Burleigh County
Multi-Hazard Mitigation Plan

FEMA Approved: August 27, 2020 – August 26, 2025

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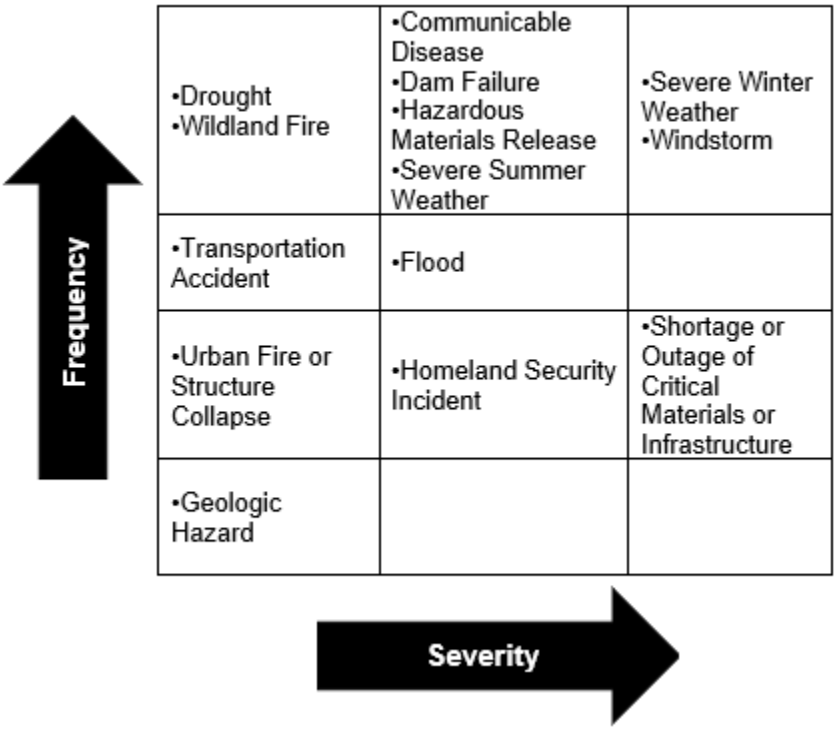
Executive Summary

The Burleigh 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 Burleigh County and the five incorporated cities: Bismarck, Lincoln, Regan, Wilton and Wing. The City of Bismarck maintains a separate Multi-Hazard Mitigation Plan. The communities of Arena, Baldwin, Driscoll, McKenzie, Menoken, Moffit, and Sterling are unincorporated cities and fall under the jurisdiction of Burleigh 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.

Burleigh County completed step one of the Threat and Hazard Identification and Risk Assessment (THIRA) in 2013 with 29 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 Burleigh 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).

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Adoption

The jurisdictions in the Burleigh County Multi-Hazard Mitigation Plan (MHMP): Burleigh County and the incorporated cities of Lincoln, Regan, Sterling, Wilton, and Wing adopt the plan as submitted to the ND Department of Emergency Services and the Federal Emergency Management Agency (FEMA).

Burleigh County

Burleigh County
Emergency Management
221 N 5th St
Bismarck ND 58501
(701) 222-6727

Burleigh County Multi-Hazard Mitigation Plan

Whereas, Burleigh County recognizes the threat that natural, man-made or technological hazards pose to people and property within our community; and

Whereas, undertaking hazard mitigation actions will reduce and/or eliminate the potential for harm to people and property from future hazard occurrences; and

Whereas, an adopted Multi-Hazard Mitigation Plan is required as a condition of future funding for mitigation projects under multiple Federal Emergency Management Agency (FEMA) pre- and post-disaster mitigation grant programs; and

Whereas, Burleigh County participated in the preparation of this plan in accordance with the Disaster Mitigation Act of 2000; and

Whereas, adoption of the Burleigh County Multi-Hazard Mitigation Plan demonstrates the commitment to hazard mitigation; and

Now, therefore, be it resolved, that the Burleigh County Commission adopts the Burleigh County Multi-Hazard Mitigation Plan.

Signed this 16th day of March, 2020

Jerry Woodcox, Chairperson
Burleigh County Board of Commissioners

City of Lincoln

RESOLUTION NO. 2020-3

Burleigh County Multi-Hazard Mitigation Plan

Whereas, the City of Lincoln recognizes the threat that natural, man-made or technological hazards pose to people and property within our community; and

Whereas, undertaking hazard mitigation actions will reduce and/or eliminate the potential for harm to people and property from future hazard occurrences; and

Whereas, an adopted Multi-Hazard Mitigation Plan is required as a condition of future funding for mitigation projects under multiple Federal Emergency Management Agency (FEMA) pre- and post-disaster mitigation grant programs; and

Whereas, the City of Lincoln participated in the preparation of this plan in accordance with the Disaster Mitigation Act of 2000; and

Whereas, adoption of the Burleigh County Multi-Hazard Mitigation Plan demonstrates the commitment to hazard mitigation; and

Now, therefore, be it resolved, that the Lincoln City Commission adopts the Burleigh County Multi-Hazard Mitigation Plan.

Signed this 5th day of March, 2020.

Attested: _____ Signed: _____
Shawn Surface, Auditor
Gerarld Wise, Mayor
Lincoln City Commission

City of Regan

Burleigh County Multi-Hazard Mitigation Plan

Whereas, the City of Regan recognizes the threat that natural, man-made or technological hazards pose to people and property within our community; and

Whereas, undertaking hazard mitigation actions will reduce and/or eliminate the potential for harm to people and property from future hazard occurrences; and

Whereas, an adopted Multi-Hazard Mitigation Plan is required as a condition of future funding for mitigation projects under multiple Federal Emergency Management Agency (FEMA) pre- and post-disaster mitigation grant programs; and

Whereas, the City of Regan participated in the preparation of this plan in accordance with the Disaster Mitigation Act of 2000; and

Whereas, adoption of the Burleigh County Multi-Hazard Mitigation Plan demonstrates the commitment to hazard mitigation; and

Now, therefore, be it resolved, that the Regan City Commission adopts the Burleigh County Multi-Hazard Mitigation Plan.

Signed this 21 day of April, 2020.

Attested: Signed:

Kelly Bauer, Auditor

Marvin Gillig, Mayor
Regan City Commission

City of Wilton

Burleigh County Multi-Hazard Mitigation Plan

Whereas, the City of Wilton recognizes the threat that natural, man-made or technological hazards pose to people and property within our community; and

Whereas, undertaking hazard mitigation actions will reduce and/or eliminate the potential for harm to people and property from future hazard occurrences; and

Whereas, an adopted Multi-Hazard Mitigation Plan is required as a condition of future funding for mitigation projects under multiple Federal Emergency Management Agency (FEMA) pre- and post-disaster mitigation grant programs; and

Whereas, the City of Wilton participated in the preparation of this plan in accordance with the Disaster Mitigation Act of 2000; and

Whereas, adoption of the Burleigh County Multi-Hazard Mitigation Plan demonstrates the commitment to hazard mitigation; and

Now, therefore, be it resolved, that the Wilton City Commission adopts the Burleigh County Multi-Hazard Mitigation Plan.

Signed this 5 day of March, 2020.

Signed: _____
LeeAnn Domonoske-Kellar, Mayor
Wilton City Commission

City of Wing

Burleigh County Multi-Hazard Mitigation Plan

Whereas, the City of Wing recognizes the threat that natural, man-made or technological hazards pose to people and property within our community; and

Whereas, undertaking hazard mitigation actions will reduce and/or eliminate the potential for harm to people and property from future hazard occurrences; and

Whereas, an adopted Multi-Hazard Mitigation Plan is required as a condition of future funding for mitigation projects under multiple Federal Emergency Management Agency (FEMA) pre- and post-disaster mitigation grant programs; and

Whereas, the City of Wing participated in the preparation of this plan in accordance with the Disaster Mitigation Act of 2000; and

Whereas, adoption of the Burleigh County Multi-Hazard Mitigation Plan demonstrates the commitment to hazard mitigation; and

Now, therefore, be it resolved, that the Wing City Commission adopts the Burleigh County Multi-Hazard Mitigation Plan.

Signed this 7th day of May, 2020.

Attested: Jean Snyder Signed: Julie Hein

Julie Hein, Mayor
Wing City Commission

Introduction

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

Scope: The scope of the Burleigh County Multi-Hazard Mitigation Plan is countywide. Due to Burleigh 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 Burleigh County Multi-Hazard Mitigation Plan.

Authority: The Burleigh 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.

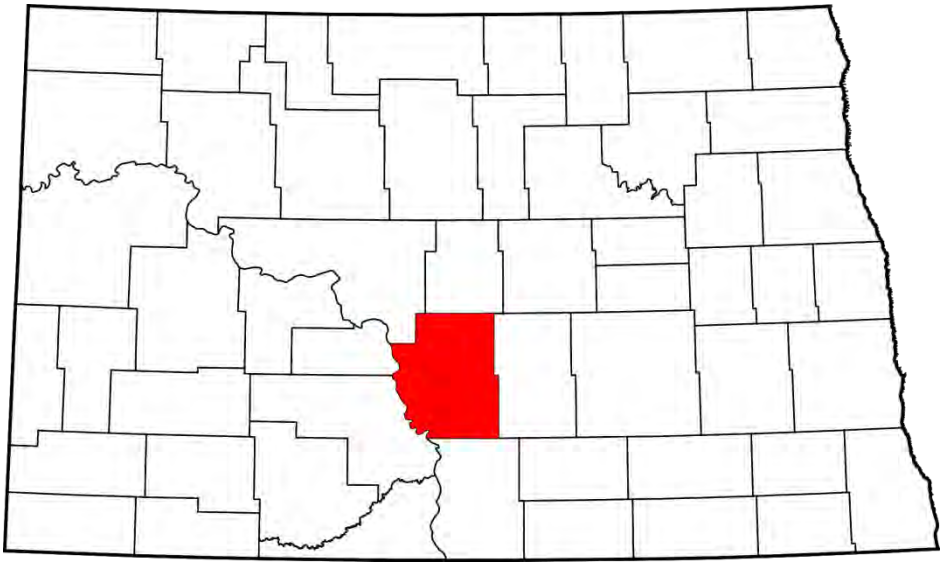
The Disaster Mitigation Act of 2000 became law on October 30, 2000 and amends the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as Amended (The Stafford Act) (P.L. 93-288, as amended). Regulations for this activity can be found in 44 CFR, Part 201.

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." Burleigh County and incorporated cities consider the Mitigation Plan an integral part of the Burleigh 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 Burleigh 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

Burleigh County is located in south-central North Dakota with the Missouri River as the western boundary. The County seat is Bismarck which is also the State Capital of North Dakota.



Picture Source: Wikipedia website

Borders

North:	McLean and Sheridan Counties
West:	McLean, Morton, and Oliver Counties
South:	Emmons and Morton Counties
East:	Kidder County

Residential and commercial development is concentrated in the incorporated areas of Burleigh County with the largest, single concentration occurring in and around the City of Bismarck. Over 95% of the land is farm property, approximately one half of which is cultivated. Lands not cultivated, primarily those with steeper slopes or shallower soils, provide native forage for livestock. Vegetation in upland areas consists of cultivated crops interspersed with native grasses and shrubs. Native trees and shrubs are common along the creek and river bottoms as well as some ravines. (Source: Flood Insurance Study, Burleigh County, North Dakota, and Incorporated Areas, Revised: August 4, 2014 available from the FEMA Map Service Center, Product 38015CVOOOB)

Rivers

Missouri River, Apple Creek, Burnt Creek, and Hay Creek

Principle drainage system: Missouri River. Burleigh County is on the western side of the continental divide and drains through the Missouri River drainage system. Most of the runoff in the eastern part of the county collects in depressions and does not reach the streams. Lakes, streams, coulees, dams and drainage ditches are abundant throughout the area. The county is a land of prairies, croplands, river valleys, and rolling hills.

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 Burleigh 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 data 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, the Emergency Manager hosted and/or attended public meetings to revisit the current Multi-Hazard Mitigation Plan and incorporate information where applicable.

09-11-19 Multi-Hazard Mitigation Plan kickoff/planning meeting combined with review of the Emergency Operations Plan.

- Confirm plan purpose
- Review current mitigation plan and discuss projects
- Refine plan scope and schedule
- Establish responsibilities
- Development outreach strategy.

10-22-19 Meeting with Mike Voigt, Bismarck Rural Fire Chief to discuss mitigation opportunities to include dry hydrants (Misty Waters Subdivision) and fire protection within the district.

10-29-19 Hosted the Local Emergency Planning Committee Meeting and discussed the Multi-Hazard Mitigation Plan (update process, mitigation projects, grant opportunities). Also discussed the "Shelter In Place" brochure and the "Every Season to Prepare" pamphlet; both items are included as ongoing mitigation projects to promote community preparedness and response to hazards in Burleigh County. An adequate supply of both items is maintained through Emergency Management and other stakeholders as well as being available throughout the community and the Burleigh County website.

12-10-19 Burleigh 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 117 responses were received which more than doubled the previous survey responses (57) 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: Burleigh County Public Survey. The survey was publicly advertised: Radio, Television, The Bismarck Tribune, Burleigh County website, Burleigh County social media, City of Bismarck website, City of Bismarck social media.

12-11-19 A regular, publicized, meeting of the Burleigh County Water Resource District with an agenda item for the Emergency Manager to discuss the Multi-Hazard Mitigation Plan process, survey, and solicited projects from the District.

12-11-19 Emergency Manager interviewed by KFYR TV to discuss hazard mitigation purpose, solicit input and projects, provide examples of projects

- Promoting Flood Insurance
- Flood Control and Drainage Projects:
  - Levees – Fox Island, Missouri River Correctional Center, Sibley Island (planning)
  - Road Grade raises
  - Culvert installation or increasing culvert size
- Firewise Safety and promoting defensible space around structures (remove debris)
- Mapping projects
- Back-up generators for critical facilities

01-09-20 Burleigh County and Bismarck Emergency Managers hosted a "Community Mitigation Planning Public Input Meeting. Attendance was extremely low (three); however, there was zero attendance in 2015. Attendees appreciated the opportunity to provide feedback and realize natural hazards are hard to mitigate and forecasts/warnings to prepare have been helpful. Discussed flooding and some of the associated mitigation projects that have been completed in Burleigh County. The underpasses in Bismarck (7th Street and 9th Street) remain a problem during significant rain events (drainage issue). One member (on behalf of media) requested abbreviated summaries emergency/disaster update meetings referencing the 2011 flood update meetings. Refugee resettlement concerns were also raised due to a recent County Commission Meeting vote to allow refugee resettlement. Meeting was widely publicized: Radio, Television, The Bismarck Tribune, Burleigh County website, Burleigh County social media, City of Bismarck website, City of Bismarck social media

02-03-20 Hosted a local Flood Annex Update and Mitigation Project Review Meeting. Discussed map updates and mitigation projects (status updates as well as new projects).

