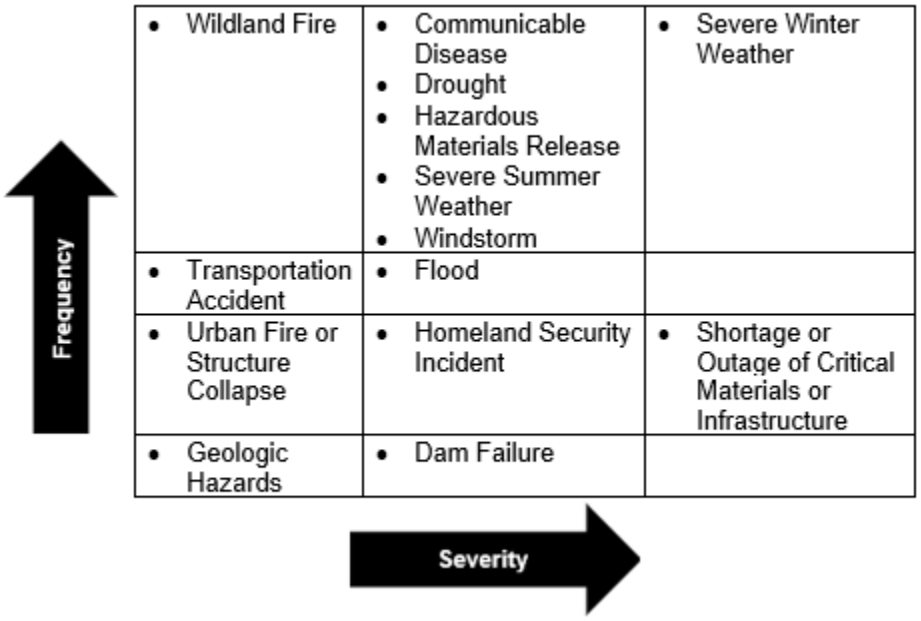
Executive Summary

The Emmons County Multi-Jurisdictional Multi-Hazard Mitigation Plan (MHMP) was originally developed and approved by the Federal Emergency Management Agency (FEMA) in 2003 and subsequently approved in 2010 and 2015 to address the needs of the community of Emmons County and the five incorporated cities: Braddock, Hague, Hazelton, Linton and Strasburg. The communities of Kintyre, Temvick, and Westfield are unincorporated cities and fall under the jurisdiction of Emmons County.

The purpose of the plan is an effort to reduce loss of life and property by lessening the impact of disasters. The planning process involves multiple elements with the two main elements being:

- Hazard Identification and Risk Assessment
- Mitigation Strategies

The14 hazards were ranked by the planning team and communities utilizing the Risk Analysis Worksheet:



Associated with each hazard are mitigation strategies that can be done at a local level.

Emmons County completed step one of the Threat and Hazard Identification and Risk Assessment in 2013 with 9 responses. The survey responses closely correlated with the Risk Analysis. Step 2 was completed in 2015, and steps 3-4 were completed in 2020.

The Emmons County Multi-Hazard Mitigation Plan meets the requirements and procedures for a local mitigation plan as found in the Code of Federal Regulations (CFR), Title 44, Chapter 1, Part 201 (44 CFR Part 201).

Table of Contents

Page

Adoption

The jurisdictions in the Emmons County Multi-Hazard Mitigation Plan (MHMP): Emmons County and the incorporated cities of Braddock, Hague, Hazelton, Linton, and Strasburg adopt the plan as submitted to the ND Department of Emergency Services and the Federal Emergency Management Agency (FEMA).

Emmons County

City of Braddock

City of Hague

City of Hazelton

City of Linton

City of Strasburg

Introduction

Purpose: Reduce the vulnerability of the life and health of people, property, environment, and economy of Emmons County and its communities from the impacts of natural and technological hazards as well as adversarial threats.

Scope: The scope of the Emmons County Multi-Hazard Mitigation Plan is countywide. Due to Emmons County's limited resources, any incident or hazard that may occur or exist affects the entire jurisdiction. The Plan is not necessarily limited to Federal, State, or locally-declared disasters or emergencies. Any time situations or incidents occur that produce an opportunity for mitigation actions; they will be developed and incorporated into the Emmons County Multi-Hazard Mitigation Plan.

Authority: The Emmons County Multi-Hazard Mitigation Plan has been prepared pursuant to Section 322 of the Disaster Mitigation Act of 2000 (Public Law 106-390) which requires local government to develop mitigation plans that shall:

- Describe actions to mitigate hazards, risks, and vulnerabilities identified under the plan; and
- Establish a strategy to implement those actions.

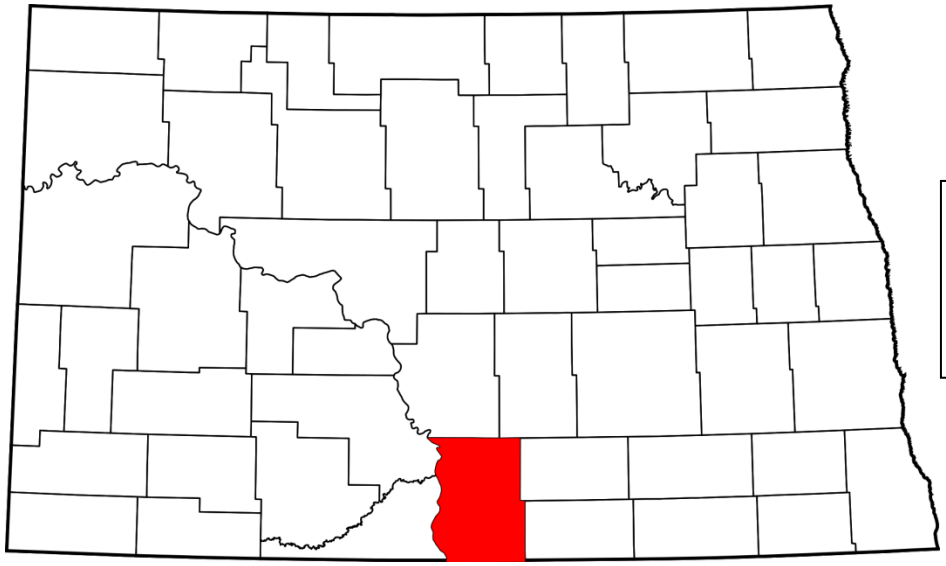
The Disaster Mitigation Act of 2000 became law on October 30, 2000 and amends the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as Amended (The Stafford Act) (P.L. 93-288, as amended). Regulations for this activity can be found in 44 CFR, Part 201.

The North Dakota Century Code 37-17.1-07 (Local or regional emergency management organizations.) states that "Each local or regional emergency management organization shall prepare and keep current a local disaster or emergency operational plan for its area." Emmons County and incorporated cities consider the Mitigation Plan an integral part of the Emmons County Emergency Management Program.

Local governments play an essential role in implementing effective mitigation, both before and after disaster events. Each local government will review all damages, losses, and related impacts to determine the need or requirement for mitigation action and planning whenever seriously affected by a disaster, or when applying for state or federal recovery assistance. In Emmons County the executive body responsible for carrying out plans and policies is the Board of County Commissioners. Each jurisdiction develops an annual budget which may or may not include monies for mitigation projects; however, budgets do include monies for continued agency services.

Community Profile

Emmons County is located in south-central North Dakota with the Missouri River as the western boundary. The County seat is Linton.



It has the 14th largest land area of the 53 counties in the State, encompassing 1,510 square miles (48 miles from north to south and 35 miles from east to west).

Picture Source: Wikipedia website

Borders

North:	Burleigh and Kidder Counties
West:	Morton and Sioux Counties
South:	South Dakota
East:	Logan and McIntosh Counties

Most of the county is nearly level to undulating, but some areas are rolling to steep. Native vegetation consists of a wide variety of grasses, forbs and shrubs. Approximately 4,712 acres are native woodland, mostly located along the Missouri River.

Principle drainage system: Missouri River. The natural drainage is mainly to the southwest to the Missouri River and north to Long Lake. Streams, coulees, dams and drainage ditches are abundant throughout the area. The county is a land of prairies, croplands, river valleys, and rolling hills.

Rivers
Missouri River, Beaver Creek, and Spring Creek

Emmons County serves as a drainage basin for water flowing from McIntosh, Logan and Emmons Counties to the Missouri River. The Beaver Creek Watershed (483,000 acres of land) and Spring Creek drain through Linton, located in the center of Emmons County.

Planning Process

Multi-hazard mitigation planning is a continuous process whereby risk analyses, updating the situation assessment, research, coordinating, disaster response or other activities are occurring simultaneously.

The goal is to maintain the Emmons County Hazard Mitigation Plan and obtain federal approval every five years. The original plan was developed in 2003 and subsequently updated in 2009 and 2015. The current plan update process began in 2019 with the Emergency Manager collecting background information and soliciting technical advice and guidance from the ND Department of Emergency Services' Mitigation Division prior to the beginning of the official update plan process. In addition, throughout 2019-2020, the Emergency Manager hosted and/or attended public meetings to revisit the current Multi-Hazard Mitigation Plan and incorporate information where applicable.

The plan update process officially began September 3, 2019 at the public Emmons County Commission Meeting. Ensuing months involved a lot of research, data gathering and outreach to regulatory agencies and other governmental entities (US Army Corps of Engineers, ND State Water Commission, Emmons County Water Resource Board, ND Forest Service, ND Fire Marshal's Office, US National Weather Service). Additionally, a vast amount of phone calls and emails were utilized to elicit feedback from the participating jurisdictions.

September 3, 2019: Emmons County Commission Meeting. The Emergency Manager discussed the current Mitigation Plan and update process with the County Commission at their September 3, 2019 regular, publicized meeting. A couple members of the public were in attendance as well as the full County Commission, States Attorney, and Auditor. Attendees were updated regarding the purpose of the plan, ongoing process, future meetings, and an electronic survey. The current plan is available on the website. Potential mitigation projects were discussed and were all related to flooding issues. Projects were deferred to the Water Resource Board for specifics. Commissioners will submit any mitigation projects to the Emergency Manager upon their review of the current plan. (Attachments, Appendix B: Public Information)

September 4, 2019: City of Strasburg Commission Meeting. This was a regularly-scheduled City Commission Meeting with the full Commission present, along with the City Auditor, Public Works Department Head, and a few members of the public in attendance. Attendees were updated regarding the purpose of the plan, ongoing process, future meetings, and an electronic survey. Potential mitigation projects were discussed and centered around the Strasburg Slough and Lagoon. Commissioners will submit any mitigation projects to the Emergency Manager upon their review of the current plan. (Attachments, Appendix B: Public Information)

October 16, 2019: Hosted the Local Emergency Planning Committee Meeting which also served as the Multi-Hazard Mitigation Plan kickoff/planning meeting combined with review of the Emergency Operations Plan. Also discussed the "Shelter in Place" brochure as an item included as ongoing mitigation project to promote community preparedness and response to hazards in Emmons County. An adequate supply is maintained through Emergency Management and available on the Emmons County website.

- Confirm plan purpose (including grant opportunities)
- Review current mitigation plan and discuss projects
- Refine plan scope and schedule
- Establish responsibilities
- Development outreach strategy.

December 18, 2019: Emmons County Emergency Management published an electronic survey utilizing "SurveyMonkey" to gather input from the public. The questions included in the survey were selected to make the experience brief while soliciting hazard vulnerability as well as public's view of the most likely community hazards. Open-ended responses were also included to collect responses the community felt relative to the survey and hazards. A total of 30 responses were received which is 5 more than previous survey responses received in 2015. The survey was emailed to area stakeholders, community responders, and contiguous counties. The survey results and the information captured were compared to the risks analysis and were closely aligned. Additionally, information received was factored into the mitigation projects. See Appendix C: Emmons County Public Survey. The survey was publicly advertised: Emmons County Record, Emmons County website, Emmons County social media, and paper copies available at the Emmons County Courthouse.

December 26, 2019: Emmons County Record published the "input on mitigation plan update" and included website to access to the electronic survey.

January 14, 2020: The Emergency Manager presented the Multi-Hazard Mitigation Plan and update process with the Emmons County Water Board at their publicized, special meeting. A few members of the public attended as well as representatives for the City of Linton and ND State Water Commission. Attendees were updated regarding the purpose of the plan, ongoing process, future meetings, and an electronic survey. Potential mitigation projects were discussed and were all related to flooding issues. (Attachments, Appendix B: Public Information)

January 21, 2020: Multi-Hazard Mitigation Plan update process published on website and social media

February 7, 2020: Spring Flood Planning and Mitigation Projects Review

March 5, 2020: A Planning Meeting was held to review the draft plan, perform a hazard risk analysis and ranking, and discuss mitigation strategies. The Emergency Manager met with Sharon Jangula (City of Linton Administrator and the Linton Industrial Development Corporation) and Mayor Dan Imdieke to review the same information. Phone calls were also made to the Cities of Braddock, Hague, Hazelton, and Strasburg to review and discuss the

information. New mitigation projects included generators and flood mitigation projects (Attachments, Appendix B: Public Information)

July 7, 2020: Meeting with Hazelton Mayor Gary Griffin and Auditor Terry Macdonald to review the current draft of the Mitigation Plan and Emergency Operations Plan. Mitigation projects and priorities were discussed along with the opportunity to add projects at any time.

Due to COVID-19 response, additional emails and conversations were completed via phone and email to complete the final draft.

Throughout the process, research was completed along with data gathering and outreach (meetings and/or emails) to regulatory agencies and other governmental entities (US Army Corps of Engineers, ND State Water Commission, Emmons County Water Resource Board, ND Forest Service, ND Fire Marshal's Office, US National Weather Service). Additionally, a vast amount of phone calls and emails were utilized to elicit feedback from the participating jurisdictions.

Outreach to contiguous counties (Burleigh, Kidder, Logan, McIntosh) was accomplished through meeting and survey invitations.

Monitoring, Evaluating, and Updating the Plan: The plan will be evaluated annually by the Emmons County Emergency Manager with input from the planning committee members. As a means of monitoring the plan and progress made on the projects, the Emmons County Emergency Manager will continually collaborate with planning committee members and representatives identified as "lead agencies" to discuss progress of the projects, existing and potential grant opportunities, and changes in regulations. It will be the responsibility of the Emergency Manager to update the hazard history sections on an annual basis as events occur.

All disaster or emergency incidents will be evaluated for general/specific mitigation recommendations to be added to the plan as they occur. A comprehensive plan review by the planning committee will occur every five years unless the need arises earlier through aforementioned reviews and actions.

The approved plan is available on the Emmons County website for review by stakeholders and the general public along with the opportunity to submit mitigation ideas at any time. Emmons County Emergency Management will continue to promote mitigation actions and seek projects through speaking engagements, booths, and especially after an actual event.

Plan Integration: The Emmons County Multi-Hazard Mitigation Plan will be considered as building codes are developed and/or updated. The awareness of the hazards and vulnerability may affect future development in hazard-prone areas.

Participating Jurisdictions in the Plan Review

Jurisdictions Located within Emmons County	Jurisdictions Asked to Participate in the Plan	Jurisdictions Represented in the Plan	Participation Status
Emmons County	Emmons County	Emmons County	Continuing Participation (2003, 2009, 2014, 2020)
City of Braddock	City of Braddock	City of Braddock	Continuing Participation (2003, 2009, 2014, 2020)
City of Hague	City of Hague	City of Hague	Continuing Participation (2003, 2009, 2014, 2020)
City of Hazelton	City of Hazelton	City of Hazelton	Continuing Participation (2003, 2009, 2014, 2020)
City of Linton	City of Linton	City of Linton	Continuing Participation (2003, 2009, 2014, 2020)
City of Strasburg	City of Strasburg	City of Strasburg	Continuing Participation (2003, 2009, 2014, 2020)

All jurisdictions were invited to participate in the update process. If they were unable to attend, the Emergency Manager did outreach to obtain input on the overall plan and mitigation opportunities.

Planning Team Members

Jurisdiction	Contact	Title	Agency
Emmons County	Mary Senger	Emergency Manager	Emmons County Emergency Mgt
Emmons County	Leonard Weichel	Commissioner	Emmons County Commission
Emmons County	Bev Voller	Director	Emmons County Public Health
Emmons County	Francis Krumm Nick Lawler	Road Supervisor	Emmons County Road Dept
Emmons County	Gary Sanders	Sheriff	Emmons County Sheriff's Dept
Emmons County	Glenn Geffre	Chair, Floodplain Administrator	Emmons County Water Board
City of Linton	Dan Imdieke	Mayor	City of Linton
City of Linton	Sharon Jangula	Administrator, Development Coordinator, Floodplain Administrator	City of Linton
City of Linton	Virgil Hulm Lee Prince	Supervisor	Linton Public Works
City of Linton	Pat Gerving	Chief	Linton Fire Dept
City of Braddock	Tim Reamann	Mayor	City of Braddock
City of Braddock	Audrey Rambough	Auditor	City of Braddock
City of Hague	Chris Baumgartner	Mayor	City of Hague
City of Hague	Joyce Pfeifer	Auditor	City of Hague
City of Hazelton	Gary Griffin	Mayor	City of Hazelton
City of Hazelton	Terry Macdonald	Auditor	City of Hazelton
City of Strasburg	Ray Nieuwsma	Mayor	City of Strasburg
City of Strasburg	Judy Pfeifer	Auditor	City of Strasburg
City of Strasburg	Mark Pearson	Chief	Strasburg Fire Department

Review and Incorporation of Existing Plans, Studies, Reports, and Technical Information: The Emmons County Multi-Hazard Mitigation Plan was developed in coordination with other local, state, and federal agencies, non-profit organizations, local businesses, schools and the public. The Cities of Braddock, Hague, Hazelton, Linton, and Strasburg support county-led planning initiatives. All jurisdictions have a Planning and Zoning Board/Commission except Braddock, Hague, and Strasburg (rely on City Ordinances).

Agency	Plans and Programs
American Red Cross (West Dakota)	• Shelter • Mass Care • Windshield Damage Assessment • Disaster Recovery
Braddock City Commission	• Disaster/Emergency Declarations • Budget Allocations • City Ordinances
Emmons County Emergency Management	• Local Emergency Operations Plan • Multi-Hazard Mitigation Plan • Evacuation Annex • Shelter Annex • Mass Care Annex • Public Information Officer • Social Media Coordination • Disaster Recovery • Audit Lead • Local Emergency Planning Committee • Grants Coordination • Emergency Notification
Emmons County Auditor	• Fiscal Management • Emergency Reserve Fund
Emmons County Board of Health	• Public Health Programs
Emmons County Commission	• Disaster/Emergency Declarations • Budget Allocations • County Ordinances • Planning and Zoning
Emmons County Extension Service	• Animal Health • Plant Health • Community Education
Emmons County GIS	• Hazard Mapping • Site Map Assistance
Emmons County Ministerial Association	• Mental Health • Disaster Recovery

Agency	Plans and Programs
Emmons County Planning Commission	• Revive meetings • Develop Comprehensive Plan
Emmons County Public Health	• Shelters • Community Education • Vulnerable Populations
Emmons County Road Department	• Primary Routes • Bridges • Debris Removal • Self-Fill Sandbag Sites
Emmons County School Superintendent	• Curriculum Standards (safety drills)
Emmons County Schools	• Curriculum Standards (safety drills)
Emmons County Sheriff's Department	• Traffic Control and Safety • Evacuation Routes • Emergency Notification
Emmons County State's Attorney	• Legal Review
Emmons County Zoning Ordinance	• Permitted Uses • Planning and Zoning Commission
Emmons County Water Resource Board	• Floodplain Management • Voices for Lake Oahe/Beaver Bay Project • South Central Regional Water Project • Missouri River Joint Water Resource • ND Flood Risk Management Study • Beaver Creek Impediments
Hague City Commission	• Disaster/Emergency Declarations • Budget Allocations • City Ordinances
Hazelton City Commission	• Disaster/Emergency Declarations • Budget Allocations • City Ordinances
Lewis and Clark Regional Development Council	• Comprehensive Economic Development Strategy
Linton City Attorney	• Legal Review
Linton City Commission	• Disaster/Emergency Declarations • Budget Allocations • Building Inspector • City Ordinances • Zoning and Planning
National Climatic Data Center (NCDC	• Weather Event Statistics
National Fire and Incident Reporting System (NFIRS)	• Fire Incident Statistics

Agency	Plans and Programs
ND Department of Agriculture	• Plant and Animal Statistics
ND Department of Emergency Services	• Enhanced Multi-Hazard Mitigation Plan • Review • Technical Assistance
ND Department of Health	• Disease Statistics
ND Department of Transportation	• Traffic Statistics
ND Forest Service	• Fire Incident Statistics
ND Pipeline Association	• Maps • Education/Training • Planning and Zoning
ND State Water Commission	• Dam Inventory • NFIP Data • Water Basin Data • Strasburg Slough Preliminary Findings Report
Salvation Army	• Shelter • Mass Care • Windshield Damage Assessment • Disaster Recovery
South Central Regional Water	• Rural Water • Planning
Southwest Central Emergency Preparedness	• Points of Distribution • Mass Inoculation • SWC Regional Strategic National Stockpile • SWC Regional EOP Mental Health • SWC Regional EOP Pandemic Influenza • SWC Regional EOP Mass Fatality
Strasburg City Commission	• Disaster/Emergency Declarations • Budget Allocations • City Ordinances
US Army Corps of Engineers	• Planning Assistance (Section 22) • Beaver Creek Study (underway)
US Census	• Demographics • Population Estimates
US Drought Monitor	• Drought Statistics • Maps
US Geological Survey	• Creek/River Gages
US National Weather Service	• Weather Advisories • Hazard Advisories

The American Red Cross includes the shelter information provided by Emmons County Emergency Management within their National Shelter System.

The Emmons County Commission and Emmons County Road Department will utilize the mitigation projects as appropriate when developing future budgets and road priorities.

Flood mitigation projects are closely tied to the Emmons County Water Resource Board and their continuing discussions as well as the Emmons County Flood Annex.

The Emmons County Zoning Ordinance (1991) is currently being considered for an update to include an updated floodplain ordinance. This may also coincide with the development of an Emmons County Comprehensive Plan.

Communicable Disease activities parallel with the Southwest Central Emergency Preparedness planning efforts.

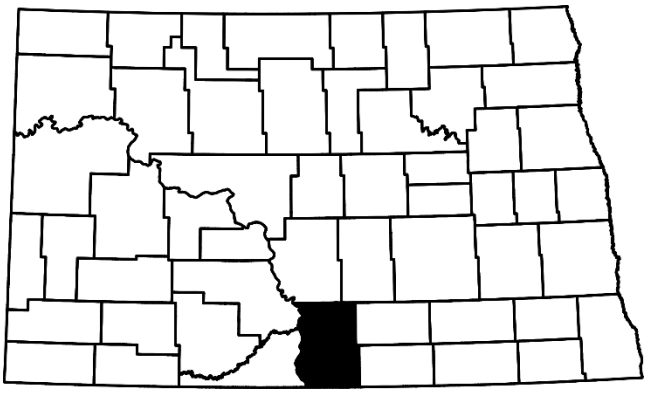
The US National Weather Service (Bismarck Office) remains in close contact with Emmons County Emergency Management and Skywarn Spotters to “truth” forecasts and/or impacts.

Changes in Development

General: Emmons County is located in south-central North Dakota with the Missouri River as the western boundary. The County seat is Linton.

Borders

North:	Burleigh and Kidder Counties
West:	Morton and Sioux Counties
South:	South Dakota
East:	Logan and McIntosh Counties



Picture Source: Wikipedia website

It has the 14th largest land area of the 53 counties in the State, encompassing 1,510 square miles (48 miles from north to south and 35 miles from east to west).

The Missouri River forms the western border between Emmons, Morton, and Sioux Counties.

Demographics

Emmons County	
2018 population estimate	3,295
2018 persons per square mile	2.4

According to the US Census Bureau, the 2018 population estimate is 3,295 (-7.2% decrease from 2010). The County population continues to decline despite an increase in 2010 as evidenced by the following:

2018 estimate	3,295
2010	3,550
2008	3,377
2000	4,331
1990	4,380

Emmons County has five incorporated cities including the county seat, Linton.

City	Population
Braddock	20
Hague	65
Hazelton	218
Linton	997
Strasburg	376

Source: US Census Bureau 2018 Population Estimates

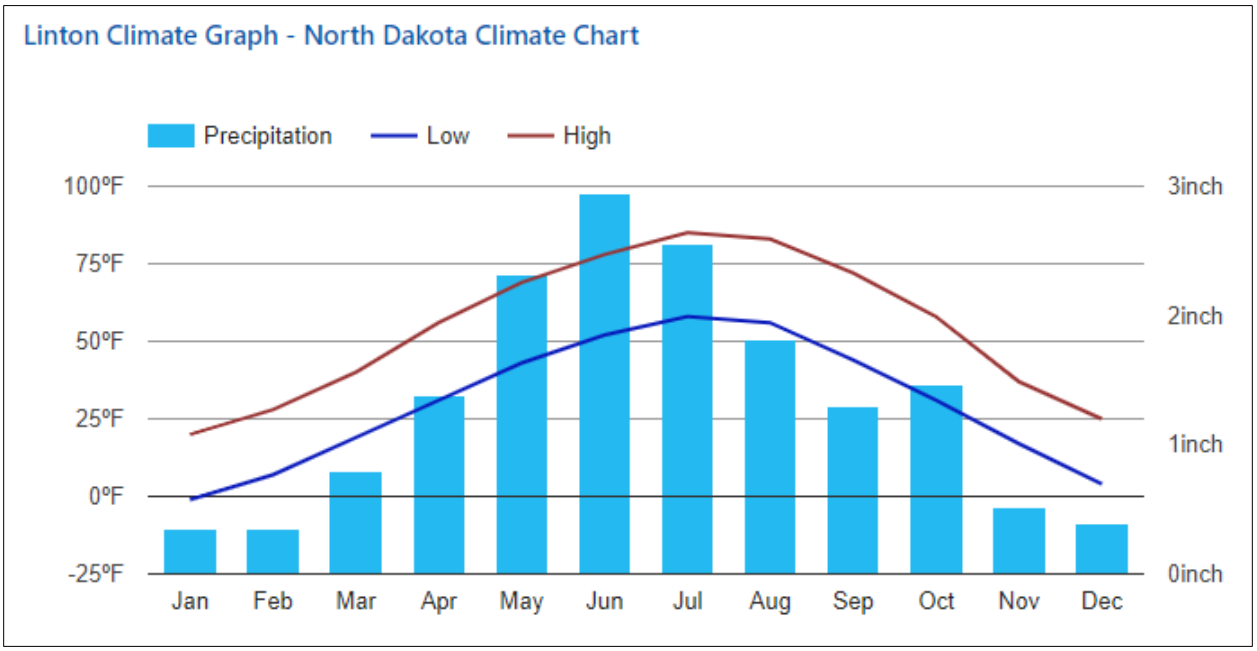
Linton is the County seat.

Climate

The County's geographic location results in a sub-humid continental climate characterized principally by marked fluctuations in daily and seasonal maximum and minimum temperatures, and light to moderate precipitation. The precipitation tends to be irregular in occurrence, amount, and area of coverage. Summers are usually hot and dry, with periods of prolonged high temperatures occurring from May through September. Winters are cold and dry, but the region is subject to severe blizzards. July is the warmest month, and January is the coldest month.

> Normally the temperature is moderate until the beginning of July, after which short, hot periods are experienced until the end of August. The freeze-free period is the number of days between the average last occurrence of freezing temperatures in the spring and the average first occurrence of 32 degrees F or lower in the fall. The length of the freeze-free period approximates the length of the growing season which ranges from 110 days to 119 days between May 16th and September 20th. Topography and local weather conditions can produce subfreezing temperatures at the ground surface while the air temperature a few feet above the ground remains above 32 degrees F. The warmest month is July. The coldest month is January.

Annual precipitation is 15-17" with 75% of the precipitation in the summer. Winter snowfall is generally not too heavy, and it is blown into drifts, so that much of the ground is free of snow. Average seasonal snow fall is 30 to 35 inches.



Source: U.S. Climate Data

Economy

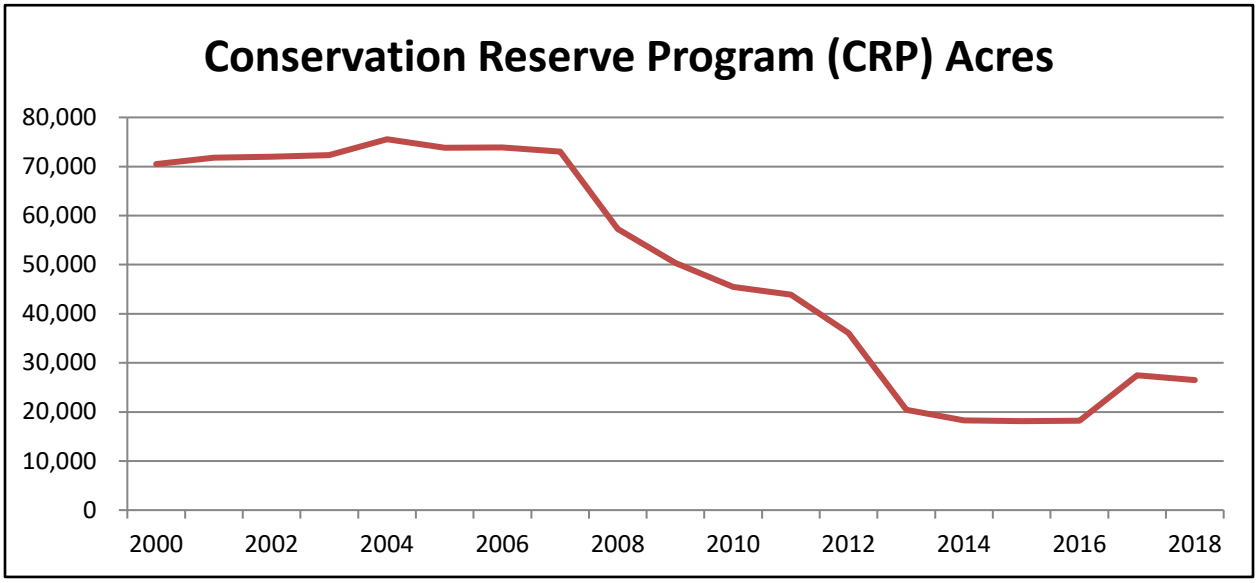
According to the US Census Bureau 2014-2018 American Community Survey, the largest percentage of the population (27.9%) is employed in the category of "Agriculture" followed by 21.6% in the category of "Educational services, and health care and social assistance".

A total of 60.7% of the workers are "private wage and salary workers", 14.9% are government workers, and 24.3% are self-employed in their own, not-incorporated businesses. The median household income was $51,029. The poverty status was 10.2% of the population below the poverty level with the 14.62% of 65 and older individuals below the poverty level.

Land Use Concerns

Agriculture remains the primary land use in Emmons County. Census data indicated that Emmons County has 516 farms in 2017 (15% decrease from 2012) that average 1,573 acres per farm for a total acreage of 811,583 acres. (Source: USDA Census of Agriculture)

Soil erosion due to wind and water remains a problem. On steep gradients, rain washes out gullies in cultivated fields, and fields cultivated in the fall suffer extensive damage from wind. The county has 26,516 acres enrolled in the Conservation Reserve Program (CRP) which has helped mitigate the erosion problem; however, the acreage enrollment decreased from 2017.



Data Source: US Department of Agriculture, Farm Service Agency

Emmons County continues to study a variety of mitigation activities. Soil erosion, water supply, and water quality are major land use concerns of the county.

Emmons County and the City of Linton currently have a floodplain ordinance. Emmons County is currently updating their ordinances to include the floodplain ordinance. The overall goal is to decrease the vulnerability of development in the hazard-prone areas.

In the aftermath of the 2009 flood disaster, 5 acquisitions were finalized in 2014 (2 in Emmons County and 3 in the City of Linton).

Additionally, the Emmons County Water Resource District utilizes previous flood event data when considering flood control projects and includes non-structural project recommendations such as amending floodplain ordinances in direct correlation with National Flood Insurance Program recommendations and FEMA's flood insurance rate map data.

Development

The Linton Industrial Development Corporation leads economic development in the Linton area. The nonprofit corporation was formed in 1984 and is focused on assisting new business development and moving or expanding businesses into the community.

Many of the local jurisdictions have economic development committees to attempt to bring industry to their jurisdiction. Emmons County has many miles of lake and river shore, respectively, along the Oahe Dam and Missouri River, which are being developed for recreational purposes.

Building Permits				
Year	**Type**	**Buildings**	**Housing Units**	**Construction Cost**
2019	Single Family		7	$1,200,000
2018	Single Family		5	$1,800,000
2017	Single Family		4	$970,000

(Source: Emmons County Tax Director)

Emmons County is experiencing a decrease in population due to outmigration and aged population. The 2018 census data identifies persons 65+ as 15.32% in North Dakota, and Emmons County is at 27.9%. (Source: US Census QuickFacts website)

Outreach to the Linton Industrial Development Corporation provided information on lack of housing ability coupled with outside investors buying the properties as secondary homes and/or renting them. In 2019, a new retail development, Dollar General, constructed a 9,100 square foot building and opened for business.

The Linton Commission recently approved (August 24, 2020) plans and specifications for a project to develop property on the east side of Linton. The project includes the creation of Eighth Street Northeast, with sewer and water service. It would include 21 residential lots ranging from .30 acres (13,062 sq. ft.) to .61 acres (26,402 sq. ft.) in size. Fifteen of those lots are over 20,000 square feet, and five others range from 15,500 to 17,185 square feet. The plan calls for six lots on the east side of Eighth Street and seven on the west side of the street from Walnut (south) to Elm avenues. The remaining eight lots will make up a cul-de-sac on the north end of the development

- Phase I of the project includes development of Eighth Street (11 residential lots), including six on the east side and five on the west side of the street at an estimated cost of $600,000.

- Phase II of the project includes development of the 10 remaining lots and cul-de-sac at an estimated cost of $516,000.

Risk Assessment and Hazard Profile

Emmons County and the incorporated cities (Braddock, Hague, Hazelton, Linton, and Strasburg) contributed to the risk assessment for the Emmons County Multi-Hazard Mitigation Plan.

The 14 hazards identified by the ND Department of Emergency Services were utilized for the risk assessment. (Source: ND Enhanced Mitigation Mission Area Operations Plan, December, 2018)

Risk Assessment by Jurisdiction						
Hazard	Emmons County	Braddock	Hague	Hazelton	Linton	Strasburg
Civil Disturbance	X	X	X	X	X	X
Criminal, Terrorist, or Nation/State Attack	X	X	X	X	X	X
Cyberattack	X	X	X	X	X	X
Dam Failure	X					
Drought	X	X	X	X	X	X
Fire (including urban fire or structure collapse and wildland fire)	X	X	X	X	X	X
Flood (including riverine, levee failure, closed basin, ice jam, and flash floods	X	X	X	X	X	X
Geologic Hazards (including landslide, earthquake, abandoned land mines, expansive/unstable soils, environmental minerals, meteorite falls, volcanic hazards)	X					
Hazardous Materials Release	X	X	X	X	X	X
Infectious Disease and Pest Infestations (including human, animal, and plant diseases)	X	X	X	X	X	X
Severe Summer Weather (including downbursts, extreme heat, hail, lightning, high wind, and tornado)	X	X	X	X	X	X
Severe Winter Weather (including blizzards, extreme cold/wind chill, heavy snow, ice storms, structure collapse)	X	X	X	X	X	X
Space Weather	X	X	X	X	X	X
Transportation Incident (including vehicular, railway, and aircraft accidents)	X	X	X	X	X	X

The majority of jurisdictions are affected by the hazards with slight variances in susceptibility as described below:

Civil Disturbance and Criminal, Terrorist, or Nation/State Attack
All jurisdictions could be impacted by a civil disturbance or criminal terrorist nation attack; however, the greater vulnerability would be anticipated to be in the most populous city and county seat, Linton.

Dam Failure
The western portion of Emmons County would be most vulnerable dam failure from Garrison Dam, located approximately 130 miles northwest of the City of Linton, Emmons County.

All the dams in Emmons County are classified as "Low Hazard Potential" with the exception of Nieuwsma Dam which is classified as "Significant" and has an Emergency Action Plan which identifies 11 homes in the area. Dam failure for "Low Hazard" dams may result in low economic, environmental, and lifeline losses generally limited to the owner with no expected loss of human life. Failure of the Nieuwsma Dam would result in economic, environment, and lifelines losses with no expected loss of human life.

Drought, Fire
Although many rural residents have their own wells, rural Emmons County would suffer great agricultural losses in drought with 516 farms in 2017 that average 1,573 acres per farm for a total acreage of 811,583 acres. (Source: USDA Census of Agriculture) Grain elevators in Braddock, Hague, Linton, and Strasburg as well as Hazelton's Cenex-Agronomy may suffer losses due to drought and loss of crops.

Water Supplies: The South Central Regional Water District is the major supplier for Emmons County. The incorporated cities (excluding Hazelton) have access to a water treatment plant along the Missouri River at Beaver Bay into Lake Oahe (2.5 million gallon per day water treatment plant and a 500,000-gallon storage reservoir). Water supply is adequate with rare requests to decrease water consumption during periods of drought/extreme heat.

In addition to South Central Regional Water:

- The City of Hazelton has a 50,000-gallon water tower with a backup generator.
- The City of Linton has two underground water tanks—one holds 150,000 gallons and the other holds 250,000. The tanks are fed from South Central Regional Water.
- Strasburg has a 75,000-gallon water tank which can be hooked up to a portable generator.

Resources for potable water supplies are identified in the Emmons County Emergency Operations Plan.

The impacts of drought and wildland fire could impact city residents in a number of ways; however, rural Emmons County is more susceptible to these hazards due to open prairie and agricultural activities. The areas around the cities (wildland urban interface) have increased opportunity to sustain damage from prairie fires. The incorporated cities are more vulnerable to urban fire with losses greater in the more populated cities.

Fire Departments continue to lose volunteers and could run the risk disbanding. All fire department in Emmons County are 100% volunteer personnel. Additional and/or replacement equipment is always needed and sought through fundraising, donations, and grants.

Flood

The following figure displays that no jurisdiction is immune to flood vulnerability and has either experienced the vulnerability or has the increasing susceptibility to experience the vulnerability. Additionally, inundation maps show the vulnerability and can be found in the Attachments.

Flood Vulnerabilities by Jurisdiction

	Emmons County	Braddock	Hague	Hazelton	Linton	Strasburg
River Flooding	X				X	X
Overland Flooding	X	X	X	X	X	X
Ice Jam Flooding	X				X	
Lift Stations					X	
Lagoon Overruns			X			X
Road Washouts	X	X	X	X	X	X

Geological Hazards

No jurisdictions have significant history of this hazard; however, the western edge of Emmons County is the most susceptible along the Missouri River.

The only jurisdiction affected would be rural Emmons County. Approximately 30 farmsteads could experience some land erosion as well as the following recreational areas: Badger Bay, Bayside Resort/Beaver Bay, Cattail Resort, Hazelton Recreation Area, and Langeliers Bay.

Hazardous Materials Release and Transportation Accident
Varied levels of susceptibility are apparent for all jurisdictions. Highway 83 runs through the middle of Emmons County (including Hazelton, Linton, and Strasburg). Additionally, County Highway 34 runs through Hazelton, and County Highway 10 runs through Hague. Railroad tracks run through Braddock. Throughout the year, farmers transport anhydrous ammonia in pup tanks. (See Attachment 3, Major Roadways Map in Emmons County)

The City of Linton is far more susceptible to the hazards due to being an urban center with the highest population density in Emmons County. Other factors increasing susceptibility include:

- County Seat
- Governmental Buildings (local, state, and federal)
- Hospital
- Increased Transportation Flow

Hazardous Materials Release and Transportation Accident						
	Emmons County	Braddock	Hague	Hazelton	Linton	Strasburg
Anhydrous Ammonia	**X**	**X**	**X**	**X**	**X**	**X**
Bulk Fuel	**X**	**X**	**X**	**X**	**X**	**X**
Bulk Fertilizer	**X**	**X**	**X**	**X**	**X**	**X**
Farm Chemicals	**X**		**X**		**X**	
Propane	**X**			**X**		**X**
Fuel and Gas	**X**	**X**	**X**	**X**	**X**	**X**
Natural Gas					**X**	
Major Transportation Route	**X**		**X**	**X**	**X**	**X**
Railroad	**X**	**X**				

Infectious Disease

Although each jurisdiction is susceptible to infectious disease, the more rural communities of Braddock and Hague and unincorporated Emmons County are particularly susceptible to those diseases that impact plants and animals. The cities, particularly the most populous city, Linton, are more susceptible to human infectious disease.

The general age for disease susceptibility considers children under the age of 14 and adults over the age of 65 as most susceptible to disease (especially if exacerbated by underlying medical conditions). The table below depicts the susceptible ages for each jurisdiction.

Community	Population	0-14 Years	15-64 Years	65+ Years
Emmons	3,352	547	1,811	994
Braddock	12	2	4	6
Hague	64	16	23	25
Hazelton	267	80	130	57
Linton	1,019	114	535	370
Strasburg	349	33	160	156

Source: US Census Bureau, 2018 ACS 5-Year Estimates Data Profile

Severe Summer Weather and Severe Winter Weather
All jurisdictions are impacted. Severe summer weather incidents may cause major economic losses based on the level of impact. Severe winter weather often results in blocked roads and can affect each jurisdiction and may lead to economic loss dependent upon severity and length of time.

Rural Emmons County residents have backup power sources (generators, coal or wood-burning stoves) and extra fuel sources (gas and propane).

The communities of Hague, Linton, and Strasburg each maintain an outdoor warning siren utilized to alert fire or ambulance crews and to signify a tornado.

The Emmons County Courthouse Auditorium is available as a shelter or temporary warming center during periods of power outages caused by extreme weather events.

Vulnerable populations:

- Linton Hospital, Linton
- Sunrise Trailer Court, Linton
- Strasburg Care Center, Strasburg

Disability Population*

	Population	Total with Disability	Under 18 Years	Total with Disability	18-64 Years	Total with Disability	65+ Years	Total with Disability
Emmons County	3,298	526	649	17	1,701	122	948	387

*2018 American Community Survey 5-Year Estimate

Emmons County does not have the resources and shelter space to accommodate functional needs and general population for a large-event. (Source: Emmons County Evacuation and Shelter Plan)

Space Weather
No jurisdictions have any significant history of this hazard. Disruption of critical facilities and infrastructure would have a significant effect on each jurisdiction to include medical, law, fire and facilities dependents on satellite data. Emergency services will continue to operate in a diminished capacity if there is a disruption to communications technology.

Critical facilities with backup power:

Linton/Emmons: Linton Hospital, Linton City Hall, Linton Lift Station, and the Emmons County Courthouse (Sheriff's Department, Emergency Operations Center). The Emmons County Road Department also has two, portable generators.

Braddock: None

Hague: None

Hazelton: Fire Department

Strasburg: Strasburg Care Center

Hazards Excluded from this Plan

Hazard	Why Excluded/Where Addressed
Avalanche	Avalanches generally require long stretches of 25-55 degree slopes; Emmons County has no areas that meet this criteria. North Dakota is not covered by a National Avalanche Center. North Dakota does not have a history of any declared state or federal avalanche disasters.
Coastal Erosion	Emmons County does not have an ocean coastline.
Coastal Storm	Emmons County does not have an ocean coastline.
Hurricane	Emmons County does not have an ocean coastline, nor is it located in a potential hurricane impact area.
Shortage or Outage of Critical Materials and/or Infrastructure	Included as part of each hazard.
Tsunami	Emmons County does not have an ocean coastline.
Volcano	Volcanic ashfall can occur over Emmons County, but the frequency is relatively rare and the potential impacts are not expected to exceed local capabilities. North Dakota does not have a history of any declared state or federal volcano disasters.

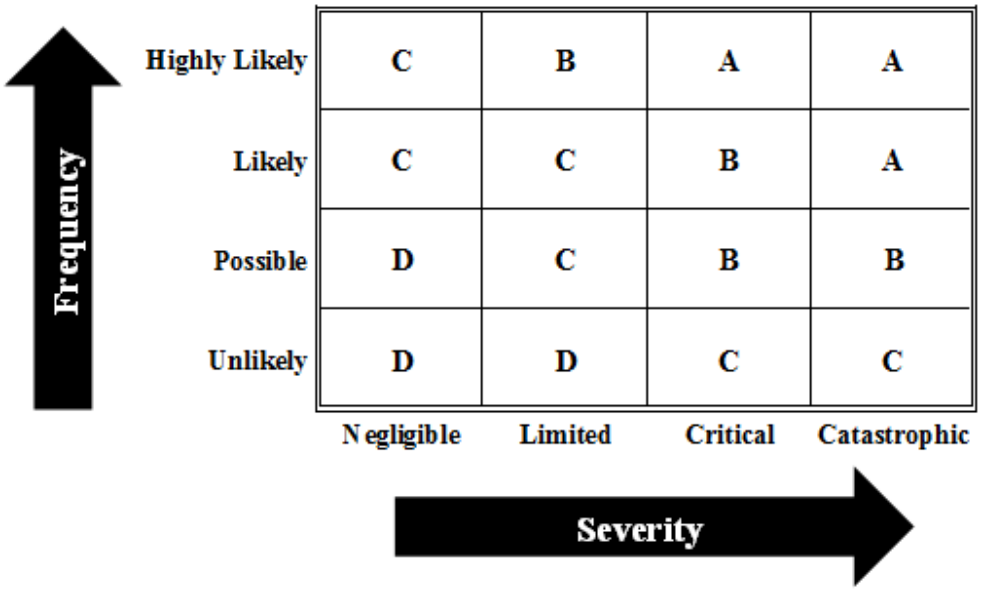
Risk Analysis Worksheet

Frequency: How often is this hazard likely to develop in this area?

Highly Likely	Nearly 100% probability in the next year
Likely	10–100% probability in the next year, or at least 1 chance in next 10 years
Possible	1–10% probability in the next year, or at least 1 chance in next 100 years
Unlikely	Less than 1% probability in next 100 years

Severity: What is the expected extent of damage caused by this type of hazard?

Catastrophic	More than 50% of jurisdiction affected
Critical	25–50% of jurisdiction affected
Limited	10–25% of jurisdiction affected
Negligible	Less than 10% of jurisdiction affected



(Source: FEMA Multi-Hazard Identification and Risk Assessment, January 1, 1997, Risk Assessment Approaches – Chapter/Section Number: Part 3)

Risk Class: Classification of the overall risk posed to the jurisdiction and immediacy of necessary action:

Seasonal Pattern: When is the type of hazard most likely to occur?

Probable Duration: How long will this event typically have an impact on the community?

Speed of Onset: How much advance warning does the community have for this type of event?

Location/Jurisdiction: Which areas are affected?

Risks: Types of situations that might result from the hazard.

Hazard
Frequency: _____ **Severity:** _____ **Risk Class:** _____ **Seasonal Pattern:** _____ **Duration:** _____ **Speed of Onset:** _____

DESCRIPTION:

IDENTIFIED IMPACTS:

HISTORY:

Emmons County Hazard Risk Analysis Chart with Vulnerabilities for each Hazard

Risk Class:	C	C	B	D	B	D	C	D	B	B	B	A	B	C
HAZARD	Civil Disturbance	Criminal, Terrorist, or Nation/State Attack	Cyberattack	Dam Failure	Drought	Fire	Flood	Geologic Hazards	Hazardous Materials Release	Infections Disease and Pest Infestations	Severe Summer Weather	Severe Winter Weather	Space Weather	Transportation Accident
Agriculture	X		X	X	X	X	X	X	X	X	X	X	X	X
Blocked Roads	X	X	X	X		X	X	X			X	X	X	X
Building Collapse				X		X		X			X	X		X
Business Interruptions	X	X	X	X	X	X	X	X		X	X	X	X	X
Delayed Emergency Response	X	X	X	X		X	X	X		X	X	X	X	X
Downed Power Lines		X		X		X	X	X			X	X		
Downed Trees				X		X	X	X			X	X		
Evacuation (Full)		X												
Evacuation (Localized)	X	X		X		X	X	X	X	X	X	X		X
Explosion		X				X		X	X					X
Flooding (Street)				X			X				X			
Flooding (Structure)				X			X				X			
HAZMAT Release		X		X		X	X	X	X		X	X		X
Increased Fire Potential		X			X	X	X	X	X		X	X	X	X
Increased Public Safety Runs	X	X		X		X	X	X	X	X	X	X	X	X
Livestock Injury/Death		X		X	X	X	X		X	X	X	X		
Loss of Economy		X	X	X	X	X	X	X	X	X	X	X	X	X
Loss/Overcrowded Medical Facilities		X				X	X	X	X	X	X		X	X
Loss of Potable Water		X		X	X		X	X	X	X	X	X		X
Loss of Power		X	X	X		X	X	X			X	X	X	
Mass Casualties		X		X		X		X	X	X	X		X	X
Personal Injury/ Death Risk	X	X		X	X	X	X	X	X	X	X	X	X	X
Property Damage		X		X	X	X	X	X	X		X	X	X	X
School Closure		X		X		X		X	X	X	X	X		X
Sewer Backup				X			X				X			
Wind Chill	X											X		

Overall Vulnerability Summary

HAZARD	Description
Civil Disturbance	New hazard to match the State Plan. Hazard is possible; however, severity was deemed limited.
Criminal Terrorist Nation Attack	New hazard name to match the State Plan; replaced "Homeland Security Incident" with no change in vulnerability.
Cyberattack	New hazard to match the State Plan. Hazard is possible; however, severity was deemed critical.
Dam Failure	No change.
Drought	No change.
Fire	New hazard name to match the State Plan; combined "Wildland Fire" and "Urban Fire or Structure Collapse". Hazard is highly likely; however, severity was deemed negligible.
Flood	No change.
Geologic Hazards	No change.
Hazardous Materials Release	No change.
Infections Disease and Pet Infestations	New hazard name to match the State Plan; replaced "Communicable Disease" with no change in vulnerability.
Severe Summer Weather	No change.
Severe Winter Weather	No change.
Space Weather	New hazard to match the State Plan. Hazard is possible; however, severity was deemed critical.
Transportation Accident	No change.

THIRA Survey Results
As of 07-18-14

2013 Emmons County Hazard/Threat Identification Comparison*						
		Very Likely	**Likely**	**Possible**	**Unlikely**	**Improbable**
	Score	**5**	**4**	**3**	**2**	**1**
Catastrophic	**5**				• Nuclear Terrorism Attack	
Significant	**4**					
Moderate	**3**			• Animal Disease Outbreak	• Chemical Terrorism Attack • Explosives Terrorism Attack • Biological Terrorism Attack	
Minor	**2**			• Armed Assault • Human Pandemic Outbreak • Biological Food Contamination • Chemical Substance Spill or Release	• Chemical/Biological Food or Food Production Attack • RDD Terrorism Attack	
None/ Negligible	**1**	• Winter Storms • Wildfire	• Summer Storms • Flood	• Cyber Attack	• Dam Failure • Aircraft as a Weapon • Radiological Substance Release	

*Based on 9 responses

THIRA Step 2 complete.
THIRA Steps 3-4 completed in 2020.

Emmons County Disaster Declarations

Number	Declared	State	Description
4475	01-21-2020	North Dakota	Flooding
4444	06-12-2019	North Dakota	Flooding
1907	04-30-2010	North Dakota	Flooding
1879	02-26-2010	North Dakota	Severe Winter Storm
1829	03-24-2009	North Dakota	Severe Storms, Flooding
1334	06-27-2000	North Dakota	Severe Storms, Flooding
1279	06-08-1999	North Dakota	Severe Storms, Tornadoes, Snow and Ice, Flooding, Ground Saturation, Landslides and Mudslides
1174	04-07-1997	North Dakota	Severe Storms, Flooding
1157	01-12-1997	North Dakota	Severe Winter Storms, Blizzards
1118	06-05-1996	North Dakota	Flooding
1050	05-16-1995	North Dakota	Flooding, Ground Saturation
1001	07-26-1993	North Dakota	Flooding, Severe Storms
581	04-26-1979	North Dakota	Snowmelt, Flooding
554	04-17-1978	North Dakota	Ice Jams, Snowmelt, Flooding
434	05-14-1974	North Dakota	Heavy Rains, Snowmelt, Flooding
287	06-05-1970	North Dakota	Severe Storms, Flooding
256	04-18-1969	North Dakota	Flooding

Source: Source: http://www.fema.gov/disasters

Emmons County Emergency Declarations

Number	Declared	State	Description
3309	03-14-2010	North Dakota	Flooding
3247	09-13-2005	North Dakota	Hurricane Katrina Evacuation
3061	02-16-1978	North Dakota	Blizzard, Snowstorms
3016	07-21-1976	North Dakota	Drought

Source: Source: http://www.fema.gov/disasters

Hazards

Civil Disturbance

Frequency	Likely (10-100% probability in the next year, or at least 1 chance in next 10 years)
Severity	Limited (10-25% of jurisdiction affected)
Risk Class	C
Seasonal Pattern	None
Duration	Hours/Days
Speed of Onset	No warning
Location	Countywide

Description
Civil disturbances can occur when large groups, organizations, or distraught individuals act with potentially disastrous or disruptive results. Many issues can cause civil disturbance, but most are due to political grievances, economic disputes or social discord, terrorism, or foreign agitators. Additionally, civil disturbance can result following a disaster that creates panic in the community. Forms of civil disturbance can range from groups blocking sidewalks, roadways, and buildings to mobs rioting and looting to gang activity. Civil disturbance may be spontaneous, as when a mob erupts into violence, or they may be planned, as when a demonstration or protest intentionally interferes with another individual's or group's lawful business. These types of incidents typically do not escalate to the traditional definition of a disaster, but can have significant impacts on the community and require additional resources to manage.

> Note: Civil Disturbances are criminal actions and are not protected by 1st Amendment Activities; "Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech, or of the press, or the right of the people peaceably to assemble, and to petition the government for redress of grievances"

Civil disturbances can occur anywhere in Burleigh County. While it is not possible to predict the location of a civil disturbance, large venue locations such as stadiums, government facilities, industrial facilities, and locations with correctional facilities are somewhat more likely to be susceptible to such incidents.

(Source: ND State Emergency Operations Plan, December 2018)

Identified Impacts

- Blocked Roads
- Business Interruptions
- Delayed Emergency Response
- Evacuation (Localized)
- Increased Public Safety Runs
- Property Damage

History

Smaller-scale protests can and have occurred in within Emmons County:

- Emmons County Courthouse
- DAPL (pipeline pad located west of Temvik along the Missouri River)

November 13-14, 2019: The ND Public Service Commission held a public hearing regarding the addition of a pump station to the existing Dakota Access Pipeline. The public hearing started on November 13th at the Emmons County Courthouse and ended at ended at 12:30 AM on November 14, 2019. The event involved approximately 40 entities and included protestors in favor and against the pump station.

2016: The Dakota Access Pipeline (DAPL) project resulted in multiple criminal activities including acts of vandalism, trespassing, riots, vehicles, hay bales and tires set on fire, and the arrest of 709 protesters. The protestors gathered to express concern about the installation of an 1134-mile long crude oil pipeline across North Dakota and other states. The protest transitioned into an unlawful assembly and civil disorder on August 10, 2016, when individuals attempted to block access to construction activities associated with the pipeline. Originally an environmental-focused event, it quickly grew from a few hundred participants to numbers estimated near 10,000. It also expanded its scope to include real or perceived concerns surrounding Native American rights, as well as a myriad of other environmental concerns not necessarily associated with construction of the DAPL. Widespread criminal activity spawned from the protest, to include vandalism, terroristic threats, and intimidation tactics directed at local landowners as well as law enforcement and their families, doxing of law enforcement and other officials (doxing is the Internet-based practice of researching and broadcasting private or identifiable information), arson, poaching, and the theft and killing of livestock in the area. The majority of activities occurred in Morton and Sioux Counties; however, Burleigh and Emmons Counties also experienced activity on a smaller scale. (Source: ND State Emergency Operations Plan, December 2018)

Criminal, Terrorist, or Nation/State Attack

Frequency	Likely (10-100% probability in the next year, or at least 1 chance in next 100 years)
Severity	Limited (10-25% of jurisdiction affected)
Risk Class	C (Low to moderate risk condition, sufficiently high to give consideration for further mitigation)
Seasonal Pattern	None
Duration	Unknown

Description

A criminal, terrorist, or nation/state attack includes chemical attacks, biological attacks, radiological attacks, nuclear attacks, explosive attacks, food/food production attacks, and armed assaults. These can broadly be defined as any intentional adversarial human-caused incident, domestic or international, that causes mass casualties, large economic losses, or widespread panic in the country. These incidents are examples of human-caused hazards that are intentional and often planned. An attack can result in a variety of hazards; for example, terrorists might compromise a dam leading to catastrophic dam failure. Other hazards that can be intentionally initiated by human actions given the appropriate materials and motivation include infectious disease, transportation incidents, hazardous material releases, utility or communications failures, and wildland fires. (Source: ND State Emergency Operations Plan, December 2018)

Identified Impacts

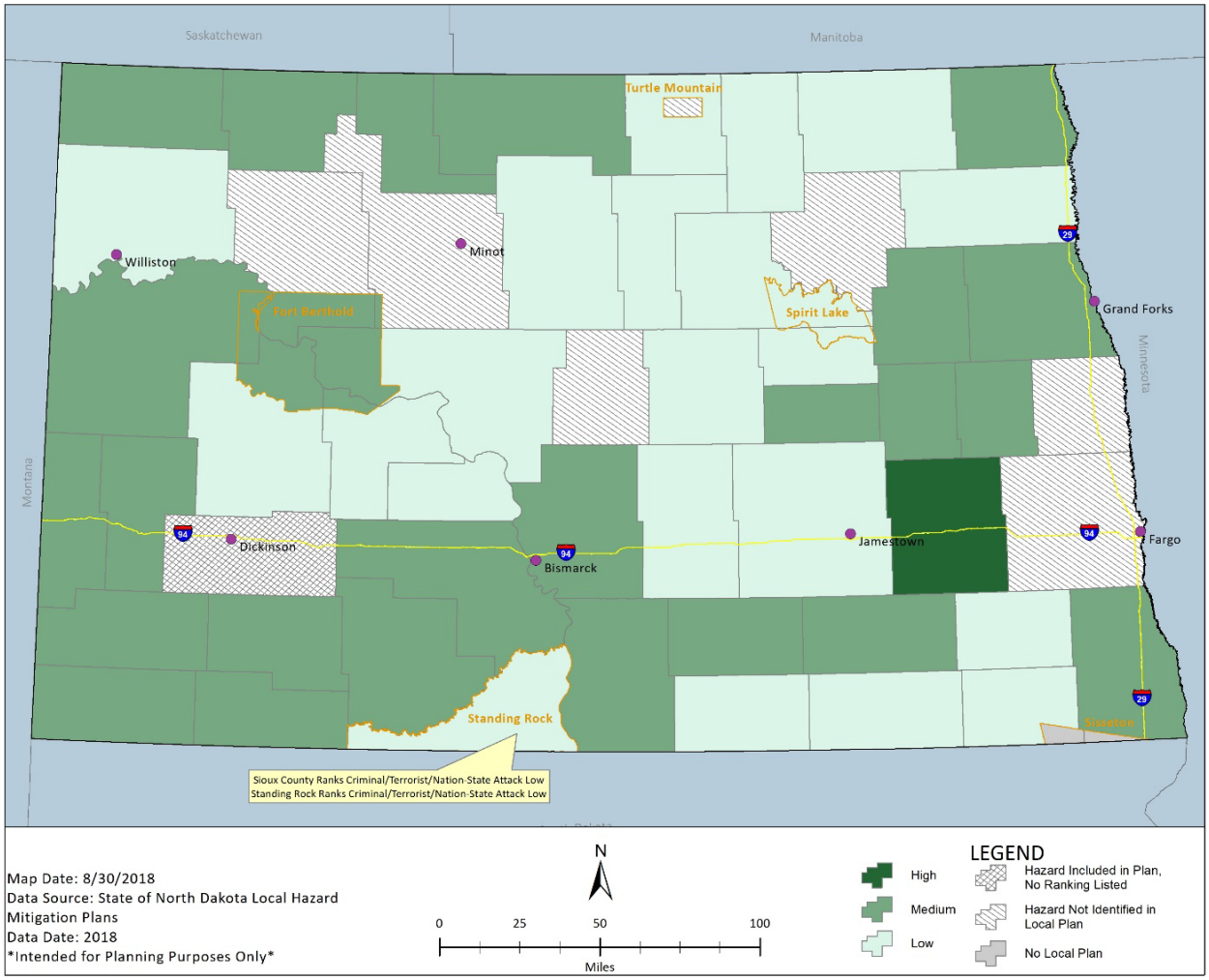
- Blocked Roads
- Business Interruptions
- Delayed Emergency Response
- Downed Power Lines
- Evacuation (Full)
- Evacuation (Localized)
- Explosion
- HAZMAT Release
- Increased Fire Potential
- Increased Public Safety Runs
- Livestock Injury/Death
- Loss of Economy
- Loss of Potable Water
- Loss/Overcrowded Medical Facilities
- Loss of Power
- Mass Casualties
- Property Damage
- School Closure

History

Although there have been no National Security Emergencies specific to Emmons County, any suspicious activity is reported to the ND State and Local Intelligence Center.

August 10, 2016 - March 23, 2017: One of the longest unlawful assemblies and civil disorders in United States history occurred in response to the construction of the Dakota Access Pipeline, which connected the Bakken and Three Forks production areas in North Dakota to Patoka, Illinois. Individuals first lawfully protested this construction project, believing that a pipeline leak would contaminate the water supply on the nearby Standing Rock Reservation. The protest escalated December 20, 2018 56 into an unlawful assembly and civil disorder on August 10, 2016. This occurred along North Dakota State Highway 1806, just north of Cannonball, North Dakota. The majority of activities occurred in Morton and Sioux Counties; however, Burleigh and Emmons Counties also experienced activity on a smaller scale. (Source: ND State Emergency Operations Plan, December 2018)

Criminal, Terrorist, National/State Attack Hazard Ranking



(Source: ND State Emergency Operations Plan, December 2018)

Critical Facilities

Critical facilities and infrastructure are assets essential to public safety and continuity of government operations. Damaged or destroyed facilities or infrastructure could have debilitating effects on safety, security, public health, or the economy in Emmons County.

The hazards most likely to impact critical facilities are cyberattack, flood, hazardous materials release, severe summer weather, severe winter weather, and space weather.

- Cyberattack: Critical facilities utilize computerized system(s) as a main function of providing services.

- Flood: Flooding of the Missouri River and Beaver Creek cause damage to homes in the western and central parts Emmons County and the City of Linton as well as farmland and rural homes along the creek areas. During flooding events, roads may become inundated with water and cut off accessibility to critical facilities.

- Hazardous Materials Release: Hazardous materials are transported via three modes into and within Emmons County: Highways, Railroad, and Air. Dependent upon location of release, critical facilities could be affected with damage or complete loss.

- Space Weather: Solar flares would impact communications, solar radiation storms will impact satellites, and geomagnetic storms will cause the greatest damage—disrupting navigation systems such as the Global Navigation Satellite System (GNSS) and creating harmful geomagnetic-induced currents (GICs) in the power grid and pipelines. It's possible for these storms to cause power grid energy spikes, which could trigger fires, power blackouts and physically harm individuals coming into contact with storm-spiked wires or pipelines.

- Summer Weather: Extreme heat, hail, lightning, high winds, and tornadoes may cause damage or complete loss to some critical facilities in Emmons County.

- Winter Weather: Major arterials are vulnerable to becoming blocked with snow making them impassible. Many county and township roads become blocked during winter storms and cities are largely affected by winter storms.

Major facilities and infrastructure:

Category	Type
Communications	Cell Towers Communication Towers Media
Emergency Services	Law Fire Emergency Medical Services (EMS) Public Works
Energy/Utility	Electric Power Generation and Substations Pipelines Transmission Lines Utility Companies Water Distribution Systems Water Towers Water Treatment Plants
Financial Institutions	Banks Credit Unions
Government	Courthouses Schools
Industrial and Storage	Food Processing and/or Storage Fuel Health and Medical Supplies Major Industries
Medical	Clinics Hospital Long-Term Care Facilities Pharmacies
Transportation	Airports Highways/Bridges Railroads

Cyberattack

Frequency	Possible (1-10% probability in next year, or at least 1 chance in next 100 years)
Severity	Critical (25-50% of jurisdiction affected)
Risk Class	B
Seasonal Pattern	None
Duration	Days/Weeks
Speed of Onset	None
Location	Countywide

Description

A cyberattack 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 cyberattack 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 cyberattacks that governments, businesses, and people are at risk to, as described below (Crime Statistics Online [CSO], 2017).

1. **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.
2. **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.
3. **Unpatched software:** Cyber attackers can access software on users' computers if the software patches are not up to date.
4. **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.
5. **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.
6. **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.
7. **Doxing:** Discovering and releasing of personally identifiable information.

Unified Cybersecurity Approach

April 11, 2019: Senate Bill 2110 was signed by the Governor to make ND the first state to authorize a central, shared service approach to cybersecurity strategy across all aspects of state government including state, local, legislative, judicial, K-12 education and higher education. The state network has 252,000 daily users and more than 400 entities.

Identified Impacts

- Agriculture
- Blocked Roads
- Business Interruptions
- Delayed Emergency Response
- Loss of Economy
- Loss of Power

History

Cyberattacks against North Dakota state government nearly tripled last year. "Shawn Riley, North Dakota's chief information officer and head of the information technology department, said there were more than 15 million cyberattacks against the state's government per month in 2019, a 300 percent increase since 2018. In 2018, there were about 5 million attempted cyberattacks per month." (Source: The Hill, January 18, 2020)

Cyberattacks occur on a daily basis and are mitigated through protected networks and servers through the ND Department of Information Services. State officials estimate the state sees roughly five million cyberattack attempts each month. (Source: Government Technology, April 12, 2019)

Known attacks:

2016: During the Dakota Access Pipeline (DAPL) criminal protests, unknown individual(s) released personally-identifying information of local officials and 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 Doxing emails and social media posts, which publicly identifies or publishes private information about someone, especially as a form of punishment or revenge.

Dam Failure

Frequency	Possible (1-10% probability in next year, or at least 1 chance in next 100 years)
Severity	Less than 10% of jurisdiction affected
Risk Class	D
Seasonal Pattern	Spring/Summer
Duration	Days/Weeks
Speed of Onset	Little Warning
Location	Western Boundary of Emmons County and Nieuwsma Dam Area

Description

A dam is any artificial barrier, including appurtenant works, which impounds or diverts water. Its purposes include the storage of water for irrigation, hydroelectric power generation, flood control, water supply, recreation, wildlife, etc. A dam failure is defined as a sudden, rapid, and uncontrolled release of impounded water that will create a potential significant downstream hazard. The dam failure hazard is determined by the potential loss of life and downstream property damage it may cause, and not by any particulars of the dam itself. There are many reasons and/or potential causes for dam failure such as terrorism, earthquakes, etc.; however, the most common reasons are hydraulic inadequacy, seepage problems, and structural defects.

The "FEMA Federal Guidelines for Dam Safety, Hazard Potential Classification System for Dams, January 2015" shows a method of categorizing dams by risk that will provide an initial sorting of dam safety actions.

Urgency of action	Characteristics and considerations	Potential actions
I – VERY HIGH URGENCY	CRITICALLY NEAR FAILURE: There is direct evidence that failure is in progress, and the dam is almost certain to fail during normal operations if action is not taken quickly. OR EXTREMELY HIGH RISK: Combination of life or economic consequences and likelihood of failure is very high with high confidence.	• Take immediate action to avoid failure. Communicate findings to potentially affected parties. • Implement IRRMs. • Ensure that the emergency action plan is current and functionally tested. • Conduct heightened monitoring and evaluation. Expedite investigations and actions to support long-term risk reduction. • Initiate intensive management and situation reports.
II - HIGH URGENCY	RISK IS HIGH WITH HIGH CONFIDENCE, OR IT IS VERY HIGH WITH LOW TO MODERATE CONFIDENCE: The likelihood of failure from one of these occurrences, prior to taking some action, is too high to delay action.	• Implement IRRMs. • Ensure that the emergency action plan is current and functionally tested. • Give high priority to heightened monitoring and evaluation. Expedite investigations and actions to support long-term risk reduction. • Expedite confirmation of classification.
III - MODERATE URGENCY	MODERATE TO HIGH RISK: Confidence in the risk estimates is generally at least moderate, but can include facilities with low confidence if there is a reasonable chance that risk estimates will be confirmed or potentially increase with further study.	• Implement IRRMs. • Ensure that the emergency action plan is current and functionally tested. • Conduct heightened monitoring and evaluation. Prioritize investigations and actions to support long-term risk reduction. • Prioritize confirmation of classification as appropriate.
IV – LOW TO MODERATE URGENCY	LOW TO MODERATE RISK: The risks are low to moderate with at least moderate confidence, or the risks are low with low confidence, and there is a potential for the risks to increase with further study.	• Ensure that routine risk management measures are in place. • Determine whether action can wait until after the next periodic review. • Before the next periodic review, take appropriate interim measures and schedule other actions as appropriate. • Give normal priority to investigations to validate classification, but do not plan for risk reduction measures at this time.
V – NO URGENCY	LOW RISK: The risks are low and are unlikely to change with additional investigations or studies.	• Continue routine dam safety risk management activities and normal operations and maintenance.

Source: FEMA Federal Guidelines for Dam Safety, page 30, Table 1 – Joint Federal risk categories

Identified Impacts

- Blocked Roads
- Building Collapse
- Business Interruptions
- Delayed Emergency Response
- Downed Power Lines
- Downed Trees
- Evacuation (Localized)
- Flooding (Street)
- Flooding (Structure)
- HAZMAT Release
- Increased Public Safety Runs
- Livestock Injury/Death
- Loss of Economy
- Loss of Potable Water
- Loss of Power
- Mass Casualties
- Property Damage
- School Closure
- Sewer Backup

The ND State Water Commission identifies 103 dams in Emmons County. All of these dams have an element of hazard to cause loss of life and property damage should the dam fail. One dam is classified as "Significant" and has the required Emergency Action Plan.

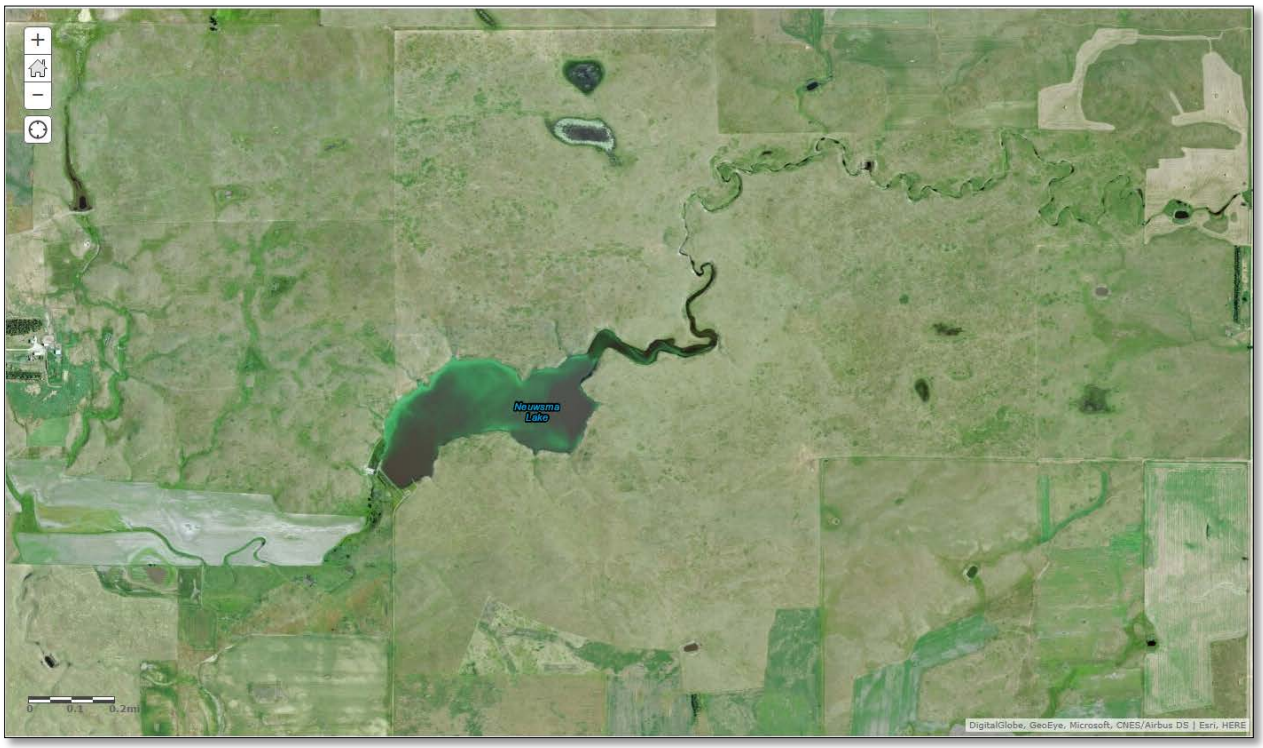
Location	Type	Structure Name	County	Purpose	Federal Hazard Class
12907422BB	Dam	129-074-22BB	Emmons		None Listed
12907431BB	Dam	Hirning Dam; Ervin	Emmons	Livestock	None Listed
12907431BC	Dam	129-074-31BC	Emmons		None Listed
12907431CBA	Dam	129-074-31CBA	Emmons		None Listed
12907527AAA	Dam	Nieuwsma Dam	Emmons	Recreation	Significant
12907531CB	Dam	Fieldheim Dam; Andrew	Emmons	Livestock	None Listed
12907628CD	Dam	129-076-28CD	Emmons		None Listed
12907628DC	Dam	Vandervorst Dam; Wilbur	Emmons	Livestock	None Listed
12907629BB	Dam	129-076-29BB	Emmons		None Listed
12907629DD	Dam	Baschker Dam; Annie	Emmons	Livestock	None Listed
12907630ACA	Dam	129-076-30ACA	Emmons		None Listed
12907630BBC	Dam	129-076-30BBC	Emmons		None Listed
12907630CB	Dam	Pollock Land Co. Dam	Emmons		None Listed
12907631A	Dam	129-076-31A	Emmons		None Listed
12907631AB	Dam	129-076-31AB	Emmons		None Listed
12907632BC	Dam	129-076-32BC	Emmons		None Listed
12907632CB	Dam	Pollock Dam; Robert	Emmons	Livestock	Undetermined
12907632D	Dam	129-076-32D	Emmons		None Listed
12907715DAD	Dam	129-077-15DAD	Emmons		None Listed
12907715DD	Dam	Ryckman Dam; David	Emmons	Livestock	Undetermined
12907731BDB	Dam	Odde Dam; Larry	Emmons	Fish & Wildlife	Low
12907809CC	Dam	Vanderlaan Dam; John	Emmons	Livestock	Undetermined
12907809DC	Dam	Vanderlaan Dam; Keith	Emmons	Livestock	Undetermined
12907814CC	Dam	Becker Dam; Donald 1	Emmons	Livestock	Undetermined
12907814DB	Dam	129-078-14DB	Emmons		None Listed
12907815CA	Dam	Becker Dam; Donald 2	Emmons		Undetermined
12907816BC	Dam	Vanderwal Dam; Karl 1	Emmons	Livestock	Undetermined
12907817AB	Dam	129-078-17AB	Emmons		None Listed
12907818AD	Dam	Vanderwal Dam; Karl 2	Emmons	Livestock	Undetermined
12907821DB	Dam	Meyer Dam; Peter	Emmons	Livestock	Undetermined
12907823BD	Dam	Ryckman Dam; Arlo	Emmons	Livestock	Low
12907901AB	Dam	Ackeson Dam; Ray	Emmons	Livestock	None Listed
12907913BD	Dam	Halsne Estate Dam	Emmons	Livestock	None Listed
13007515CC	Dam	NIEUWSMA DAM; RAY	Emmons	Livestock	Low
13007525CA	Dam	EBERLY DAM; JOSEPH	Emmons	Livestock	Low
13007628BD	Dam	Vanderval Dam; Karl	Emmons	Livestock	Low

13107507BC	Dam	BAUMAN DAM; RONALD	Emmons	Livestock	Low
13107733DB	Dam	Welk Dam	Emmons	Recreation	Low
13107821BA	Dam	Parmley Dam; Richard	Emmons	Livestock	Low
13207416DC	Dam	FLICKERTAIL DAM	Emmons	Fish & Wildlife	None Listed
13207418BC	Dam	Schaffer Dam; Jacob No.2	Emmons	Livestock	Low
13207436AA	Dam	Weisser Dam	Emmons	Livestock	Low
13207513AA	Dam	Schaffer Dam; Jacob No.1	Emmons	Livestock	Low
13207513BB	Dam	Schaffer Dam; Jacob No.5	Emmons	Livestock	Low
13207513CA	Dam	Schaffer Dam; Jacob No.4	Emmons	Livestock	Low
13207513DA	Dam	Schaffer Dam; Jacob No.3	Emmons	Livestock	Low
13207601BB	Dam	Nieuwsm No. 1	Emmons	Livestock	Low
13207612AB	Dam	NIEUWSMA DAM; J ED 2	Emmons	Fish & Wildlife	Low
13207612AC	Dam	NIEUWSMA DAM; J ED 5	Emmons	Livestock	Low
13207612BC	Dam	NIEUWSMA DAM; J ED 4	Emmons	Livestock	Low
13207612CCB	Dam	NIEUWSMA DAM; J ED 1	Emmons	Fish & Wildlife	Low
13207612DA	Dam	Nieuwsma Dam; Ed 6	Emmons	Fish & Wildlife	Low
13207613BAA	Dam	NIEUWSMA DAM; J ED 3	Emmons	Fish & Wildlife	Low
13207617D	Dam	132-076-17	Emmons		Low
13207618AD	Dam	BEAVER CK LAND MANAGE LLP#2	Emmons	Livestock	Low
13207618DA	Dam	BEAVER CK LAND MANAGE LLP#1	Emmons	Livestock	Low
13207633AD	Dam	RODENBURG DAM; RAYMOND 1	Emmons	Fish & Wildlife	Low
13207712E	Dam	132-077-12	Emmons	Other	Low
13207722DB	Dam	SCHATZ DAM; RIENHOLD	Emmons	Fish & Wildlife	Low
13207723BD	Dam	Gleason Dam; Connie	Emmons	Fish & Wildlife	Low
13207729BC	Dam	OLIVER DAM; KEVIN	Emmons	Livestock	Low
13207813BB	Dam	Klaudt Dam; Reinhold	Emmons	Irrigation	Low
13307432AC	Dam	HOFF DAM; ALFRED	Emmons	Fish & Wildlife	Low
13307503D	Dam	Ferderer Dam; Kevin	Emmons	Livestock	Undetermined
13307518BA	Dam	SANDWICK DAM; LOUIS	Emmons	Livestock	Low
13307533AB	Dam	Spring Water Lake Dam	Emmons	Livestock	Low
13307534DA	Dam	Ibach Dam; Terry	Emmons	Fish & Wildlife	Low
13307605BB	Dam	Temvik Dam	Emmons	Livestock	Low

13307625AC	Dam	RODENBURG DAM; RAYMOND 2	Emmons	Fish & Wildlife	Low
13307625AD	Dam	RODENBURG DAM; RAYMOND 3	Emmons	Fish & Wildlife	Low
13307629BDD	Dam	ALVERSHERE DAM; LLOYD	Emmons	Fish & Wildlife	Low
13307717AB	Dam	HUBER DAM; JERALD	Emmons	Livestock	Low
13307729A	Dam	Hilzendeger Dam; Randy 1A	Emmons	Livestock	Low
13307729BA	Dam	Hilzendeger Dam; Randy	Emmons	Livestock	Undetermined
13307729D	Dam	Hilzendeger Dam; Randy 3A	Emmons	Livestock	Low
13307729D	Dam	Hilzendeger Dam; Randy 2A	Emmons	Livestock	Low
13307804BA	Dam	Sunburst Lake Dam	Emmons	Fish & Wildlife	Low
13307804BB	Dam	Horsehead Creek Dam 1	Emmons	Fish & Wildlife	Low
13407536BC	Dam	ND STATE LAND DEPT DAM 12	Emmons	Livestock	Low
13407603BA	Dam	APPERT LAKE DAM	Emmons	Fish & Wildlife	Low
13407734AC	Dam	WILHELM DAM; DONALD H	Emmons	Livestock	Low
13407806AB	Dam	Humann Dam; Pat 2	Emmons	Fish & Wildlife	Undetermined
13407806BA	Dam	Humann Dam; Pat 1	Emmons	Livestock	Undetermined
13407815BD	Dam	SCHIERMEISTER DAM; WILLIAM	Emmons	Livestock	Low
13407817AD	Dam	Streyle Dam; Jack	Emmons	Fish & Wildlife	Low
13407924AA	Dam	Ryckman Dam; Daniel	Emmons	Livestock	Low
13507504BA	Dam	Braddock Dam	Emmons	Irrigation	Low
13507803CA	Dam	FOELL DAM; SHELLY 2	Emmons	Livestock	Low
13507803DD	Dam	FOELL DAM; SHELLY 1	Emmons	Livestock	Low
13507817AC	Dam	GRENZ DAM; KENNETH	Emmons	Fish & Wildlife	Low
13507831BC	Dam	Humann Dam 2; Mitch	Emmons	Livestock	Undetermined
13507831CB	Dam	Humann Dam; Mitch	Emmons	Livestock	Undetermined
13507832AB	Dam	Grenz Dam; Lyle 2	Emmons	Fish & Wildlife	Low
13507832BA	Dam	Grenz Dam; Lyle 1	Emmons	Fish & Wildlife	Low
13607517DB	Dam	NAADEN DAM; PETE 1	Emmons	Fish & Wildlife	Low
13607521CC	Dam	Naaden Dam; Pete 4	Emmons	Livestock	Low
13607521CD	Dam	Naaden Dam; Pete 5	Emmons	Fish & Wildlife	Low

13607522CC	Dam	Naaden Dam; Pete 2	Emmons	Livestock	Low
13607522DC	Dam	NAADEN DAM; PETE 3	Emmons	Fish & Wildlife	Low
13607618CC	Dam	Schlittenhart Dam; Bob	Emmons	Livestock	Low
13607627DB	Dam	SCHIERMEISTER DAM; JAMES	Emmons	Livestock	Low
13607704AD	Dam	VETTER DAM; DONALD	Emmons	Livestock	Low
13607823AA	Dam	KALBERER DAM; JOSEPH E	Emmons	Fish & Wildlife	Low

The Nieuwsma Dam is classified as “Significant” and is located 5 miles south, 1 mile east, and 1 mile north of the intersection of US Highway 83 & ND 11. It’s a recreational purpose dam and a popular fishing area in Emmons County. Failure of the rural dam would most likely result in agricultural loss due to location and three farmsteads with multiple structures.