02-12-20 A regular, publicized, meeting of the Burleigh County Water Resource District and the Multi-Hazard Mitigation Plan was again discussed (process, updated maps, and projects).

02-24-20 The Emergency Manager scheduled a meeting with the Cities of Regan and Wilton 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.

02-26-20 The Emergency Manager scheduled a meeting with the City of Lincoln 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.

02-26-20 Draft Mitigation Plan published on the website.

03-06-20 The Emergency Manager scheduled a meeting with the City of Wing 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.

03-11-20 A regular, publicized, meeting of the Burleigh County Water Resource District. Discussed the hydrologic update and Mitigation Plan updates. Draft plan is available on the website.

03-16-20 Mitigation Plan presentation and adoption at the Burleigh County Commission Meeting and advertised through a variety of media.

03-22-20 Final draft (available via website) provided to stakeholders to review and provide comment.

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, Burleigh 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 was accomplished through phone, meeting invites, and online survey participation. Emmons County, Morton County, and McLean County completed the online survey.

Monitoring, Evaluating, and Updating the Plan: The plan will be evaluated annually by the Burleigh County Emergency Manager with input from the planning committee members. As a means of monitoring the plan and progress made on the projects, the Burleigh 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 Burleigh County website for review by stakeholders and the general public along with the opportunity to submit mitigation ideas at any time. Burleigh 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 Burleigh 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.

The Comprehensive Plan for Burleigh County (page 8) ties all other plans to the Burleigh County Multi-Hazard Mitigation Plan:

> "Objective 5: Ensure that the County is prepared to address Emergency Management incidents.
>
> Policy: #1 Review and update contingency plans for all hazards identified in the Burleigh County Multi-Hazard Mitigation Plan.
>
> #2 Review and address opportunities for mitigation of potential damage, such as, prohibiting developments in areas of high flood probability.
>
> #3 Encourage County Departments and Boards to review and update emergency policies and procedures.
>
> #4 Ensure that all developments are established with the safety of current and future users in mind."

Participating Jurisdictions in the Plan Review

Jurisdictions Located within Burleigh County	Jurisdictions Asked to Participate in the Plan	Jurisdictions Represented in the Plan	Participation Status
Burleigh County	Burleigh County	Burleigh County	Continuing Participation (2003, 2008, 2014, 2020)
City of Bismarck	City of Bismarck	City of Bismarck	*Continuing Participation (2003, 2008, 2014, 2020)
City of Lincoln	City of Lincoln	City of Lincoln	Continuing Participation (2003, 2008, 2014, 2020)
City of Regan	City of Regan	City of Regan	Continuing Participation (2003, 2008, 2014, 2020)
City of Wilton	City of Wilton	City of Wilton	Continuing Participation (2003, 2008, 2014, 2020)
City of Wing	City of Wing	City of Wing	Continuing Participation (2003, 2008, 2014, 2020)

*The City of Bismarck has chosen to develop an independent Mitigation Plan for their jurisdiction. A few agencies did participate in the Burleigh County update process due to their job functions which entail City of Bismarck and Burleigh County jurisdictions. A joint public meeting was hosted, and the Burleigh County Public Survey included the City of Bismarck.

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
Burleigh County	Mary Senger	Emergency Manager	Burleigh County Emergency Mgt
Burleigh County	Jim Peluso	Commissioner	Burleigh County Commission
Burleigh County	Ray Ziegler Mitch Flanagan	Building Official, Floodplain Administrator	Burleigh Building/Planning/Zoning
Burleigh County	Greg Carlson	GIS Coordinator	Burleigh County Highway Dept
Burleigh County	Marcus Hall	Engineer	Burleigh County Highway Dept
Burleigh County	Kelly Leben	Sheriff	Burleigh County Sheriff's Dept
Burleigh County	Mike Voigt	Chief	Bismarck Rural Fire Dept
Burleigh County	Renae Moch	Director	Bismarck/Burleigh Public Health
Burleigh County	Crystalynn Kuntz	Emergency Preparedness Coord	Bismarck/Burleigh Public Health
City of Lincoln	Gerarld Wise	Mayor	City of Lincoln
City of Lincoln	Shawn Surface	Auditor	City of Lincoln
City of Lincoln	Rob Dickson	Supervisor	City of Lincoln, Public Works
City of Lincoln	Robyn Krile	Chief	City of Lincoln Police Dept
City of Regan	Marvin Gillig	Mayor	City of Regan
City of Regan	Kelly Bauer	Auditor	City of Regan
City of Wilton	LeeAnn Domonoske-Keller	Mayor	City of Wilton
City of Wilton	JD Youngbird	Chief	City of Wilton Fire Dept
City of Wing	Julie Hein	Mayor	City of Wing
City of Wing	Frank Hein	Chief	City of Wing Fire Dept
City of Wing	Kyle Steele	Department Head	City of Wing Public Works

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

Additionally, the Planning Team will continue to ensure the Burleigh County Multi-Hazard Mitigation Plan informs the plans and programs listed below, by incorporating risk assessment data and mitigation actions.

Agency	**Plans and Programs**
American Red Cross (West Dakota)	• Shelter • Mass Care • Windshield Damage Assessment • Disaster Recovery
Bismarck Community Development	• Plat Reviews
Bismarck/Burleigh Public Health	• Shelters • Community Education • Vulnerable Populations
Burleigh County Auditor	• Fiscal Management • Emergency Reserve Fund
Burleigh County Board of Health	• Public Health Programs
Burleigh County Building/Planning/Zoning	• Development • Floodplain Administration • Inspections • Planning
Burleigh County Comprehensive Plan	• Development • Planning
Burleigh County Commission	• Disaster/Emergency Declarations • Budget Allocations • County Ordinances
Burleigh County Community Wildfire Protection Plan	• Fuel Loads • Mitigation Projects

Agency	Plans and Programs
Burleigh 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
Burleigh County Extension Service	• Animal Health • Plant Health • Community Education
Burleigh County GIS	• Hazard Mapping • Online (public) Flood and Elevation Mapping Tool
Burleigh County Highway Department	• Primary Routes • Bridges • Debris Removal • Self-Fill Sandbag Sites
Burleigh County Local Emergency Planning Committee	• Tier II Reporting • Community Education • Planning and Training
Burleigh County Multi-Hazard Mitigation Plan (2015)	• Reviewed and updated • Mitigation projects reviewed for status • Mitigation projects developed
Burleigh County Schools	• Curriculum Standards (safety drills)
Burleigh County School Superintendent	• Curriculum Standards (safety drills)
Burleigh County Sheriff's Department	• Traffic Control and Safety • Evacuation Routes • Emergency Notification
Burleigh County Snowmobile CERT	• Alternate Transportation • Safety Checks • Planning and Training
Burleigh County State's Attorney	• Legal Review

Agency	Plans and Programs
Burleigh County Water Resource Board	• Permitted Uses • Planning Commission • Flood Protection Projects
Burleigh County Zoning Ordinance	• Floodplain Management • South Central Regional Water Project • Missouri River Joint Water Resource • ND Flood Risk Management Study
Central Dakota Amateur Radio Club	• Alternate Communications • Weather Spotters
Central Dakota Communications Center (9-1-1)	• Alert and Warning • Communications • Emergency/Disaster Procedures
Crisis Care Chaplaincy	• Mental Health • Disaster Recovery
Lewis and Clark Regional Development Council	• Comprehensive Economic Development Strategy
Lincoln City Attorney	• Legal Review
Lincoln City Commission	• Disaster/Emergency Declarations • Budget Allocations • Building and Inspections • City Ordinances • Comprehensive Plan • Planning and Zoning Commission
Metropolitan Planning Organization	• Hazardous Materials Route Mapping (In Progress) • Transportation Routes • Planning
National Climatic Data Center (NCDC	• Weather Event Statistics
National Fire and Incident Reporting System (NFIRS)	• Fire Incident Statistics
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

Agency	Plans and Programs
ND State Water Commission	• Dam Inventory • NFIP Data • Water Basin Data
Regan City Commission	• Disaster/Emergency Declarations • Budget Allocations • City Ordinances
Salvation Army	• Canteen (mobile feeding) • 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
US Army Corps of Engineers	• Planning Assistance (Section 22)
US Census	• Demographics • Population Estimates
US Drought Monitor	• Drought Statistics • Maps
US Geological Survey	• Creek/River Gages
US National Weather Service	• Hazard Advisories • Outlooks • Statistics • Weather Advisories
Wilton City Commission	• Disaster/Emergency Declarations • Budget Allocations • City Ordinances • Planning and Zoning Board
Wing City Commission	• Disaster/Emergency Declarations • Budget Allocations • City Ordinances

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

The Burleigh County Commission and Burleigh County Highway Department utilize the mitigation projects as appropriate when developing future budgets and road priorities.

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

The Burleigh County Zoning Floodplain Ordinance is evaluated and based upon current NFIP guidelines.

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

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

The Comprehensive Plan for Burleigh County (page 8) ties all other plans to the Burleigh County Multi-Hazard Mitigation Plan.

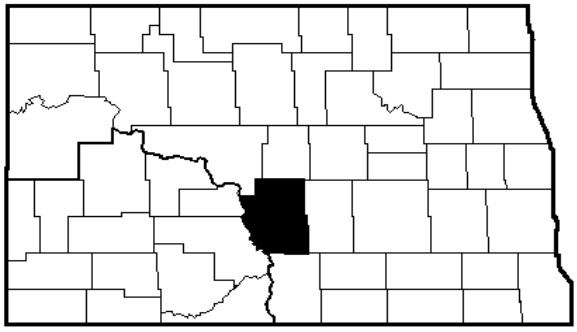
Changes in Development

General: Burleigh County is located in the south central portion of North Dakota.

Borders

North	McLean and Sheridan Counties
West	Morton, Oliver, and McLean Counties
South	Emmons and Morton Counties
East	Kidder County

Burleigh County



It has the 13th largest area of the 53 counties in the State, and is 1,654 square miles. It is 48 miles from north to south and 39 miles from east to west.

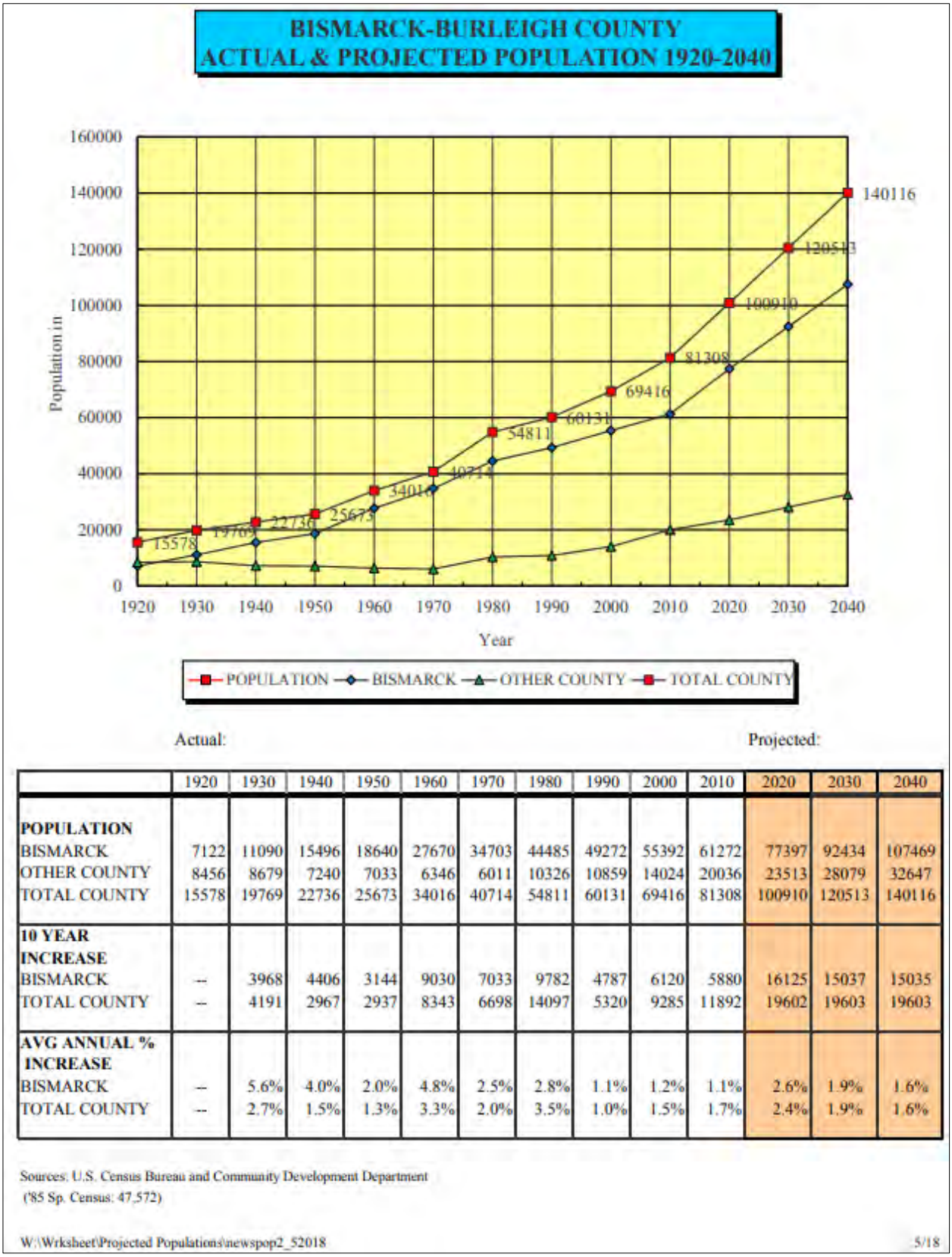
The Missouri River forms the western border between Burleigh, Morton, and Oliver Counties.

Demographics

According to the US Census Bureau, the 2018 population estimate is 95,273 (17.2% increase from 2010). The County population continues to steadily increase:

2018 estimate	95,273
2010	81,308
2000	69,416
1990	60,131

Projected populations show a continued, steady growth:



Actual: Projected:

	1920	1930	1940	1950	1960	1970	1980	1990	2000	2010	2020	2030	2040
POPULATION													
BISMARCK	7122	11090	15496	18640	27670	34703	44485	49272	55392	61272	77397	92434	107469
OTHER COUNTY	8456	8679	7240	7033	6346	6011	10326	10859	14024	20036	23513	28079	32647
TOTAL COUNTY	15578	19769	22736	25673	34016	40714	54811	60131	69416	81308	100910	120513	140116
10 YEAR INCREASE													
BISMARCK	--	3968	4406	3144	9030	7033	9782	4787	6120	5880	16125	15037	15035
TOTAL COUNTY	--	4191	2967	2937	8343	6698	14097	5320	9285	11892	19602	19603	19603
AVG ANNUAL % INCREASE													
BISMARCK	--	5.6%	4.0%	2.0%	4.8%	2.5%	2.8%	1.1%	1.2%	1.1%	2.6%	1.9%	1.6%
TOTAL COUNTY	--	2.7%	1.5%	1.3%	3.3%	2.0%	3.5%	1.0%	1.5%	1.7%	2.4%	1.9%	1.6%

Sources: U.S. Census Bureau and Community Development Department
('85 Sp. Census: 47,572)

W:\Wrksheet\Projected Populations\newspop2_52018 5/18

Source: Bismarck Community Development website

Burleigh County has five incorporated cities including the county seat, Bismarck.