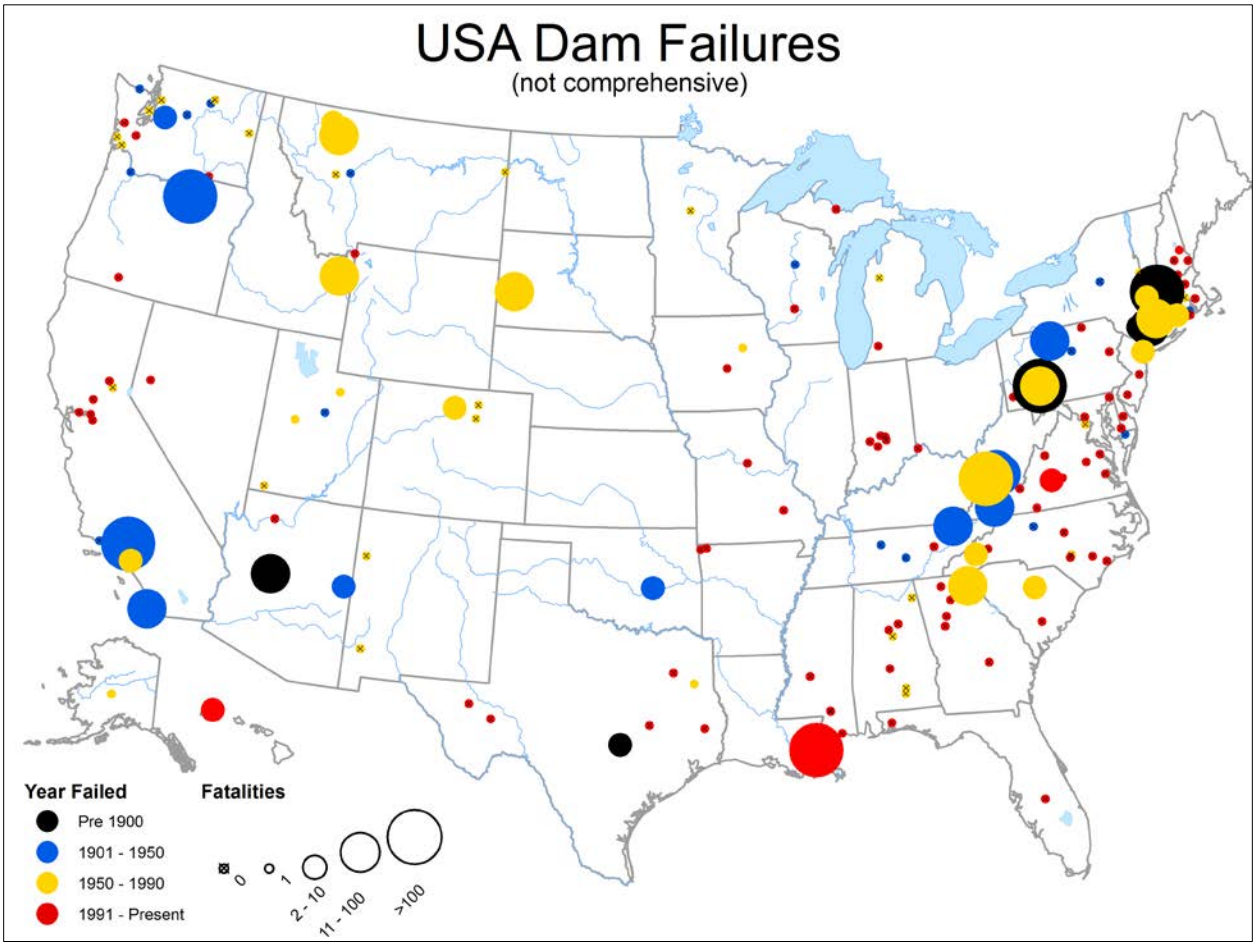


Source: ND Game and Fish website

History

July 15, 1995—Dam Failure. Reports of up to 10 inches of rain during the first part of July caused the Appert Lake Dam (Located southeast of Hazelton. . Latitude: 46.446656, **Longitude:** -100.2120562) to fail. Parts of Highway 13 were flooded for a time. No reports of property damage were received.

The Association of State Dam Safety Officials presents a map on their website compiled of a list of dam failures. "No one knows precisely how many dam failures have occurred in the U.S., but they have been documented in every state. From January 2005 through June 2013, state dam safety programs reported 173 dam failures and 587 "incidents" - episodes that, without intervention, would likely have resulted in dam failure."



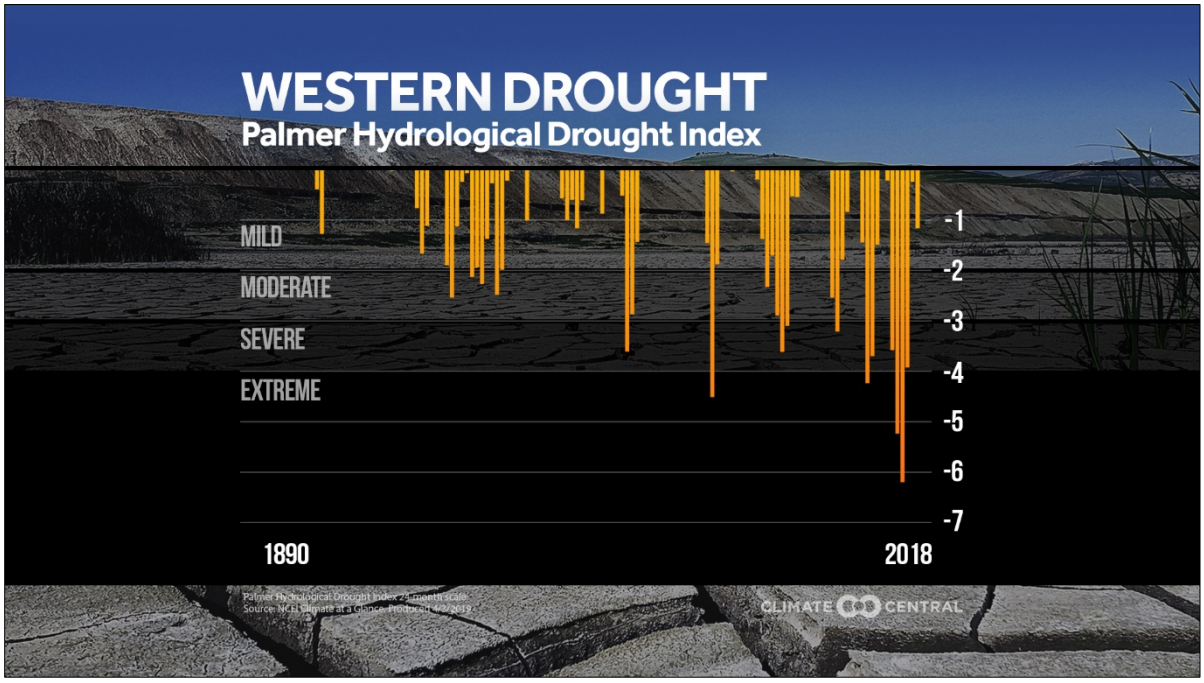
Source: https://damsafety.org/

Drought

Frequency	Likely (10-100% probability in the next year, or at least 1 chance in next 10 years)
Severity	Critical (25-50% of jurisdiction affected)
Risk Class	B
Seasonal Pattern	Summer
Duration	Weeks/Months
Speed of Onset	Slow Onset
Location	Countywide

Description

Drought is a condition of climatic dryness which is severe enough to reduce soil moisture and water below the minimum necessary for sustaining plant, animal, and human life systems. Drought characteristics usually include precipitation levels well below normal and temperatures higher than normal. In addition to severe damage to vegetation, soil in a drought area becomes dry and crumbles. Often, topsoil is blown away by hot, dry winds. Streams, ponds, and wells often dry up during a drought, thus wildlife and livestock suffer and even die. Although agriculture production is the most obvious recipient of drought losses, this hazard will also attack urban areas by impacting on domestic and industrial water supplies.



Source: Climate Central

Identified Impacts
It is a fact that precipitation deficits as little as four to six inches can cause severe drought conditions.

Drought severity regarding our agriculture procedures depends on time of year, timing of precipitation, amount of stored soil water, type of crop, stage of growth, and meteorological variables such as temperature, humidity, and wind.

A number of secondary hazards are generally associated with drought. Rural grassland fires increase because of dry vegetation. Reduction in vegetation cover will expose the soil to wind, and dust storms and soil erosion will occur. Because of reduction in flow, the chemical quality of river and lake water will change, and the sediment transport regimes of streams will be altered.

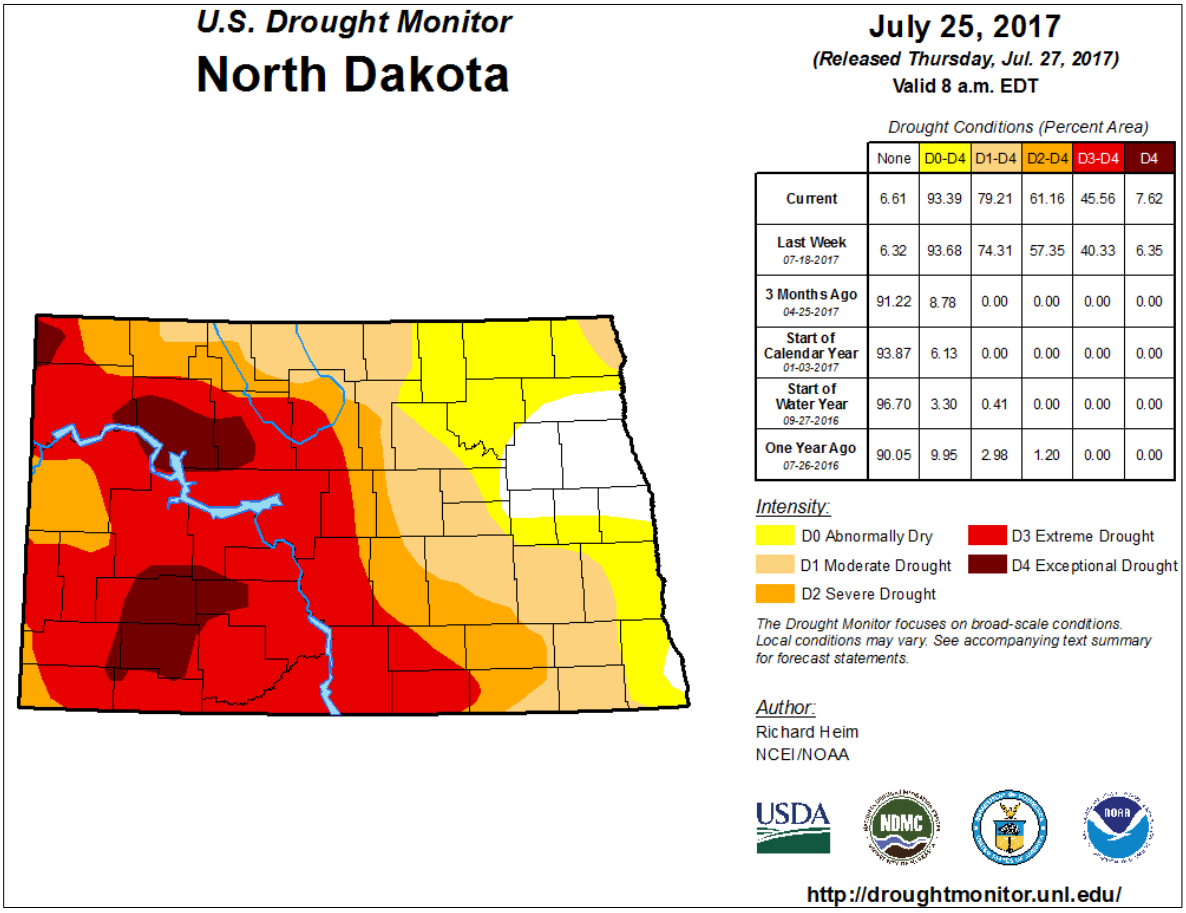
Deterioration in water quality, in turn, results in injury and death to plants and animals. Stagnant pools along river courses will provide favorable habitats for insects, particularly mosquitoes and grasshoppers. Finally, with the return of the rains, the dry and unstable topsoil is vulnerable to gullying and flooding.

There are a wide range of possible consequences that have and can occur again in regard to drought.

- Business Interruptions
- Increased Fire Potential
- Livestock Injury/Death
- Loss of Economy
- Loss of Potable Water
- Property Damage

History

June-August, 2017—Extreme drought in Emmons County. Severity similar to 2006.



June 26, 2006—Emmons County declared a drought emergency. Extreme dry conditions caused lack of feed and water shortages for livestock, crop failures, water quality problems, and extreme danger of rural fires. Emmons County was declared a disaster area due to drought conditions.

June, 2002—Emmons County declared a drought emergency. Extreme dry conditions caused lack of feed and water shortages for livestock, crop failures, water quality problems, and extreme danger of rural fires.

June 12, 1992—Emmons County was declared a disaster area due to drought conditions.

May 1, 1990—Emmons County continues to experience drought since 1988 and was again declared a disaster area.

June 7, 1988—Emmons County was declared a disaster area due to drought conditions because of high temperatures and lack of rain. A burning ban was issued for all private and public fireworks. Cattlemen were forced to sell some of their livestock because of lack of feed. This drought extended into 1989.

July 21, 1976—Emmons County included in Federal Emergency Declaration.

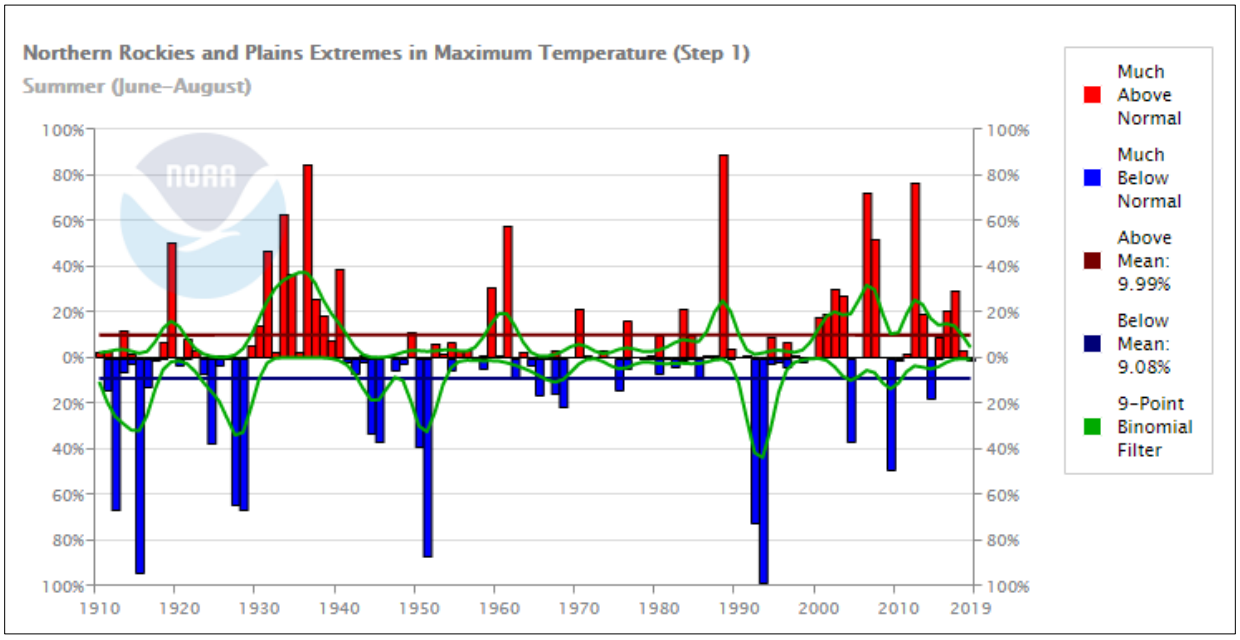
Excessive Heat

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
EMMONS (ZONE)	EMMONS (ZONE)	ND	07/16/2011	11:00	CST-6	Excessive Heat		0	0	0.00K	0.00K
Totals:								0	0	0.00K	0.00K

Source: National Oceanic and Atmospheric Administration National Climatic Data Center Website (01/1950 to 10/2019)

U.S. Climate Extremes Index (CEI)

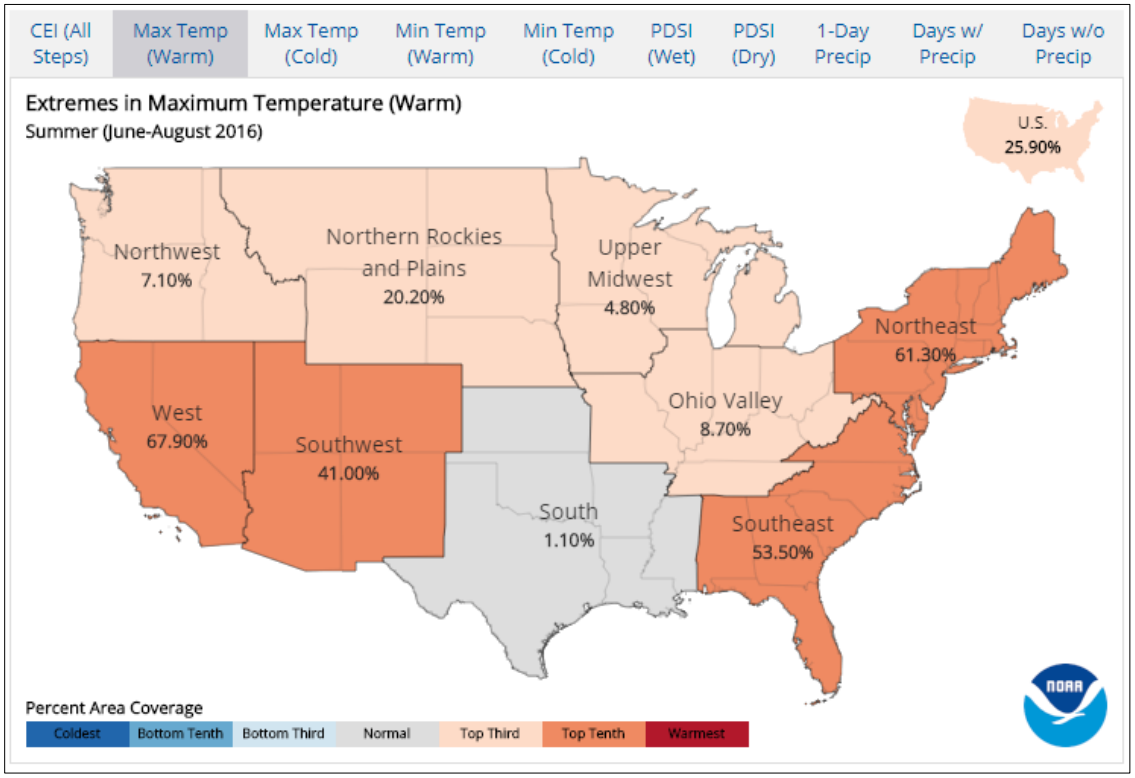
Extremes in maximum temperature for the period of Summer (June-August) from 1910-2019.



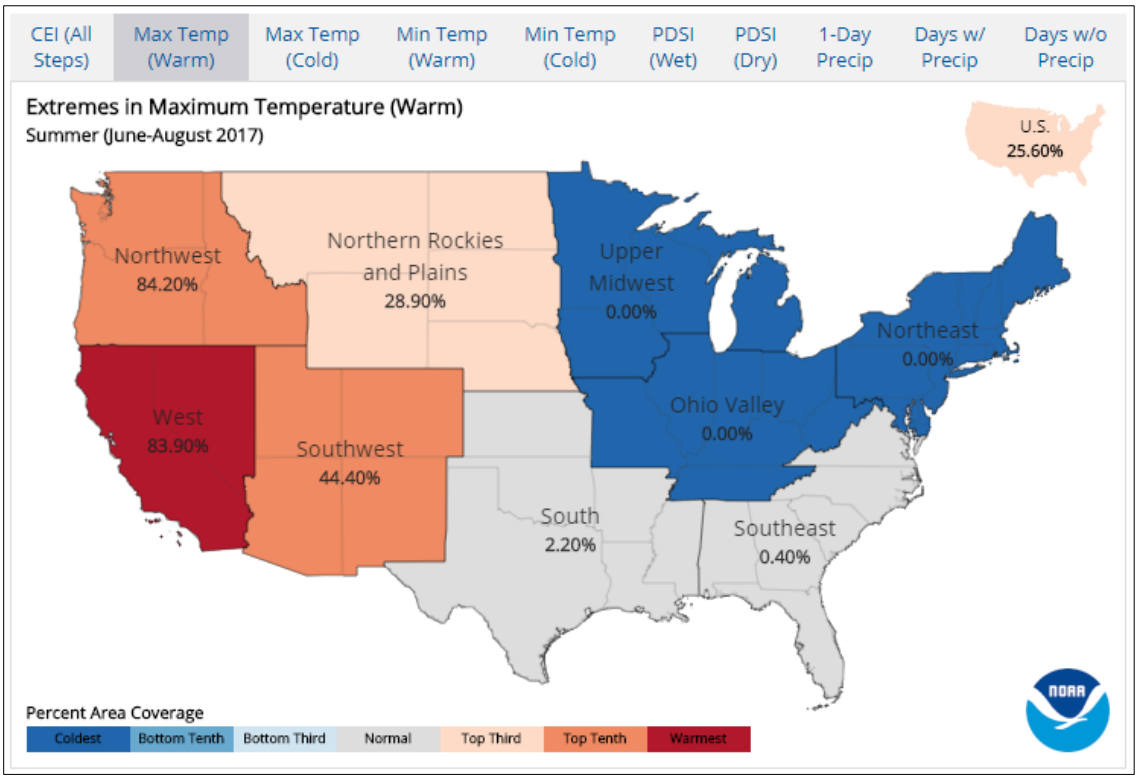
Source: www.ncdc.noaa.gov

U.S. Climate Extremes Index (CEI)

The 2016 and 2017 summer periods were the warmest periods of the previous 5 years.



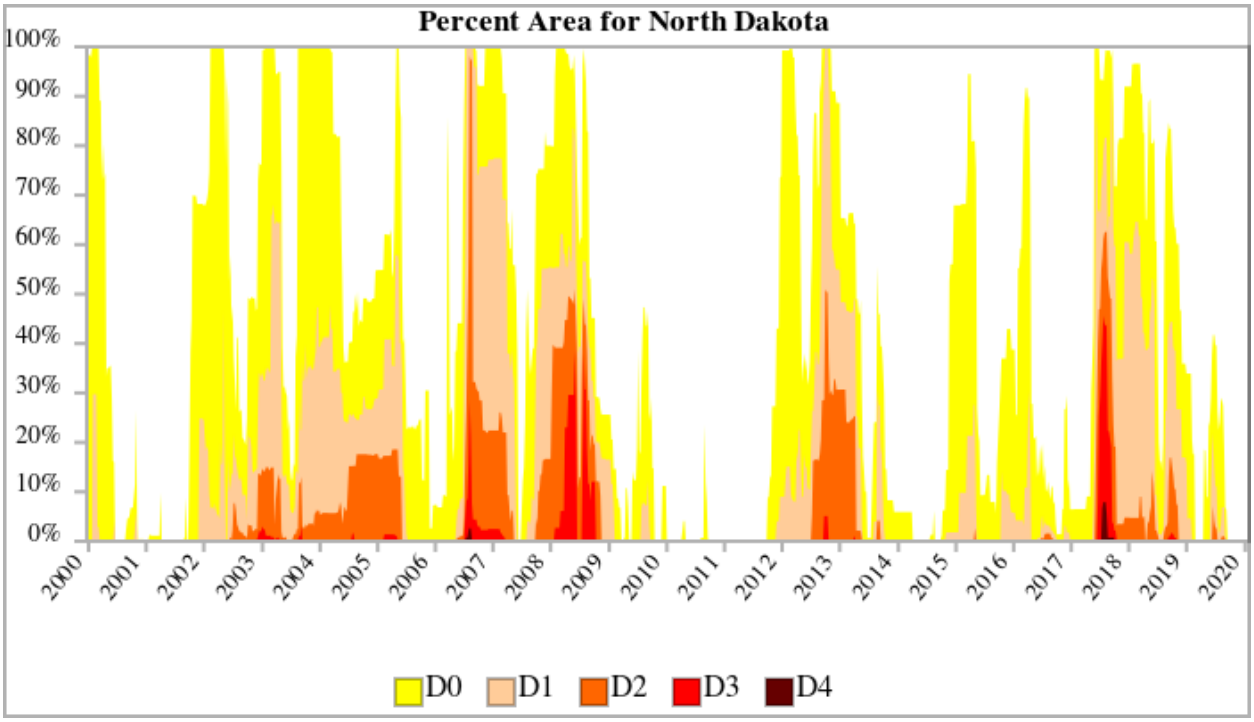
Source: www.ncdc.noaa.gov



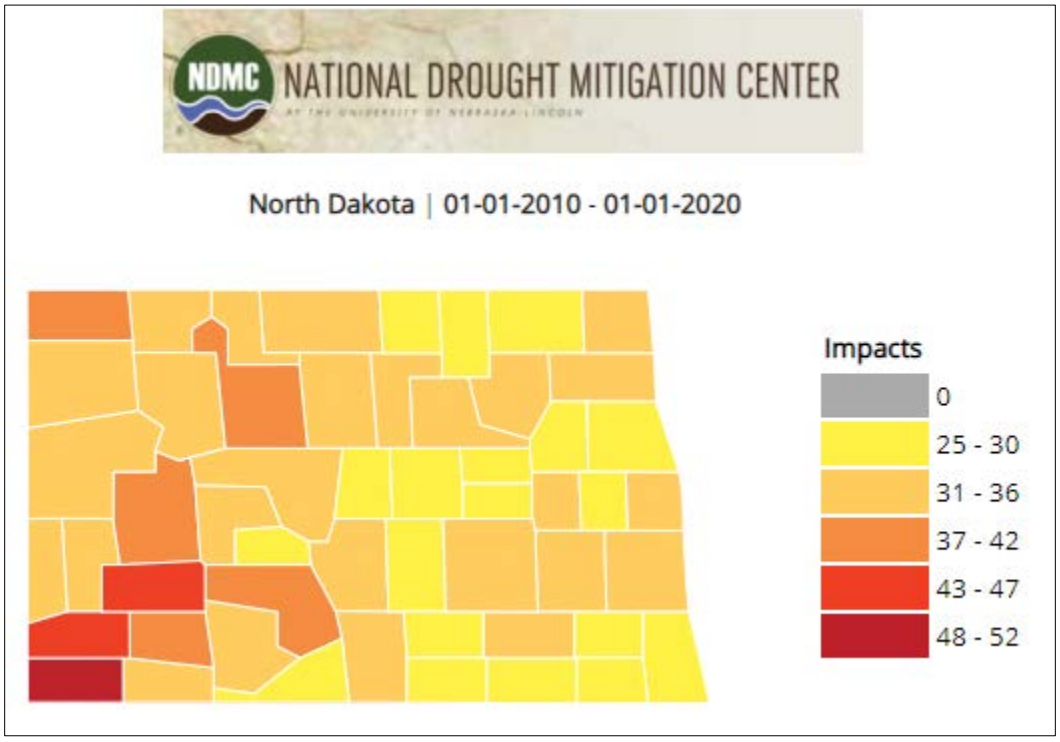
Source: www.ncdc.noaa.gov

United States Drought Monitor

The U.S. Drought Monitor started in 2000. Since 2000, the longest duration of drought (D1-D4) in North Dakota lasted 162 weeks beginning on June 4, 2002 and ending on July 5, 2005.



Source: www.drought.gov



Source: National Drought Mitigation Center

Fire

Frequency	Highly Likely (Nearly 100% probability in the next year)
Severity	Negligible (Less than 10% of jurisdiction affected)
Risk Class	D (Low risk condition, to be considered in planning)
Seasonal Pattern	None
Duration	Hours
Speed of Onset	No warning
Location	Countywide

Urban Fire Description

The urban fire department is one of the oldest continuing institutions in America. Their profession and skill is to arrive at the fire as soon as possible, get all human life to safety, and to suppress the fire as quickly as possible. Primary factors that influence the potential for urban fire or structure collapse include: Electrical; incendiary-arson; smoking materials; heating devices; fuel systems; sparks; spills; spontaneous combustion and the levels of human activity in urban areas. Primary factors may also be secondary factors to another hazard such as tornado, wildfire, and severe winter storms.

The increasing cost of natural gas and fuel oil has caused families to rediscover alternate heating methods to heat their homes. As a result, the use of space heaters, fireplaces, and wood burning stoves can increase the fire hazard.

Many portable propane gas or kerosene heaters have self-continued fuel supplies and can be hazardous; even when used according to the manufacturer's instructions. The open flame provides a potential fire hazard, fuel leakage from the container could cause an explosion, and the fuel vapor is a source of indoor pollution.

Most people have limited experience with wood burners. As a result, a number of fires are caused by faulty installation of stoves and chimneys—wood heat has a poor safety record.

Wildland Fire Description

Emmons County experiences wildland fires every year. Factors that influence the potential for wildland fires include: type, amounts and conditions of fuel supply (vegetation); temperatures; wind conditions; precipitation patterns; humidity levels; topography and the levels of human activity on the land. Fires in areas of heavy vegetation, if not quickly detected and suppressed can quickly flare out of control and cause major damage to habitat, crops, livestock, wildlife, people, and structural property.

Wildland fires can occur at any time of the year, although they seldom occur during winter months (cold and snow are excellent mitigating factors).

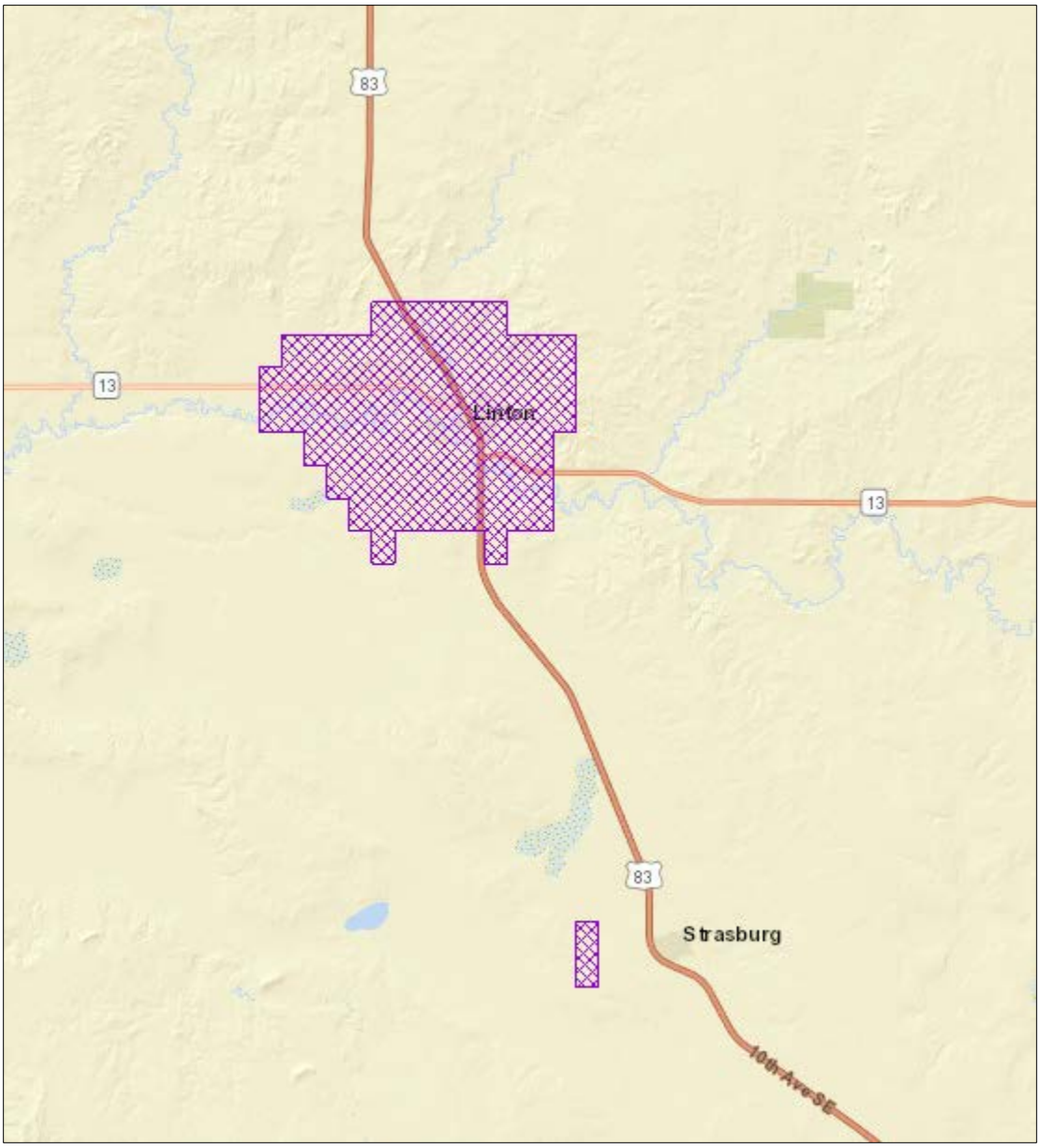
The main fire season normally begins about July 15th, when summer weather warms significantly and precipitation is usually limited to that resulting from thunderstorm activity. This longer and more dangerous season extends until about October 30th or until the first significant snow cover.

Most wildland fires result from acts of human carelessness during activities such as: controlled burns of sloughs, ditches, and fields by landowners; recreational activity such as camping, hunting, and other off-road vehicle travel; and use of fireworks preceding and immediately following the 4th of July.

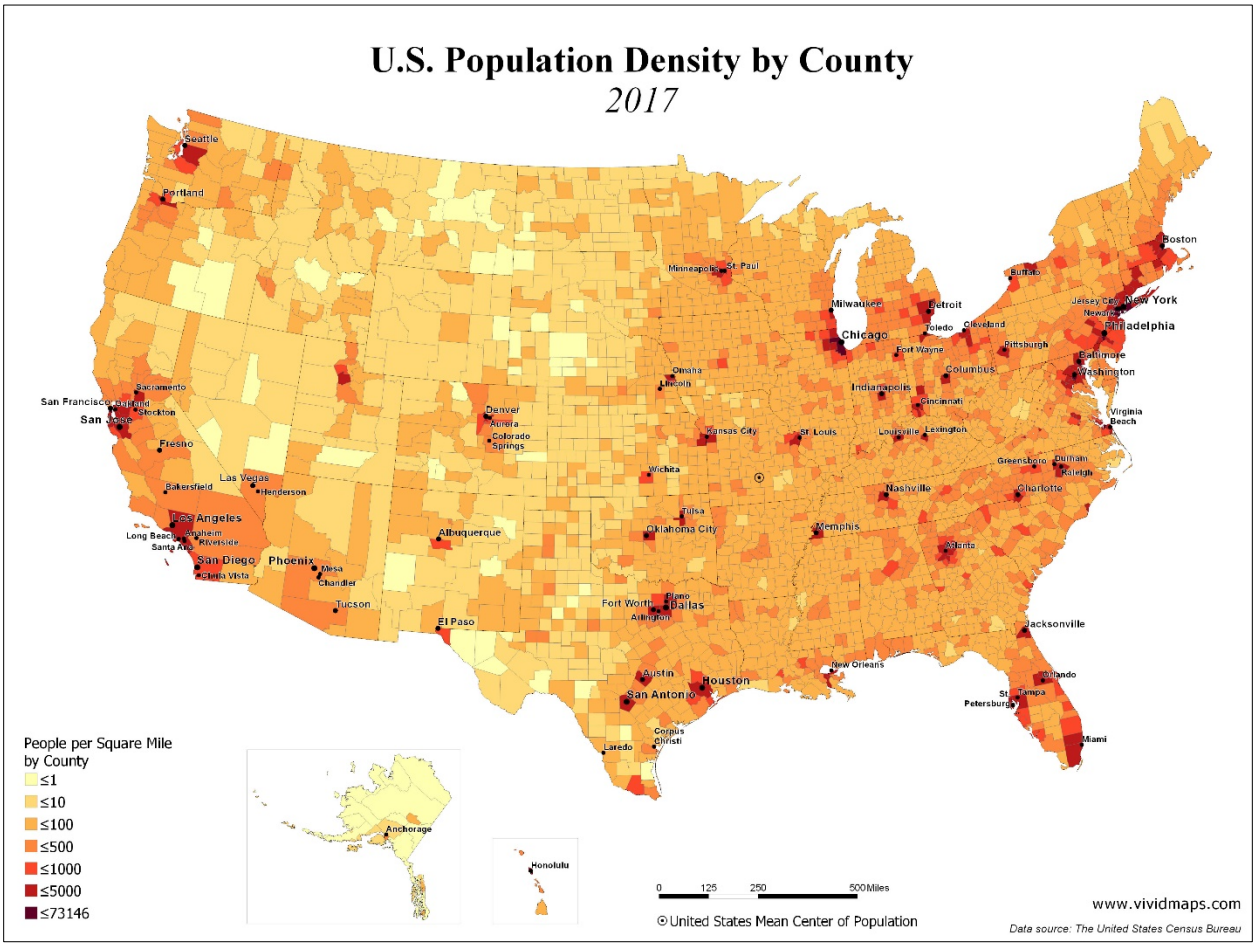
Numerous fires are reported annually as a direct result from the use of farm machinery in fields and pastures. Fires along railroad right-of-ways are common occurrences during extremely dry conditions. Finally, some fires are caused annually by Mother Nature during lightning or thunderstorms.

The vulnerability risk for Emmons County, based on the following maps, is low due to the very low-density housing.

Emmons County Wildland Urban Interface



Source: Federal Fire Occurrence Website

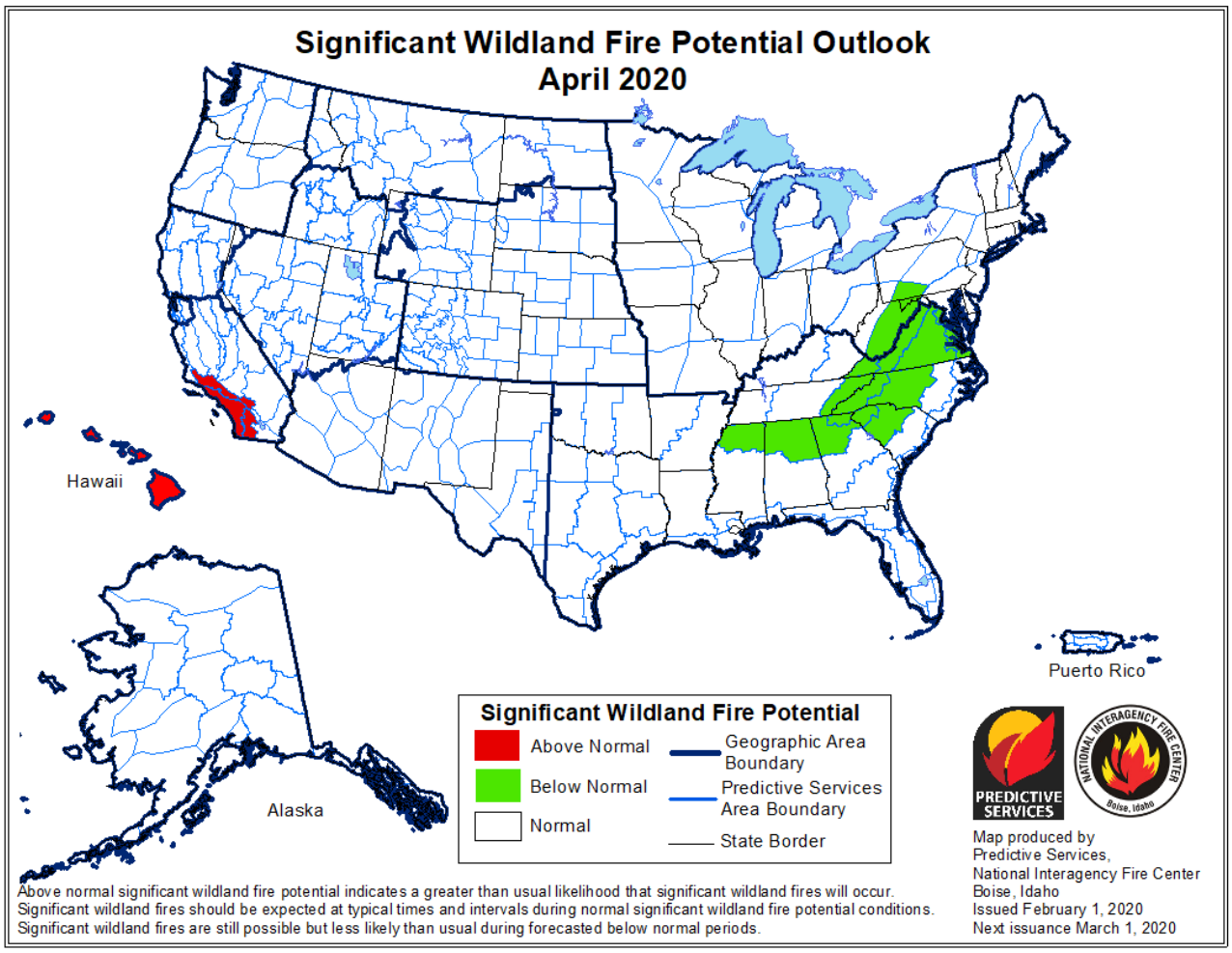


Source: https://vividmaps.com

Identified Impacts

- Agriculture
- Blocked Roads
- Building Collapse
- Business Interruptions
- Delayed Emergency Response
- Downed Power Lines
- Downed Trees
- Evacuation (Localized)
- Explosion
- HAZMAT Release
- Increased Fire Potential
- Increased Public Safety Runs
- Livestock Injury/Death
- Loss of Economy
- Loss/Overcrowded Medical Facilities
- Loss of Power
- Mass Casualties
- Personal Injury/Death Risk
- Property Damage
- School Closure

National Weather Service Fire Weather

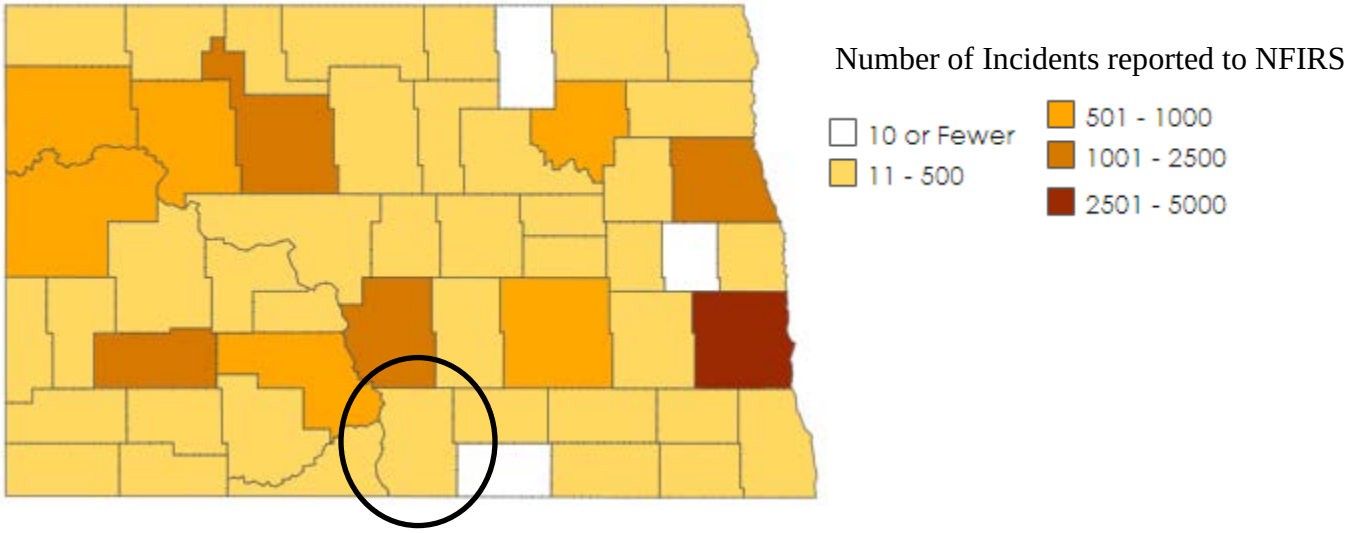


Source: [NOAA National Weather Service, Fire Weather]

History

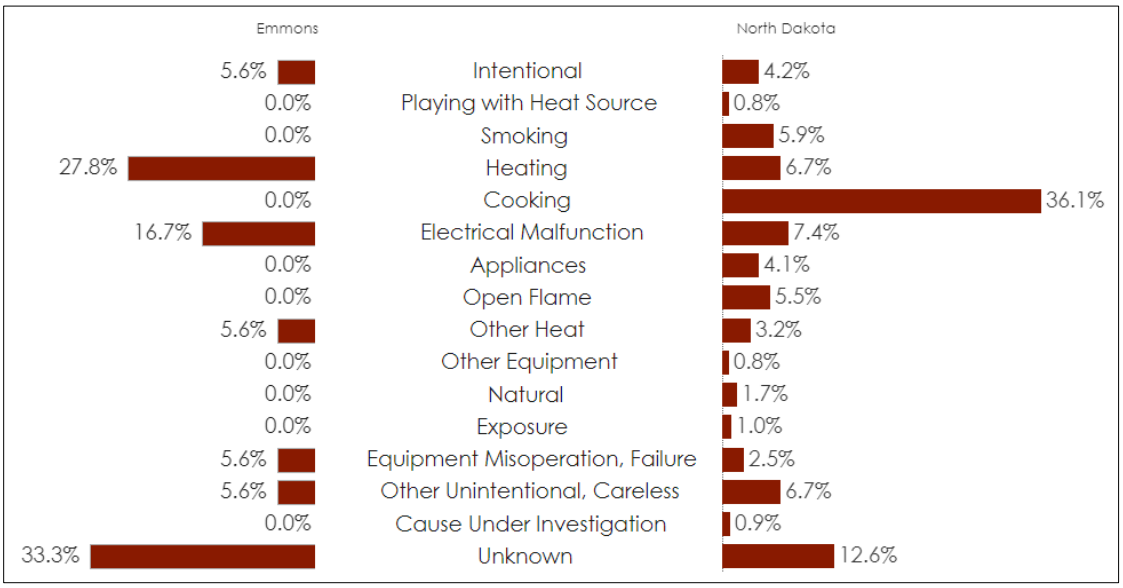
National Fire Incident Reporting System (NFIRS)

North Dakota reported 20,980 fires to the National Fire Incident Reporting System (NFIRS) from 2008-2017.



	General Property Use Type				
	Residential Fires	Non-Residential Fires	Vehicle Fires	Outside Fires	Other Fires
North Dakota	21.14%	9.98%	16.63%	46.58%	5.67%
Emmons	10.29%	8.57%	20.00%	57.71%	3.43%

Causes of residential fires:



Source: www.fema.gov

Summary By Incident Type

Report Period: From 01/01/2015 to 12/31/2019

All Selected Fire Departments

Calls By Incident Type	Frequency	Percent Of Total Calls	Mutual Aid None	Mutual Aid Given	Mutual Aid Received	Other Aid Given	Invalid Aid Flag	Exposures	Total Incidents
FIRES									
Structure Fires (110-118, 120-123)	10	6.25 %	10	4	0	0	0	0	14
Vehicle Fires (130-138)	14	8.75 %	14	1	0	0	0	0	15
Other Fires (100, 140-173)	22	13.75 %	22	8	0	0	0	0	30
Total Fires	46	28.75 %	46	13	0	0	0	0	59
Pressure Ruptures, Explosion, Overheat (200-251)	0	0.00 %	0	0	0	0	0	0	0
RESCUE CALLS									
Emergency Medical Treatment (300-323)	59	36.88 %	55	6	4	0	0	0	65
All Others (331-381)	10	6.25 %	10	11	0	0	0	0	21
Total Rescue Calls	69	43.12 %	65	17	4	0	0	0	86
Hazardous Condition Calls (400-482)	7	4.38 %	6	0	1	0	0	0	7
Service Calls (500-571)	11	6.88 %	11	0	0	0	0	0	11
Good Intent Calls (600-671)	2	1.25 %	2	3	0	0	0	0	5
Severe Weather or Natural Disaster Calls (800-815)	0	0.00 %	0	0	0	0	0	0	0
Special Incident Calls (900-911)	6	3.75 %	6	0	0	0	0	0	6
Unknown Incident Type (UUU)	0	0.00 %	0	0	0	0	0	0	0
FALSE CALLS									
Malicious Calls (710-715, 751)	0	0.00 %	0	1	0	0	0	0	1
Other False Calls (700, 721-746)	19	11.88 %	19	0	0	0	0	0	19
Total False Calls	19	11.88 %	19	1	0	0	0	0	20
TOTAL CALLS	**160**	**100.00 %**	**155**	**34**	**5**	**0**	**0**	**0**	**194**

Total Incidents With Exposure Fires	0	Total Fire Dollar Loss	$ 1,298,825.00
Total Exposure Fires	0	Total Dollar Loss	$ 1,493,825.00

Casualty Summary	Civilian	Fire Service
Fire Related Injuries	0	0
Non-Fire Injuries	0	1
Fire Related Deaths	0	0
Non-Fire Deaths	0	0

Source: ND Fire Marshal's Office, NFIRS 5.0 National Reporting System

Firefighters train in a live burn trailer

Local firefighters from the Linton and Strasburg departments had a chance to experience what obstacles they would need to overcome in a structural fire, during a training session with a live burn trailer.
(Source: Emmons County Record, October 24, 2018)

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
LINTON	EMMONS CO.	ND	04/09/2003	14:14	CST	Wildfire		0	0	0.00K	0.00K
Totals:								0	0	0.00K	0.00K

Source: National Oceanic and Atmospheric Administration National Climatic Data Center Website (01/1950 to 10/2019)

In the past there have been a number of urban structures that burned in Emmons County. Elevators in the cities of Linton, Braddock, Strasburg, and Hague have all been destroyed due to fire.

The following history was obtained from the Fire Districts and the Emmons County Record:

07-03-19 Flash fire from pickup truck and all-terrain vehicle collision. The accident was on a gravel roadway near 88th Street and 12th avenue (east of Strasburg). The collision cased the fuel cap of the ATV to break and create a flash fire. One person suffered burns to scalp and leg.

03-26-17 Prairie fire 12 miles west and 6 miles north of Linton. Fire form a garbage pit escaped and spready to a nearby stubble field.

11-26-16 A vehicle was destroyed by fire at a Linton residence near NE 3rd Street and Oak Avenue. Linton Fire & Rescue and the Emmons County ALS Ambulance responded to find a smoke-filled garage ad pushed the vehicle out of the garage. Car was a total loss, and garage sustained light smoke damage. Fire was caused when the vehicle's engine and exhaust ignited cardboard pieces that were under the engine compartment to catch oil drips.

10-11-16 Several hay bales burned in fire about five miles northeast of Linton. Cause of fire suspected to be either a cigarette thrown out of passing vehicle or spark from tractor exhaust system.

08-18-16 Combined destroyed by fire in field two miles south of Hazelton. Approximately 40 acres (50 bushels) of remaining crop burned.

(Source: Emmons County Record website)

07-19-16 Linton business complex (Lisa McCrory, CPA, Dakota Eye Institute, Wangler Chiropractic Clinic, and John R. Beck Insurance) on North Broadway damaged by fire caused by an outlet short circuit which operated a timer for an eyeglass heater.

07-14-16 Exterior fire at Road Hawg Grill in Hazelton was contained and caused damage to siding and insulation and minor smoke damage inside the restraint. Cause of fire was thought to be a smoldering cigarette in dry grass.

03-30-16 Two hours after 'not guilty' verdict issued, defendant's home and vehicle are destroyed in Hazelton. State Fire Marshal initial determination was a suspicious fire started on the exterior of the building.

09-20-15 Pickup destroyed in fire on farm located about 10 miles west of Temvik. Fire originated in the engine compartment of the pickup.

04-23-15 Prairie fire in southeast Emmons County (one mile south of US Highway 83 and Highway 11) about 4 miles southwest of Hague when rock was struck by the planter and ignited the grass. Strong winds pushed the fire as fire departments from Hague, Strasburg, Zeeland, Linton and Pollock (S.D.) responded to the scene. Also responding were the Emmons County Sheriff's Department, and the Emmons County ALS Ambulance.

11-04-14 Combine fire in sunflower field

(Source: Emmons County Record website)

04-24-14 Linton Fire Department responded to a prairie fire located about four miles east of Linton. A controlled burn was called in on April 23rd. The fire was extinguished due to forecast high winds. A small area of pasture burned, and no injuries reported.

04-23-14 Linton Fire Department responded to a prairie fire at the Marvin Wolf Farm (5 miles south of Linton). A controlled burn from March 28th flared up. No injuries reported.

04-22-14 Linton Fire Department responded to a fire in a harvested cornfield 12 miles northwest of Linton. A pickup muffler ignited the corn stubble. Due to increased winds, the fire spread quickly to the northwest and resulted in 24-30 acres burned.

04-21-14 Linton Fire Department responded to a fire on the farm of Gary Mosset (8 miles southwest of Linton). A hay grinder overheated and ignited the surrounding grass and loose hay. A small area burned and was extinguished quickly. Minimal damage and no injuries were reported.

03-28-14 Linton Fire Department responded to a prairie fire at the Marvin Wolf farm (5 miles south of Linton). Controlled burn got out of control. No injuries, and 20 acres burned.

03-26-14 Linton Fire Department responded to a fire in a cornfield (13 miles east and 1 mile north of Linton) caused by a combine. The combine sustained damage and a small area of corn around the machine.

11-04-13 Strasburg Fire Department responded to a combine fire (4 miles north of Strasburg) which caught fire in a sunflower field. Combine destroyed.

08-14-13 Strasburg Fire Department responded to a combined fire southeast of Strasburg. Combined damaged; however, the fire was stopped from spreading to another field.

06-11-13 Linton Fire Department responded to a baler fire 10 miles northeast of Linton. Fire contained to baler which was a total loss.

05-14-13 Several fire departments (Linton, Hague, Strasburg, Hazelton, Braddock, Napoleon, Steele, Pollock) responded to a fire 3 miles east of Temvik caused by a disc striking a rock in a corn field which was exacerbated dry conditions and high winds. Approximately 350-400 acres burned.

(Source: Emmons County Record website)

Flood

Frequency	Likely (10-100% probability in the next year, or at least 1 chance in next 10 years)
Severity	Limited (10-25% of jurisdiction affected)
Risk Class	C
Seasonal Pattern	Spring and Summer
Duration	1 to 10 days
Speed of Onset	More than 24 hours warning
Location	Countywide

Description
Flooding is defined as an overflow of water on land not normally covered by water.

Flood hazards arise from the complex effects of water on land surfaces and by water pressure. Flooding and its impact occur from the overflow of rivers, creeks, drainage channels, streams, lakes, and other bodies of standing water. Also, the inundation of low lands, the temporary backup of sewer and storm water systems, the rise of ground water, and finally the failure of flood control facilities such as dams, dikes, and levees.

Floods can occur when the ground is frozen and/or saturated with moisture and cannot absorb any further moisture. This moisture can come from several different sources and circumstances. One source is heavy snowpack which is affected by a rapid warming trend as well as spring rain falling directly on the snowpack. Another source of flooding occurs when heavy rain falls in such a short time that the soil cannot absorb it. Flooding is also caused when heavy rain falls over a prolonged period of time and the ground becomes saturated and cannot absorb the additional moisture.

Flooding can also result from ice jamming or blockage along streams. Ice breaking up into pieces, called floes, move along with the flowing rivers or streams. The ice floes can jam at curves, narrow places in the channel, and at structures creating an effective dam that produces water backup and overflow. Finally, flooding can occur as a result of dam, dike, or levee failure, overtopping or breaching.

The spring flood danger period generally occurs during March and April. A wet fall, early freeze up with saturated ground at the time of freezing, heavy winter precipitation, and warm rains during and after spring haw add to the seriousness of the spring flooding situation.

Floodplain Management in North Dakota

Flood control development had its beginning with the Flood Control Act of 1936. This Act provided a basic plan and an authorized program for the control of water resources. In the early 1940's the North Dakota State Water Commission cooperated with the Federal agencies to plan and engineer the overall program for North Dakota.

The U.S. Army Corps of Engineers occupies one of the major roles in flood control planning and construction. Two reservoirs built by the U.S. Soil Conservation Service have contributed materially to flood control by the construction of watershed projects in North Dakota. These watershed projects include channel work and flood retention structures. In such projects, the Soil Conservation District has the responsibility for assuring that 50 percent of the farms above a structure are under a basic conservation plan.

Floodplain Management in North Dakota: North Dakota has recognized that good floodplain management involves the utilization of a variety of tools to reduce the impact of flood disasters. It is also recognized that a balance must be reached between the three aspects of floodplain management which are: structural works designed to modify the flood itself, regulatory functions which may reduce susceptibility to flooding, and emergency preparedness actions which may reduce susceptibility to flooding, and emergency preparedness actions which minimize a flood's effect during a disaster.

The Federal Disaster Protection Act of 1973 requires state and local government to participate in the National Flood Insurance Program (NFIP) as a condition to the receipt of any federal loan or grant for construction projects in flood prone areas.

Participation in the NFIP requires communities to adopt floodplain regulations that meet NFIP objectives, which are: New buildings must be protected from flooding damages that occur as a result of the 100-year flood, and new development must not cause an increase in flood damages to other property. (See Attachment 3, Flood Insurance Rate Map for Emmons County and Flood Insurance Rate Map for City of Linton)

Communities have been provided assistance through passage, in 1981, of the state's first Floodplain Management Act which directs the State Engineer to aid local governments to reduce flood damages through sound floodplain management. As a start, the state legislature provided the State Engineer with an appropriation to be used in assisting communities to obtain base flood (100-year) elevation data. With appropriate planning, we will see continued reduction in flood damage susceptibility across the state, but it will likely take many years to achieve the established goals.

Missouri River Basin

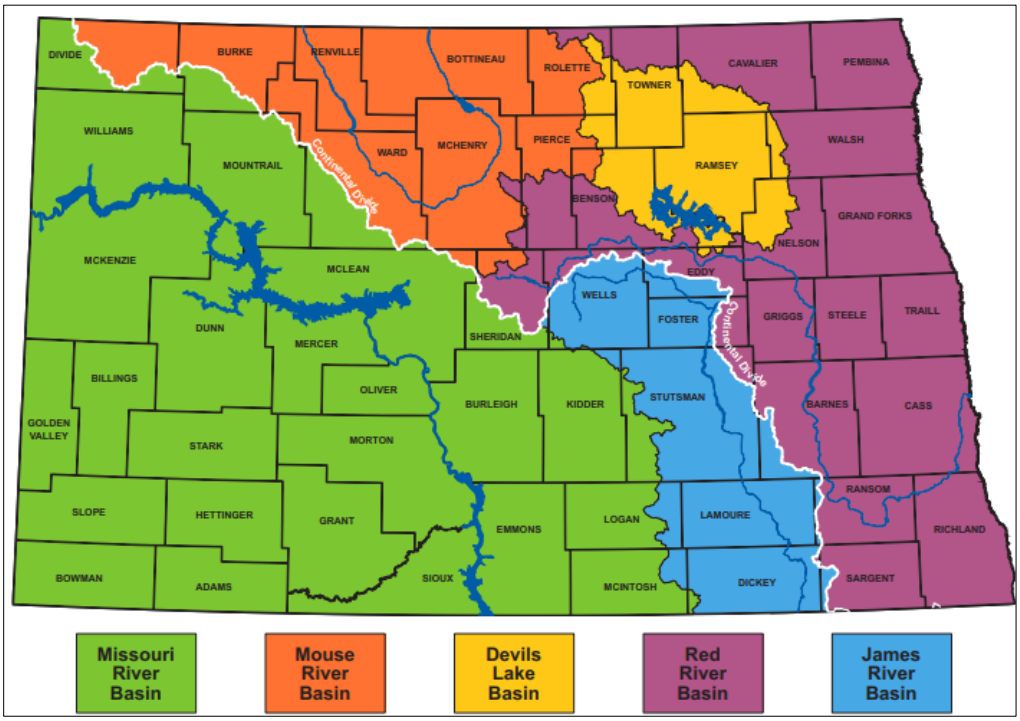
"Historically, the Missouri River has had the best water quality of any river in the state.

The Missouri River Basin, comprised of seven major sub-basins, is the largest in the state. It drains approximately 48% of the state's total area. Many tributaries on the south and west sides of the Missouri River typically create small but sharply-defined valleys. This area is well drained with very few natural lakes. The topography is characterized by numerous flat-topped, steep sided buttes and hills. The most prominent are located in what is known as the Badlands along the Little Missouri River.

The area east of the Missouri River is characterized by numerous small lakes and wetlands. Annual mean precipitation in the basin ranges from 14" in the northwest to 22" in the east.

Lake Sakakawea was formed by the closing of Garrison Dam in 1953. Lake Sakakawea normally covers 365,000 surface acres, can store a maximum of 24.2 million acre feet, and has 1,600 miles of shoreline in six counties. Lake Oahe, formed by closing Oahe Dam in 1959 in South Dakota, covers up to 374,000 acres, 80,000 surface acres in North Dakota, and can store a maximum of 23.1 MAF. The two projects required a total of 550,000 acres of land in North Dakota, including shoreline acres needed for flood conditions.

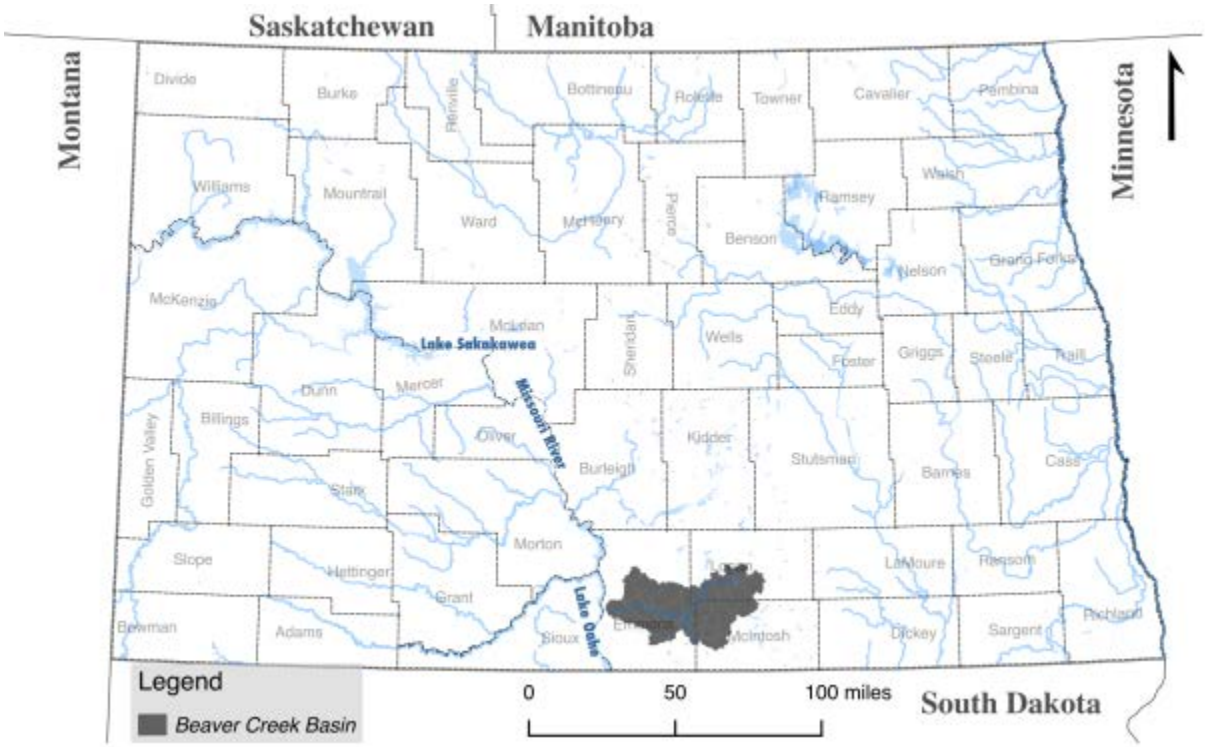
Only about 79 miles of the original 350 Missouri River miles in North Dakota remain free flowing outside of reservoir boundaries. The Little Missouri River is the only river designated as a State Scenic River by the North Dakota Legislature."



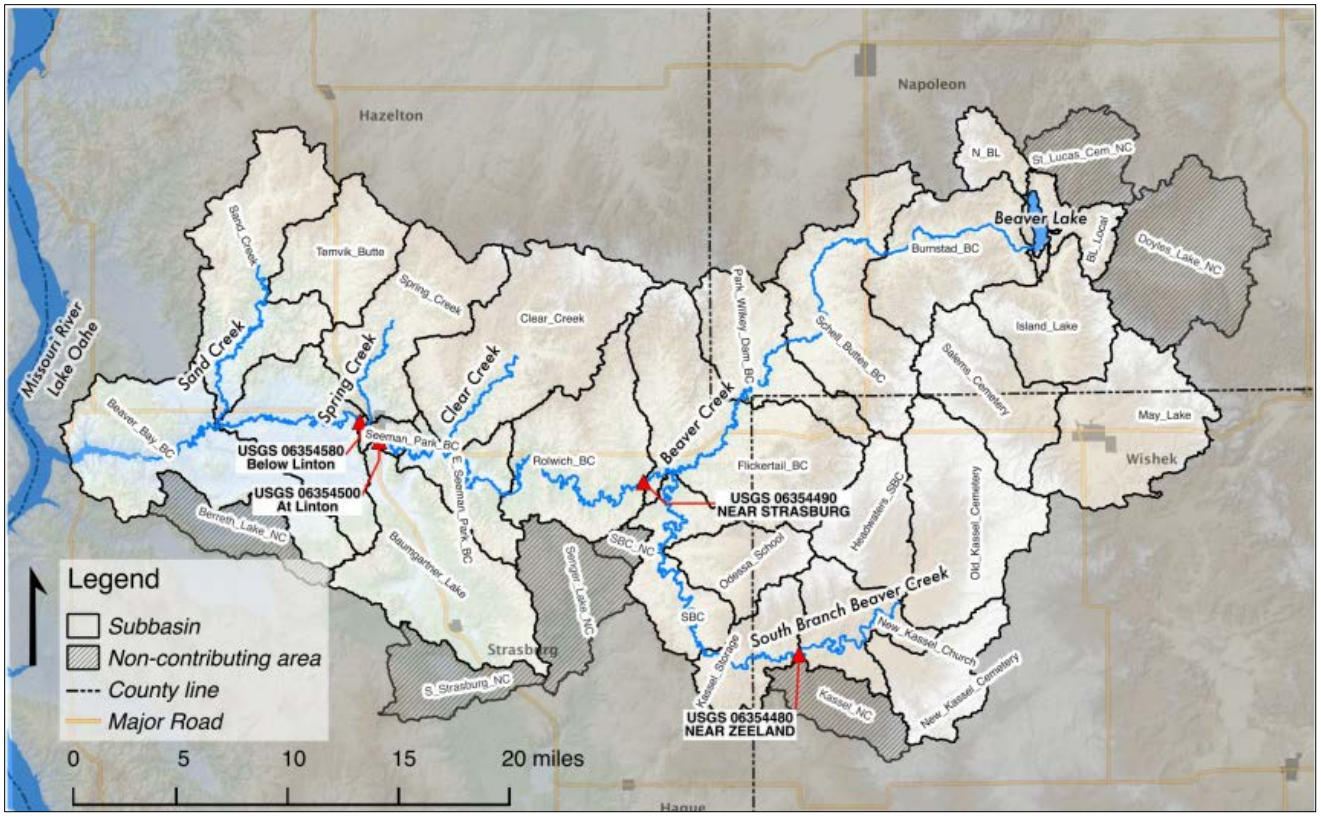
Source: A Reference Guide to North Dakota Waters 2014, ND State Water Commission

Beaver Creek Watershed

Beaver Creek drains parts of Emmons, Logan and McIntosh Counties in North Dakota.

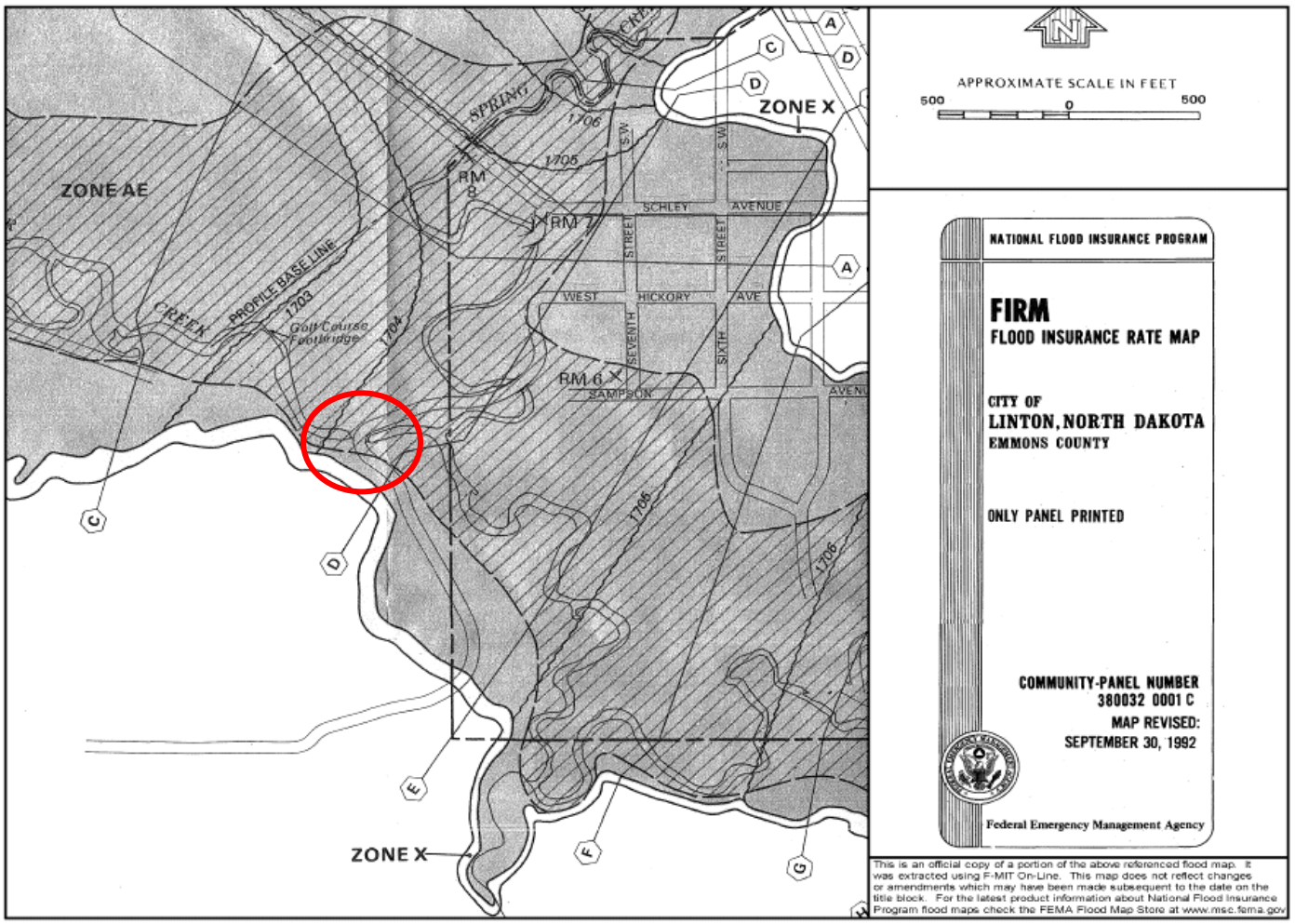


(Source: ND State Water Commission, Beaver Creek Hydrology Report, SWC Project #558, August 2016)



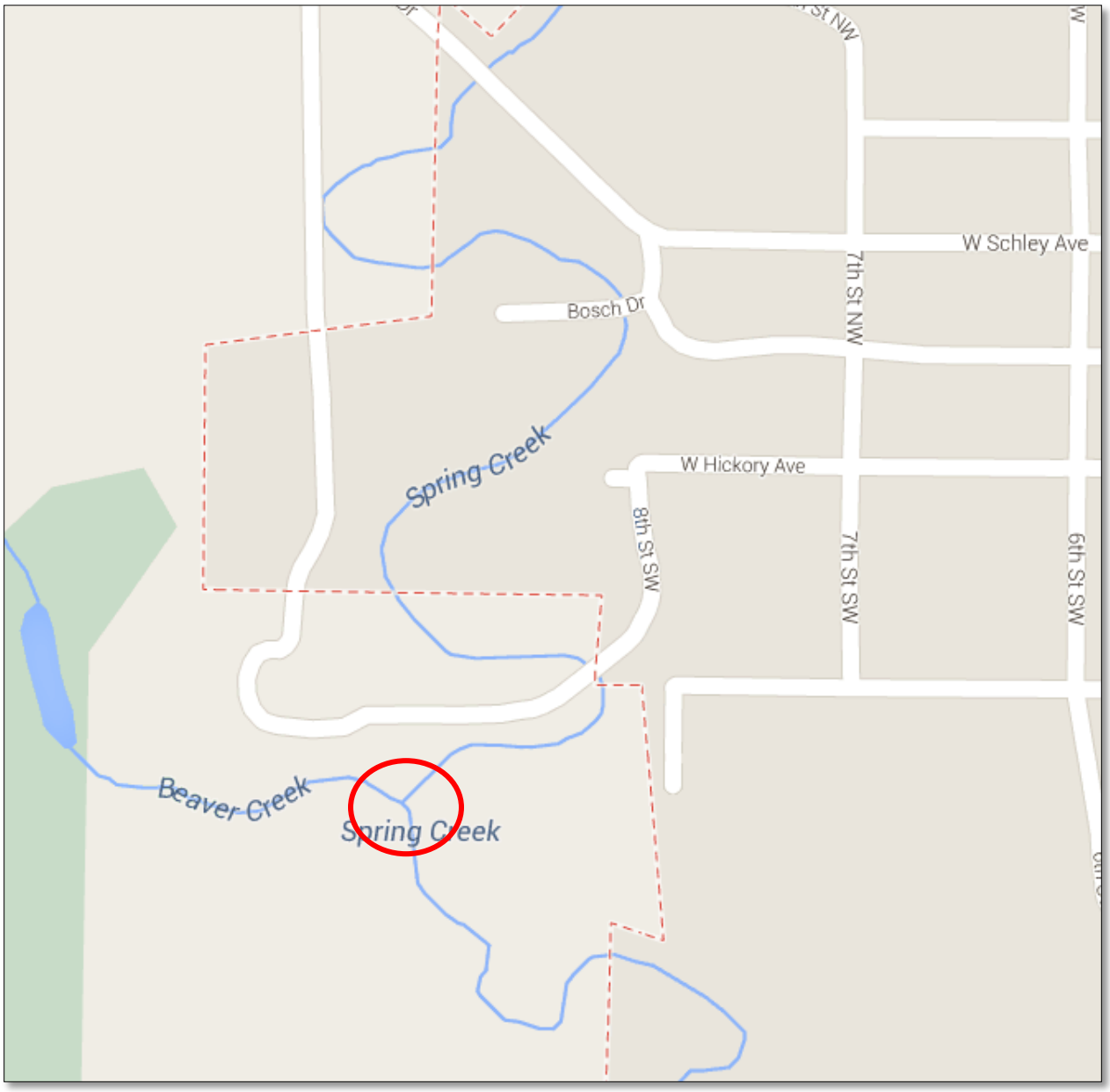
(Source: ND State Water Commission, Beaver Creek Hydrology Report, SWC Project #558, August 2016)

Beaver Creek and Spring Creek Confluence



Source: FEMA Map Service Center website

The potential remains for the Beaver Creek and Spring Creek confluence to exacerbate flood events during torrential rain events and/or spring thaw. Approximately 50 structures would be impacted from confluence flooding to the north and south. Historically, Beaver Creek and Spring Creek do not thaw simultaneously in the Spring.