City	Population
Bismarck	73,112
Lincoln	3,779
Regan	44
Wilton	713
Wing	152

Source: US Census Bureau 2018 Population Estimates

Bismarck is also the State Capitol of North Dakota:

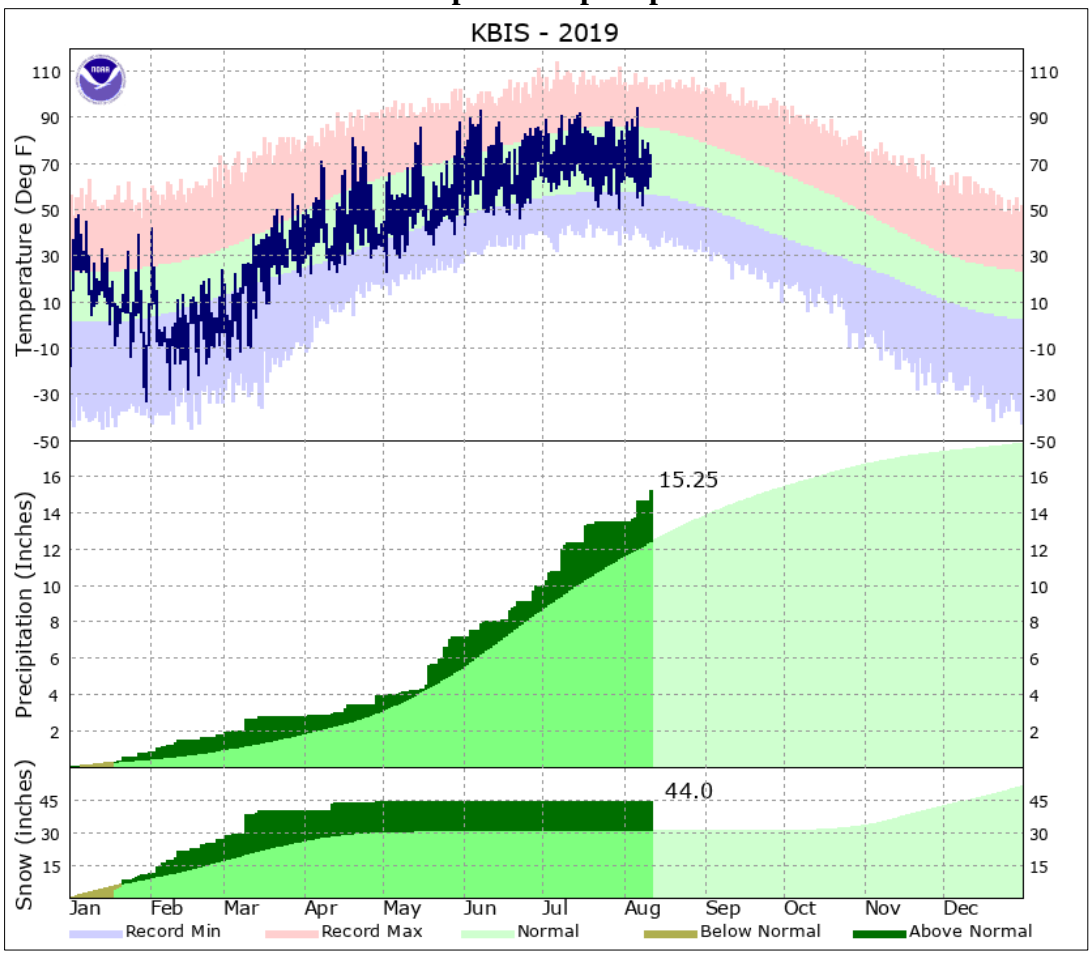
Source: ND Office of Management and Budget, State Capitol Information

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 over 130 days between May 12th and September 23rd. 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.

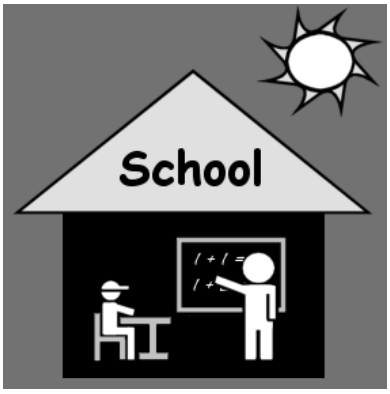
Bismarck 2019 temperature/precipitation/snowfall



Source: US National Weather Service, Bismarck Office website

Economy

According to the US Census Bureau 2013-2017 American Community Survey, the largest percentage of the population (27.5%) is employed in the category of "Educational services, and health care and social assistance", followed by 11.4% in the category of "Retail Trade".

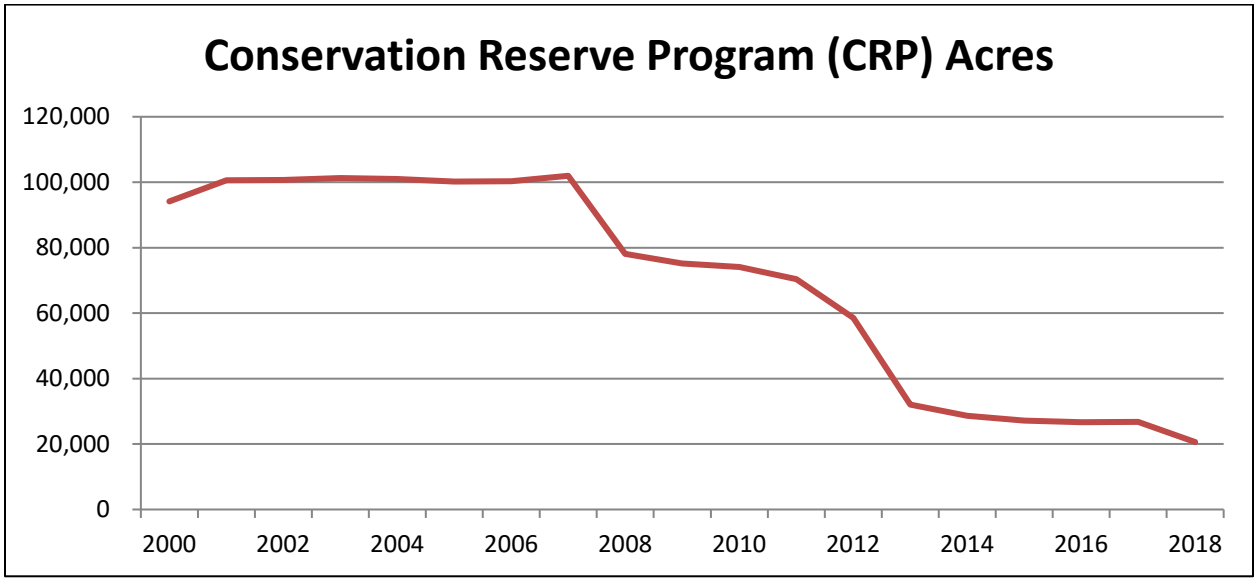


A total of 77.1% of the workers are "Private wage and salary workers", 17.8% are "Government workers", and 5% are "Self-employed in own, not-incorporated business workers". The median household income was $67,308. The poverty status was 5.2% of the families below the poverty level, 8.5% of the individuals below the poverty level with 7.2% of 65 and older individuals below the poverty level.

Land Use Concerns

Agriculture remains the primary land use in Burleigh County. Census data indicated that Burleigh County has 785 farms in 2017 (a 23% decrease from 2012) that average 1,050 acres per farm for a total acreage of 824,199 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 20,607 acres enrolled (2018) in the Conservation Reserve Program (CRP) which has helped mitigate the erosion problem; however, the acreage enrollment continues to steadily decrease.



Data Source: US Department of Agriculture, Farm Service Agency

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

The Burleigh County floodplain ordinance was last updated in 2015: Appointment of secretary to the Commission, update name of Department, and update fees.

The City of Bismarck floodplain ordinance was last updated in 2015 to provide an exception to the freeboard requirement for non-substantial (less than 50% of the market value of the structure) improvements to pre-FIRM structures (structures built before 1985).

Additionally, the Burleigh 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 Bismarck Mandan Chamber EDC and local jurisdictions promote and encourage opportunities for the area as a destination to live, work, and play.

The ND oil boom peaked in 2012 which resulted in increased population and development. Construction has now decreased after the peak.

Burleigh County Building Permits (Reported Only)

Year	Type	Buildings	Unit	Construction Cost
2018	Single Family	271	271	$61,086,783
	Two Family	0	0	0
	Three & Four Family	0	0	0
	Five or More Family	3	96	$11.780.076
2017	Single Family	373	373	$81,036,721
	Two Family	0	0	0
	Three & Four Family	0	0	0
	Five or More Family	1	60	$4.420.000
2016	Single Family	451	451	$94,619,250
	Two Family	6	12	1.050.342
	Three & Four Family	0	0	0
	Five or More Family	3	90	$9.188.000
2015	Single Family	483	483	$96,364,478
	Two Family	1	2	$208,661
	Three & Four Family	0	0	0
	Five or More Family	12	291	$23,658,000
2014	Single Family	694	694	$118,979,828
	Two Family	11	22	$1,752,564
	Three & Four Family	1	4	1,006,200
	Five or More Family	11	534	$55,614,451

(Source: US Census Bureau)

Risk Assessment and Hazard Profile

Burleigh County and the incorporated cities (Lincoln, Regan, Wilton, and Wing) contributed to the risk assessment for the Burleigh 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	Burleigh County	Lincoln	Regan	Wilton	Wing
Civil Disturbance	X	X	X	X	X
Criminal, Terrorist, or Nation/State Attack	X	X	X	X	X
Cyberattack	X	X	X	X	X
Dam Failure	X	X			
Drought	X	X	X	X	X
Fire (including urban fire or structure collapse and wildland fire)	X	X	X	X	X
Flood (including riverine, levee failure, closed basin, ice jam, and flash floods	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
Infectious Disease and Pest Infestations (including human, animal, and plant diseases)	X	X	X	X	X
Severe Summer Weather (including downbursts, extreme heat, hail, lightning, high wind, and tornado)	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
Space Weather	X	X	X	X	X
Transportation Incident (including vehicular, railway, and aircraft accidents)	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 capital of North Dakota—City of Bismarck. The greatest threat would be significant impact to critical facilities and/or infrastructure.

Dam Failure
Two, high-hazard dams present significant risks to several sections of Burleigh County. Failure of the Garrison Dam in McLean County could affect the southwest section of Burleigh County (including the Cities of Bismarck and Lincoln) as discussed in the Dam Failure section. A failure of the Heart Butte Dam in Grant County could have an effect on portions of the far southwest portion of Burleigh County.

Drought and Fire
Although many rural residents have their own wells, rural Burleigh County would suffer great agricultural losses in drought with785 farms in 2017 (a 23% decrease from 2012) that average 1,050 acres per farm for a total acreage of 824,199 acres. (Source: USDA Census of Agriculture) Grain elevators in Regan, Sterling, Wilton, and Wing as well as area agronomy centers may suffer losses due to drought and loss of crops.

Water Supplies: The South Central Regional Water District is the major supplier for Burleigh County. The City of Bismarck Public Works supplies water to the City of Lincoln and areas of Burleigh County that border the City of Bismarck. Water supply is adequate with rare requests to decrease water consumption during periods of drought/extreme heat.

In addition to South Central Regional Water:

- City of Lincoln has two, gravity-fed water towers with a 500,000-gallon capacity for each tower.
- City of Regan continues to have maintained wells and individual septic systems.
- City of Wilton has one, gravity-fed water tower with a 300,000-gallon capacity.
- City of Wing has one, gravity-fed water tower with a 50,000-gallon capacity.

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

The impacts of drought and wildland fire could impact city residents in a number of ways; however, rural Burleigh 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 staff and could run the risk disbanding. Additional and/or replacement equipment is always needed and sought through fundraising, donations, and grants. A maps of current fire districts is located in Attachments: Maps. The Bismarck Rural Fire Department is a combination department of paid and volunteer personnel. All other rural fire departments are 100% volunteer personnel.

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

	Burleigh County	Bismarck	Lincoln	Regan	Wilton	Wing
Creek/River Flooding	X	X	X			
Overland Flooding	X	X	X	X	X	X
Ice Jam Flooding	X	X	X			
Lift Stations	X	X	Gravity Flow		Gravity Flow	X
Lagoon Overruns	X	X	X			
Road Washouts	X	X	X	X	X	X

Geologic Hazards

No jurisdictions have significant history of this hazard.

An area of rural SW Burleigh County along the southern portion of Apple Creek has experienced some bank failures and slumping; no structures affected. University of Mary is currently undergoing a bank stabilization project uphill from Apple Creek.

The Double Ditch Indian Village State Historical Site (SW Burleigh County) suffered severe erosion caused by the 2011 Missouri River flood and has undergone bank stabilization. The site is monitored by the ND Historical Society on a biannual basis to include drone aerial inspections.

Areas along River Road in north Bismarck and rural Burleigh County (Western County border) also experience some sloughing from the grade of the eastern ridge with no structures affected.

Hazardous Materials Release and Transportation Incident
Varied levels of susceptibility are apparent for all jurisdictions. Highway 83 runs through the western side of Burleigh County (including the Cities of Bismarck and Wilton). Additionally, Interstate 94 transects the middle of Burleigh County through the City of Bismarck and near the City of Lincoln. Railroad tracks run through Burleigh County, Bismarck, and Wilton. The City of Regan is located approximately ½ mile north of Highway 36, which is not a major transportation route. Throughout the year, farmers transport anhydrous ammonia in pup tanks.