Source: Google Maps website

Identified Impacts

- Agriculture
- Blocked Roads
- Business Interruptions
- Delayed Emergency Response
- Downed Power Lines
- Downed Trees
- Evacuation (Localized)
- Flooding (Street)
- Flooding (Structure)
- HAZMAT Release
- Increased Fire Potential
- Increased Public Safety Runs
- Livestock Injury/Death
- Loss of Economy
- Loss/Overcrowded Medical Facilities
- Loss of Potable Water
- Loss of Power
- Personal Injury/Death Risk
- Property Damage
- School Closure
- Sewer Backup

Source: Emmons County Record, September 3, 2020

City of Linton completed (2020) a project to improve the drainage ditches and water flow to Beaver Creek on the southwest side of the City.

History

Flash Flood

Location	County/Zone	Date	Time	Type	PrD	CrD
WESTFIELD	EMMONS CO.	07/08/2019	23:00	Flash Flood	40.00K	0.00K
TEMVIK	EMMONS CO.	07/04/2018	00:35	Flash Flood	15.00K	0.00K
TEMVIK	EMMONS CO.	06/20/2013	19:00	Flash Flood	25.00K	0.00K
LINTON	EMMONS CO.	08/04/2006	18:00	Flash Flood	15.00K	0.00K
LINTON	EMMONS CO.	07/23/2005	03:23	Flash Flood	0.00K	0.00K
Totals:					95.00K	0.00K

Flood

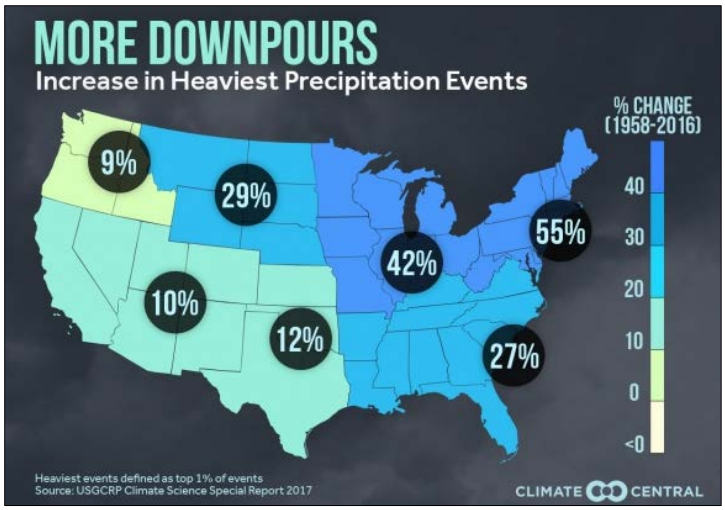
Location	County/Zone	Date	Time	Type	PrD	CrD
HAZELTON	EMMONS CO.	04/01/2009	00:00	Flood	300.00K	0.00K
HAZELTON	EMMONS CO.	03/06/2009	00:00	Flood	748.00K	0.00K
EMMONS (ZONE)	EMMONS (ZONE)	03/21/1997	08:00	Flood	0.00K	0.00K
Totals:					1.048M	0.00K

Heavy Rain

Location	County/Zone	Date	Time	Type	PrD	CrD
KINTYRE	EMMONS CO.	07/08/2011	19:39	Heavy Rain	0.00K	0.00K
HAZELTON	EMMONS CO.	06/14/2011	09:21	Heavy Rain	0.00K	0.00K
Totals:					0.00K	0.00K

Source: National Oceanic and Atmospheric Administration National Climatic Data Center Website (01/1950 to 10/2019)

The number of days each year with extreme rainfall is on average, increasing in every region of the United States. Heavy precipitation events often lead to flash flooding.



Source: Climate Central

October 28, 2019—Flood Emergency Declaration approved by the Emmons County Commission due to excessive rainfall, fall blizzard, high water tables, seepage, overland flooding, and road damage. Event became Presidential Declaration 4444.

April 8, 2019—Beaver Creek crested at 14'. The City of Linton declared a flood emergency on April 1st, and Emmons County declared on April 2nd. Numerous roads were closed, and a self-fill sandbag site was established. Residents experienced seepage and pumped basements (especially areas in "Old Town" and along Highway 83).

Sampson Avenue looking West.

April 6, 2011—Beaver Creek crested at 12.71'. Earlier projections showed an exceedance probability of 10-50% for reaching Moderate Flood Stage. A planning meeting was hosted on February 25, 2011 and again on April 5, 2011.

March 19, 2010—Beaver Creek crested at 13.63'. Winter season brought snowfall atop saturated soils, and a public forum was hosted (February 10, 2010) to discuss flood forecasting services for Linton. Beaver Creek in Linton was not a forecast point until March, 2010.

March 13, 2009 to August 10, 2009—Major Disaster Declaration declared on March 24, 2009 (DR-1829). Significant flooding occurred as a result of spring thaw, snow, and torrential rains. Numerous bridges and roads were damaged and washed out. Significant numbers of livestock perished. The ND National Guard evacuated 20 residents of Linton, many from the "Old Town" area. Several homes were purchased in Linton and Emmons County as part of the mitigation process.

Sourced from 2003 Emmons County Multi-Hazard Mitigation Plan
April-June 2000—Excessive spring runoff, high water table and torrential rains caused flooding in Emmons County.

May 1999—Above average rainfall caused damage to basements and farm buildings due to flooding and seepage. A number of roads went under water. Public utilities exceeded their budget due to the fact the poles and guy wires were giving way because of water and saturated soil.

March-April 1997—Spring runoff and ice jams caused flooding along Beaver Creek and low-lying areas. Flooding occurred in the southwest portion of the city of Linton. Roads were washed out and culverts became undermined. Five concrete bridges over Beaver Creek were damaged. Homes along Beaver Creek experienced water seepage. Four farm homes were abandoned. One dairy farmer was forced to completely disperse of his herd.

March 1996—Spring runoff and ice jams caused flooding along Beaver Creek. The west side of the city of Linton also experienced flooding. Major damage was done to rural roads that became submerged. There was also major damage to the Seaman Park bridge.

June 15, 1995—The City of Hague suffered damage to their city lagoon due to high water and heavy rainfall.

March 1995 – Spring runoff and ice jams caused flooding along Beaver Creek. Highway 83 in the city of Linton overflowed and was closed for a four-hour period. The southwest area of the city of Linton was flooded with several basements flooding. Many county roads washed out in low-lying areas and some bridges were also damaged.

August 1, 1993—Flood. Deaths: 1. Property Damages of $50,000. Crop Damages of $50,000. The heavy rains of July swelled Beaver Creek. On the evening of the first, a vehicle attempted to cross the spillway in Linton. When the attempt was unsuccessful, the occupants got out of their vehicle. One of the occupants lost her footing, fell into the creek, and drowned.

July 15, 1993—During the late evening hours heavy rain fell in Emmons County causing flash flooding in the northern third of the county. Major damage was done to roads, bridges, culverts, farmlands, homes, businesses and other public facilities. On August 1, 1993, one woman trying to cross the spillway with her bicycle was swept off the spillway and drowned.

Sourced from Flood Insurance Study, City of Linton, ND, Emmons County, FEMA, Revised: 09/13/1992.

1952—The flood problem in Linton is severe. The information on extent of flooding and monetary losses experienced in the floods prior to 1952 is fragmentary and consists of items taken from newspaper files of the Emmons County Record. Portions of the Old Town section of Linton were under water during almost every flood.

August, 1989—Approximately 6 inches of rain fell in a one and one-half hour period causing Spring Creek to swell. The worst damage occurred from fast-moving water coming into Linton on Horner's Ravine and the Unnamed Coulee from the steep bluffs to the east of town. During this flood, the flows on Beaver Creek and Horner's Ravine peaked at 4,450 cfs and 414 cfs, respectively.

Marcy, 1987—Once again rapid snowmelt caused Beaver Creek to overflow its banks and inundate the Old Town.

July, 1977—There was white water on Beaver Creek. Recent rains swelled the usually gently running stream flooding more than one half of the Seeman Park land surface area.

March 18, 1972—Spring Creek was out of its banks at Linton and was pouring water down the north-south streets in Old Town. At the northwest corner of the City, an ice jam formed at the railroad bridge, causing water to flood the east-west road north of the city.

April 9, 1969—Beaver Creek hit 17-year high. At the John Deere Implement Shop, water reached the door, which was sandbagged. At the Linton Hatcher, water was up to within less than 1 foot of the foundation. In the Old Town section, Sampson Avenue was flooded from the MDU building to the creek. Beaver Creek was crossing over the road south of the cemetery and was approximately two-blocks wide. Water in the backyards of several homes along the west side of U.S. Highway 83 ranged from approximately 12- to 16-inches below the 1952 flood.

June, 1956— On June 5 and 6, heavy rainfall, totaling approximately 4.5 inches, caused high stages on Beaver and Spring Creeks at and near Linton. Beaver Creek crested 0.3 foot below flood stage at Linton, but overbank flows from Spring Creek inundated six city blocks.

June, 1953— Four inches of rainfall in the Beaver Creek basin resulted in flooding in the Linton area. Twenty-nine homes in the Old Town area were flooded.

April, 1952— (Maximum flood of record; slightly higher than 50-year frequency) Rapid melting of snow in the Beaver Creek basin resulted in the most damaging flood of record at Linton. Forty-one families were forced to evacuate the low-lying Old Town section of Linton, and water reached a depth of 4 feet. The U.S. Highway 83 bridge spanning Beaver Creek was weakened by floodwaters.

April, 1950— Peak flows of Beaver Creek inundated homes along U.S. Highway 83 and in the Old Town section of Linton.

March, 1948— High flows on Beaver Creek inundated portions of Old Town. Subsequent to the flood Beaver Creek, high stages occurred on Spring Creek, and portions of Old Town were again flooded.

March, 1945— The damage resulting from the flood of 1945 was not as severe as a in the two previous years. U.S. Highway 83 was under water, and two homes had water on the first floor.

April, 1944— Floodwaters inundated the greater part of Old Town and washed out a section of U.S. Highway 83 at Linton.

March, 1943— Spring Creek overflowed its banks on March 23, inundating a 9-square block area in Old Town in one of the worst floods of history on Spring Creek. Shortly after the Spring Creek overflow, Beaver Creek overflowed, again inundating Old Town.

June, 1939— Heavy rains on June 27 caused overflow of Beaver and Spring creeks at Linton.

June, 1934— Cloudburst rains caused Beaver Creek to overflow, inundating highways and flooding basements in Linton.

March, 1929— Heavy snows and continuous warm weather during the middle of the month caused Beaver Creek to overflow and flood Old Town.

May, 1927— Runoff from heavy rainfall caused Spring Creek to overflow, inundating a large section of Old Town.

September, 1926— Heavy rainfall during the first 10 days of September caused flood stages in the Linton area.

March, 1916— On March 29, snowmelt flows of Beaver Creek inundated most of the Old Town section of Linton.

June, 1914— On June 26, runoff from a three-hour cloudburst inundated most of Old Town when a railroad grad north of the city failed and released impounded water.

Portions of unincorporated Emmons County and the City of Linton include Special Flood Hazard Areas (SFHAs). FEMA has not completed a study of the Cities of Braddock, Hague, Hazelton, and Strasburg to determine flood hazard.

As a means of providing protection from large monetary losses, the County encourages property owners to purchase flood insurance through the National Flood Insurance Program (NFIP). Properties that have sustained two or more losses of $1000 or more in a 10-year period since 1978 are considered to be repetitive loss properties.

This type of insurance is only available to property owners whose jurisdiction participates in the NFIP. The following jurisdictions participate in the National Flood Insurance Program (NFIP):

CID	Community	Status	Date of Entry	Date of Current Effective Map	Date of Init Map
380327	Emmons County	Participating	2/4/87	2/4/87	2/4/87
380260	Braddock, City of	Participating	3/29/99 (Emergency Program)	Never Mapped	Never Mapped
380232	Hazelton, City of	Participating	1/30/84	NSFHA	FHBM 1/17/75
380032	Linton, City of	Participating	11/19/80	9/30/92	11/19/80
380252	Strasburg, City of	Participating	4/25/97	NSFHA	FHBM 2/14/75

Source: Dionne Haynes, State NFIP Coordinator

Emmons County is trying to foster participation from the City of Hague.

Flood Insurance Study (FIS)

The last Flood Insurance Study (FIS), effective September 30, 1992, covered the jurisdiction of the City of Linton, Emmons County, North Dakota and is available at http://www.msc.fema.gov/ Product ID 380032V000. The Study reaffirms the history of the principal flood problems on pages 5-8.

November 4, 2019: The Linton City Council unanimously approved a motion not to sell any City property located in a flood zone under the current stipulations and regulations of the city's flood plan. The Emergency Manager previously recommended this action at the April 1, 2019 Council Meeting.

October 12, 2017: A Flood Emergency Action Plan Workshop was hosted and well attended by areas stakeholders. The Emmons County Flood Annex was reviewed and discussed throughout the workshop.

After the 2009 flood event, the City of Linton and Emmons County proceeded with five acquisitions (three in the City and two in the County). The acquisitions had suffered severe damage and/or were left uninhabitable. The "green-space" properties are maintained by the respective jurisdictions.

Policy and Claims Report

CID	Community Name	Total Premium	V-Zone	A-Zone	No. Policies	Total Coverage	Total Claims Since 1978	Total Paid Since 1978
380032	Linton, City of	$30,916	0	17	21	$3,137,700	65	$855,860
380232	Hazelton, City of	0	0	0	0	0	1	$411
380327	Emmons County	$818	0	0	1	$63,000	14	$219,451
	County Total:	$31,734	0	17	22	$376,700	80	$1,075,722

Source: Dionne Haynes, State NFIP Coordinator

The Emmons County Water Resource Board serves as the Floodplain Administrator for Emmons County. Emmons County and the City of Linton currently have floodplain ordinances. Emmons County is currently updating their ordinances. The overall goal is to decrease the vulnerability of development in the hazard-prone areas.

Community Repetitive Loss

COMMUNITY : EMMONS COUNTY*

Community | State | Regional | National

	AE, A1-30, AO, AH, A	VE, V1-30, V	B, C, X	TOTAL
RL Buildings (Total)	0	0	0	1
RL Buildings (Insured)	0	0	0	0
RL Losses (Total)	0	0	0	3
RL Losses (Insured)	0	0	0	0
RL Payments (Total)	$.00	$.00	$.00	$62,236.16
Building	$.00	$.00	$.00	$62,236.16
Contents	$.00	$.00	$.00	$.00
RL Payments (Insured)	$.00	$.00	$.00	$.00
Building	$.00	$.00	$.00	$.00
Contents	$.00	$.00	$.00	$.00

Post - FIRM SFHA RL Buildings:	0
Insured Buildings with 4 or More Losses:	0
Insured Buildings with 2-3 Losses > Building Value:	0
Total Target RL Buildings:	0

Community Repetitive Loss

COMMUNITY : LINTON, CITY OF

Community | State | Regional | National

	AE, A1-30, AO, AH, A	VE, V1-30, V	B, C, X	TOTAL
RL Buildings (Total)	3	0	1	4
RL Buildings (Insured)	0	0	1	1
RL Losses (Total)	6	0	3	9
RL Losses (Insured)	0	0	3	3
RL Payments (Total)	$128,180.34	$.00	$34,604.07	$162,784.41
Building	$127,460.34	$.00	$32,604.07	$160,064.41
Contents	$720.00	$.00	$2,000.00	$2,720.00
RL Payments (Insured)	$.00	$.00	$34,604.07	$34,604.07
Building	$.00	$.00	$32,604.07	$32,604.07
Contents	$.00	$.00	$2,000.00	$2,000.00

Post - FIRM SFHA RL Buildings:	0
Insured Buildings with 4 or More Losses:	0
Insured Buildings with 2-3 Losses > Building Value:	0
Total Target RL Buildings:	0

Source: Dionne Haynes, State NFIP Coordinator

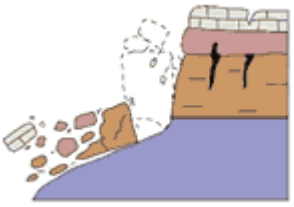
Geologic Hazards

Frequency	Unlikely (Less than 1% probability in the next 100 years)
Severity	Negligible (Less than 10% of jurisdiction affected)
Risk Class	D
Seasonal Pattern	Spring and Summer
Duration	1 to 10 days
Speed of Onset	Hours to days
Location	Countywide (areas along Missouri River and Creeks)

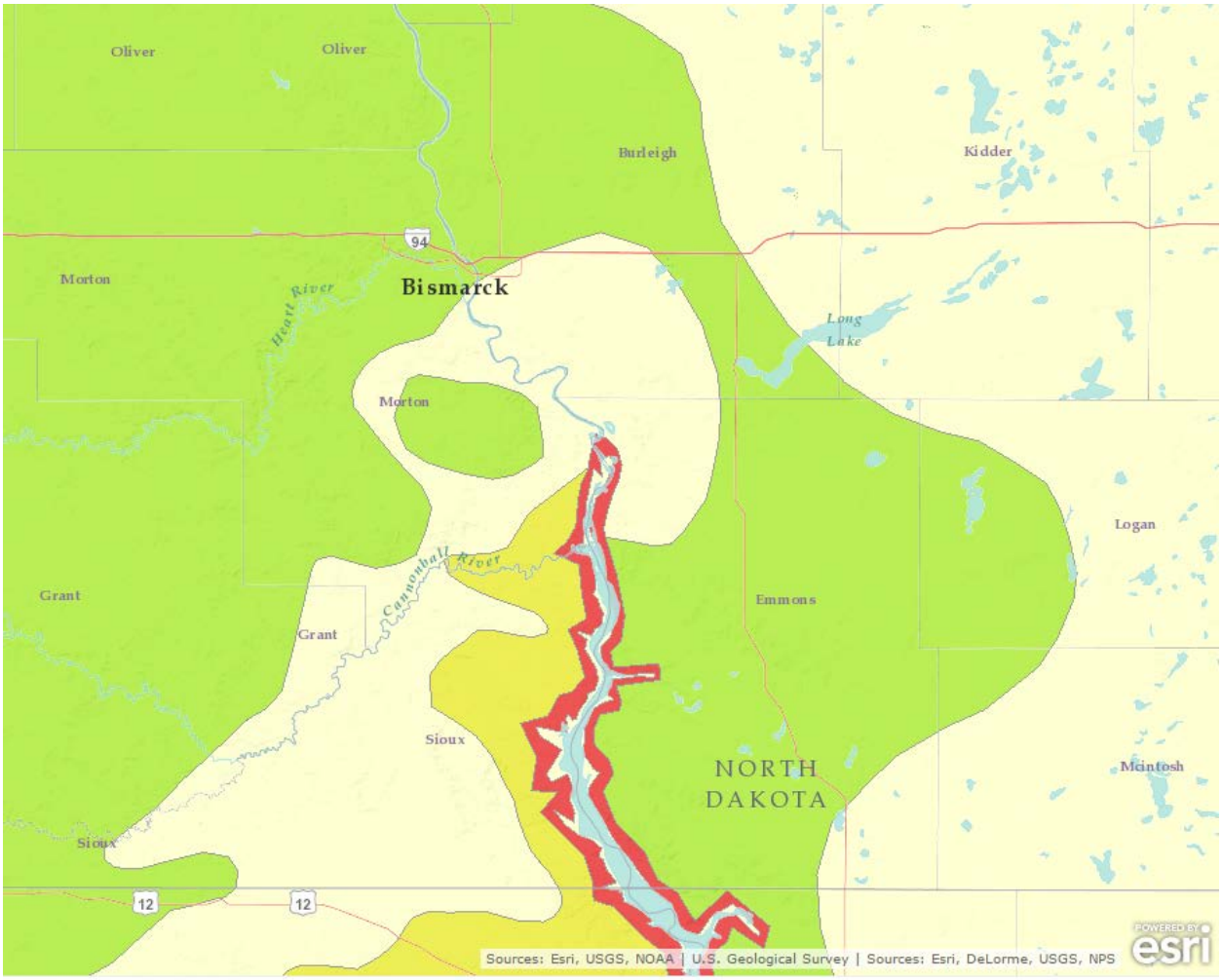
Description
Geologic hazards in Emmons County are not anticipated to cause severe damage; however, the potential exists for the occasional landslide or earthquake to cause some loss.

Landslide
The term landslide includes a wide range of ground movement, such as rock falls, deep failure of slopes, and shallow debris flows. Although gravity acting on an over-steepened slope is the primary reason for a landslide, there are other contributing factors:

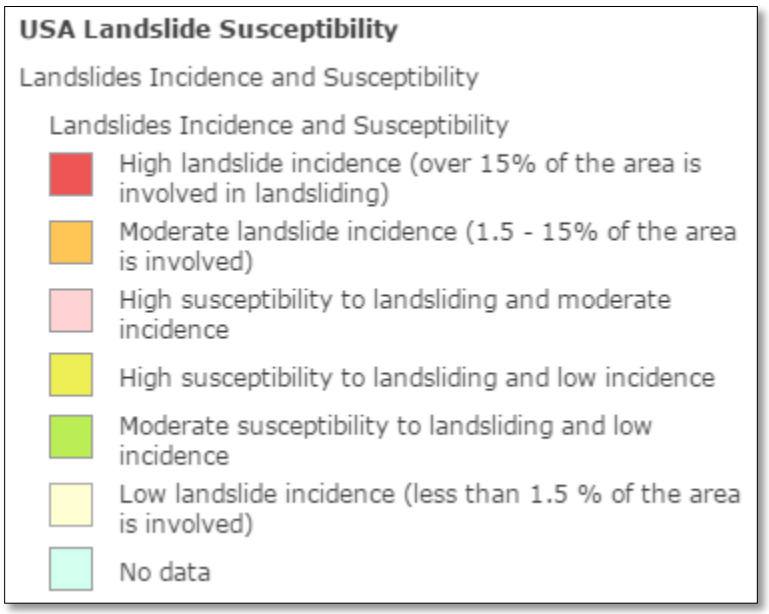
- erosion by rivers, glaciers, or ocean waves create oversteepened slopes
- rock and soil slopes are weakened through saturation by snowmelt or heavy rains
- earthquakes create stresses that make weak slopes fail
- earthquakes of magnitude 4.0 and greater have been known to trigger landslides
- volcanic eruptions produce loose ash deposits, heavy rain, and debris flows
- excess weight from accumulation of rain or snow, stockpiling of rock or ore, from waste piles, or from man-made structures may stress weak slopes to failure and other structures



Slope material that becomes saturated with water may develop a debris flow or mud flow. The resulting slurry of rock and mud may pick up trees, houses, and cars, thus blocking bridges and tributaries causing flooding along its path.
(Source: US Geological Survey website)



Source: ArcGIS USA Landslide Susceptibility website



Identified Impacts

- Agriculture
- Blocked Roads
- Building Collapse
- Business Interruptions
- Delayed Emergency Response
- Downed Power Lines
- Downed Trees
- Evacuation (Localized)
- Explosion
- HAZMAT Release
- Increased Fire Potential
- Increased Public Safety Runs
- Loss of Economy
- Loss/Overcrowded Medical Facilities
- Loss of Potable Water
- Loss of Power
- Mass Casualties
- Personal Injury/Death Risk
- Property Damage
- Sewer Backup

History

There is no identified history of geologic hazards for Emmons County; however, the landslide susceptibility has been identified for the western edge of Emmons County which borders the Missouri River.

Hazardous Materials Release

Frequency	Highly Likely (Nearly 100% probability in the next year)
Severity	Limited (10-25% of jurisdiction affected)
Risk Class	B
Seasonal Pattern	None
Duration	Hours/Days
Speed of Onset	No warning
Location	Countywide

Description

Hazardous materials are any substances in any quantity or form which may pose an unreasonable risk to the safety, health, environment, and property of citizens. The term "hazardous materials" covers a wide array of products, from relatively innocuous ones such as hair spray in aerosol dispensers and wash preservatives such as creosote to highly toxic or poisonous materials such as anhydrous ammonia and phosgene gas. The potential severity of hazards of these materials is varied, but the primary reason for their designation is their risk to public safety. Tier II forms are on file with Emmons County Emergency Management.

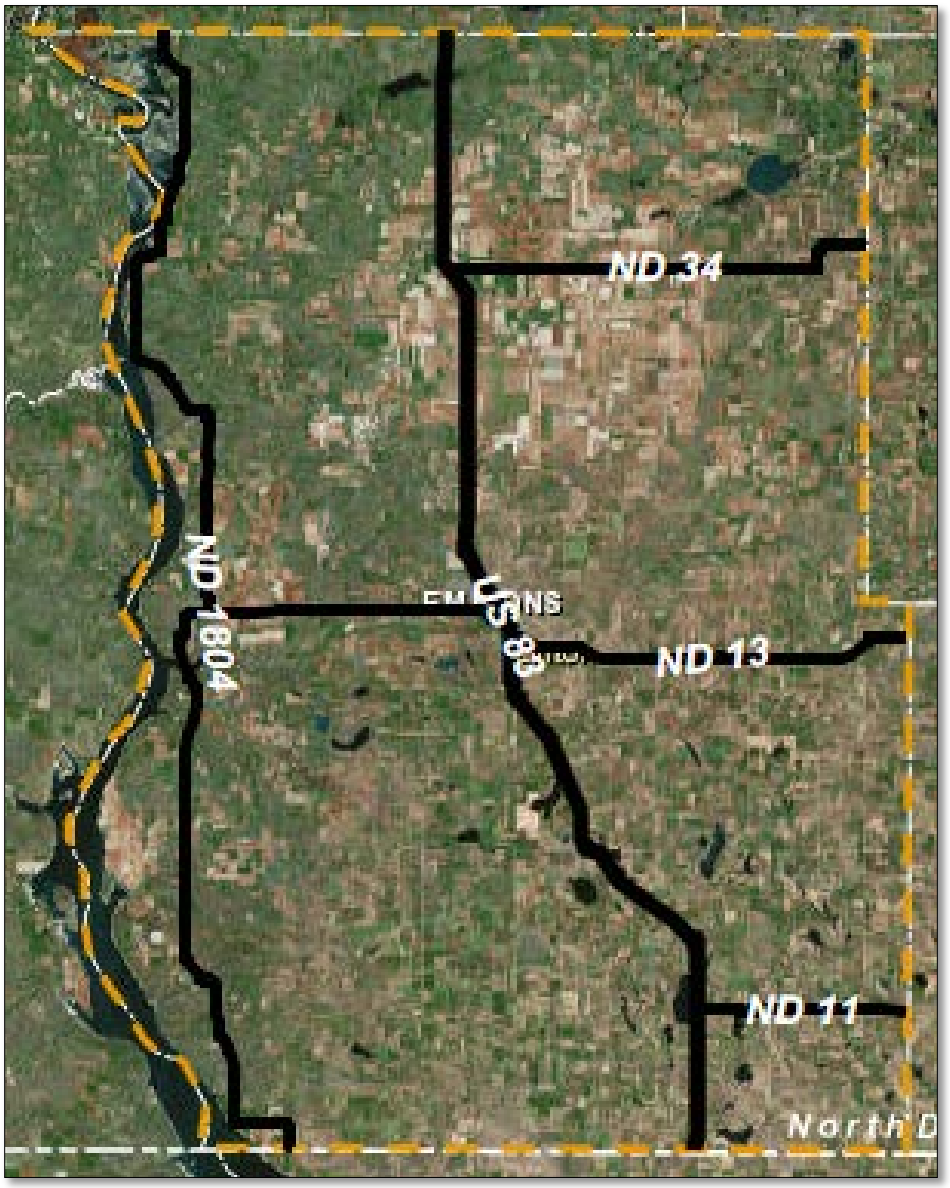
The County is exposed to and is at risk from accidents and/or incidents involving hazardous materials. The economy is based upon agriculture, manufacturing, and industry. All of these rely on the production, use, storage, transportation, etc. of hazardous materials. Explosives, flammable liquids, flammable solids, gases, poisons, pesticides, oxidizing substances, miscellaneous dangerous substances, and radioactive materials are either used in or transported through Emmons County.

Hazardous materials are transported via two modes into and within Emmons County:

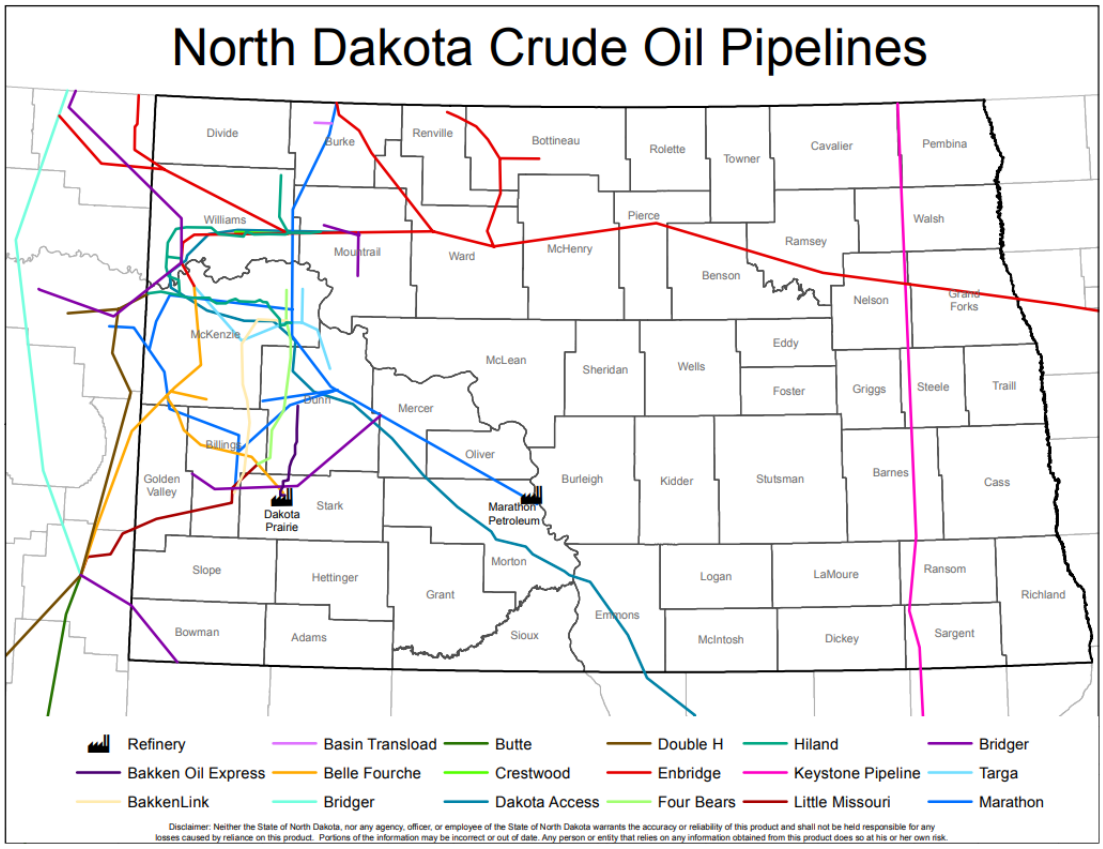
Highways: US-83 runs north-south through the middle of the county. ND 1804 runs north-south on the western edge of the county. ND 11, 13 34 run east-west through the county.

Pipeline: Crude Oil
Natural Gas

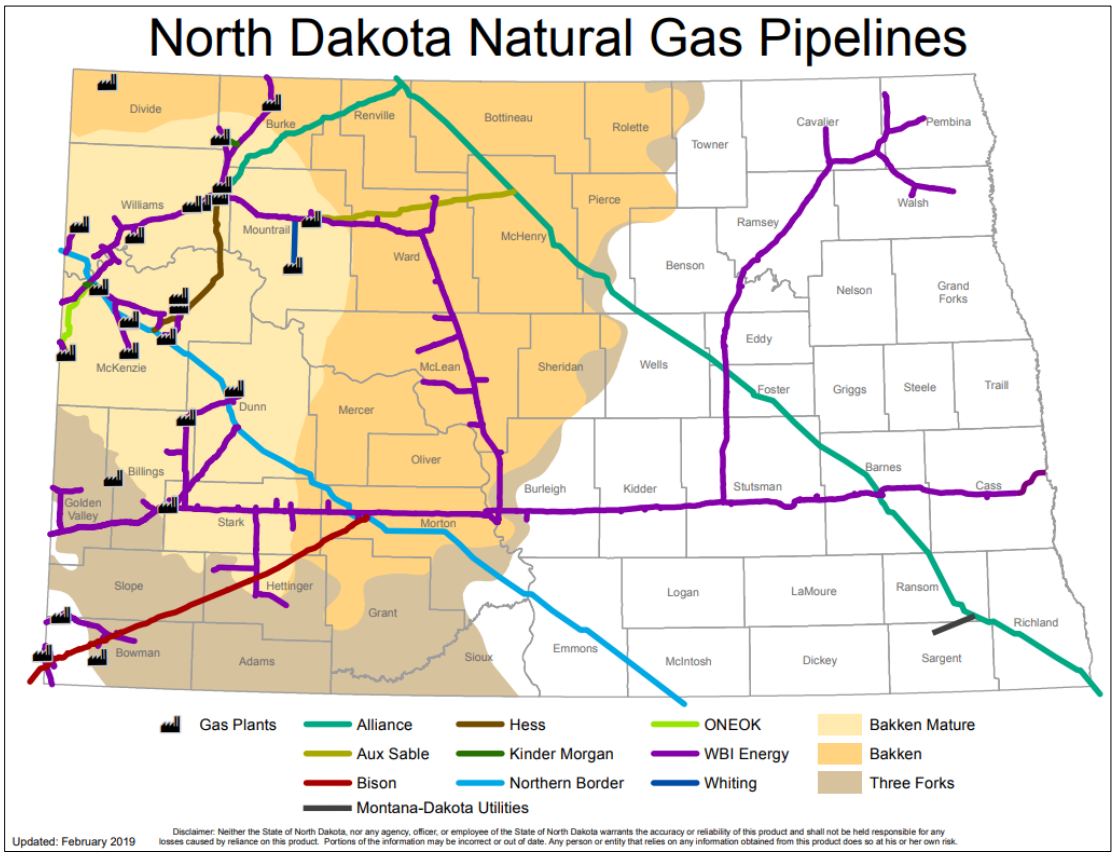
Major Roadways in Emmons County



Source: Emmons County GIS



Source: ND Pipeline Authority website



Source: ND Pipeline Authority website

2020 Emmons County Pipeline Training

Identified Impacts

- Agriculture
- Evacuation (Localized)
- Explosion
- HAZMAT Release
- Increased Fire Potential
- Increased Public Safety Runs
- Livestock Injury/Death
- Loss of Economy
- Loss/Overcrowded Medical Facilities
- Loss of Potable Water
- Mass Casualties
- Personal Injury/Death Risk
- Property Damage
- School Closure

History

The ND Department of Health, Environmental Quality, records data whenever a General Environmental Incident Report is filed. Emmons County ten-year reportable data is identified below:

Incident ID	Date Reported	Date Incident	Twn Rng Sec	Latitude	Longitude	Contaminant	Volume	Units	Contained
EIR9431	3/10/2020	3/9/2020	13107626	46.13525	-100.16881	Transformer Mineral Oil (<2 ppm PCB nameplate concentration)	50	gallons	Yes
EIR9324	11/20/2019	11/6/2019	13207728	46.2276	-100.3143	Engine oil ,Hyd oil			No
EIR5895	11/2/2018	11/1/2018	13107932	46.13158	-100.59551	K-PAM HL			Yes
EIR9255	6/2/2018	6/1/2018	13207607	46.2673	-100.24209	amonia, roundup, and other chemicals			No
EIR5715	5/10/2018	5/5/2018	12907406	46.02851	-99.99643	10-34 Fertilizer (Liquid Ag Crop Fertilizer)	750	gallons	Yes
EIR4169	7/15/2016	7/15/2016	13507807	46.52173	-100.5344	Liquid 28% Nitrogen (80%) Thiosulfate (18%) Boron (2%)	500	gallons	No
EIR3930	10/7/2015	10/7/2015	13207606	46.27651	-100.24232	Diesel fuel and anti-freeze	60	gallons	Yes
EIR3814	7/8/2015	7/8/2015	13507435	46.54525	-99.951	A Mix of Round-up, Cadett, Buckhorn, Class Act and Water	2	gallons	Yes
EIR3812	7/8/2015	6/29/2015	13207617	46.25708	-100.2214	MC 3000 road oil	90	gallons	Yes
EIR3776	5/13/2015	5/12/2015	13107934	46.12413	-100.5559	10-34-0 and Amoniated Zinc Starter fertilizer	1000	gallons	Yes
EIR3737	4/29/2015	4/28/2015	13507630	46.48227	-100.28437	8-20-5-4 Liquid Fertilizer	4000	gallons	Yes
EIR1883	3/6/2013	2/23/2013	13107623	46.15268	-100.16001	diesel fuel from truck saddle tank during accident	50	gallons	

Source: ND Department of Health website

Infectious Disease and Pest Infestations
(including human, animal, and plant diseases)

Frequency	Likely (10-100% probability in the next year, or at least 1 chance in next 10 years)
Severity	Critical (25-50% of jurisdiction affected)
Risk Class	B
Seasonal Pattern	None
Duration	Hours/Days
Speed of Onset	No warning
Location	Countywide

Description
Naturally occurring biological diseases in humans as well as those biological agents found in the environment, or diagnosed in animals, that have the potential for transmission to humans.

The probability of communicable disease in Emmons County presents challenges due to a limited history of outbreaks. Medical advances over the past fifty years prevent many disease outbreaks, yet the potential still remains. Emmons County is primarily a rural setting and somewhat isolated from the rapid spread of global diseases, however, international and domestic travel is so common that, like the Spanish Influenza Pandemic of 1918, North Dakotans would most likely be affected at some point. The urban areas could see rapid spread of such diseases through their populations.

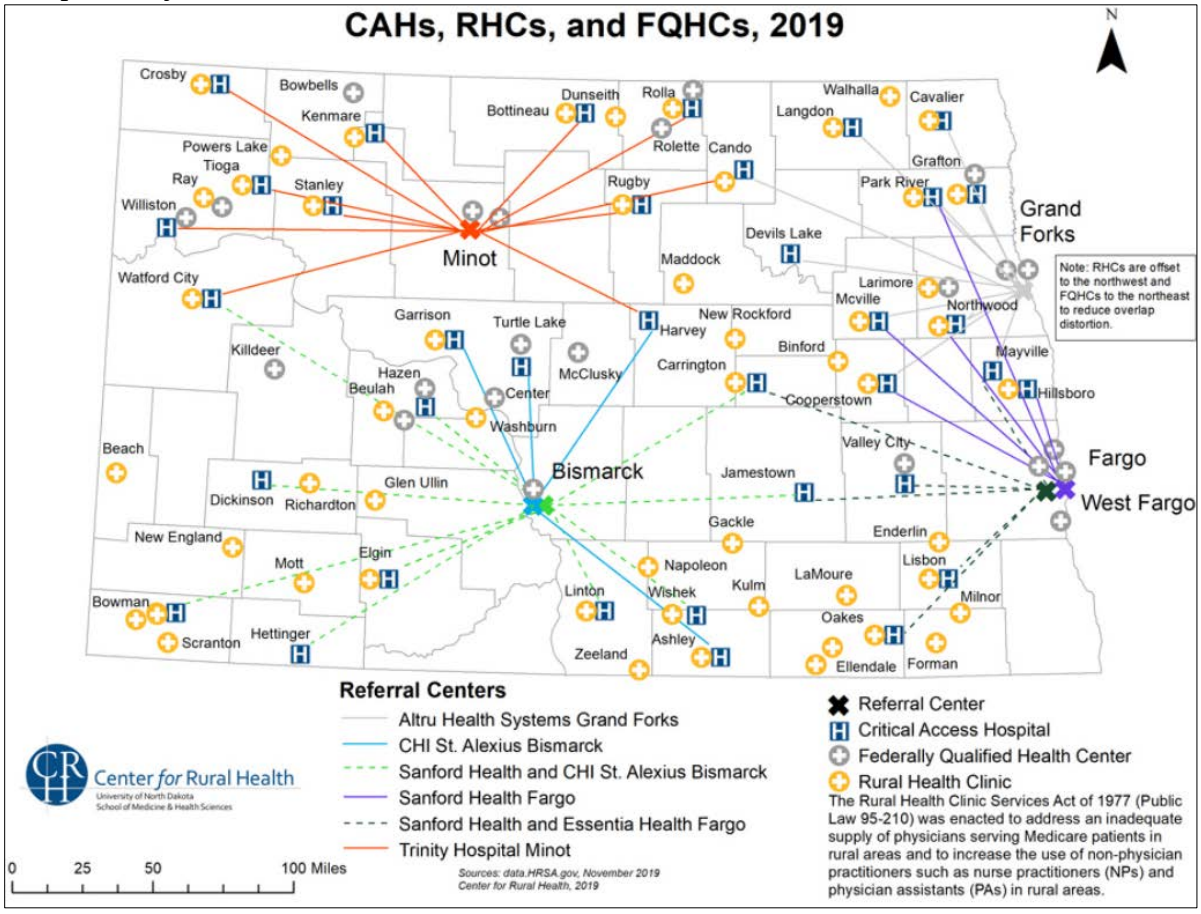
Identified Impacts
- Agriculture
- Business Interruptions
- Delayed Emergency Response
- Evacuation (Localized)
- Increased Public Safety Runs
- Livestock Injury/Death
- Loss of Economy
- Loss/Overcrowded Medical Facilities
- Loss of Potable Water
- Mass Casualties
- Personal Injury/Death Risk
- School Closure

The ND Department of Health list of diseases and conditions:

- Bloodborne Diseases: Hepatitis B, Hepatitis C, HIV/AIDS
- Emerging Infections and Bioterrorism: Acute Flaccid Myelitis, Anthrax, Coronavirus, Ebola
- Healthcare Associated Infections: Healthcare Associated Infections, Infection Prevention & Control, Resistance and Stewardship
- Sexually Transmitted Diseases: Chlamydia, Gonorrhea, HIV/AIDS, Human Papillomavirus, Sexually Transmitted Disease, Syphillis
- Vectorborne Diseases: Tickborne Diseases, West Nile Virus, Zika
- Chronic Diseases: Cancer, Diabetes, HIV/AIDS
- Foodborne, Waterborne, and Gastrointestinal (GI) Diseases: Foodborne and Gastrointestinal Illness, Campylobacteriosis, Cryptosporidiosis, E. coli, Giardiasis, Norovirus, Salmonellosis, Shigellosis
- Respiratory Diseases: Diptheria, Haemophilus Influenzae, Type B (HIB), Hantavirus, Influenza, Legionellosis, Middle Eastern Respiratory Syndrome (MERS), Pertussis, Tuberculosis (TB), Sudden Acute Respiratory Syndrome (SARS
- Vaccine Preventable Diseases: Chickenpox (Varicella), Hepatitis A, Hepatitis B,Influenza, Measles, Mumps, Pertussis, Vaccine Preventable
- Zoonotic Diseases: Brucellosis, Campylobacter, Escherichia coli (E.coli), Hantavirus, Plague, Rabies, Tularemia, Q Fever

Disease history reporting is also available on the ND Department of Health website.

ND is primarily rural with access to networked medical care:



Source: Center for Rural Health, University of North Dakota School of Medicine & Health Sciences.

Most Significant Health Needs

Following careful consideration of the results and findings of this assessment, Community Group members determined that, in their estimation, the top three significant health needs or issues in the community are:

- Jobs with livable wages
- Having enough child daycare services
- Cancer

Also ranked at top priorities but not selected to be in the top three:

- Ability to recruit and retain primary care providers (MD, NP, PA)
- Youth drug use and abuse

Source: https://ruralhealth.und.edu/projects/community-health-needs-assessment/community-needs

History
Although Emmons County has not experienced a pandemic in recent years, seasonal influenza outbreaks occur annually.

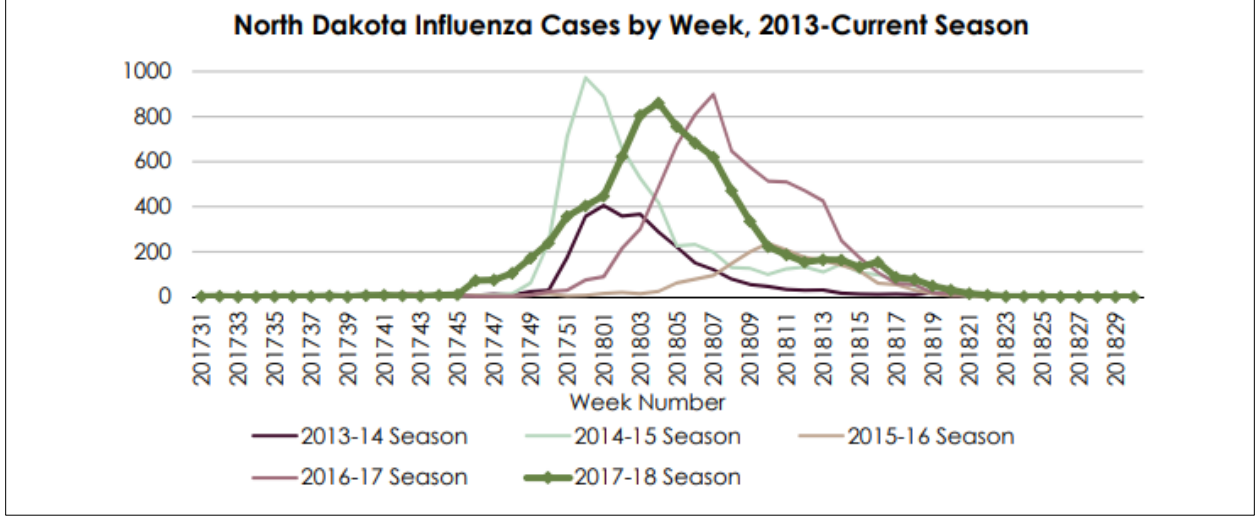
Emmons County Influenza Season Summary

Season	Cases Identified in Emmons County	Cases Identified in North Dakota
2017-2018	36	8,530
2015-2016	7	1,942
2014-2015	20	6,443
2013-2014	10	2,922
2012-2013	42	4,833
2011-2012	17	1,487
2010-2011	15	2,089
2009-2010	23	3,259

Source: ND Department of Health

Seasonal Timing and Multi-Season Comparison

The 2017-18 influenza season peaked the week ending January 27, 2018 (week 4). The peak three weeks earlier than the previous season. Overall, influenza season in North Dakota typically peaks between January and March, so timing for 2017-18 was average. However, significant circulation started earlier than average, and the season lasted longer than average, contributing to the large case count.



Source: www.ndflu.com

North Dakota has had three influenza pandemics in the 20th century: 1918 caused 5,100 deaths in North Dakota, 500,000 deaths in the United States; 1957 resulted in 70,000 deaths in the United States; and 1968 resulted in 34,000 deaths in the United States.

Spanish Influenza Pandemic of 1918

The magnitude of a communicable disease outbreak varies from everyday disease occurrences to widespread infection. During the 1918 Influenza Pandemic, infection rates approached 28% in the United States. (Billings, 1997). Other pandemics produced infections rates as high as 35% of the total population. (World Health Organization, 2007). Such a pandemic affecting North Dakota represents a severe magnitude event. Almost any highly contagious, incapacitating disease that enters the North Dakota population would quickly overwhelm local and state health resources. Similarly, any rapidly spreading bioterrorism event for which little vaccination or containment capability exists is a high magnitude event.

Agricultural Diseases, Noxious Weeds, and Pests

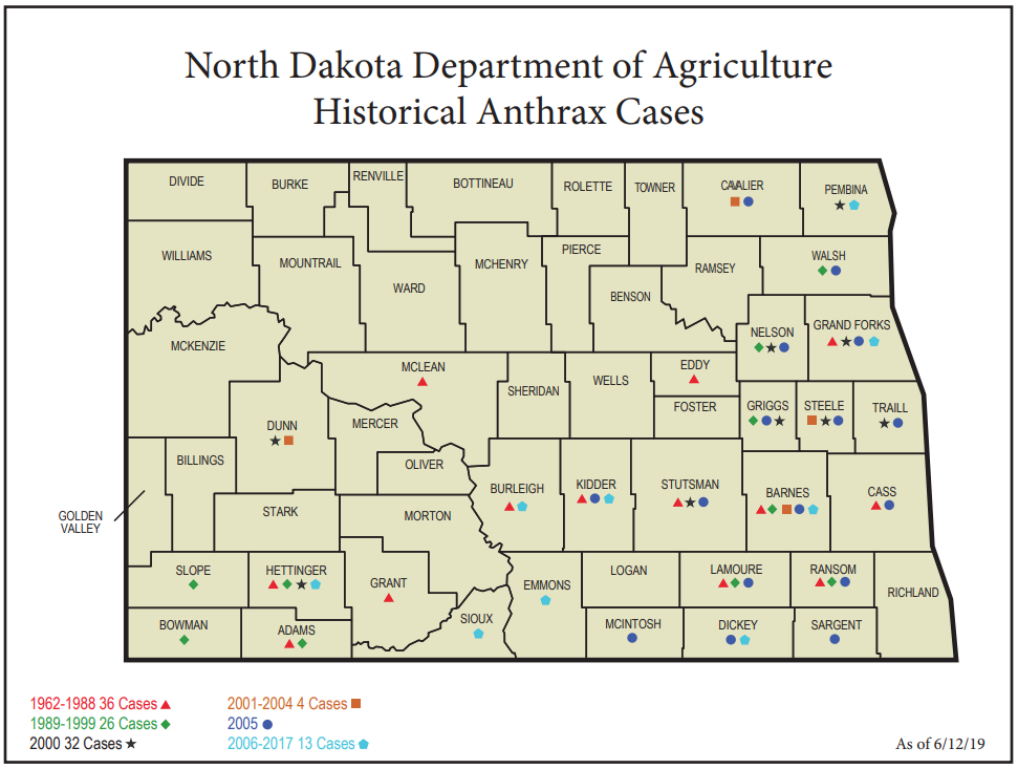
A comprehensive list of reportable conditions is maintained by the ND Department of Agriculture and available on their website.

Anthrax

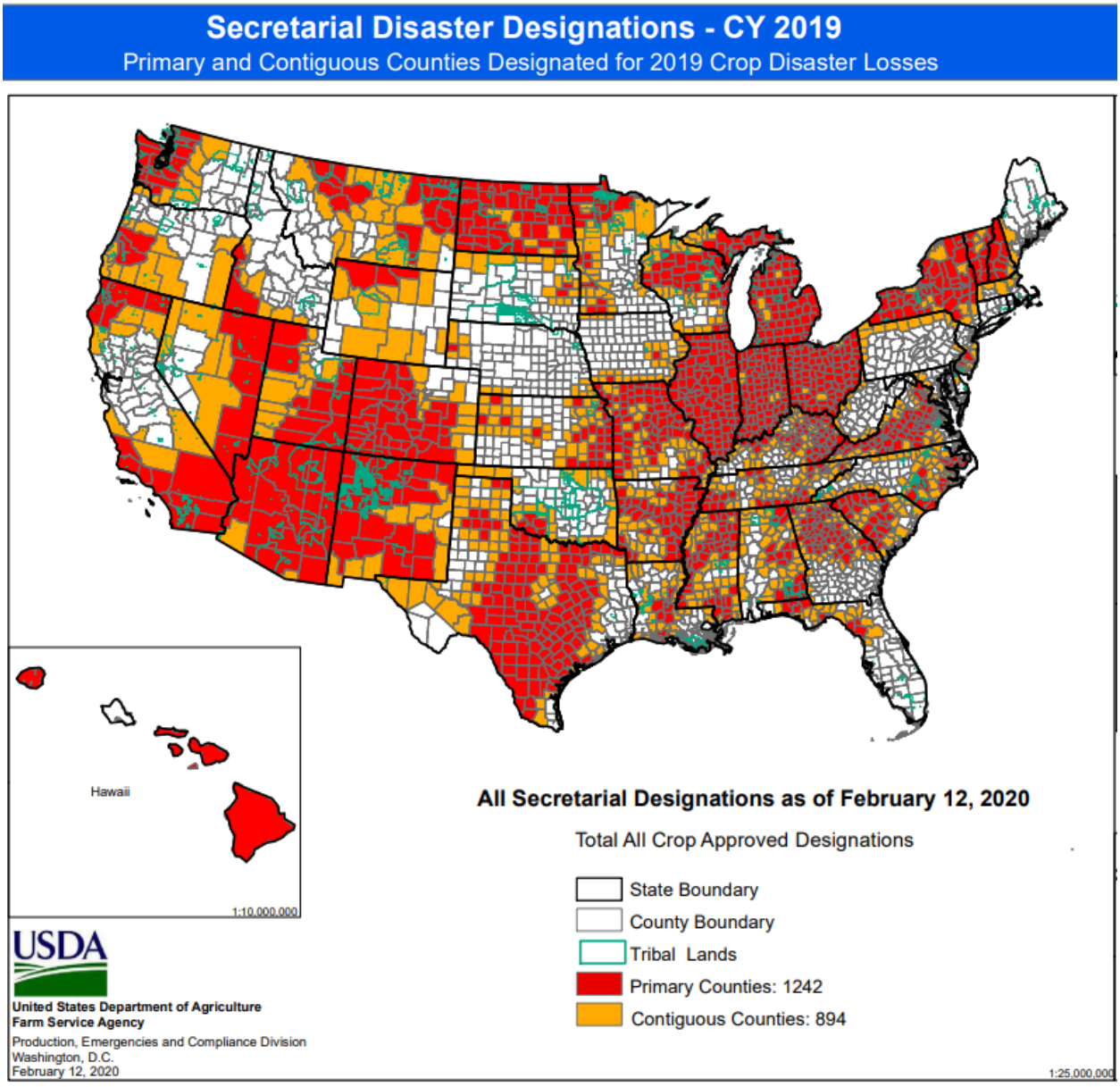
"Anthrax occurs worldwide and is associated with sudden death of cattle and sheep. Anthrax can infect all warm-blooded animals, including humans. The anthrax organism (Bacillus anthracis) has the ability to form spores and become resistant to adverse conditions. Pasteurization or ordinary disinfectants may destroy anthrax organisms in animals or their secretions. However, if the animal carcass is opened and the organisms are exposed to air, the bacilli will form spores. Sporulated anthrax organisms are highly resistant to heat, cold, chemical disinfectants and drying. The anthrax spore may live up to five years in surface soil (top 6 inches) of a contaminated pasture or yard, and indefinitely in deeper soils, depending on soil type. Herbivores – particularly cattle, bison and sheep – are susceptible to anthrax. Horses, swine and humans are less susceptible than cattle or sheep. Wild ruminants such as deer and elk also may become infected. Dogs and cats are susceptible when exposed to contaminated blood; the most common source is a recently necropsied carcass. Most birds are naturally resistant to anthrax because of their higher body temperature. Ostriches and rheas can be affected by anthrax because of their lower body temperature." (Source: ND Department of Agriculture website)

Emmons County has a low case history:

Anthrax Cases in Emmons County	
2010, 2013-2017	0
2006	1
2005	0



Agriculture-related disasters and disaster designations are quite common. Disaster designation information and fact sheets are provided by the United Stated Department of Agriculture.



Source: [United States Department of Agriculture Farm Service Agency]

Severe Summer Weather

Frequency	Highly Likely (Nearly 100% probability in the next year)
Severity	Limited (10-25% of jurisdiction affected)
Risk Class	B
Seasonal Pattern	April to November
Duration	2 to 5 hours
Speed of Onset	Little to no warning
Location	Countywide

Description

Severe summer storms are generated by temperature imbalances in the atmosphere, and as warm, moist are rises, the thunderstorm develops. These conditions will produce updrafts and downdrafts which are the reason for gust fronts, heavy rain (flash flooding), lightning, hail, and high winds. Downburst or straight-line winds can be as deadly as tornadoes. If the thunderstorm continues to intensify, a tornado may develop.

Why Worry About Thunderstorms?

Lightning:

- Causes an average of 55-60 fatalities and 400 injuries each year
- Occurs with all thunderstorms
- Costs more than $1 billion in insured losses each year

Tornadoes:

- Cause an average of 60-65 fatalities and 1,500 injuries each year
- Can produce wind speeds in excess of 200 mph
- Can be 1 mile wide and stay on the ground over 50 miles

Straight-line Winds:

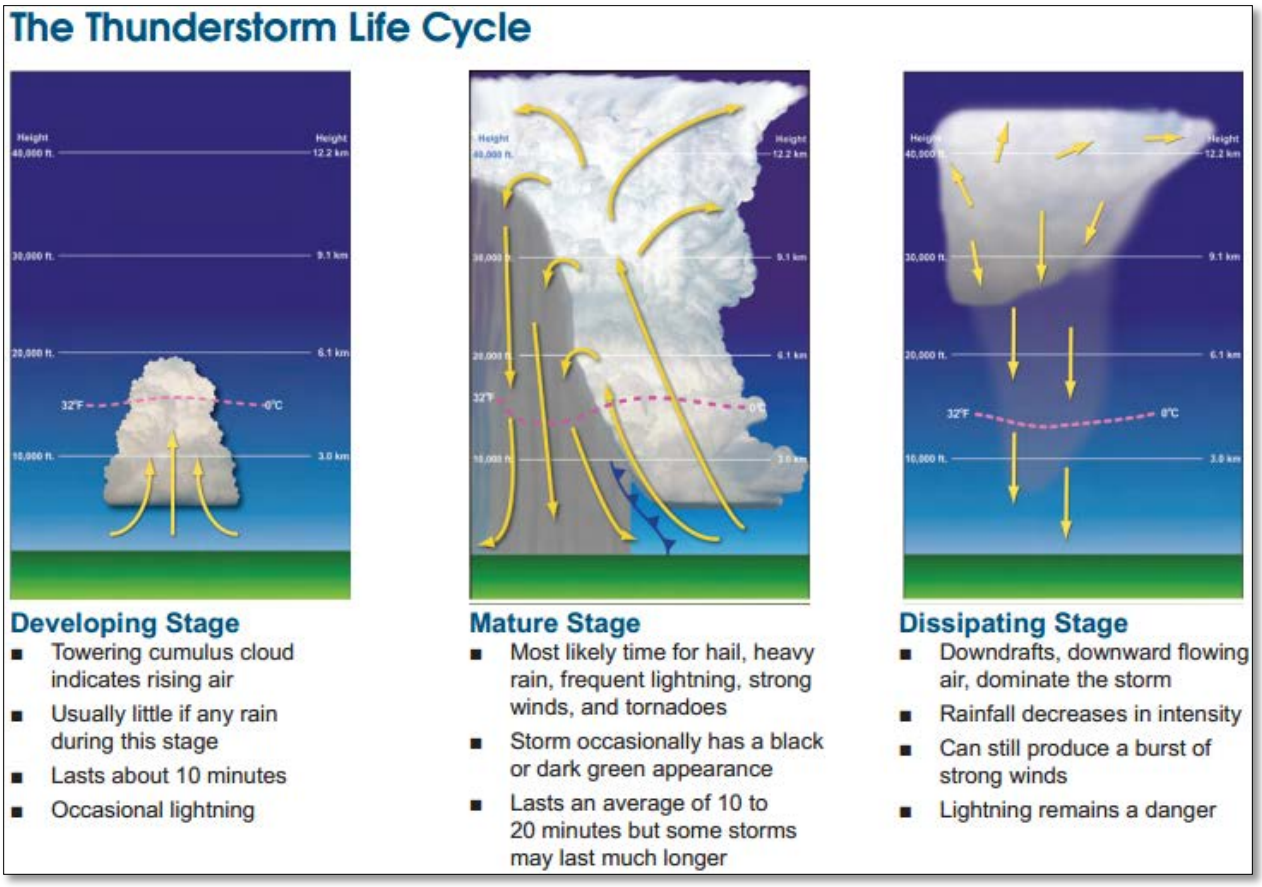
- Can exceed 125 mph
- Can cause destruction equal to a tornado
- Are extremely dangerous to aviation

Hail:

- Can be larger than a softball (5 inches in diameter)
- Causes more than $1 billion in crop and property damage each year

A thunderstorm affects a relatively small area when compared to a winter storm. The typical thunderstorm is 15 miles in diameter and lasts an average of 30 minutes. Despite their small size, all thunderstorms are dangerous! Every thunderstorm needs:

- Moisture—to form clouds and rain
- Unstable air—warm air that can rise rapidly
- Lift—caused by cold or warm fronts, sea breezes, mountains, or the sun's heat.



Source: Thunderstorms, Tornadoes, Lightning…A Preparedness Guide, US Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service

Lightning

The rising air in a thunderstorm cloud causes various types of frozen precipitation to form within the cloud. Included in these precipitation types are very small ice crystals and much larger pellets of snow and ice. The smaller ice crystals are carried upward toward the top of the clouds by the rising air while the heavier and denser pellets are either suspended by the rising air or start falling toward the ground. Collisions occur between the ice crystals and the pellets, and these collisions serve as the charging mechanism of the thunderstorm. The small ice crystals become positively charged while the pellets become negatively charged. As a result, the top of the cloud becomes positively charged and the middle to lower part of the storm becomes negatively charged. At the same time, the ground underneath the cloud becomes charged oppositely of the charges directly overhead.

When the charge difference between the ground and the cloud becomes too large, a conductive channel of air develops between the cloud and the ground, and a small amount of charge (step leader) starts moving toward the ground. When it nears the ground, an upward leader of opposite charge connects with the step leader. At the instant this connection is made, a powerful discharge occurs between the cloud and the ground. We see this discharge as a bright visible flash of lightning.

Source: Thunderstorms, Tornadoes, Lightning…A Preparedness Guide, US Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service

Severe Thunderstorms can occur any time of the day or night, but are most frequent during the late afternoon and evening hours. This is mostly due to the daytime heating which creates the extra heat energy to form these large thunderstorms. The criteria used by the National Weather Service for calling a thunderstorm severe is winds of 58 mph or more and/or hail three-quarters of an inch larger in diameter. There are other elements that make thunderstorms deadly, such as severe lightning, heavy rains, hail, straight-line winds, and tornadoes.

The general makeup of a severe thunderstorm is similar to that of a regular thunderstorm, except that each element is enhanced or more intense. This can be seen in the cloud formations and the weather that the storm produces.

Tornado

Tornadoes are nature's most destructive weapons. They occur in many parts of the world—most frequently in the United States and can occur at any time of day.

- A tornado is a violently rotating column of air extending from a cumuliform cloud, such as a thunderstorm, to the ground.
- Tornadoes may appear nearly transparent until dust and debris are picked up or a cloud forms within the funnel. The average tornado moves from southwest to northeast, but **tornadoes can move in any direction** and can suddenly change their direction of motion.
- The average forward speed of a tornado is 30 mph but may vary from nearly stationary to 70 mph.
- The strongest tornadoes have rotating winds of more than 200 mph.
- Tornadoes can accompany tropical storms and hurricanes as they move onto land.
- Waterspouts are tornadoes that form over warm water. Water spouts can move onshore and cause damage to coastal areas.

Tornadoes are Nature's Most Violent Storms

North Dakota has on average 23 *reported* tornadoes a year (1950 through 2019). The numbers range from only two in 1950, 1951 and 1961 to as many as 61 in 1999. Most tornadoes in the state occur from 3 PM to 11 PM local time in the months of June, July and August.

Development Phase

Mature Stage

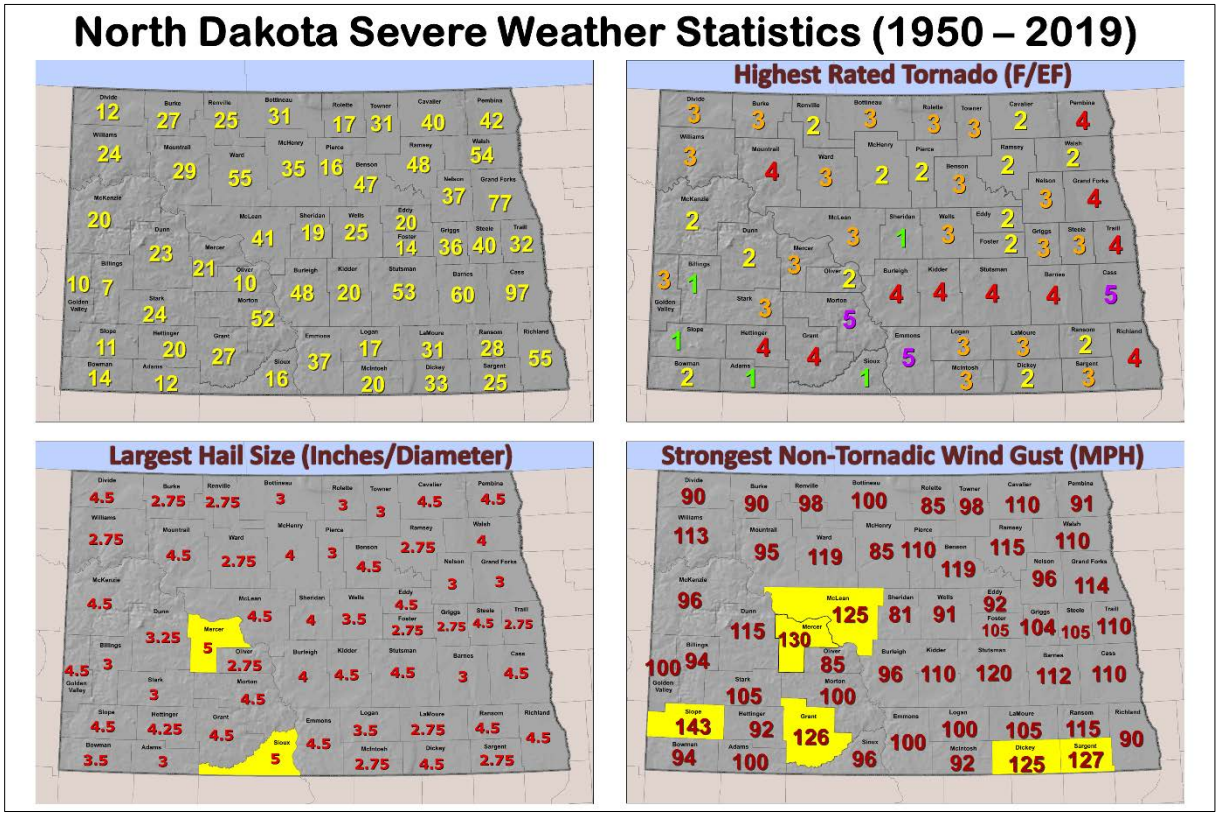
Dissipation Stage

Source: Source: National Weather Service Weather Forecast Office, Bismarck, ND website

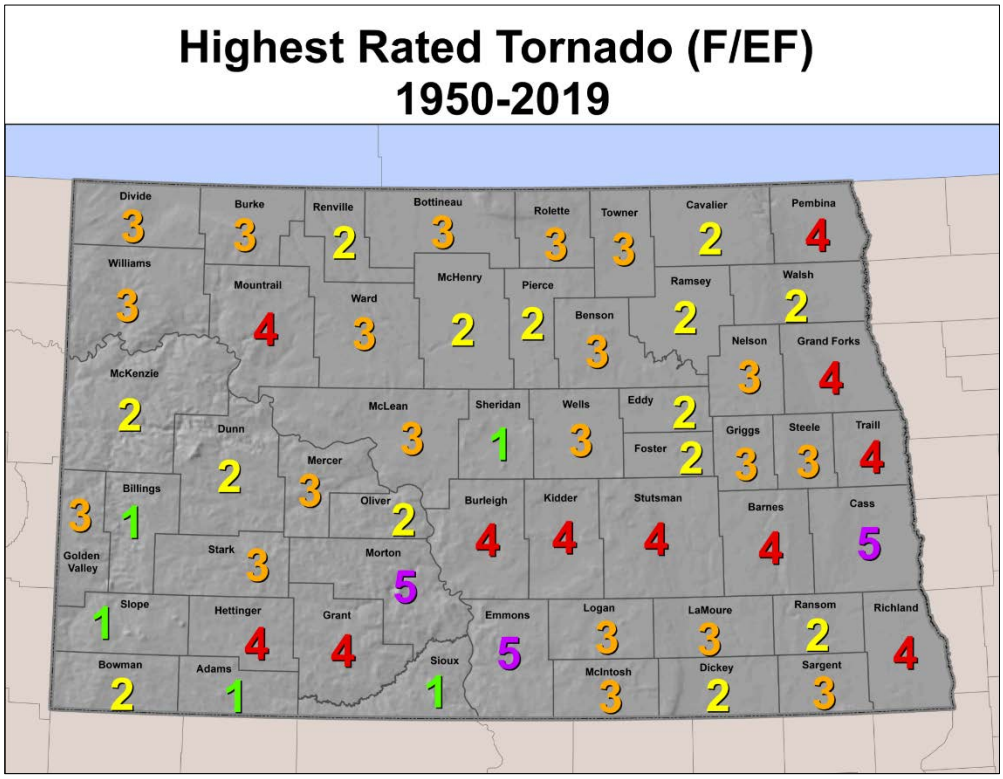
.

Tornado Scales

FUJITA SCALE			DERIVED EF SCALE		OPERATIONAL EF SCALE	
F Number	Fastest 1/4 mile (mph)	3 Second Gust (mph)	EF Number	3 Second Gust (mph)	EF Number	3 Second Gust (mph)
0	40-72	45-78	0	65-85	0	65-85
1	73-112	79-117	1	86-109	1	86-110
2	113-157	118-161	2	110-137	2	111-135
3	158-207	162-209	3	138-167	3	136-165
4	208-260	210-261	4	168-199	4	166-200
5	261-318	262-317	5	200-234	5	Over 200



Source: National Weather Service Weather Forecast Office, Bismarck, ND website



Source: National Weather Service Weather Forecast Office, Bismarck, ND website

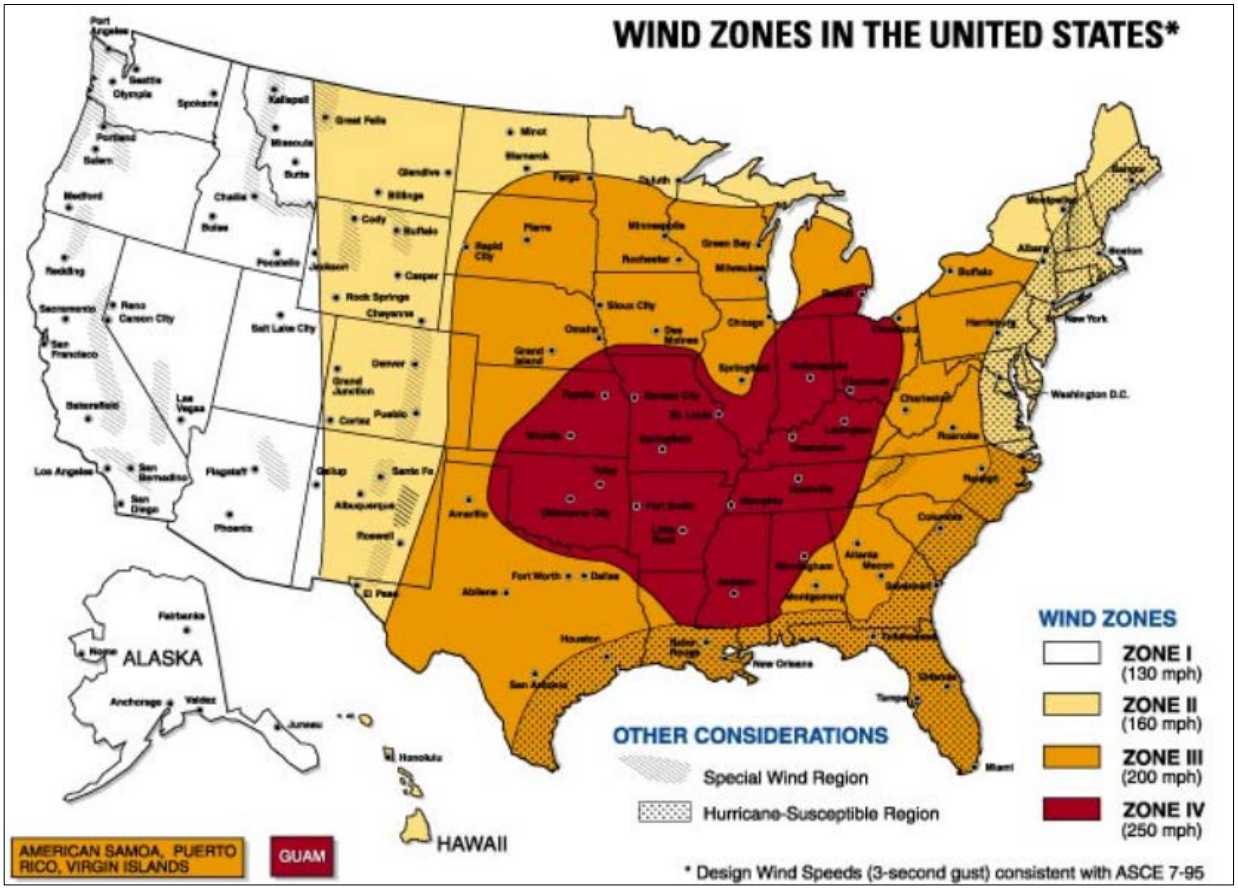
Wind

The National Weather Service defines wind as:

> "The horizontal motion of the air past a given point. Winds begin with differences in air pressures. Pressure that's higher at one place than another sets up a force pushing from the high toward the low pressure. The greater the difference in pressures, the stronger the force. The distance between the area of high pressure and the area of low pressure also determines how fast the moving air is accelerated. Meteorologists refer to the force that starts the wind flowing as the "pressure gradient force." High and low pressure are relative. There's no set number that divides high and low pressure. Wind is used to describe the prevailing direction from which the wind is blowing with the speed given usually in miles per hour or knots." (Source: National Weather Service Glossary website)

The Federal Emergency Management Agency recognizes Wind Zones in the United States. North Dakota is primarily in Zone II (160 mph) with a southeast portion in Zone III (200 mph). Emmons County is within the Zone III designation.

United States Wind Zones



Source: Federal Emergency Management Agency, Wind Zones website

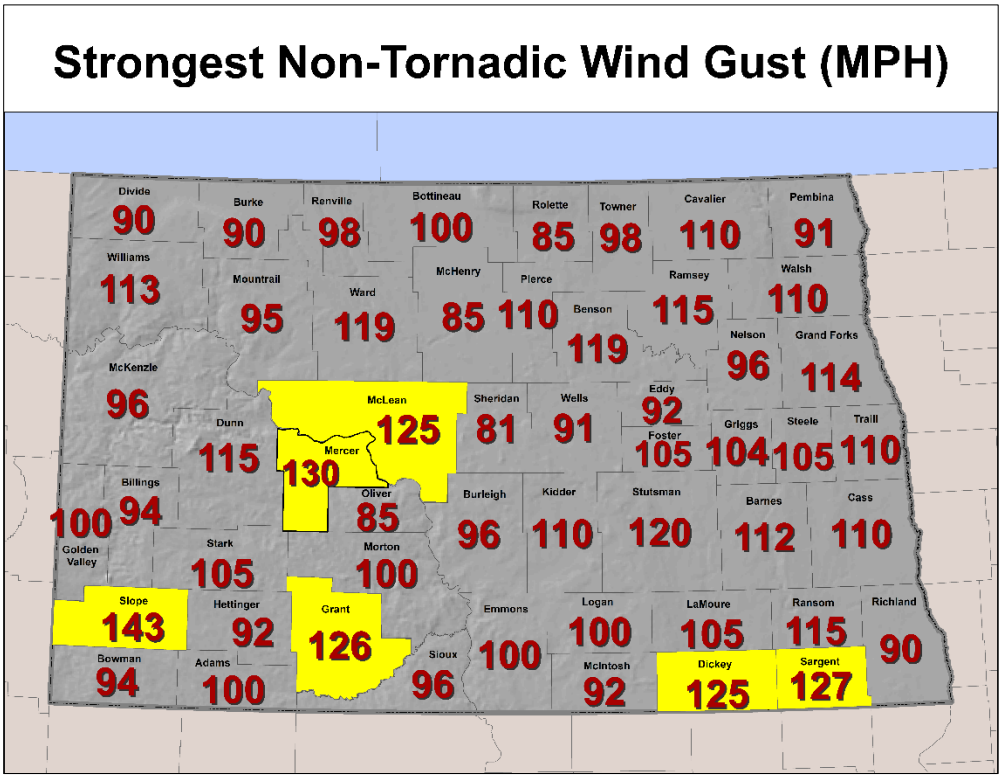
Page 2 Emmons County Record · www.ecrecord.com · ©2018 February 8, 2018

Local producers learn about erosion

Chris Augustin, far right, North Central Research Extension Center soil health specialist, demonstrates wind erosion at the Winter Crops meeting on Tuesday, Jan.30, 2018, at the Emmons County Memorial Auditorium, Linton. With the help of a leaf blower, a pan of soil and a small rake to serve as a cultivator, he showed producers how wind erosion is still an issue today. He said, "We've got a lot of erosion going on in our state and there are ways to curb it including planting higher residue crops in order to maintain soil quality. Erosion becomes a problem when it's greater than how fast we can create topsoil. It takes 500 years to create an inch of top soil, so soil is a very precious resource." The Winter Crops Meeting was sponsored by North Dakota State University Extension Service, Emmons County, and the Emmons County Soil Conservation District.

Straight-line winds are any winds not associated with the rotation of a tornado and are responsible for most thunderstorm damage. The winds can exceed 125 mph! A downburst is a small area of rapidly descending air beneath a thunderstorm and can cause damage equivalent to a strong tornado and can be extremely hazardous to aviation.

The number one cause of wind damage in North Dakota is from downburst winds, not tornadoes.



Source: National Weather Service Weather Forecast Office, Bismarck, ND website

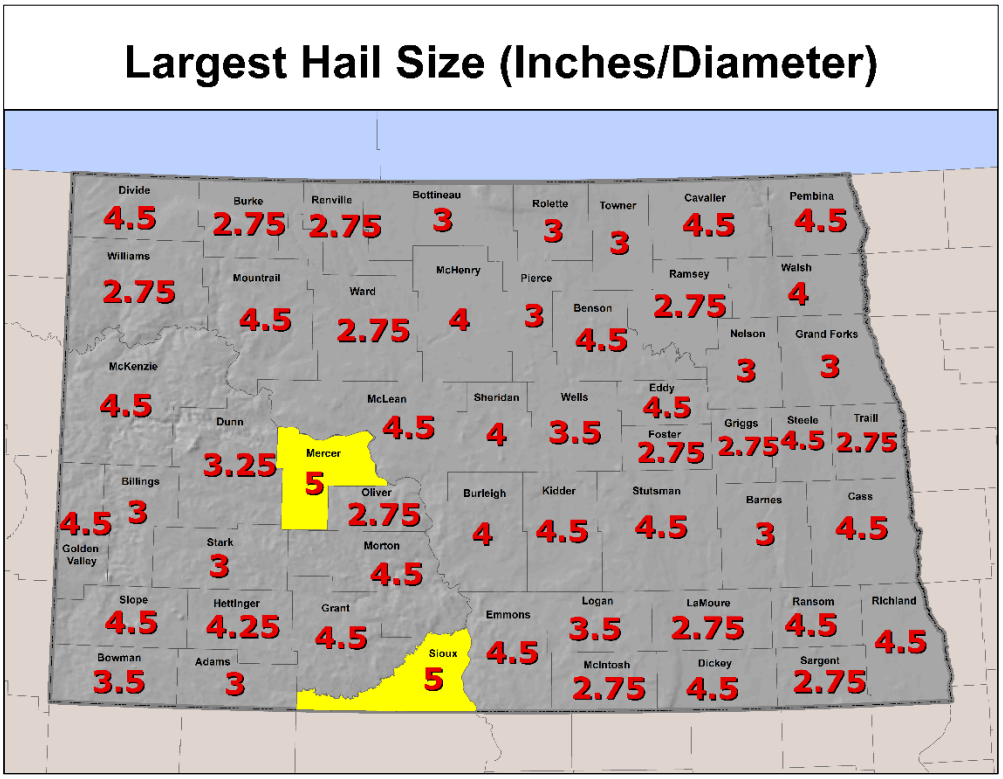
Emmons County Deputy Sheriff Mark Pearson said it was a long night on Tues., Aug. 9, and early morning Wed., Aug. 10, with the severe storms and wind gusts of 90-95 mph that came through Strasburg.