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

- State Capitol
- Governmental Buildings (local, state, and federal)
- Higher Education Facilities
- Numerous Medical Facilities
- Tourism Destination
- Commercial and Agricultural Industries
- Increased Number of Impervious Surfaces
- Increased Transportation Flow

Hazardous Materials Release and Transportation Incident						
	Burleigh County	Bismarck	Lincoln	Regan	Wilton	Wing
Anhydrous Ammonia	**X**	**X**	**X**	**X**	**X**	**X**
Bulk Fuel	**X**	**X**			**X**	
Bulk Fertilizer	**X**	**X**				
Farm Chemicals	**X**	**X**	**X**	**X**	**X**	**X**
Propane	**X**	**X**			**X**	
Fuel and Gas	**X**	**X**	**X**	**X**	**X**	**X**
Natural Gas	**X**	**X**	**X**		**X**	
Major Transportation Route	**X**	**X**	**X**		**X**	
Railroad	**X**	**X**	**X**		**X**	

Infectious Disease and Pest Infestations
Although each jurisdiction is susceptible to infectious disease and pest infestations, the more rural communities of Regan and Wing and unincorporated Burleigh County are particularly susceptible to diseases that impact plants and animals. The cities are more susceptible to communicable 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
Burleigh	92,372	18,004	60,747	13,621
Bismarck	70,536	12,808	46,236	11,492
Lincoln	3,467	1,096	2,217	154
Regan	36	5	19	12
Wilton	912	180	616	116
Wing	115	24	57	34

(Source: 2017 American Community Survey)

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 Burleigh County residents have backup power sources (generators, coal or wood-burning stoves) and extra fuel sources (gas and propane). Windstorms may result in downed power lines coupled with damage from flying debris and damage to facilities. Mobile home dwellings are encouraged to have tie-downs.

The communities of Bismarck, Lincoln, Wilton, and Wing each maintain and test outdoor warning sirens. Lincoln, Wilton, and Wing also utilize their sirens to alert fire or ambulance crews.

Disability Population

	Under 18 Years	18-64 Years	65+ Years
Burleigh County	444	Not Available	9,037

(Source: 2013-2017 American Community Survey 5-Year Estimates)

Burleigh County doesn't have enough resources and shelter space to accommodate functional needs and general population for a large-event and would require mutual aid. (Source: Burleigh 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.

Bismarck/Burleigh: Critical facilities with backup power include both hospitals, the City/County Building, Central Dakota Communications Center (911), Emergency Operations Center, Bismarck Police Department, Burleigh County Sheriff's Office.

Lincoln: Lincoln City Hall/Lincoln Police Department has a backup generator; however, the following critical facilities do not have backup power: Lincoln Public Works Facility, two Pump Stations, and Lift Station (listed as mitigation projects in Attachments)

Wilton: The Wilton Senior Center (utilized as a shelter) has a backup generator; however, the following critical facilities do not have backup power: Wilton City Hall, Wilton Ambulance, Wilton Water Tower.

Wing: Critical facilities without backup power include the City of Wing Fire Department/City Hall, Water Tower, two Wells, and two Lift Stations (listed as mitigation projects in Attachments).

Hazards Excluded or Minimally Addressed in this Plan

Hazard	Why Excluded/Where Addressed
Avalanche	Avalanches generally require long stretches of 25-55 degree slopes; Burleigh 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	Burleigh County does not have an ocean coastline.
Coastal Storm	Burleigh County does not have an ocean coastline.
Hurricane	Burleigh 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	Burleigh County does not have an ocean coastline.
Volcano	Volcanic ashfall can occur over Burleigh 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.

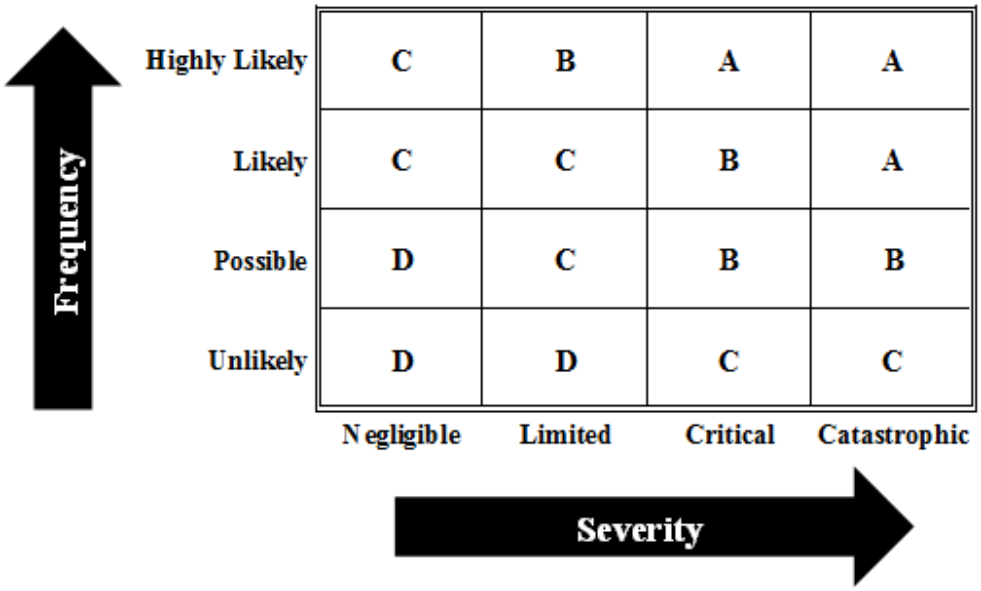
Risk Analysis Worksheet

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:

Burleigh County Hazard Risk Analysis Chart with Vulnerabilities for each Hazard

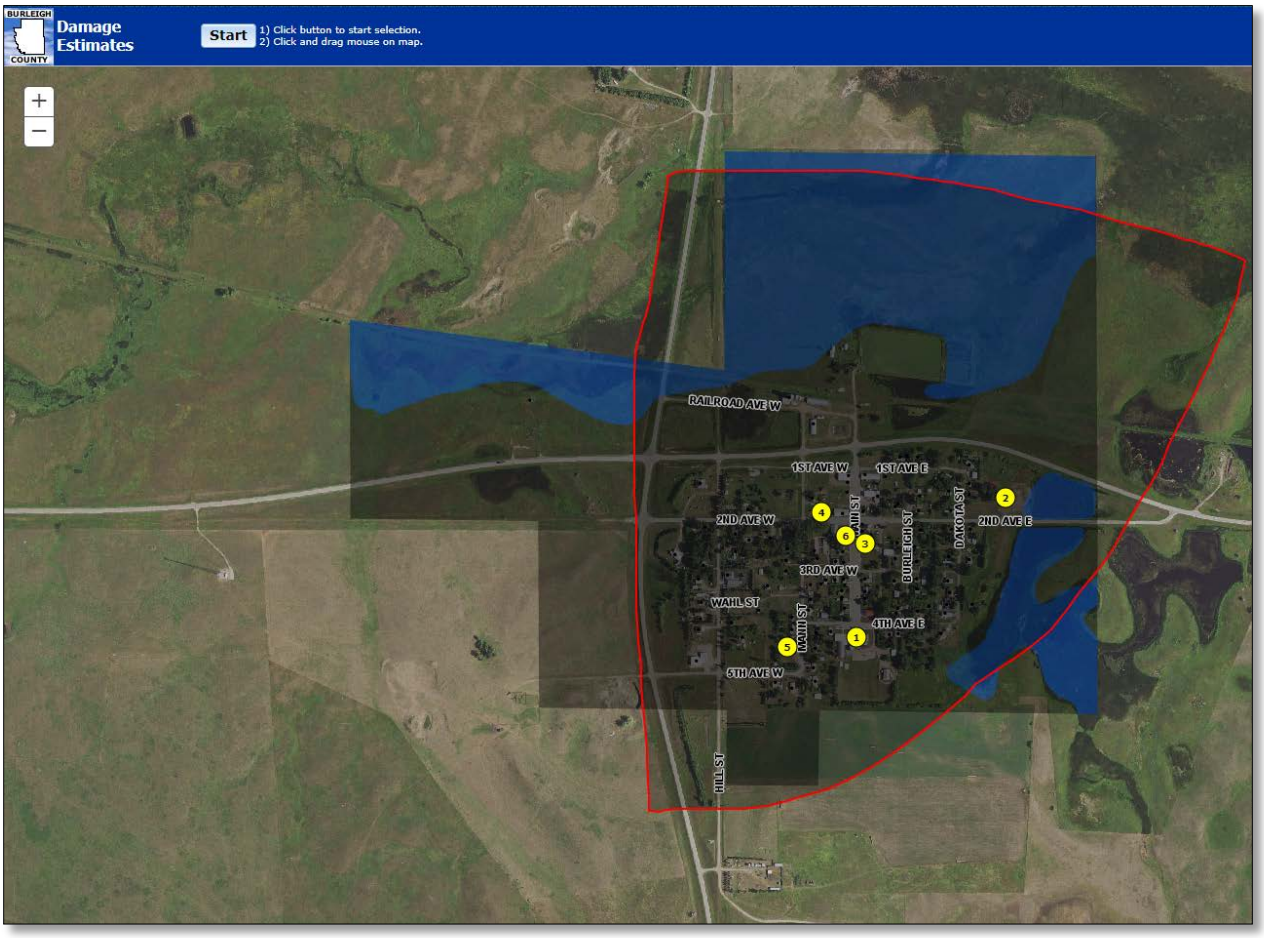
Risk Class:	C	C	B	B	C	C	C	D	B	B	B	A	B	C
HAZARD:	Civil Disturbance	Criminal, Terrorist, or Nation/State	Cyberattack	Dam Failure	Drought	Fire	Flood	Geologic Hazards	Hazardous Materials Release	Infections Disease and Pest Infestations	Severe Summer Weather	Severe Winter Weather	Space Weather	Transportation Accident
Blocked Roads	X	X	X	X		X	X	X	X		X	X	X	X
Building Collapse		X		X		X	X	X	X		X	X		
Business Interruptions	X	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	X
Downed Power Lines		X		X		X	X	X	X		X	X		
Downed Trees				X		X	X	X	X		X	X		
Evacuation (Full)				X					X					
Evacuation (Localized)	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
Increased Fire Potential					X	X			X		X	X	X	
Increased Public Safety Runs	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
Loss/Overcrowded Medical Facilities		X		X		X	X		X	X	X	X	X	X
Loss of Potable Water		X		X	X		X	X	X	X	X	X		
Loss of Power		X	X	X		X	X	X	X		X	X	X	
Mass Casualties		X		X		X	X		X	X	X		X	X
Property Damage	X	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		

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" with no change in vulnerability.
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.

Damage Assessment

An in-house GIS application was created to assess damages from nearly any hazard. Example shown below:



Source: Burleigh County GIS

The assessment includes:

- Any geometric shape
- Population within the shape
- Properties with assessed structures
- Assessed structure values
- Breakdown of the major structure types

Source: Burleigh County GIS

THIRA Survey Results
As of 07-18-14

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

*Based on 29 responses

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

Burleigh County Disaster Declarations

Number	Declared	State	Description
1981	5/10/2011	North Dakota	Flooding
1901	4/21/2010	North Dakota	Severe Winter Storm
1829	3/24/2009	North Dakota	Severe Storms and Flooding
1376	5/28/2001	North Dakota	Floods
1334	6/27/2000	North Dakota	Severe Storms And Flooding
1279	6/8/1999	North Dakota	Severe Storms, Tornadoes, Snow and Ice, Flooding, Ground Saturation, Landslides and Mudslides
1174	4/7/1997	North Dakota	Severe Storms/Flooding
1157	1/12/1997	North Dakota	Severe Winter Storms/Blizzards
1118	6/5/1996	North Dakota	Flooding
1050	5/16/1995	North Dakota	Severe Storms, Flooding, Ground Saturation
1001	7/26/1993	North Dakota	Flooding, Severe Storms
581	4/26/1979	North Dakota	Storms, Snowmelt, Flooding
554	4/17/1978	North Dakota	Storms, Ice Jams, Snowmelt, Flooding
287	6/5/1970	North Dakota	Severe Storms, Flooding
256	4/18/1969	North Dakota	Flooding

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

Burleigh County Emergency Declarations

Number	Declared	State	Description
3318	4/7/2011	North Dakota	Flooding
3309	3/14/2010	North Dakota	Flooding
3247	9/13/2005	North Dakota	Hurricane Katrina Evacuation
3016	7/21/1976	North Dakota	Drought
3012	4/13/1976	North Dakota	Severe Flooding

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 riots and assaults can and have occurred in correctional facilities located within Burleigh County:

- Bismarck Transition Center
- Burleigh/Morton Detention Center
- ND Missouri River Correctional Center
- ND State Penitentiary

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	Possible (1-10% probability in next year, or at least 1 chance in next 100 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

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

As one of the largest urban centers and the State Capital, Bismarck is far more susceptible to this risk than other jurisdictions within the County.

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

May 21, 2019: South Bismarck Walmart received bomb threats which resulted in evacuation of the store and investigation by police.

April 24, 2019: Starion Bank sustained an attempted robbery and suspect relayed there was a bomb in their backpack. Businesses in downtown Bismarck were urged to shelter in place while police investigate the threat.

March – April 2018: Legacy High School in Bismarck, North Dakota received seven separate bomb threats by telephone between March and April. The school was evacuated and searched by law enforcement.

March 29, 2018: The south Walmart store was evacuated after a bomb threat was called in. Police walked through the store and determined there was no threat.

August 28, 2017: North Walmart evacuated due to bomb threat; nothing found.

August 29, 2017: North Walmart evacuated for bomb threat. Police searched the store after evacuation and found no bomb.