Source: Emmons County Record, August 18, 2016

Hail

Strong rising currents of air within a storm (updrafts) carry water droplets to a height where they freeze. Ice particles grown in size, becoming too heavy to be supported by the updraft, and fall to the ground. Hail is larger than sleet and forms only in thunderstorms. Hail stones can range from pea size to the size of a grapefruit. Hail has the potential to be life-threatening due to falling from great heights; large hailstones can fall at speeds faster than 100 mph!

The major hazard is to crops, aircraft, automobiles, roofs, and windows, etc. The destructiveness of hailstorms is not due to the hailstones alone. Hail damage is difficult to determine, as hail, wind, and rain frequently occur at the same time.



Source: National Weather Service Weather Forecast Office, Bismarck, ND website

Identified Impacts

- Agriculture
- Blocked Roads
- Building Collapse
- Business Interruptions
- Delayed Emergency Response
- Downed Power Lines
- Downed Trees
- Evacuation (Localized)
- Flooding (Street)
- Flooding (Structure)
- HAZMAT Release
- Increased Fire Potential
- Increased Public Safety Runs
- Livestock Injury/Death
- Loss of Economy
- Loss/Overcrowded Medical Facilities
- Loss of Potable Water
- Loss of Power
- Mass Casualties
- Personal Injury/Death Risk
- Property Damage
- School Closure
- Sewer Backup

History

Tornado

Location	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
LINTON	07/16/2011	20:47	CST-6	Tornado	EF0	0	0	30K	50K
LINTON MUNI ARPT	06/25/2010	16:35	CST-6	Tornado	EF0	0	0	0K	0K
STRASBURG	06/07/2005	19:19	CST	Tornado	F0	0	0	0K	0K
BRADDOCK	07/03/2003	19:52	CST	Tornado	F0	0	0	0K	0K
STRASBURG	06/05/2003	11:35	CST	Tornado	F0	0	0	0K	0K
HAZELTON	06/09/2001	18:10	CST	Tornado	F1	0	1	0K	0K
HAZELTON	06/03/1999	16:29	CST	Tornado	F0	0	0	0K	0K
HAGUE	07/06/1998	16:55	CST	Tornado	F0	0	0	0K	0K
LINTON	08/03/1996	22:30	CST	Tornado	F0	0	0	750K	0K
STRASBURG	07/10/1996	21:40	CST	Tornado	F0	0	0	25K	0K
LINTON	07/10/1996	19:05	CST	Tornado	F0	0	0	0K	0K
Linton	07/03/1995	18:53	CST	Tornado	F0	0	0	0K	0K
Linton	07/03/1995	18:20	CST	Tornado	F0	0	0	0K	0K
Strasburg	10/06/1994	16:55	CST	Tornado	F0	0	0	0K	0K
EMMONS CO.	05/21/1992	15:12	CST	Tornado	F0	0	0	0K	0K
EMMONS CO.	08/01/1988	14:35	CST	Tornado	F1	0	0	25K	0K
EMMONS CO.	08/01/1988	14:07	CST	Tornado	F1	0	0	25K	0K
EMMONS CO.	05/11/1986	19:20	CST	Tornado	F0	0	0	0K	0K
EMMONS CO.	05/11/1986	19:20	CST	Tornado	F0	0	0	0K	0K
EMMONS CO.	07/02/1983	15:20	CST	Tornado	F0	0	0	0.03K	0K
EMMONS CO.	04/28/1981	18:30	CST	Tornado	F0	0	0	0.25K	0K
EMMONS CO.	07/12/1976	23:45	CST	Tornado	F0	0	2	0K	0K
EMMONS CO.	06/11/1976	23:10	CST	Tornado	F0	0	0	25K	0K
EMMONS CO.	06/11/1976	21:30	CST	Tornado	F1	0	0	25K	0K
EMMONS CO.	06/11/1976	21:10	CST	Tornado	F1	0	0	0K	0K
EMMONS CO.	06/11/1976	21:10	CST	Tornado	F1	0	0	0K	0K
EMMONS CO.	08/19/1974	18:15	CST	Tornado	F2	0	0	25K	0K
EMMONS CO.	07/11/1974	21:10	CST	Tornado	F1	0	0	0K	0K
EMMONS CO.	05/26/1974	22:30	CST	Tornado	F2	0	0	25K	0K
EMMONS CO.	08/17/1967	15:00	CST	Tornado		0	0	25K	0K
EMMONS CO.	07/31/1966	18:35	CST	Tornado		0	0	0K	0K
EMMONS CO.	07/31/1966	18:35	CST	Tornado		0	0	0K	0K
EMMONS CO.	05/05/1964	21:05	CST	Tornado	F2	0	0	250K	0K

EMMONS CO.	07/24/1960	15:00	CST	Tornado		0	0	2.50K	0K
EMMONS CO.	08/25/1959	17:17	CST	Tornado	F2	0	0	0K	0K
EMMONS CO.	07/01/1955	17:10	CST	Tornado	F3	0	0	25K	0K
EMMONS CO.	05/29/1953	17:30	CST	Tornado	F5	0	0	250K	0K
Totals:						0	3	1.508M	50K

Source: National Oceanic and Atmospheric Administration National Climatic Data Center Website (01/1950 to 10/31/19)

High Wind Events
High Wind, Marine High Wind, Marine Strong Wind, Marine Thunderstorm Wind, Strong Wind, Thunderstorm Wind
(ten-year history plus previous events including death, injury, or damage)

Location	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
STRASBURG	6/28/2019	8:20	CST-6	Thunderstorm Wind	56 kts. EG	0	0	10K	0K
EMMONS (ZONE)	1/27/2019	17:00	CST-6	High Wind	52 kts. EG	0	0	0K	0K
TEMVIK	7/8/2018	0:35	CST-6	Thunderstorm Wind	50 kts. MG	0	0	0K	0K
HAZELTON	7/8/2018	0:31	CST-6	Thunderstorm Wind	78 kts. EG	0	0	200K	0K
WESTFIELD	7/3/2018	4:50	CST-6	Thunderstorm Wind	70 kts. EG	0	0	90K	0K
KINTYRE	7/3/2018	4:30	CST-6	Thunderstorm Wind	74 kts. EG	0	0	300K	0K
TEMVIK	6/14/2018	20:31	CST-6	Thunderstorm Wind	62 kts. MG	0	0	0K	0K
BRADDOCK	7/21/2017	22:36	CST-6	Thunderstorm Wind	61 kts. EG	0	0	8K	0K
HAZELTON	7/21/2017	22:22	CST-6	Thunderstorm Wind	52 kts. EG	0	0	5K	0K
STRASBURG	7/18/2017	2:45	CST-6	Thunderstorm Wind	56 kts. EG	0	0	15K	0K
STRASBURG	7/5/2017	18:05	CST-6	Thunderstorm Wind	52 kts. EG	0	0	0K	0K
EMMONS (ZONE)	3/7/2017	6:00	CST-6	High Wind	52 kts. MG	0	0	0K	0K
EMMONS (ZONE)	1/30/2017	9:00	CST-6	High Wind	35 kts. ES	0	0	0K	0K
STRASBURG	8/9/2016	23:30	CST-6	Thunderstorm Wind	70 kts. EG	0	0	200K	50K
TEMVIK	8/9/2016	23:26	CST-6	Thunderstorm Wind	70 kts. MG	0	0	0K	0K
STRASBURG	8/9/2016	23:20	CST-6	Thunderstorm Wind	61 kts. EG	0	0	0K	0K
LINTON	8/9/2016	23:18	CST-6	Thunderstorm Wind	65 kts. EG	0	0	100K	50K
HAZELTON	8/9/2016	23:15	CST-6	Thunderstorm Wind	52 kts. EG	0	0	0K	0K
TEMVIK	7/11/2016	1:29	CST-6	Thunderstorm Wind	53 kts. MG	0	0	0K	0K
HAZELTON ARPT	6/22/2016	0:25	CST-6	Thunderstorm Wind	83 kts. EG	0	0	100K	0K
EMMONS (ZONE)	2/7/2016	0:00	CST-6	High Wind	37 kts. MS	0	0	0K	0K
EMMONS (ZONE)	11/18/2015	13:00	CST-6	High Wind	52 kts. MG	0	0	0K	0K
EMMONS (ZONE)	10/11/2015	12:00	CST-6	High Wind	50 kts. MG	0	0	0K	0K
EMMONS (ZONE)	8/22/2015	18:00	CST-6	High Wind	61 kts. EG	0	0	10K	0K
LINTON MUNI ARPT	6/21/2015	21:10	CST-6	Thunderstorm Wind	54 kts. MG	0	0	0K	0K
LINTON	6/21/2015	21:05	CST-6	Thunderstorm Wind	52 kts. EG	0	0	0K	0K
HAZELTON	6/19/2015	20:35	CST-6	Thunderstorm Wind	52 kts. EG	0	0	5K	0K
LINTON	8/20/2014	20:45	CST-6	Thunderstorm Wind	52 kts. EG	0	0	2K	0K
HAZELTON	7/21/2014	17:05	CST-6	Thunderstorm Wind	59 kts. MG	0	0	0K	0K
LINTON MUNI ARPT	7/6/2014	22:35	CST-6	Thunderstorm Wind	54 kts. MG	0	0	0K	0K
HAZELTON	7/6/2014	22:14	CST-6	Thunderstorm Wind	65 kts. EG	0	0	45K	0K
EMMONS (ZONE)	1/15/2014	20:00	CST-6	High Wind	50 kts. MG	0	0	0K	0K
EMMONS (ZONE)	10/17/2012	21:00	CST-6	High Wind	50 kts. MG	0	0	0K	0K
LINTON	6/7/2012	19:10	CST-6	Thunderstorm Wind	70 kts. EG	0	0	35K	0K
LINTON MUNI ARPT	5/2/2012	19:05	CST-6	Thunderstorm Wind	56 kts. MG	0	0	0K	0K

EMMONS (ZONE)	10/7/2011	10:00	CST-6	High Wind	50 kts. MG	0	0	0K	0K
EMMONS (ZONE)	9/20/2011	3:00	CST-6	High Wind	35 kts. ES	0	0	0K	0K
WESTFIELD	8/28/2011	3:20	CST-6	Thunderstorm Wind	52 kts. EG	0	0	0K	0K
LINTON	7/22/2011	22:50	CST-6	Thunderstorm Wind	61 kts. EG	0	0	35K	0K
BRADDOCK	7/10/2011	13:33	CST-6	Thunderstorm Wind	52 kts. EG	0	0	0K	0K
HAZELTON ARPT	7/10/2011	13:24	CST-6	Thunderstorm Wind	61 kts. EG	0	0	25K	0K
HAZELTON	7/10/2011	13:15	CST-6	Thunderstorm Wind	83 kts. MG	0	0	150K	0K
HAZELTON	7/8/2011	18:30	CST-6	Thunderstorm Wind	52 kts. EG	0	0	0K	0K
KINTYRE	6/2/2011	23:53	CST-6	Thunderstorm Wind	78 kts. EG	0	0	200K	0K
KINTYRE	6/2/2011	23:52	CST-6	Thunderstorm Wind	78 kts. EG	0	0	125K	0K
KINTYRE	6/2/2011	23:50	CST-6	Thunderstorm Wind	87 kts. EG	0	0	350K	0K
LINTON	6/2/2011	23:37	CST-6	Thunderstorm Wind	83 kts. EG	0	0	35K	0K
LINTON MUNI ARPT	6/2/2011	23:35	CST-6	Thunderstorm Wind	82 kts. MG	0	0	100K	0K
EMMONS (ZONE)	5/31/2011	9:00	CST-6	High Wind	35 kts. ES	0	0	0K	0K
EMMONS (ZONE)	4/30/2011	13:00	CST-6	High Wind	52 kts. EG	0	0	0K	0K
EMMONS (ZONE)	2/13/2011	9:00	CST-6	High Wind	35 kts. ES	0	0	20K	0K
EMMONS (ZONE)	10/26/2010	11:00	CST-6	High Wind	50 kts. MG	0	0	0K	0K
EMMONS (ZONE)	8/13/2010	0:00	CST-6	High Wind	55 kts. MG	0	0	0K	0K
LINTON	8/12/2010	22:50	CST-6	Thunderstorm Wind	70 kts. EG	0	0	15K	0K
HAGUE	6/26/2010	19:05	CST-6	Thunderstorm Wind	52 kts. EG	0	0	0K	0K
WESTFIELD	6/26/2010	18:24	CST-6	Thunderstorm Wind	65 kts. EG	0	0	6K	0K
HAZELTON	6/22/2010	1:45	CST-6	Thunderstorm Wind	70 kts. EG	0	0	20K	0K
EMMONS (ZONE)	6/18/2010	10:00	CST-6	High Wind	35 kts. ES	0	0	0K	0K
HAZELTON	6/16/2010	23:15	CST-6	Thunderstorm Wind	52 kts. EG	0	0	0K	0K
STRASBURG	5/24/2010	19:51	CST-6	Thunderstorm Wind	56 kts. EG	0	0	20K	0K
LINTON	5/24/2010	19:40	CST-6	Thunderstorm Wind	70 kts. EG	0	0	90K	0K
LINTON	5/22/2010	3:00	CST-6	Thunderstorm Wind	70 kts. EG	0	0	50K	0K
EMMONS (ZONE)	7/13/2009	23:55	CST-6	High Wind	52 kts. EG	0	0	5K	0K
TEMVIK	7/12/2009	1:27	CST-6	Thunderstorm Wind	52 kts. EG	0	0	0K	0K
BRADDOCK	6/11/2008	2:35	CST-6	Thunderstorm Wind	61 kts. EG	0	0	35K	0K
LINTON	8/4/2006	18:00	CST	Thunderstorm Wind	78 kts. ES	0	0	200K	0K
LINTON	8/4/2006	17:47	CST	Thunderstorm Wind	61 kts. EG	0	0	5K	0K
STRASBURG	7/6/1998	16:40	CST	Thunderstorm Wind	87 kts.	0	0	200K	80K
LINTON	10/11/1997	20:10	CST	Thunderstorm Wind	85 kts.	0	0	150K	0K
CANNONBALL	5/16/1996	22:50	CST	Thunderstorm Wind	65 kts.	0	0	50K	0K
Linton	8/28/1993	16:15	CST	Thunderstorm Wind	60 kts.	0	0	50K	50K
Totals:						0	0	3.061 M	230K

Source: National Oceanic and Atmospheric Administration National Climatic Data Center Website (01/1950 to 10/31/2019)

Hail

(ten-year history plus previous events including death, injury, or damage)

Location	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
LINTON	9/20/2019	15:36	CST-6	Hail	1 in.	0	0	0K	0K
WESTFIELD	8/6/2019	16:50	CST-6	Hail	2 in.	0	0	50K	100K
WESTFIELD	8/6/2019	16:46	CST-6	Hail	1.75 in.	0	0	0K	0K
STRASBURG	8/6/2019	16:45	CST-6	Hail	1.75 in.	0	0	0K	0K
KINTYRE	5/15/2019	18:10	CST-6	Hail	1.25 in.	0	0	0K	0K
HAZELTON	5/15/2019	17:40	CST-6	Hail	1.50 in.	0	0	0K	0K
HAZELTON	5/15/2019	17:34	CST-6	Hail	1 in.	0	0	0K	0K
HAZELTON	5/15/2019	17:25	CST-6	Hail	1 in.	0	0	0K	0K
HAZELTON	5/15/2019	17:15	CST-6	Hail	1 in.	0	0	0K	0K
HAZELTON	6/14/2018	20:44	CST-6	Hail	0.88 in.	0	0	0K	0K
HAGUE	7/21/2017	18:30	CST-6	Hail	1.75 in.	0	0	0K	0K
STRASBURG	8/1/2016	15:27	CST-6	Hail	1.25 in.	0	0	0K	0K
STRASBURG	8/1/2016	15:03	CST-6	Hail	1 in.	0	0	0K	0K
HAGUE	7/22/2016	11:30	CST-6	Hail	1 in.	0	0	0K	0K
LINTON MUNI ARPT	7/22/2016	10:57	CST-6	Hail	0.75 in.	0	0	0K	0K
LINTON	7/11/2016	3:16	CST-6	Hail	0.88 in.	0	0	0K	0K
KINTYRE	7/11/2016	1:55	CST-6	Hail	1.75 in.	0	0	0K	150K
LINTON	7/11/2016	0:12	CST-6	Hail	2 in.	0	0	50K	20K
KINTYRE	8/6/2015	7:10	CST-6	Hail	1 in.	0	0	0K	0K
LINTON	6/21/2015	21:10	CST-6	Hail	1 in.	0	0	0K	0K
LINTON	6/21/2015	21:05	CST-6	Hail	1 in.	0	0	0K	0K
TEMVIK	6/2/2015	18:00	CST-6	Hail	1.75 in.	0	0	0K	0K
HAGUE	6/2/2015	15:35	CST-6	Hail	0.88 in.	0	0	0K	0K
STRASBURG	6/2/2015	15:07	CST-6	Hail	1 in.	0	0	0K	0K
STRASBURG	6/2/2015	15:05	CST-6	Hail	1 in.	0	0	0K	0K
LINTON	6/2/2015	13:55	CST-6	Hail	0.88 in.	0	0	0K	0K
LINTON MUNI ARPT	6/22/2013	19:15	CST-6	Hail	1 in.	0	0	0K	0K
STRASBURG	6/20/2013	19:30	CST-6	Hail	1 in.	0	0	0K	0K
LINTON	6/20/2013	18:28	CST-6	Hail	1 in.	0	0	0K	0K
LINTON	6/20/2013	17:55	CST-6	Hail	2.75 in.	0	0	250K	50K
BRADDOCK	6/20/2013	17:45	CST-6	Hail	1 in.	0	0	0K	0K
LINTON	6/20/2013	17:35	CST-6	Hail	1.75 in.	0	0	75K	0K
BRADDOCK	6/20/2013	17:02	CST-6	Hail	1 in.	0	0	0K	0K
KINTYRE	6/20/2013	16:45	CST-6	Hail	0.75 in.	0	0	0K	0K
KINTYRE	6/20/2013	16:23	CST-6	Hail	1 in.	0	0	0K	0K
WESTFIELD	8/28/2011	3:20	CST-6	Hail	1.50 in.	0	0	0K	0K
WESTFIELD	8/28/2011	3:00	CST-6	Hail	1.50 in.	0	0	0K	0K

STRASBURG	6/3/2011	0:00	CST-6	Hail	0.88 in.	0	0	0K	0K
KINTYRE	7/14/2010	2:05	CST-6	Hail	1 in.	0	0	0K	0K
HAZELTON	7/14/2010	1:44	CST-6	Hail	1.75 in.	0	0	0K	0K
HAZELTON	7/14/2010	1:43	CST-6	Hail	1.50 in.	0	0	0K	0K
HAZELTON	7/14/2010	1:30	CST-6	Hail	1.75 in.	0	0	20K	50K
LINTON	7/14/2010	0:15	CST-6	Hail	2.50 in.	0	0	500K	650K
HAGUE	6/26/2010	19:05	CST-6	Hail	1 in.	0	0	0K	0K
HAGUE	6/26/2010	19:00	CST-6	Hail	1 in.	0	0	0K	75K
HAZELTON	6/25/2010	16:50	CST-6	Hail	1 in.	0	0	0K	0K
HAZELTON	6/25/2010	16:30	CST-6	Hail	1.75 in.	0	0	0K	0K
HAZELTON	6/25/2010	16:17	CST-6	Hail	1 in.	0	0	0K	0K
KINTYRE	6/24/2010	22:01	CST-6	Hail	1.75 in.	0	0	0K	100K
KINTYRE	5/22/2010	19:05	CST-6	Hail	1.25 in.	0	0	0K	0K
LINTON	6/22/2009	18:25	CST-6	Hail	1 in.	0	0	0K	0K
HAZELTON	5/28/2009	15:35	CST-6	Hail	0.88 in.	0	0	0K	0K
LINTON	7/27/2008	2:20	CST-6	Hail	3 in.	0	0	500K	25K
DANA	7/19/2008	20:30	CST-6	Hail	2 in.	0	0	65K	90K
HAZELTON	6/30/2006	17:45	CST	Hail	1.75 in.	0	0	1K	0K
LINTON	6/21/1999	6:20	CST	Hail	1.75 in.	0	0	130K	0K
HAZELTON	7/6/1998	20:30	CST	Hail	0.75 in.	0	0	0K	800K
HAGUE	7/6/1998	17:00	CST	Hail	1 in.	0	0	50K	100K
HAZELTON	5/31/1996	15:45	CST	Hail	0.75 in.	0	0	1K	0K
HAZELTON	5/31/1996	15:00	CST	Hail	1.25 in.	0	0	12K	5K
Totals:						0	0	1.704M	2.215M

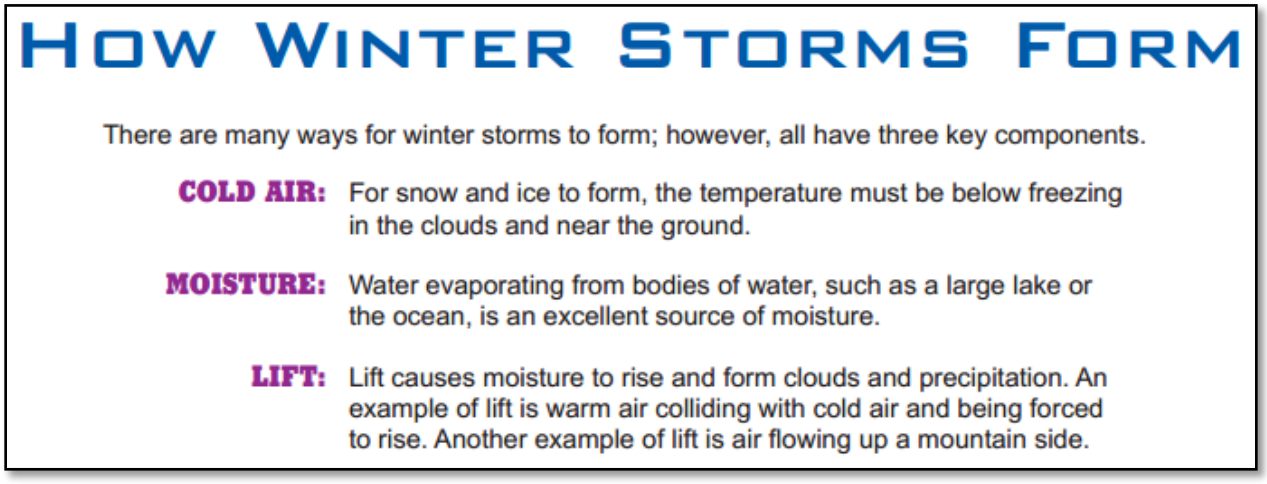
Source: National Oceanic and Atmospheric Administration National Climatic Data Center Website (01/1950 to 10/31/2019)

Severe Winter Weather
(including blizzards, extreme cold/wind chill, heavy snow, ice storms, structure collapse)

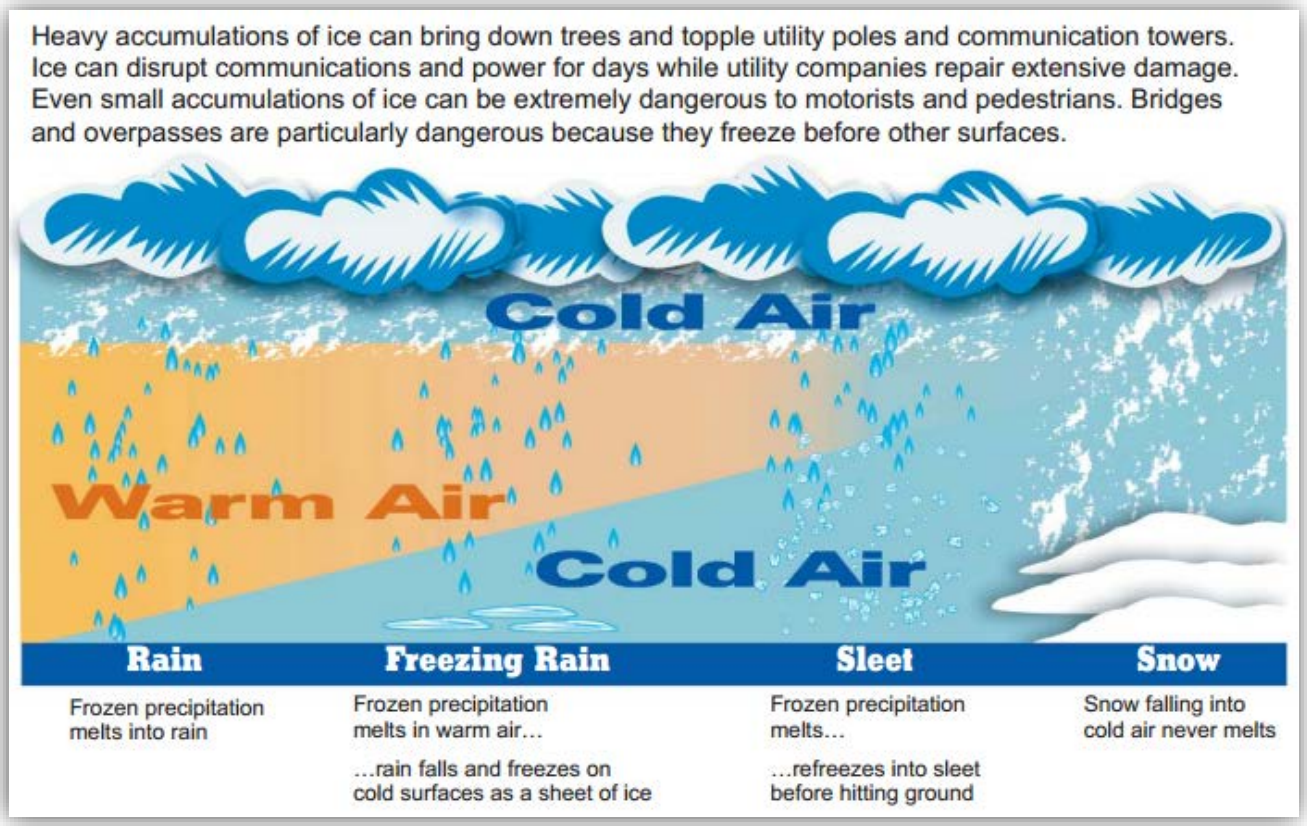
Frequency	Highly Likely (Nearly 100% probability in the next year)
Severity	Critical (25-50% of jurisdiction affected)
Risk Class	A
Seasonal Pattern	November to April
Duration	2 to 5 days
Speed of Onset	12 to 24 hours warning
Location	Countywide

Description
Winter storms occur in many forms and vary significantly in size, strength, intensity, duration, and impact. The winter season can begin as early as September and last into May. Generally, a period from mid-November through early April provides the bulk of winter storms.

Heavy snow can paralyze a community by stranding travelers, stopping the flow commodities, and disrupting emergency services. The weight of snow can cause roofs to collapse and knock down trees and utility lines. Homes and farms may be isolated for days and unprotected livestock may die. The cost of snow removal, damage repair, and loss of business can have economic impacts on communities.



Source: Winter Storms, The Deceptive Killers, A Preparedness Guide, U.S. Department of Commerce, National Oceanic and Atmospheric Administration, June 2008



Source: Winter Storms, The Deceptive Killers, A Preparedness Guide, U.S. Department of Commerce, National Oceanic and Atmospheric Administration, June 2008

Key Terms

Blizzard: Sustained winds or frequent gusts of 35 mph or more with snow and blowing snow frequently reducing visibility to less than a quarter mile for 3 hours or more.

Blowing Snow: Wind-driven snow that reduces visibility. Blowing snow may be falling snow and/or snow on the ground picked up by the wind.

Freezing Rain: Rain that freezes when it hits the ground; creating a coating of ice on roads, walkways, trees and power lines.

Sleet: Rain that turns to ice pellets before reaching the ground. Sleet also causes moisture on roads to freeze and become slippery.

Snow Squalls: Brief, intense snow showers accompanied by strong, gusty winds. Accumulation may be significant.

Snow Showers: Snow falling at varying intensities for brief periods of time. Some accumulation is possible.

Snow Flurries: Light snow falling for short durations with little or no accumulation.

Wind Chill: A measure of how cold people feel due to the combined effect of wind and cold temperatures; the Wind Chill Index is based on the rate of heat loss from exposed skin. Both cold temperatures and wind remove heat from the body; as the wind speed increases during cold conditions, a body loses heat more quickly. Eventually, the internal body temperature also falls and hypothermia can develop. Animals also feel the effects of wind chill; but inanimate objects, such as vehicles and buildings, do not. They will only cool to the actual air temperature, although much faster during windy conditions.

Wind Chill Chart

Wind (mph) \ Temperature (°F)	Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5		36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10		34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15		32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20		30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25		29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30		28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35		28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40		27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45		26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50		26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55		25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60		25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

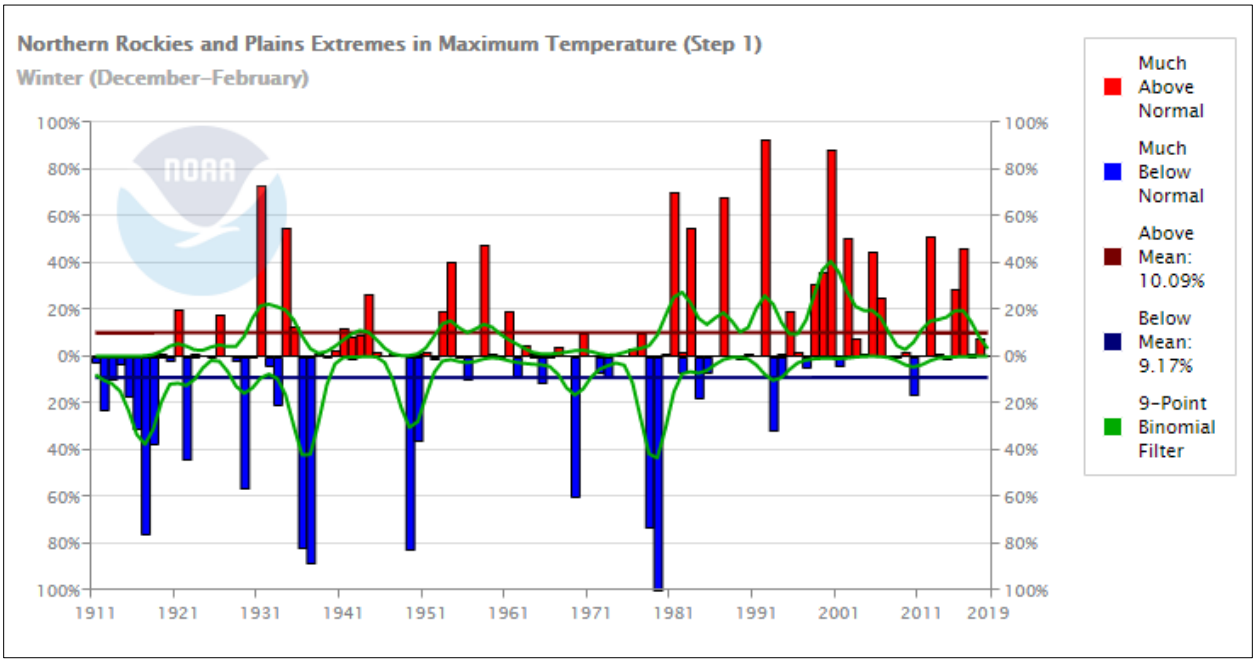
Frostbite Times: 30 minutes; 10 minutes; 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

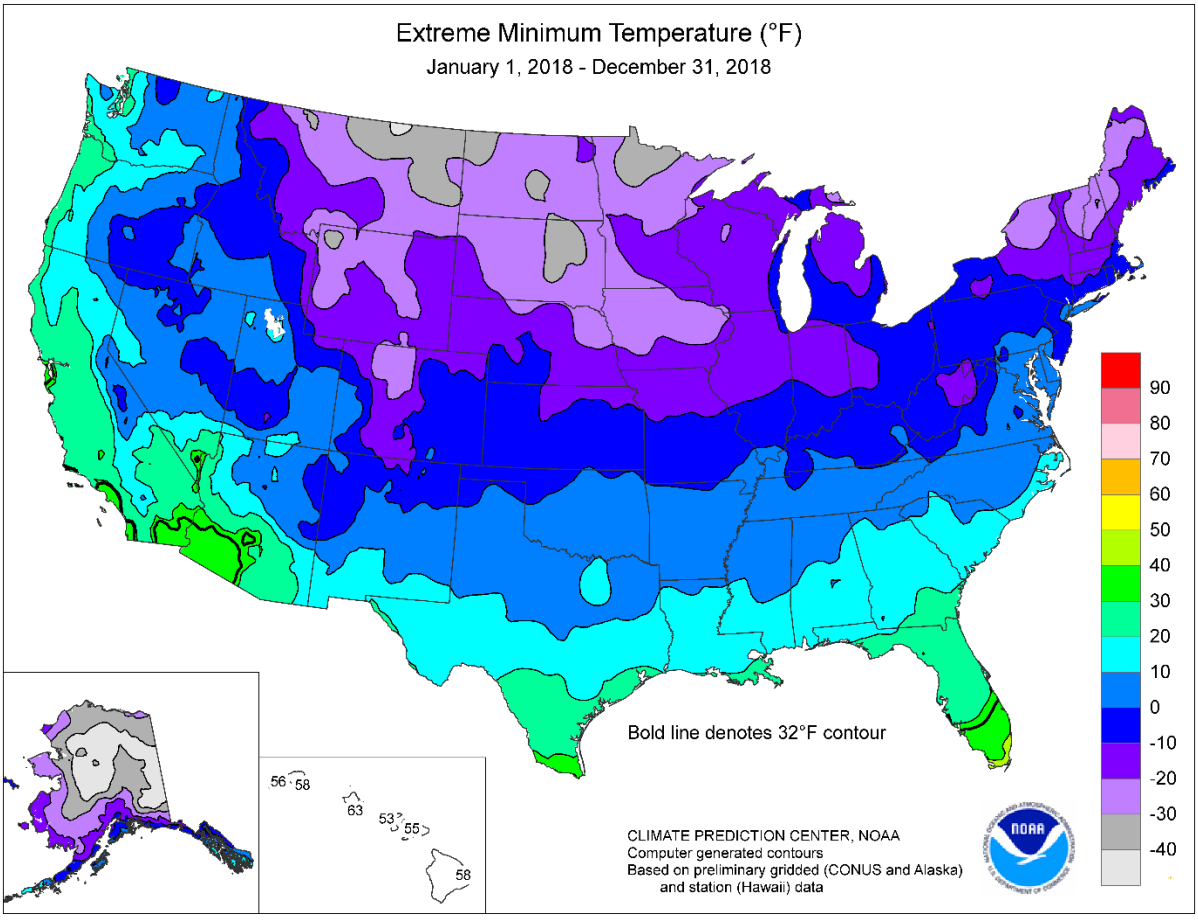
Where, T= Air Temperature (°F) V= Wind Speed (mph) *Effective 11/01/01*

Sources: Winter Storms, The Deceptive Killers, A Preparedness Guide, U.S. Department of Commerce, National Oceanic and Atmospheric Administration, June 2008

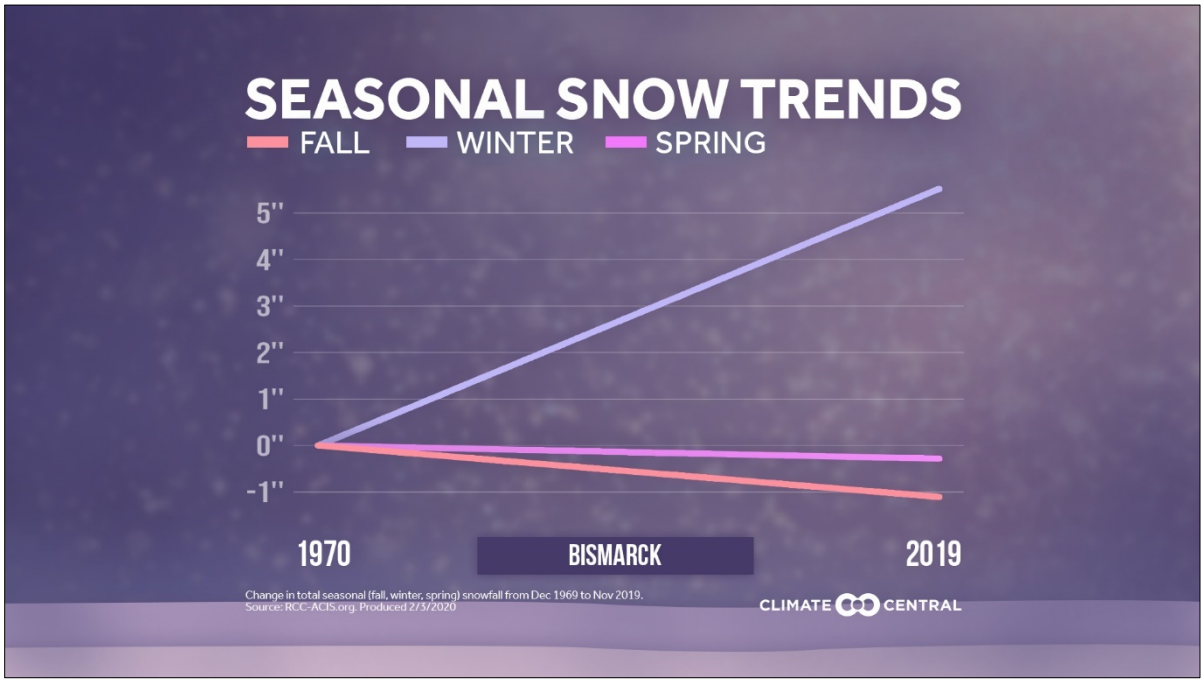
National Weather Service, National Oceanic and Atmospheric Administration, Winter Storm Safety, website



Source: www.ncdc.noaa.gov

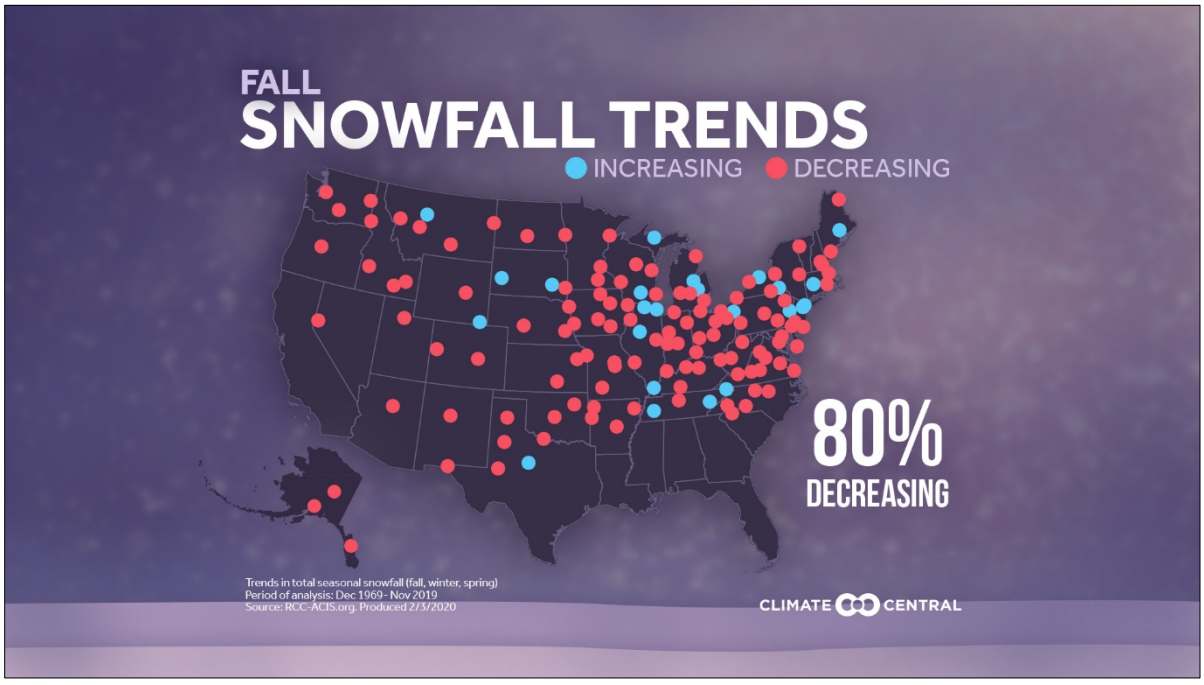


https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/12cmin0.png



Source: Climate Central

The impact of climate change on snow can be a tricky story to tell. While warming winters would suggest that more precipitation will fall as rain instead of snow, a warming climate is also associated with increased precipitation which, in cold regions, can lead to an increase in snowfall. A new report from Climate Central aims to make sense of this challenging subject—analyzing snowfall data collected between 1970 and 2019 from 145 stations across the country.



Source: Climate Central

Identified Impacts

- Agriculture
- Blocked Roads
- Building Collapse
- Business Interruptions
- Delayed Emergency Response
- Downed Power Lines
- Downed Trees
- Evacuation (Localized)
- HAZMAT Release
- Increased Fire Potential
- Increased Public Safety Runs
- Livestock Injury/Death
- Loss of Economy
- Loss of Power
- Personal Injury/Death Risk
- Property Damage
- School Closure
- Wind Chill

History

Severe Winter Weather Events
Blizzard, Cold/Wind Chill, Extreme Cold/Wind Chill, Heavy Snow, Ice Storm, Winter Storm, Winter Weather
(ten-year history plus previous events including death, injury, or damage)

Location	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
LINTON	9/20/2019	15:36	CST-6	Hail	1 in.	0	0	0K	0K
WESTFIELD	8/6/2019	16:50	CST-6	Hail	2 in.	0	0	50K	100K
WESTFIELD	8/6/2019	16:46	CST-6	Hail	1.75 in.	0	0	0K	0K
STRASBURG	8/6/2019	16:45	CST-6	Hail	1.75 in.	0	0	0K	0K
KINTYRE	5/15/2019	18:10	CST-6	Hail	1.25 in.	0	0	0K	0K
HAZELTON	5/15/2019	17:40	CST-6	Hail	1.50 in.	0	0	0K	0K
HAZELTON	5/15/2019	17:34	CST-6	Hail	1 in.	0	0	0K	0K
HAZELTON	5/15/2019	17:25	CST-6	Hail	1 in.	0	0	0K	0K
HAZELTON	5/15/2019	17:15	CST-6	Hail	1 in.	0	0	0K	0K
HAZELTON	6/14/2018	20:44	CST-6	Hail	0.88 in.	0	0	0K	0K
HAGUE	7/21/2017	18:30	CST-6	Hail	1.75 in.	0	0	0K	0K
STRASBURG	8/1/2016	15:27	CST-6	Hail	1.25 in.	0	0	0K	0K
STRASBURG	8/1/2016	15:03	CST-6	Hail	1 in.	0	0	0K	0K
HAGUE	7/22/2016	11:30	CST-6	Hail	1 in.	0	0	0K	0K
LINTON MUNI ARPT	7/22/2016	10:57	CST-6	Hail	0.75 in.	0	0	0K	0K
LINTON	7/11/2016	3:16	CST-6	Hail	0.88 in.	0	0	0K	0K
KINTYRE	7/11/2016	1:55	CST-6	Hail	1.75 in.	0	0	0K	150K
LINTON	7/11/2016	0:12	CST-6	Hail	2 in.	0	0	50K	20K
KINTYRE	8/6/2015	7:10	CST-6	Hail	1 in.	0	0	0K	0K
LINTON	6/21/2015	21:10	CST-6	Hail	1 in.	0	0	0K	0K
LINTON	6/21/2015	21:05	CST-6	Hail	1 in.	0	0	0K	0K
TEMVIK	6/2/2015	18:00	CST-6	Hail	1.75 in.	0	0	0K	0K
HAGUE	6/2/2015	15:35	CST-6	Hail	0.88 in.	0	0	0K	0K
STRASBURG	6/2/2015	15:07	CST-6	Hail	1 in.	0	0	0K	0K
STRASBURG	6/2/2015	15:05	CST-6	Hail	1 in.	0	0	0K	0K
LINTON	6/2/2015	13:55	CST-6	Hail	0.88 in.	0	0	0K	0K
LINTON MUNI ARPT	6/22/2013	19:15	CST-6	Hail	1 in.	0	0	0K	0K
STRASBURG	6/20/2013	19:30	CST-6	Hail	1 in.	0	0	0K	0K
LINTON	6/20/2013	18:28	CST-6	Hail	1 in.	0	0	0K	0K
LINTON	6/20/2013	17:55	CST-6	Hail	2.75 in.	0	0	250K	50K
BRADDOCK	6/20/2013	17:45	CST-6	Hail	1 in.	0	0	0K	0K
LINTON	6/20/2013	17:35	CST-6	Hail	1.75 in.	0	0	75K	0K
BRADDOCK	6/20/2013	17:02	CST-6	Hail	1 in.	0	0	0K	0K
KINTYRE	6/20/2013	16:45	CST-6	Hail	0.75 in.	0	0	0K	0K

KINTYRE	6/20/2013	16:23	CST-6	Hail	1 in.	0	0	0K	0K
WESTFIELD	8/28/2011	3:20	CST-6	Hail	1.50 in.	0	0	0K	0K
WESTFIELD	8/28/2011	3:00	CST-6	Hail	1.50 in.	0	0	0K	0K
STRASBURG	6/3/2011	0:00	CST-6	Hail	0.88 in.	0	0	0K	0K
KINTYRE	7/14/2010	2:05	CST-6	Hail	1 in.	0	0	0K	0K
HAZELTON	7/14/2010	1:44	CST-6	Hail	1.75 in.	0	0	0K	0K
HAZELTON	7/14/2010	1:43	CST-6	Hail	1.50 in.	0	0	0K	0K
HAZELTON	7/14/2010	1:30	CST-6	Hail	1.75 in.	0	0	20K	50K
LINTON	7/14/2010	0:15	CST-6	Hail	2.50 in.	0	0	500K	650K
HAGUE	6/26/2010	19:05	CST-6	Hail	1 in.	0	0	0K	0K
HAGUE	6/26/2010	19:00	CST-6	Hail	1 in.	0	0	0K	75K
HAZELTON	6/25/2010	16:50	CST-6	Hail	1 in.	0	0	0K	0K
HAZELTON	6/25/2010	16:30	CST-6	Hail	1.75 in.	0	0	0K	0K
HAZELTON	6/25/2010	16:17	CST-6	Hail	1 in.	0	0	0K	0K
KINTYRE	6/24/2010	22:01	CST-6	Hail	1.75 in.	0	0	0K	100K
KINTYRE	5/22/2010	19:05	CST-6	Hail	1.25 in.	0	0	0K	0K
LINTON	6/22/2009	18:25	CST-6	Hail	1 in.	0	0	0K	0K
HAZELTON	5/28/2009	15:35	CST-6	Hail	0.88 in.	0	0	0K	0K
LINTON	7/27/2008	2:20	CST-6	Hail	3 in.	0	0	500K	25K
DANA	7/19/2008	20:30	CST-6	Hail	2 in.	0	0	65K	90K
HAZELTON	6/30/2006	17:45	CST	Hail	1.75 in.	0	0	1K	0K
LINTON	6/21/1999	6:20	CST	Hail	1.75 in.	0	0	130K	0K
HAZELTON	7/6/1998	20:30	CST	Hail	0.75 in.	0	0	0K	800K
HAGUE	7/6/1998	17:00	CST	Hail	1 in.	0	0	50K	100K
HAZELTON	5/31/1996	15:45	CST	Hail	0.75 in.	0	0	1K	0K
HAZELTON	5/31/1996	15:00	CST	Hail	1.25 in.	0	0	12K	5K
Totals:						0	0	1.704M	2.215M

Source: National Oceanic and Atmospheric Administration National Climatic Data Center Website (01/1950 to 10/31/2019)

Space Weather

Frequency	Possible (1-10% probability in next year, or at least 1 chance in next 100 years)
Severity	Critical (25-50% of jurisdiction affected)
Risk Class	B
Seasonal Pattern	None
Duration	Days/Weeks
Speed of Onset	Little to no warning
Location	Countywide

Description

Space Weather refers to variations in the space environment between the sun and Earth (and throughout the solar system) that can affect technologies in space and on Earth. Space weather is primarily driven by solar storm phenomenon that include coronal mass ejections, solar flares, solar particle events and solar wind. These phenomena can occur in various regions on the sun's surface, but only Earth directed solar storms are potential drivers of space weather events on Earth. An understanding of solar storm phenomena is an important component to developing accurate space weather forecasts (event onset, location, duration, and magnitude).

Why does space weather matter?

Space weather is a global issue. Unlike terrestrial weather events, like a hurricane, space weather has the potential to impact not only the United States, but wider geographic regions. These complex events can have significant economic consequences and have the potential to negatively affect numerous sectors, including communications, satellite and airline operations, manned space flights, navigation and surveying systems, as well as the electric power grid.

NOAA Space Weather Scales

Source: NOAA National Weather Service Space Weather Prediction Center

The NOAA Space Weather Scales were introduced as a way to communicate to the general public the current and future space weather conditions and their possible effects on people and systems. Many of the SWPC products describe the space environment, but few have described the effects that can be experienced as the result of environmental disturbances. These scales are useful to users of our products and those who are interested in space weather effects. The scales describe the environmental disturbances for three event types: geomagnetic storms, solar radiation storms, and radio blackouts. The scales have numbered levels, analogous to hurricanes, tornadoes, and earthquakes that convey severity. They list possible effects at each level. They also show how often such events happen, and give a measure of the intensity of the physical causes.

Geomagnetic Storms

Scale	Description	Effect	Physical measure	Average Frequency (1 cycle = 11 years)
G 5	Extreme	**Power systems:** Widespread voltage control problems and protective system problems can occur, some grid systems may experience complete collapse or blackouts. Transformers may experience damage. **Spacecraft operations:** May experience extensive surface charging, problems with orientation, uplink/downlink and tracking satellites. **Other systems:** Pipeline currents can reach hundreds of amps, HF (high frequency) radio propagation may be impossible in many areas for one to two days, satellite navigation may be degraded for days, low-frequency radio navigation can be out for hours, and aurora has been seen as low as Florida and southern Texas (typically 40° geomagnetic lat.).	Kp = 9	4 per cycle (4 days per cycle)
G 4	Severe	**Power systems:** Possible widespread voltage control problems and some protective systems will mistakenly trip out key assets from the grid. **Spacecraft operations:** May experience surface charging and tracking problems, corrections may be needed for orientation problems. **Other systems:** Induced pipeline currents affect preventive measures, HF radio propagation sporadic, satellite navigation degraded for hours, low-frequency radio navigation disrupted, and aurora has been seen as low as Alabama and northern California (typically 45° geomagnetic lat.).	Kp = 8, including a 9-	100 per cycle (60 days per cycle)
G 3	Strong	**Power systems:** Voltage corrections may be required, false alarms triggered on some protection devices. **Spacecraft operations:** Surface charging may occur on satellite components, drag may increase on low-Earth-orbit satellites, and corrections may be needed for orientation problems. **Other systems:** Intermittent satellite navigation and low-frequency radio navigation problems may occur, HF radio may be intermittent, and aurora has been seen as low as Illinois and Oregon (typically 50° geomagnetic lat.).	Kp = 7	200 per cycle (130 days per cycle)
G 2	Moderate	**Power systems:** High-latitude power systems may experience voltage alarms, long-duration storms may cause transformer damage. **Spacecraft operations:** Corrective actions to orientation may be required by ground control; possible changes in drag affect orbit predictions. **Other systems:** HF radio propagation can fade at higher latitudes, and aurora has been seen as low as New York and Idaho (typically 55° geomagnetic lat.).	Kp = 6	600 per cycle (360 days per cycle)
G 1	Minor	**Power systems:** Weak power grid fluctuations can occur. **Spacecraft operations:** Minor impact on satellite operations possible. **Other systems:** Migratory animals are affected at this and higher levels; aurora is commonly visible at high latitudes (northern Michigan and Maine).	Kp = 5	1700 per cycle (900 days per cycle)

Solar Radiation Storms

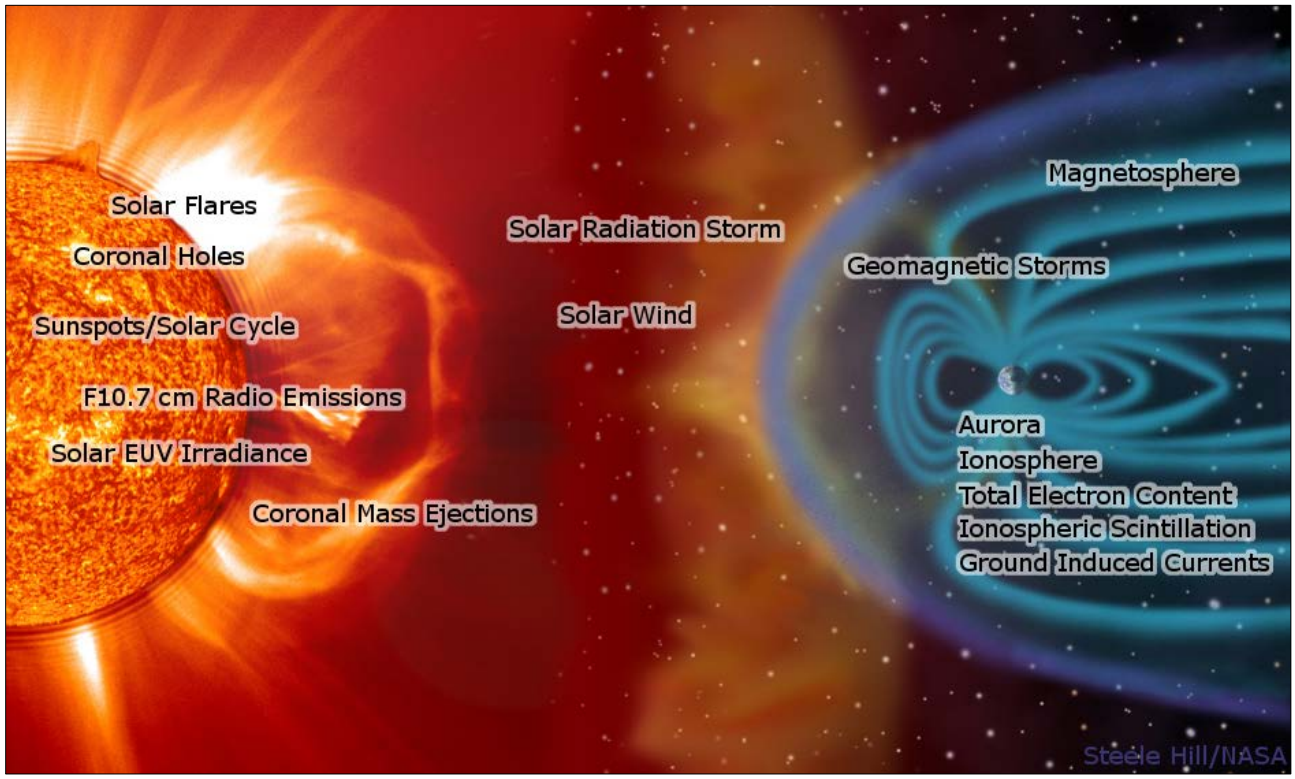
Scale	Description	Effect	Physical measure (Flux level of >= 10 MeV particles)	Average Frequency (1 cycle = 11 years)
S 5	Extreme	**Biological:** Unavoidable high radiation hazard to astronauts on EVA (extra-vehicular activity); passengers and crew in high-flying aircraft at high latitudes may be exposed to radiation risk. **Satellite operations:** Satellites may be rendered useless, memory impacts can cause loss of control, may cause serious noise in image data, star-trackers may be unable to locate sources; permanent damage to solar panels possible. **Other systems:** Complete blackout of HF (high frequency) communications possible through the polar regions, and position errors make navigation operations extremely difficult.	10^5	Fewer than 1 per cycle
S 4	Severe	**Biological:** Unavoidable radiation hazard to astronauts on EVA; passengers and crew in high-flying aircraft at high latitudes may be exposed to radiation risk. **Satellite operations:** May experience memory device problems and noise on imaging systems; star-tracker problems may cause orientation problems, and solar panel efficiency can be degraded. **Other systems:** Blackout of HF radio communications through the polar regions and increased navigation errors over several days are likely.	10^4	3 per cycle
S 3	Strong	**Biological:** Radiation hazard avoidance recommended for astronauts on EVA; passengers and crew in high-flying aircraft at high latitudes may be exposed to radiation risk. **Satellite operations:** Single-event upsets, noise in imaging systems, and slight reduction of efficiency in solar panel are likely. **Other systems:** Degraded HF radio propagation through the polar regions and navigation position errors likely.	10^3	10 per cycle
S 2	Moderate	**Biological:** Passengers and crew in high-flying aircraft at high latitudes may be exposed to elevated radiation risk. **Satellite operations:** Infrequent single-event upsets possible. **Other systems:** Small effects on HF propagation through the polar regions and navigation at polar cap locations possibly affected.	10^2	25 per cycle
S 1	Minor	**Biological:** None. **Satellite operations:** None. **Other systems:** Minor impacts on HF radio in the polar regions.	10	50 per cycle

Radio Blackouts

Scale	Description	Effect	Physical measure	Average Frequency (1 cycle = 11 years)
R 5	Extreme	**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 en route 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)

Impacts

Source: NOAA National Weather Service Space Weather Prediction Center



Space Weather Impacts on Climate

All weather on Earth, from the surface of the planet out into space, begins with the Sun. Space weather and terrestrial weather (the weather we feel at the surface) are influenced by the small changes the Sun undergoes during its solar cycle.

The most important impact the Sun has on Earth is from the brightness or irradiance of the Sun itself. The Sun produces energy in the form of photons of light. The variability of the Sun's output is wavelength dependent; different wavelengths have higher variability than others. Most of the energy from the Sun is emitted in the visible wavelengths (approximately 400 – 800 nanometers (nm)). The output from the sun in these wavelengths is nearly constant and changes by only one part in a thousand (0.1%) over the course of the 11-year solar cycle.

Electric Power Transmission

The electric power grid, and consequently the power to your home and business, can be disrupted by space weather. One of the great discoveries of the 19th century was the realization that a time-varying magnetic field is able to produce an electrical current in a conducting wire. The basic idea is that the time rate of change of the magnetic flux (i.e. lines of magnetic force) passing through a current loop is proportional to the current that is generated around the loop. A slightly earlier but equally important discovery was that a current-carrying wire produces a magnetic field. A system that is near peak levels of demand prior to the geomagnetic storm event may not be able to meet the total power demand when the geomagnetic storm occurs, leading to partial or system wide blackouts.

Space Weather and GPS Systems

The use of single and dual frequency satellite radio navigation systems, like the Global Positioning System (GPS), has grown dramatically in the last decade. GPS receivers are now in nearly every cell phone and in many automobiles, trucks, and any equipment that moves and needs precision location measurements. High precision dual frequency GPS systems are used for farming, construction, exploration, surveying, snow removal and many other applications critical to a functional society. Other satellite navigation systems in orbit include the European Galileo system and the Russian GLONASS system.

HF Radio Communications

Space weather impacts radio communication in a number of ways. At frequencies in the 1 to 30 mega Hertz range (known as “High Frequency” or HF radio), the changes in ionospheric density and structure modify the transmission path and even block transmission of HF radio signals completely. These frequencies are used by amateur (ham) radio operators and many industries such as commercial airlines. They are also used by a number of government agencies such as the Federal Emergency Management Agency and the Department of Defense.

Satellite Communications

Satellite communication refers to any communication link that involves the use of an artificial satellite in its propagation path. Satellite communications play a vital role in modern life. There are over 2000 artificial satellites in use. They can be found in geostationary, Molniya, elliptical, and low Earth orbits and are used for traditional point-to-point communications, mobile applications, and the distribution of TV and radio programs.

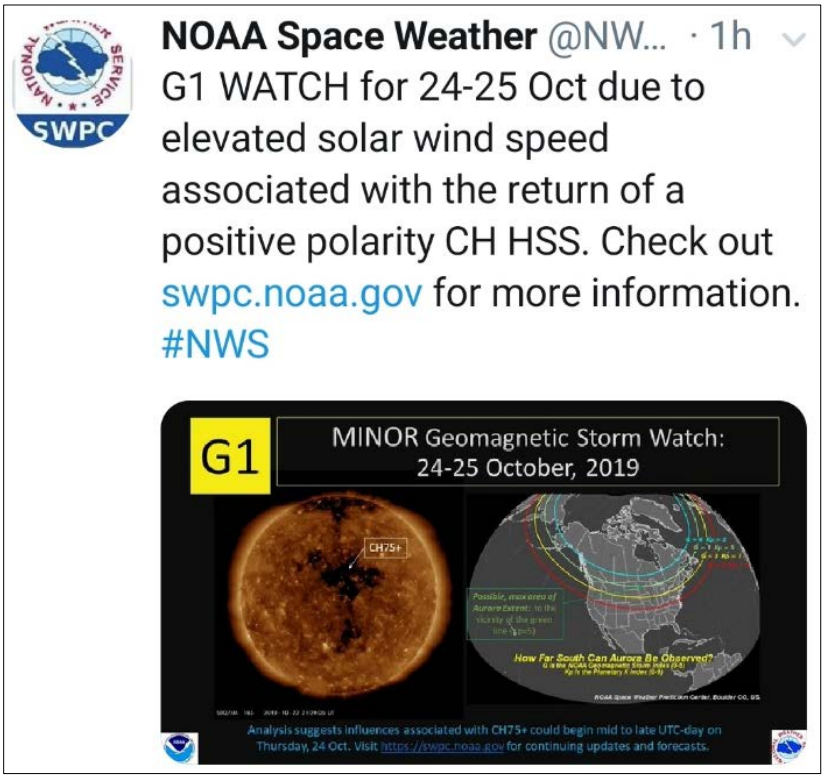
Satellite Drag

Drag is a force exerted on an object moving through a fluid, and it is oriented in the direction of relative fluid flow. Drag acts opposite to the direction of motion and tends to slow an object. As an example, think of running against a high wind and feeling the drag pushing you back in the direction of relative fluid flow. This same force acts on spacecraft and objects flying in the space environment. Drag has a significant impact on spacecraft in low Earth orbit (LEO), generally defined as an orbit below an altitude of approximately 2,000 kilometers (1,200 mi). Although the air density is much lower than near the Earth’s surface, the air resistance in those layers of the atmosphere where satellites in LEO travel is still strong enough to produce drag and pull them closer to the. The International Space Station (ISS) and the Hubble Space Telescope are examples of spacecraft operating in LEO.

Identified Impacts

- Agriculture
- Blocked Roads
- Business Interruptions
- Delayed Emergency Response
- Increased Fire Potential
- Increased Public Safety Runs
- Loss of Economy
- Loss/Overcrowded Medical Facilities
- Loss of Power
- Mass Casualties
- Personal Injury/Death Risk
- Property Damage
- School Closure

Advanced notifications through the NOAA Space Weather Prediction Center via Twitter.



History

There is no significant history of space weather within the County.

Transportation Accident

Frequency	Likely (10-100% probability in the next year, or at least 1 chance in next 100 years.)
Severity	Negligible (Less than 10% of jurisdiction affected)
Risk Class	C
Seasonal Pattern	None
Duration	Hours
Speed of Onset	No warning
Location	Countywide

Description
A transportation accident is any large-scale aircraft, railroad, or vehicular accident involving mass casualties.

Emmons County has one airport, a freight service rail line, and one major highway.

Tractor/trailer left US Highway 83 just south of the Braddock turnoff.

Source: Emmons County Record, October 29, 2015

Airport

Emmons County has one airport: The Linton Municipal Airport. It is located 2 miles south of Linton. The airport's focus is on small aircraft and has a 3,700 foot lighted runway.

Source: Google Maps website

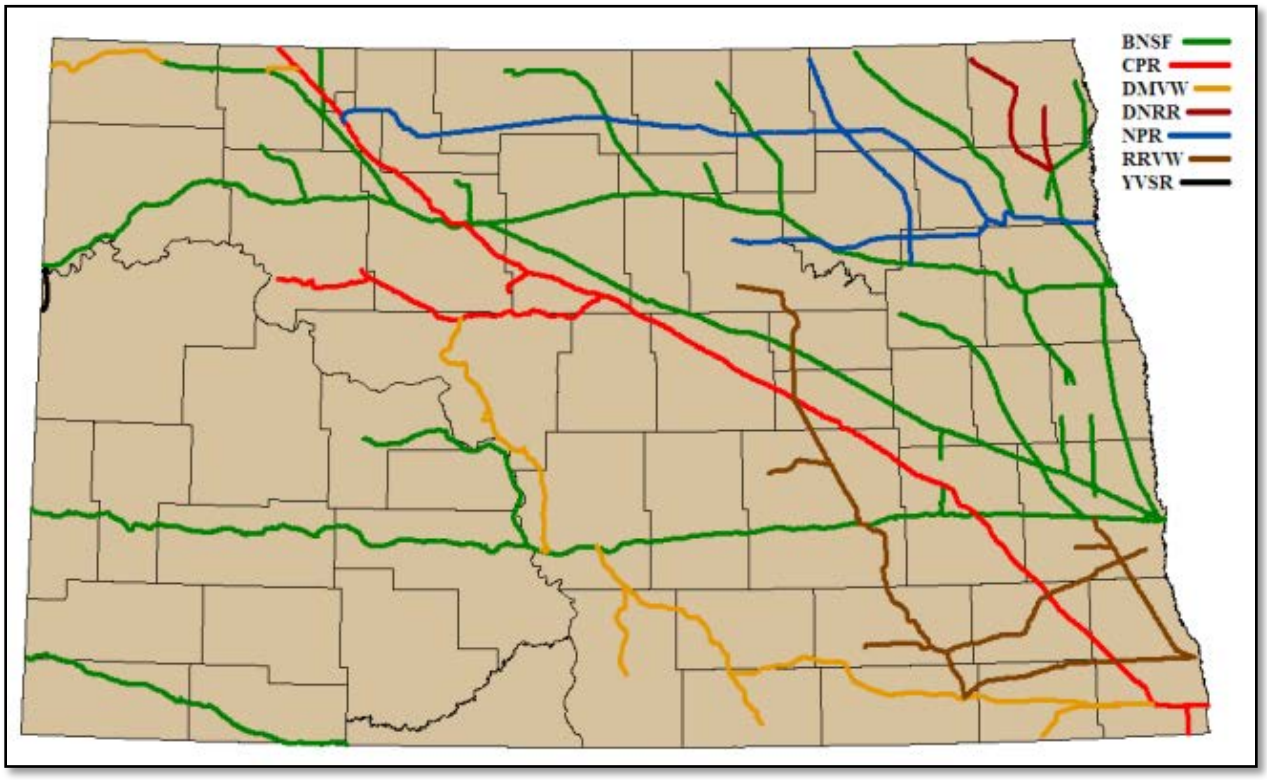
Source: Emmons County Record, July 25, 2018

Pilot lost his life in the crash of a small plane in the afternoon of July 17, 2018 at the end of an island in the Missouri River west of the Hazelton Recreation Area. The crash was roughly halfway between the shorelines of Emmons and Morton Counties but was listed as Morton County since the original Missouri River channel is the boundary.

Railroad

One railroad traverses the county: Dakota, Missouri Valley Western Railroad (DMVW).

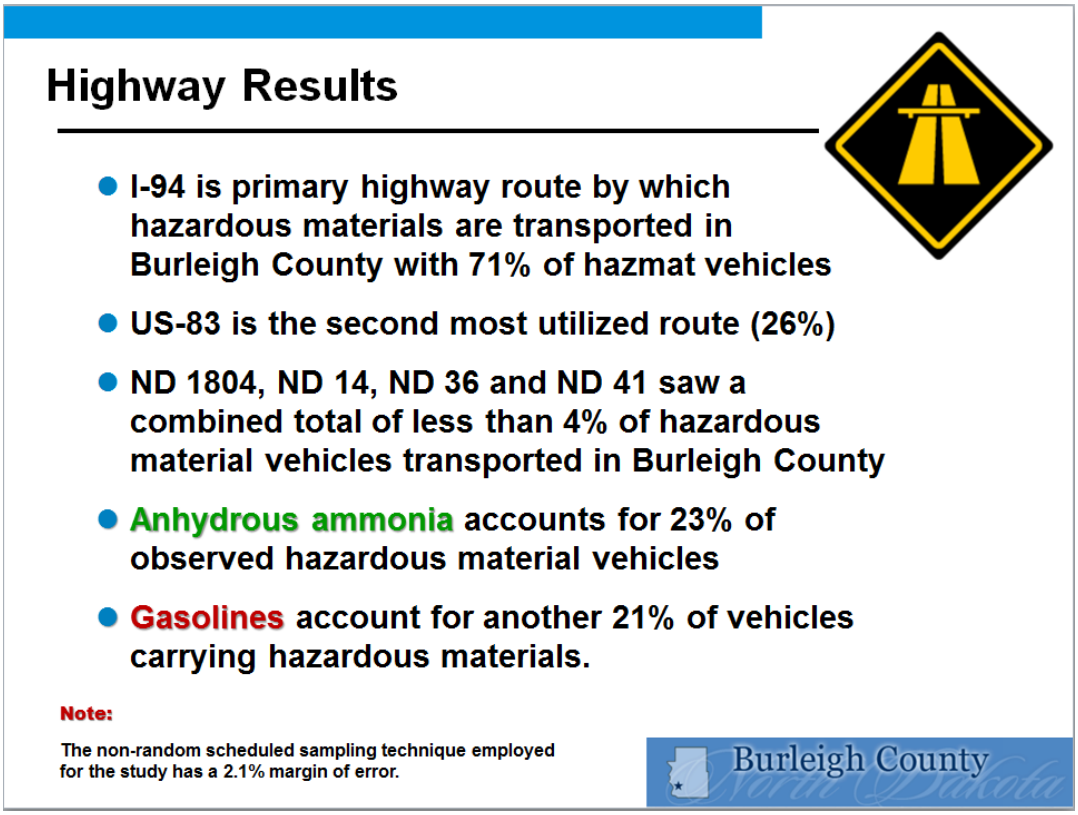
Emmons County has limited railroad service, freight service only. The Dakota Missouri Valley and Western Railroad (DMVW) provides freight services, mostly for the transport of agricultural products, in North Dakota, South Dakota and Montana. In Emmons County, DMVW passes by the communities of Braddock, Kintyre, into Logan County to the east.



Source: ND State Rail Plan, December 2007

Vehicle

U.S. Highway 83 is a major, north/south transportation route intersecting Emmons County and the Cities of Hazelton and Linton thereby increasing the probability of an event. Highway 83 is the second most utilized route through Burleigh County which north of Emmons County. The most predominant products observed in the study were anhydrous ammonia and gasolines. (See Attachment 3, Major Roadways Map in Emmons County)



Source: HazMat Traffic Flow Study, Burleigh County, September 2012

Identified Impacts

- Agriculture
- Blocked Roads
- Building Collapse
- Business Interruptions
- Delayed Emergency Response
- Evacuation (Localized)
- Explosion
- HAZMAT Release
- Increased Fire Potential
- Increased Public Safety Runs
- Loss of Economy
- Loss/Overcrowded Medical Facilities
- Loss of Potable Water
- Mass Casualties
- Personal Injury/Death Risk
- Property Damage
- School Closure

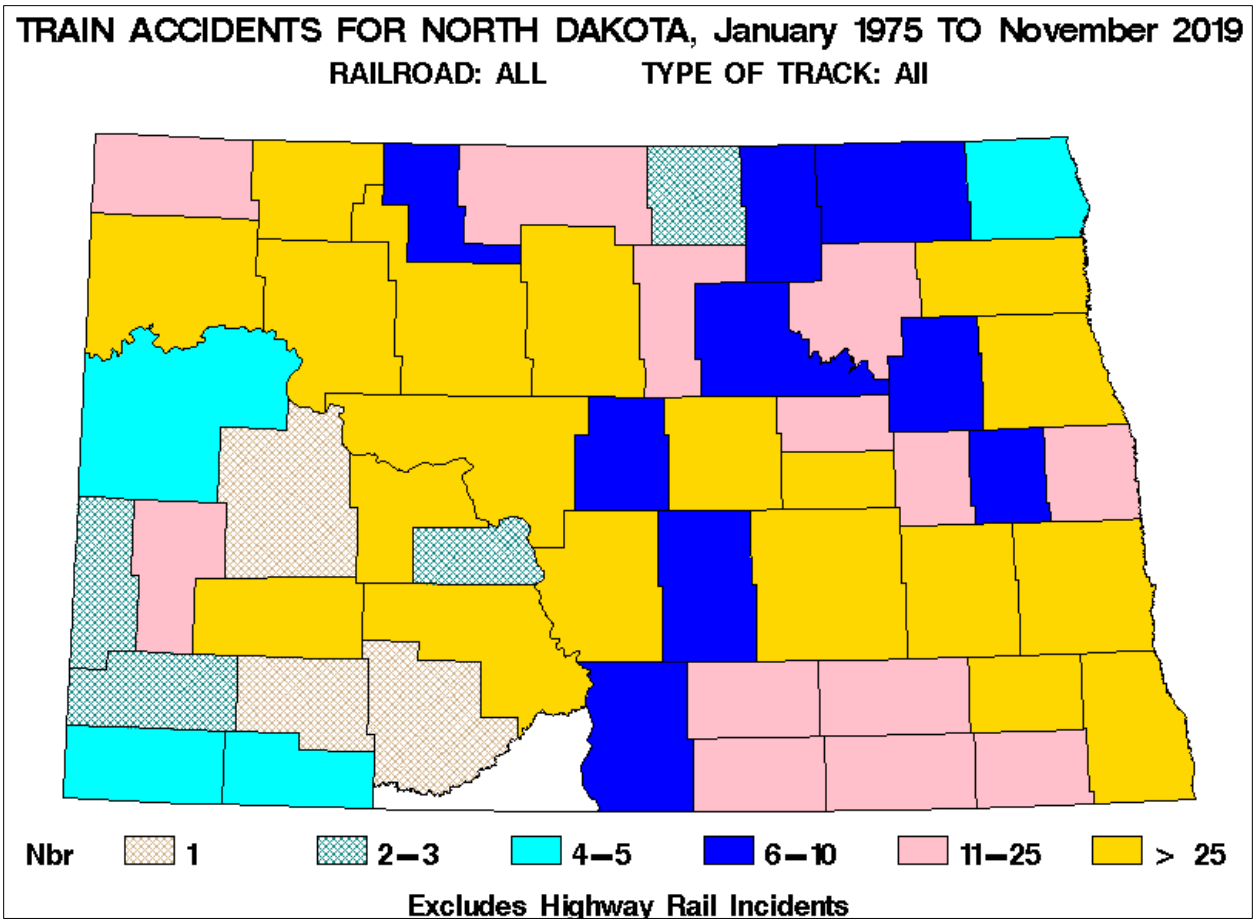
History
There is no history of mass casualty within Emmons County.

Aviation

Current Synopsis	PDF Report(s) (Published)	Event Date	Location	Make/Model	Regist. Number	NTSB No.	Event Severity
_____	Factual	5/15/2010	Linton, ND	WSK-PZL WARZAWA-OKECIE PZL-104 WILGA 80	N4346M	CEN10CA333	Nonfatal
_____	Factual	8/9/2007	Hazelton, ND	Snow S-2C	N16535	CHI07CA267	Nonfatal
_____	Factual	8/10/2001	Hazelton, ND	Grumman G-164B	N48624	CHI01LA273	Fatal(1)
_____	Factual	7/26/1996	Hazelton, ND	Beech C24R	N5247M	CHI96LA259	Nonfatal
_____	Factual	6/30/1995	Linton, ND	PIPER PA-28-140	N6917W	CHI95LA207	Nonfatal
_____	Factual	6/22/1990	Hazelton, ND	PIPER PA-25-260	N4988Y	DEN90LA140	Nonfatal
_____		6/27/1974	HAZELTON, ND	PIPER PA-25	N7358Z	MKC74FTG22	Nonfatal
_____		10/31/1966	STRASBURG, ND	CESSNA 180	N4775U	Unknown	Nonfatal

Source: National Transportation Safety Board website

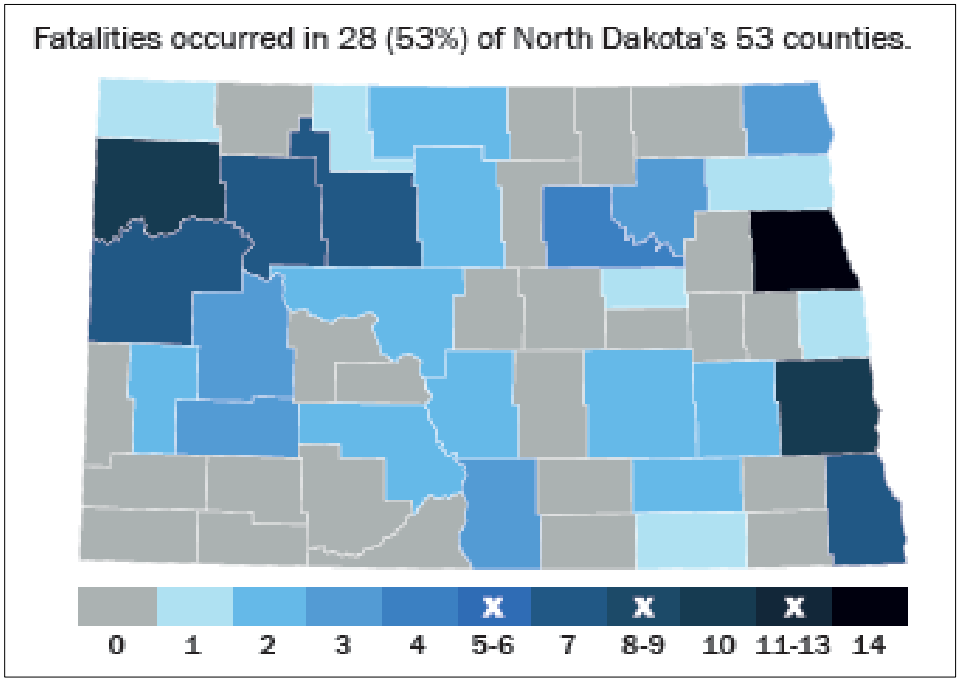
Railroad



Source: Federal Railroad Administration Office of safety Analysis website The National Transportation Safety Board, Railroad Accident Reports website shows no incidents in Emmons County.

The Federal Railroad Administration Office of Safety Analysis website shows no major incidents in Emmons County

Vehicle



Source: 2018 North Dakota Crash Summary, North Dakota Department of Transportation

Attachments

Separate document.

Appendices

Separate document.

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