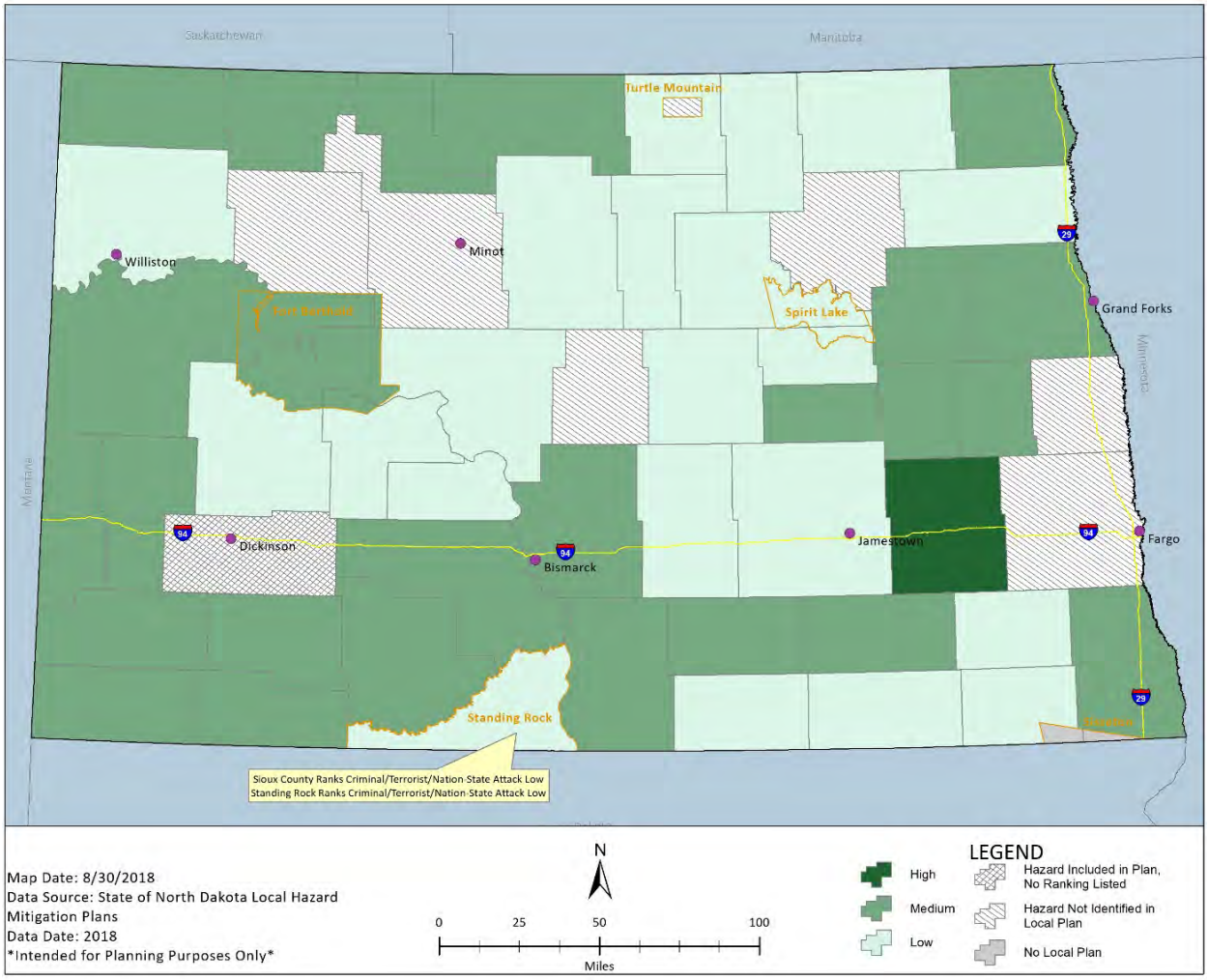
August 10, 2016 - March 23, 2017: One of the longest unlawful assemblies and civil disorders in United States history occurred in response to the construction of the Dakota Access Pipeline, which connected the Bakken and Three Forks production areas in North Dakota to Patoka, Illinois. Individuals first 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)

July 30, 2016: Both north and south Walmart locations were evacuated and searched for explosives due to false bomb threats.

May 27, 2016: Pioneer Elementary School received a bomb threat which prompted an evacuation drill while police investigated.

May 25, 2016: Sunrise Elementary School received a bomb threat which was investigated by police.

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 Burleigh 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 Apple Creek cause damage to homes in the western part Burleigh County and the City of Bismarck 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 Burleigh 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 Burleigh 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 Information/Data/Record Centers Media
Emergency Services	Law Fire Emergency Medical Services (EMS) ND National Guard Public Safety Answering Points (PSAPs)/911 Centers 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 Jails Schools
Industrial and Storage	Food Processing and/or Storage Fuel Health and Medical Supplies Major Industries
Medical	Clinics Hospitals 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

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

History

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

Known attacks:

2019, February: Bismarck Public Schools suffered a vicious malware attack resulting in a severe data breach (names, addresses, emails, and phone numbers of individuals had been accessed). It should be noted that this was a nationwide breach through a software and other schools throughout the State of North Dakota were also affected.

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	Critical (25-50% of jurisdiction affected)
Risk Class	B
Seasonal Pattern	Spring/Summer
Duration	Days/Weeks
Speed of Onset	Little warning
Location	Countywide

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 (Full)
- Evacuation (Localized)
- Flooding (Street)
- Flooding (Structure)
- HAZMAT Release
- Increased Public Safety Runs
- Livestock Injury/Death
- Loss of Economy
- Loss/Overcrowded Medical Facilities
- Loss of Potable Water
- Loss of Power
- Mass Casualties
- Property Damage
- School Closure
- Sewer Backup

The ND State Water Commission identifies 124 dams in Burleigh 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 one dam is classified as "High". Rural Burleigh County, Bismarck, and Lincoln are at risk for dam failure while dams do not pose a threat to the cities of Regan, Wilton and Wing. No other dam failures in the jurisdiction affect critical infrastructure but may cause agricultural or environmental damage.

Location	Type	Structure Name	County	Purpose	Federal Hazard Class
13707508CCC	Dam	LONG LAKE NWR 7	Burleigh	Fish & Wildlife	Low
13707517BA	Dam	Long Lake NWR - G12 Marsh	Burleigh	Livestock	Low
13707517D	Dam	None Listed	Burleigh	Fish & Wildlife	None Listed
13707530BA	Dam	Long Lake Nwr Dam 3	Burleigh	Fish & Wildlife	Low
13707609CDCC	Dam	LONG LAKE NWR 6	Burleigh	Fish & Wildlife	Low
13707614AD	Dam	LANE DAM; MARY	Burleigh	Fish & Wildlife	Low
13707615AC	Dam	LONG LAKE NWR 5	Burleigh	Fish & Wildlife	Low
13707624AA	Dam	LONG LAKE NWR 4	Burleigh	Fish & Wildlife	Low
13707828BCC	Dam	SCHEELER DAM; DON	Burleigh	Livestock	Low
13707829AC	Dam	Dietrich Dam 1; Clem	Burleigh	Irrigation	Undetermined
13707829DC	Dam	Dietrich Dam 2; Clem	Burleigh	Irrigation	None Listed
13707830DDB	Dam	WEISBECK DAM; ROSE	Burleigh	Fish & Wildlife	Low
13707919BC	Dam	Kimball Bottoms Spillway	Burleigh	Fish & Wildlife	Low
13707923DC	Dam	Burleigh Co GMA 1	Burleigh	Fish & Wildlife	Low
13807602AB	Dam	WETZEL DAM; EWALD 3	Burleigh	Fish & Wildlife	Low
13807604	Dam	STERLING RR DAM	Burleigh	None Listed	None Listed
13807711CA	Dam	MACDONALD DAM	Burleigh	Livestock	Low
13807711CA	Dam	MACDONALD DAM	Burleigh	Livestock	None
13807904AA	Dam	Yegan Dam	Burleigh	Irrigation	Low
13807909AB	Dam	138-079-09	Burleigh	Other	Low

13807918BC	Dam	Tatley Dam	Burleigh	Fish & Wildlife	Low
13808018DD	Dam	TURNBOW DEVELOPMENT CORP	Burleigh	Fish & Wildlife	Low
13907605BA	Dam	BROWN DAM; ROY N 1	Burleigh	Livestock	Low
13907605CB	Dam	BROWN DAM; ROY N 2	Burleigh	Livestock	Low
13907610C	Dam	Funston Dam; Merle	Burleigh	Livestock	Low
13907635CA	Dam	WETZEL DAM; EWALD 1	Burleigh	Fish & Wildlife	Low
13907635CD	Dam	WETZEL DAM; EWALD 2	Burleigh	Fish & Wildlife	Low
13907715BD	Dam	Estey Dam; Michael	Burleigh	Fish & Wildlife	Low
13907728BDA	Dam	Northern Pacific Dam	Burleigh	Other	None Listed
13907801CAA	Dam	Bliss Dam; David	Burleigh	Fish & Wildlife	Low
13907814CCC	Dam	RUE DAM	Burleigh	None Listed	None Listed
13907819AB	Dam	Apple Creek Dam	Burleigh	None Listed	Undetermined
13907903CD	Dam	Esposito Dam; Mike 2	Burleigh	Livestock	Low
13907910AC	Dam	Esposito Dam; Mike	Burleigh	Livestock	Low
13907925CB	Dam	Henderson Dam	Burleigh	Fish & Wildlife	Low
13907927DC	Dam	McDowell Dam	Burleigh	Recreation	Significant
13907936BC	Dam	Reed Dam; Irwin	Burleigh	Fish & Wildlife	Low
13908017AAA	Dam	CLAIRMONT FAMILY TRS DAM 1	Burleigh	Fish & Wildlife	Low
13908017AAB	Dam	CLAIRMONT FAMILY TRS DAM 2	Burleigh	Fish & Wildlife	Low
13908019DA	Dam	C-Family Trust (William Clairmont)	Burleigh	Livestock	Low
13908020BB	Dam	C-FAMILY TRUST	Burleigh	Livestock	Low
13908027ADA	Dam	Hay Creek Overflow Dam	Burleigh	Flood Control	Low
13908032ABB	Dam	Jackman Coulee Dam 1	Burleigh	Flood Control	Low
13908032ABC	Dam	Jackman Coulee Dam 2	Burleigh	Flood Control	High
14007511BC	Dam	Dronen Dam; Tim	Burleigh	Livestock	Low
14007534ABA	Dam	HARPOLE DAM; RICHARD	Burleigh	Fish & Wildlife	Low
14007605BC	Dam	Rice Lake Dam	Burleigh	Recreation	Low
14007728CD	Dam	NORTHERN IMPROVEMENT CO.	Burleigh	Waste Lagoon	None

14007829DD	Dam	MCCORMICK RANCH INC. DAM	Burleigh	Livestock	Low
14007904BD	Dam	BORNER DAM; AL	Burleigh	Fish & Wildlife	Low
14007906BD	Dam	Jose Dam No 1; Dalton	Burleigh	Livestock	Undetermined
14007906CB	Dam	JACOBS DAM; JUSTIN 1	Burleigh	Irrigation	Low
14007906CB	Dam	Jacobs Dam; Justin 2	Burleigh	Fish & Wildlife	None Listed
14007922BD	Dam	USFWS Wetland 1	Burleigh	Livestock	Low
14007922CC	Dam	WARFORD DAM; DR JOHN 1	Burleigh	Fish & Wildlife	Low
14007922CD	Dam	USFWS Wetland No. 2	Burleigh	Livestock	Low
14007926CC	Dam	Neal Fischer	Burleigh	Livestock	Undetermined
14007927BA	Dam	USFWS Wetland No. 3	Burleigh	Livestock	Low
14007927BB	Dam	USFWS Wetland No. 4 - 11/4/16	Burleigh	Fish & Wildlife	Low
14007929BB	Dam	WARFORD DAM; JOHN	Burleigh	Fish & Wildlife	Low
14007932BAC	Dam	CLOOTEN DAM; CRAIG	Burleigh	Fish & Wildlife	Low
14008016D	Dam	140-080-16	Burleigh	Livestock	Low
14008019AA	Dam	Beckman Dam; Kerry 3	Burleigh	Livestock	Undetermined
14008019DA	Dam	Beckman Dam; Kerry 4	Burleigh	Livestock	Undetermined
14008023BA	Dam	Jose Dam; Lane	Burleigh	Fish & Wildlife	None Listed
14008026DB	Dam	SOLBERG DAM; JOHN	Burleigh	Livestock	Low
14008030C	Dam	140-080-30C	Burleigh	Other	Low
14008030D	Dam	140-080-30	Burleigh	Livestock	Low
14008034ACB	Dam	WILLIAMS DAM; ROGER	Burleigh	Livestock	Low
14008103BDA	Dam	Dakota Adventist Academy	Burleigh	Irrigation	Low
14008109DDA	Dam	Andahl Dam; Ronald & Paul	Burleigh	Mining	Low
14107510AD	Dam	DECKERT DAM; DENNIS 2	Burleigh	Livestock	Low

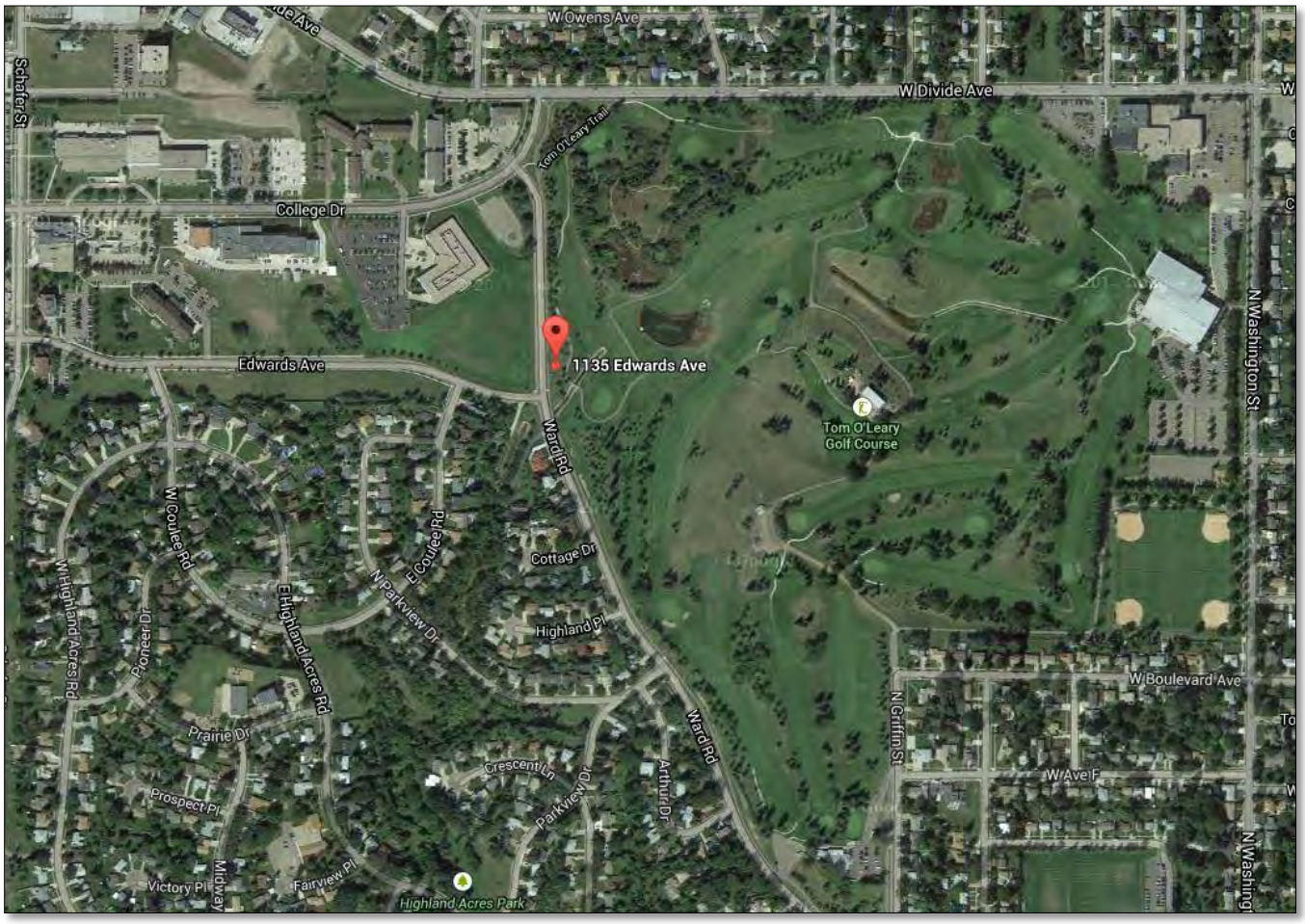
14107510DD	Dam	DECKERT DAM; DENNIS 1	Burleigh	Livestock	Low
14107526DDD	Dam	HEIDT DAM; EARL	Burleigh	Livestock	Low
14107602CB	Dam	THOMPSON & STUART DAM 1	Burleigh	Fish & Wildlife	Low
14107604CA	Dam	Neideffer Flood Control Dam	Burleigh	Flood Control	Low
14108014AC	Dam	McCLINTOCK DAM; ZOE	Burleigh	Livestock	Low
14108029B	Dam	Peterson Dam; Charlene 1	Burleigh	Livestock	Undetermined
14108031CD	Dam	Peterson Dam; Chuck 3	Burleigh	Livestock	Undetermined
14108031DC	Dam	Peterson Dam; Chuck 2	Burleigh	Livestock	Undetermined
14108032BB	Dam	KARCH DAM; HAROLD	Burleigh	Livestock	Low
14108101DC	Dam	Bopp Dam; Timothy	Burleigh	Livestock	Low
14108125AAA	Dam	JONES DAM; LLOYD 1	Burleigh	Fish & Wildlife	Low
14108125ADB	Dam	Jones Dam; Lloyd 2	Burleigh	Fish & Wildlife	Low
14108136CC	Dam	141-080-36	Burleigh	Livestock	Undetermined
14207519ACC	Dam	None Listed	Burleigh	Fish & Wildlife	None Listed
14207532BD	Dam	KOSKI DAM; ELMER 1	Burleigh	Fish & Wildlife	Low
14207532CC	Dam	KOSKI DAM; ELMER 2	Burleigh	Fish & Wildlife	Low
14207607DA	Dam	FOX DAM; JAMES	Burleigh	Fish & Wildlife	Low
14207611AB	Dam	ND No Name 122	Burleigh	Recreation	Low
14207629AB	Dam	CORNATZER DAM; DR. WILLIAM 3	Burleigh	Fish & Wildlife	Low
14207629AC	Dam	CORNATZER DAM; DR. WILLIAM 4	Burleigh	Fish & Wildlife	Low
14207629BA	Dam	CORNATZER DAM; DR. WILLIAM 1	Burleigh	Fish & Wildlife	Low
14207629BDA	Dam	CORNATZER DAM; DR. WILLIAM 2	Burleigh	Fish & Wildlife	Low
14207629BDC	Dam	CORNATZER DAM; DR. WILLIAM 5	Burleigh	Fish & Wildlife	Low
14207806CA	Dam	STROM DAM; VICTOR	Burleigh	Livestock	Low
14208011DCA	Dam	ADAMS DAM; WARREN	Burleigh	Fish & Wildlife	Low
14307521DB	Dam	RATH WPA WETLAND	Burleigh		Low

14307604BB	Dam	SMITH DAM; FRED 2	Burleigh	Fish & Wildlife	Low
14307604BC	Dam	SMITH DAM; FRED 1	Burleigh	Fish & Wildlife	Low
14307634DA	Dam	NEMETZ DAM; JEAN L 3	Burleigh	Fish & Wildlife	Low
14307721BC	Dam	CANFIELD LAKE WPA	Burleigh	Fish & Wildlife	Low
14307806CB	Dam	ERICKSON DAM; JOHN 2	Burleigh	Livestock	Low
14307902AB	Dam	Adamyk Dam; Ted	Burleigh	Livestock	Low
14307906CB	Dam	Aune Dam; Earl	Burleigh	Flood Control	None Listed
14307929AA	Dam	DESCIAK DAM; STEVE	Burleigh	Fish & Wildlife	Low
14407625DB	Dam	SMITH DAM; FRED 4	Burleigh		Low
14407625DD	Dam	SMITH DAM; FRED 3	Burleigh	Fish & Wildlife	Low
14407633AC	Dam	NEMETZ DAM; JEAN L 1	Burleigh	Fish & Wildlife	Low
14407633DB	Dam	NEMETZ DAM; JEAN L 2	Burleigh	Fish & Wildlife	Low
14407821DA	Dam	Fisher Dam; Wilbert	Burleigh	Livestock	Low
14407831DA	Dam	Olson Dam	Burleigh		None Listed
14407831DDA	Dam	ERICKSON DAM; JOHN 1	Burleigh	Fish & Wildlife	Low
14407836DD	Dam	Lemke Dam; Roger	Burleigh	Fish & Wildlife	Low
14407919BC	Dam	BERG DAM; ELLA 2	Burleigh	Fish & Wildlife	Low
14407919CDA	Dam	BERG DAM; ELLA 1	Burleigh	Fish & Wildlife	Low
14407923CD	Dam	LIFFRIG DAM; DUANE 2	Burleigh	Livestock	Low
14407934ADB	Dam	DUMA DAM; DAVID	Burleigh	Fish & Wildlife	Low
14407935AB	Dam	LIFFRIG DAM; DAVID 3	Burleigh	Livestock	Low
14407936AA	Dam	LIFFRIG DAM; DAVID 5	Burleigh	Fish & Wildlife	Low
14407936AB	Dam	LIFFRIG DAM; DAVID 6	Burleigh	Livestock	Low
14407936AD	Dam	LIFFRIG DAM; DAVID 4	Burleigh	Livestock	Low

McDowell Dam is recreation area located five miles east of Bismarck (1951 93rd Street NE). Available activities include swimming, boating, fishing and paddle boating. Failure of the rural dam classified as "significant" would most likely result in environmental and home loss (approximately 100) due to location.

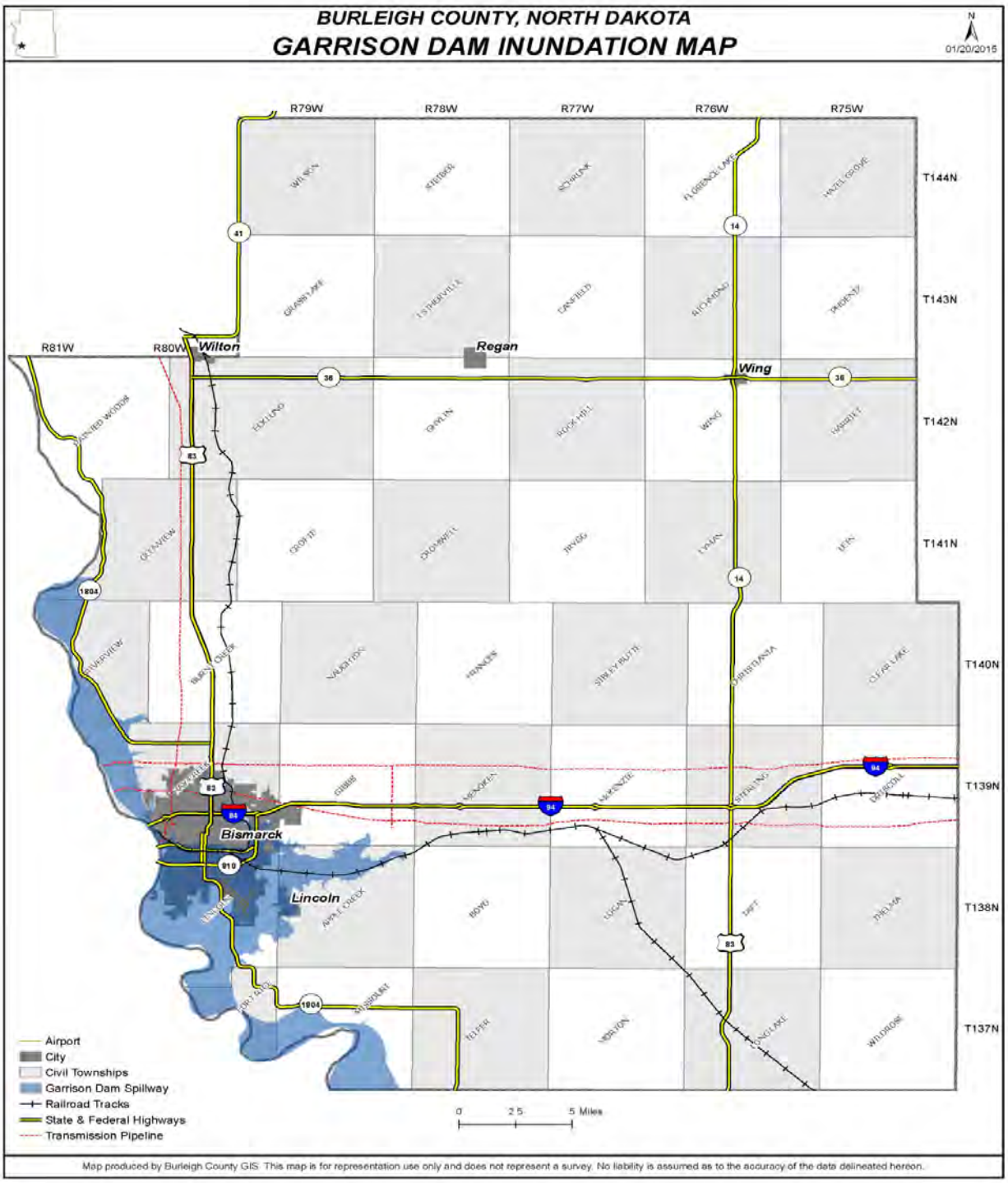
Source: ND Game and Fish website

The Jackman Coullee2 Dam is flood control structure located within the City of Bismarck (1135 Edwards Avenue). The structure is on the western edge of the "Tom O'Leary Golf Course". Failure of the urban dam classified as "high" would most likely result in environmental and home damages (200+) and/or loss due to location.



Source: Google Maps Website

Lake Sakakawea was formed by the construction of the Garrison Dam in 1953. Lake Sakakawea covers 368,000 surface acres, can store a maximum of 24.5 million acre-feet, and has 1,600 miles of shoreline is six counties. Total failure of the dam could affect approximately 18,449 people and 6,756 properties with an assessed value of $1,875,275,104 utilizing the Burleigh County Damage Estimator.

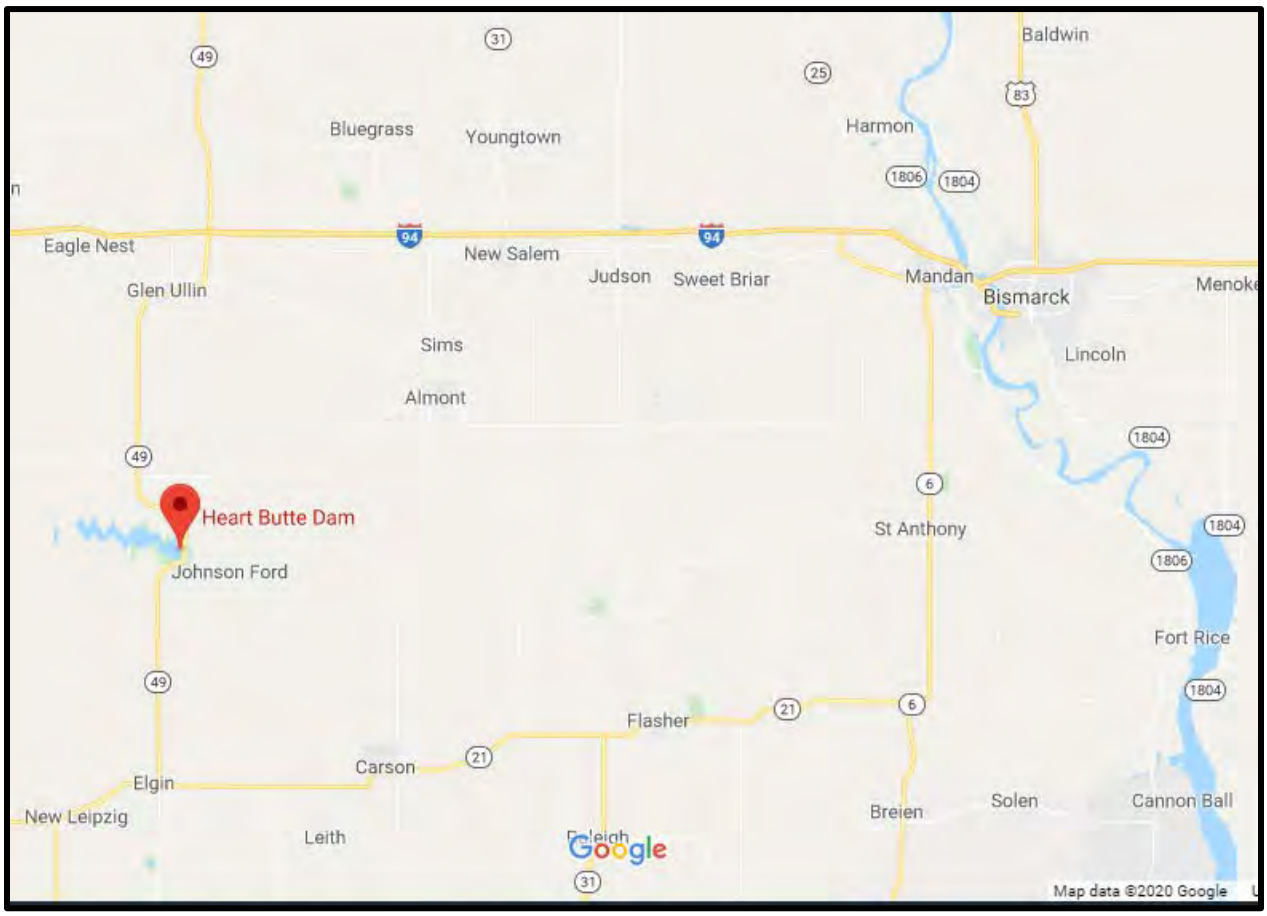


Source: Burleigh County GIS

Heart Butte Dam and Reservoir, or Lake Tschida as it was renamed in 1958, is located in Grant County. The reservoir is approximately 70 miles southwest of Bismarck (Burleigh County). (Source: Heart Butte Reservoir Resource Management Plan, December 2006)

The dam is on the Heart River in Grant County. The spillway is a morning-glory type, leading to a 14- foot tube with a capacity of 5,700 cubic feet per second. The outlet works consist of a gated tube with a capacity of 700 cubic feet per second. The reservoir has a total capacity of 223,646 acre-feet, of which 147,861 acre-feet are for flood control storage and 206,365 acre-feet are for surcharge. The lake has a surface area of 3,397 acres. (Source: U.S. Department of Interior, Bureau of Reclamation website)

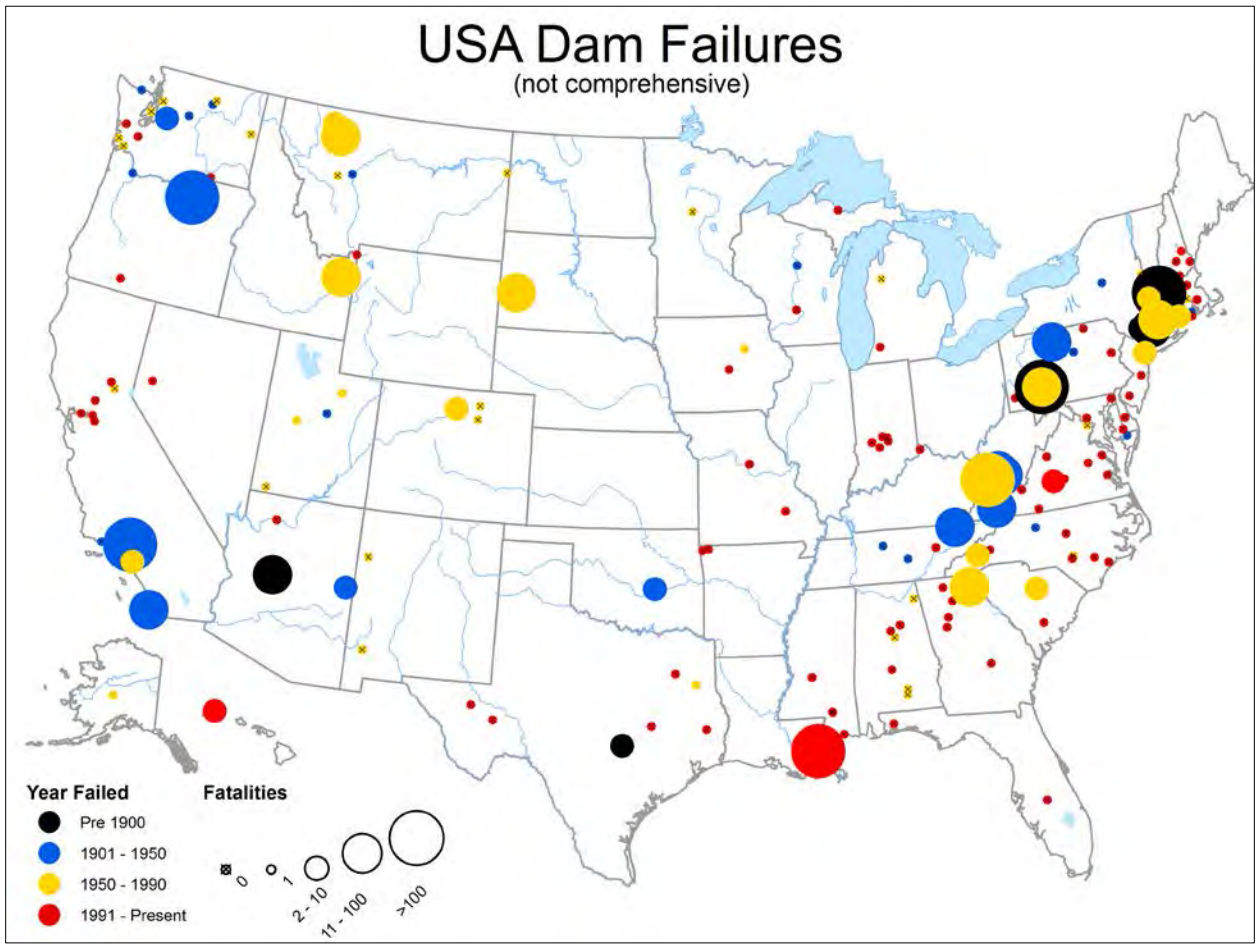
A Heart Butte Dam hydrologically induced static failure scenario could affect approximately 17,385 people and 5,361 properties with assessed value of $1,460,631,800 utilizing the Burleigh County Damage Estimator.



Source: Google Map Data

History – There has been no history of a dam failure within the County.

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."



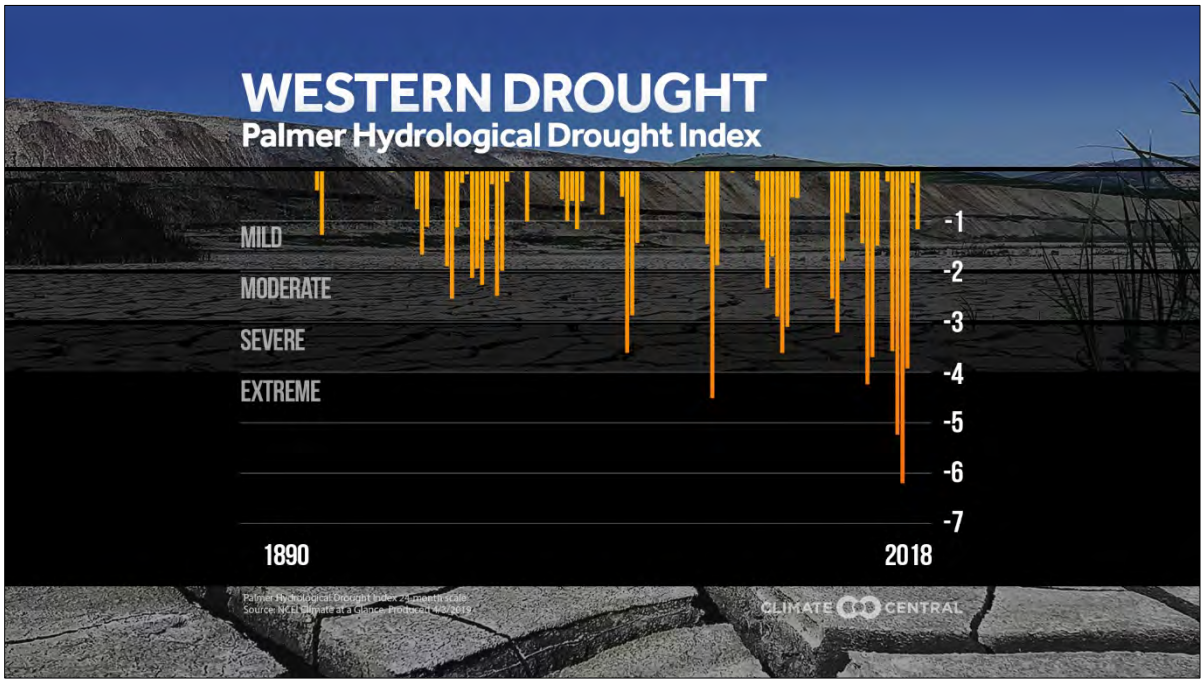
Source: https://damsafety.org/

Drought

Frequency	Likely (10-100% probability in the next year, or at least 1 chance in next 100 years)
Severity	Limited (10-25% of jurisdiction affected)
Risk Class	C
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

May, 2017 – Voluntary water restrictions requested in City of Bismarck and City of Lincoln due to low water reservoirs as a result of a period of increased temperatures.

March-July, 2017 – A least 268 rural wildfires reported to the ND Department of Emergency Services, with more than 55% reported in July. (Source: The Bismarck Tribune, July 21, 2017)

June 1, 1988 – Excessive heat reported in Burleigh County with crop damages estimated over $20 million.

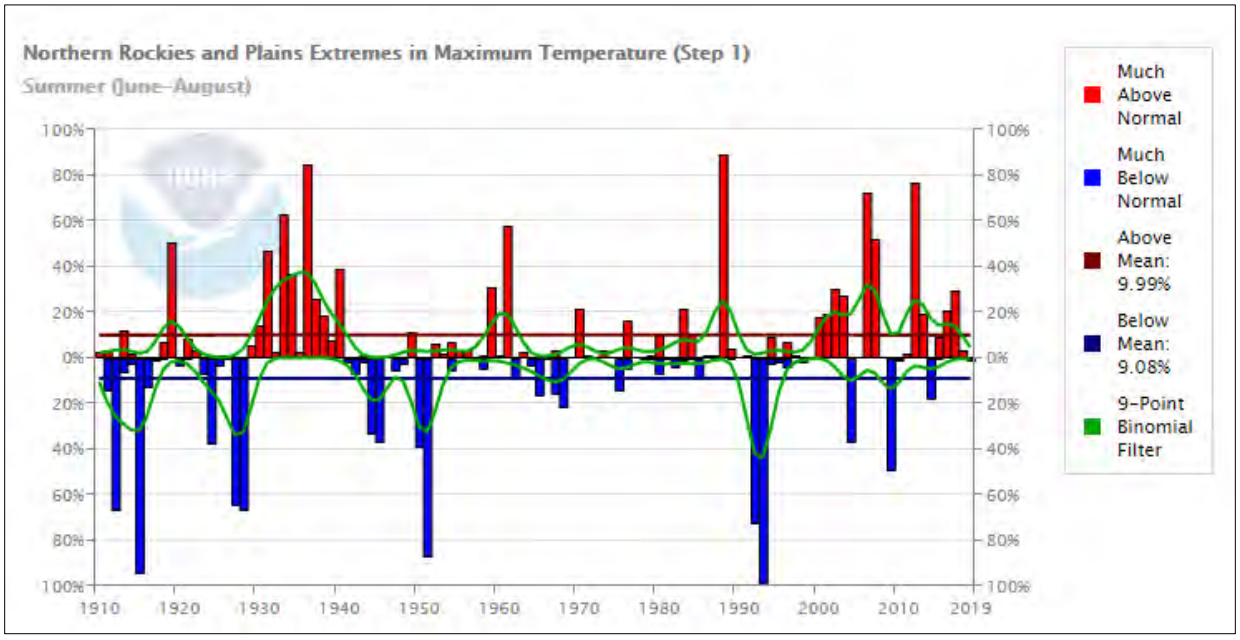
Excessive Heat

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
BURLEIGH (ZONE)	BURLEIGH (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 2019)

U.S. Climate Extremes Index (CEI)

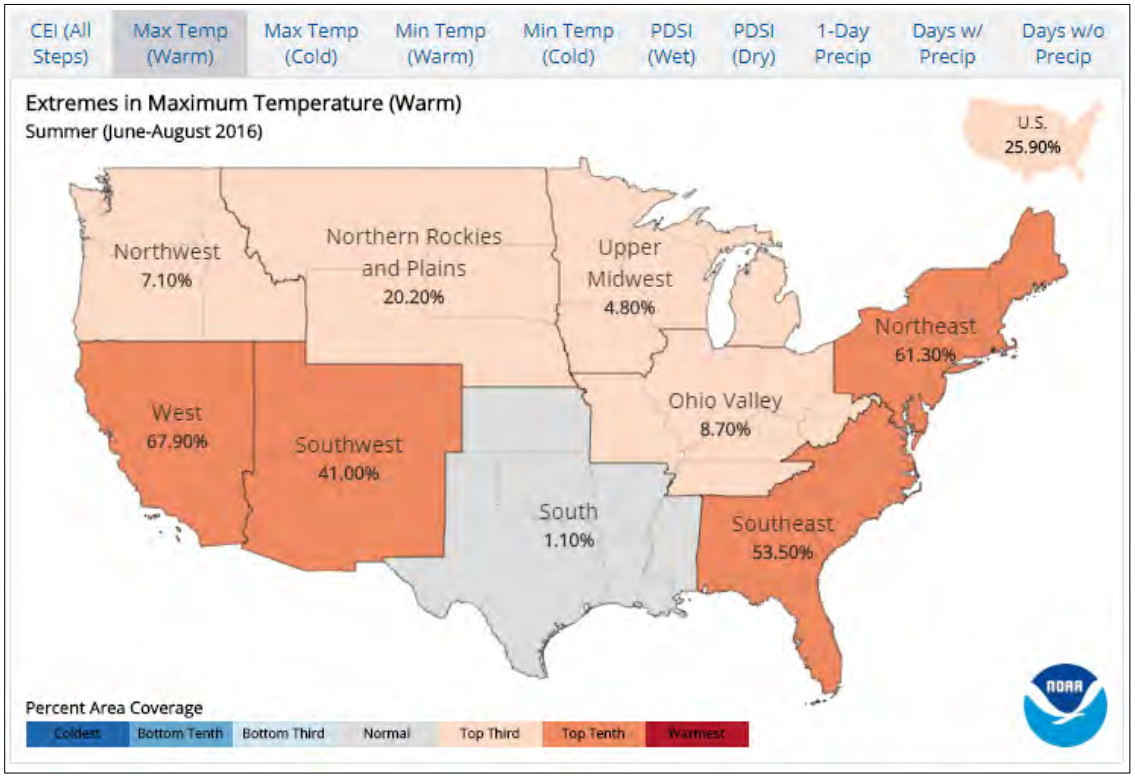
Extremes in maximum temperature for the period of Summer (June-August) from 1910-2019.



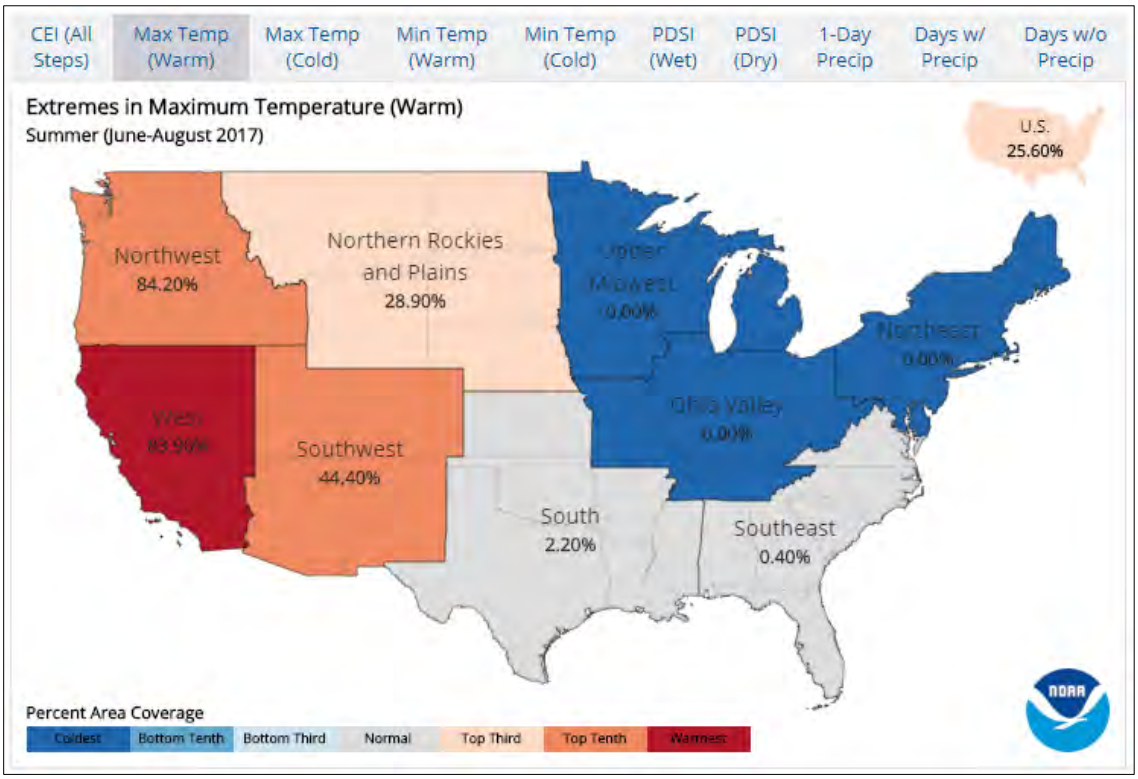
Source: www.ncdc.noaa.gov

U.S. Climate Extremes Index (CEI)

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



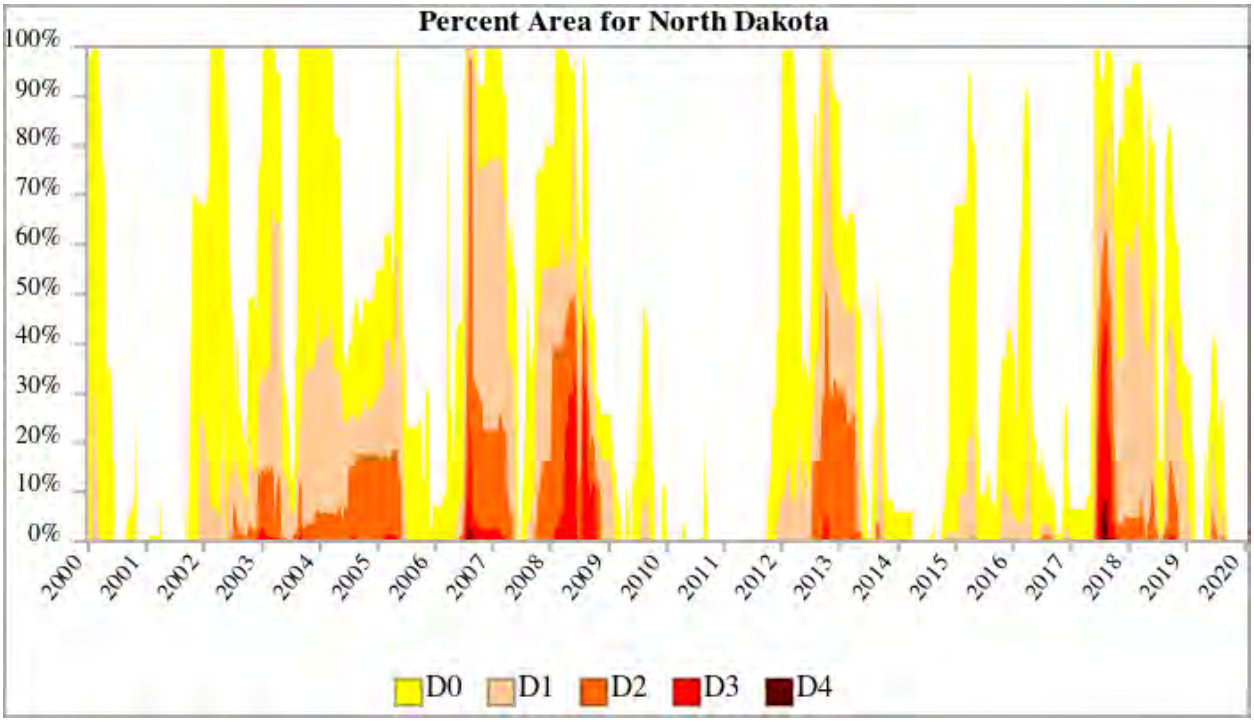
Source: www.ncdc.noaa.gov



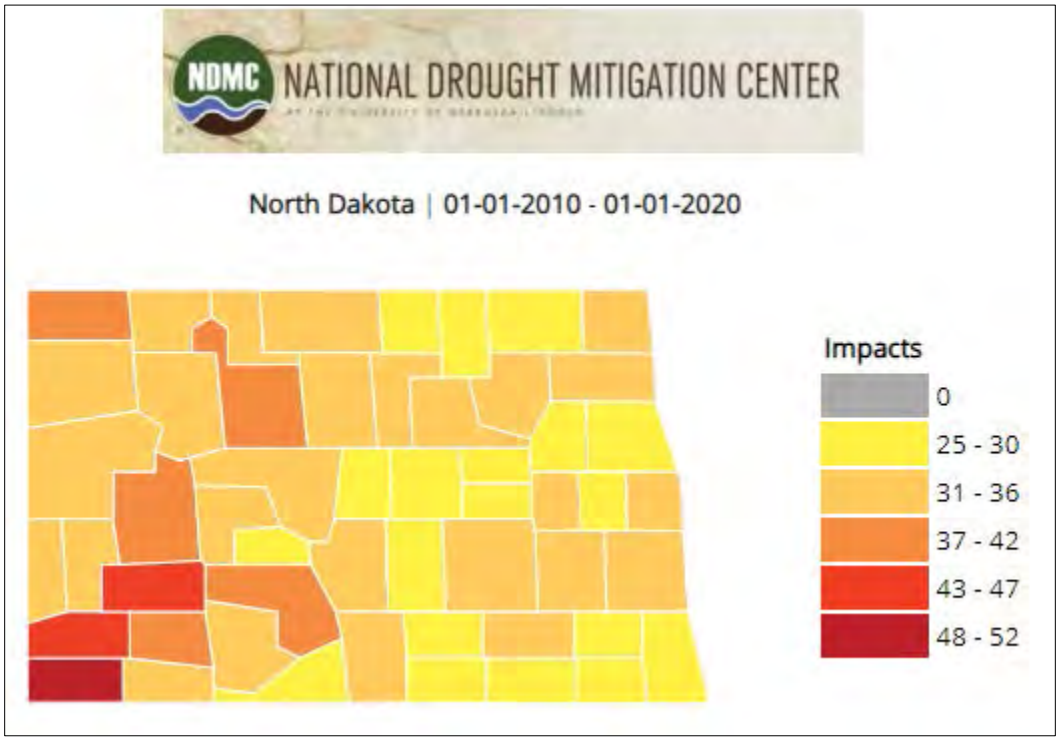
Source: www.ncdc.noaa.gov

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
(including urban fire or structure collapse and wildland fire)

Frequency	Highly Likely (Nearly 100% probability in the next year)
Severity	Negligible (Less than 10 of jurisdiction affected)
Risk Class	C
Seasonal Pattern	None
Duration	Hours/Days
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

Burleigh 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.

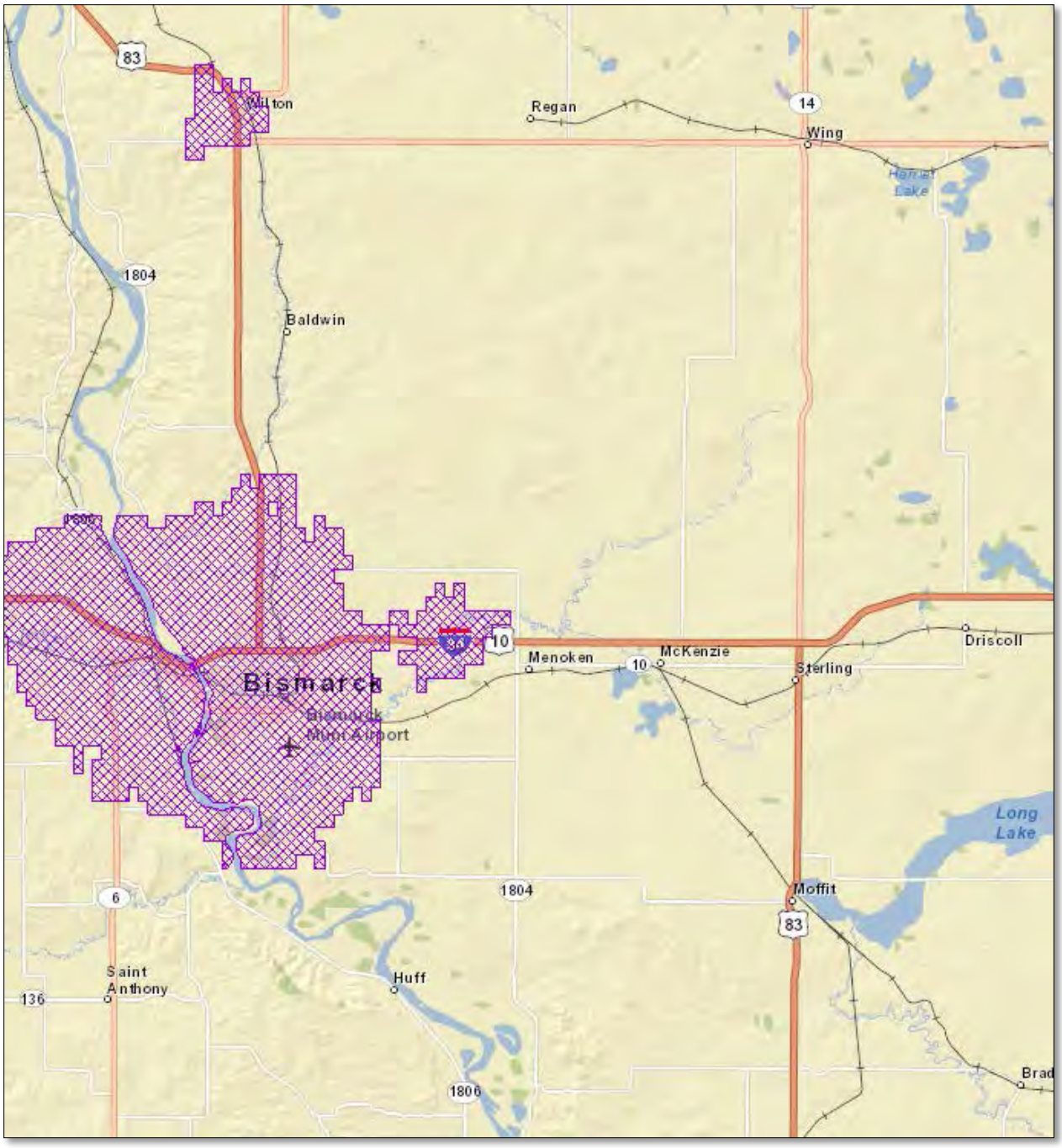
Most wildland fires result from acts of human carelessness during activities such as: controlled burns of sloughs, ditches, and fields by landowners; recreational activity such as camping, hunting, and other off-road vehicle travel; and use of fireworks preceding and immediately following the 4th of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

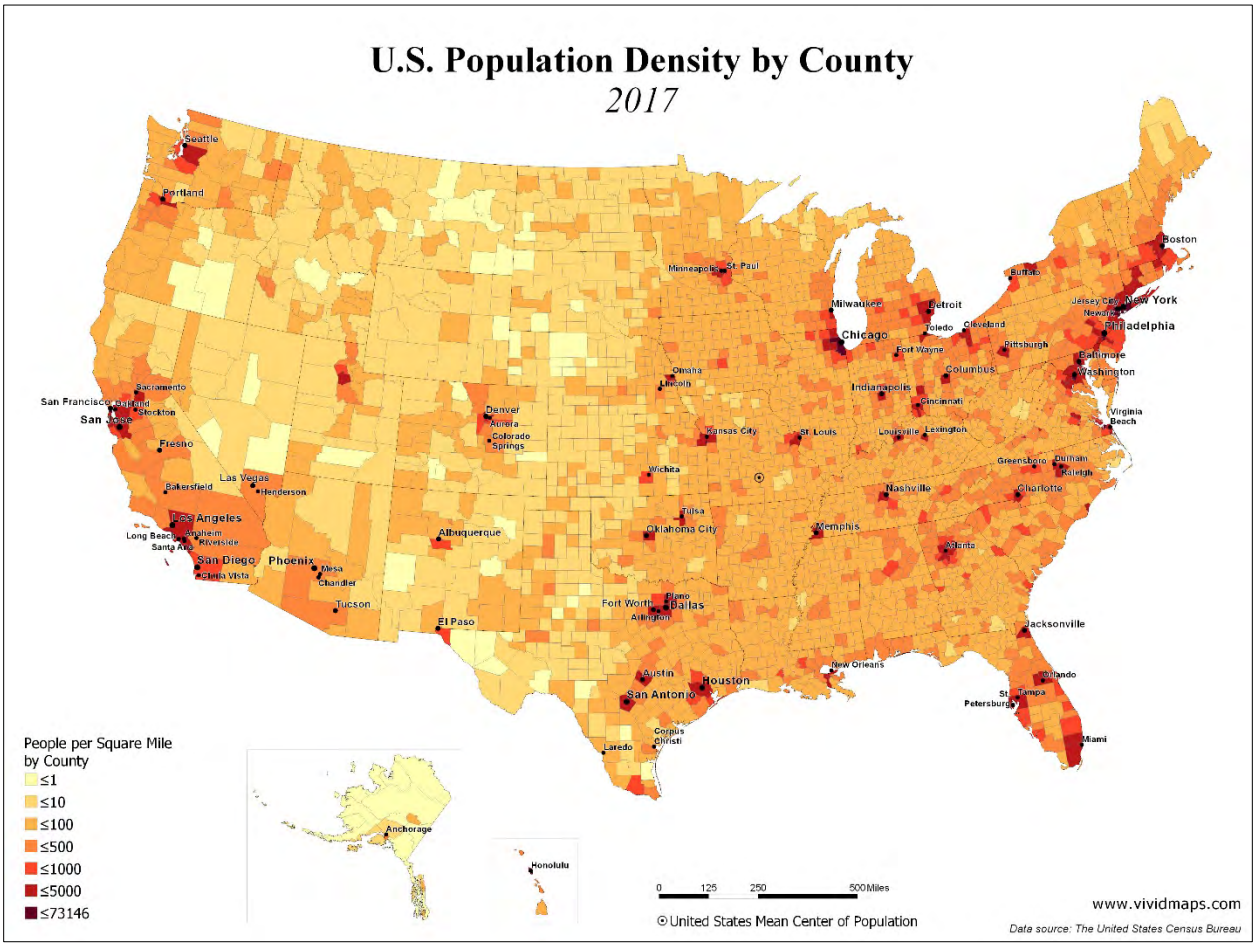
The vulnerability risk for Burleigh County, based on the following maps, is low due to the very low-density population/housing.

A Bismarck Rural Fire Department brush truck drives along the fire line as thick smoke shrouds the sky during extinguishing of a scheduled burn which got out of control at Hawktree Golf Course northwest of Bismarck (Source: The Bismarck Tribune, March 10, 2016).

Burleigh County Wildland Urban Interface



Source: Federal Fire Occurrence Website

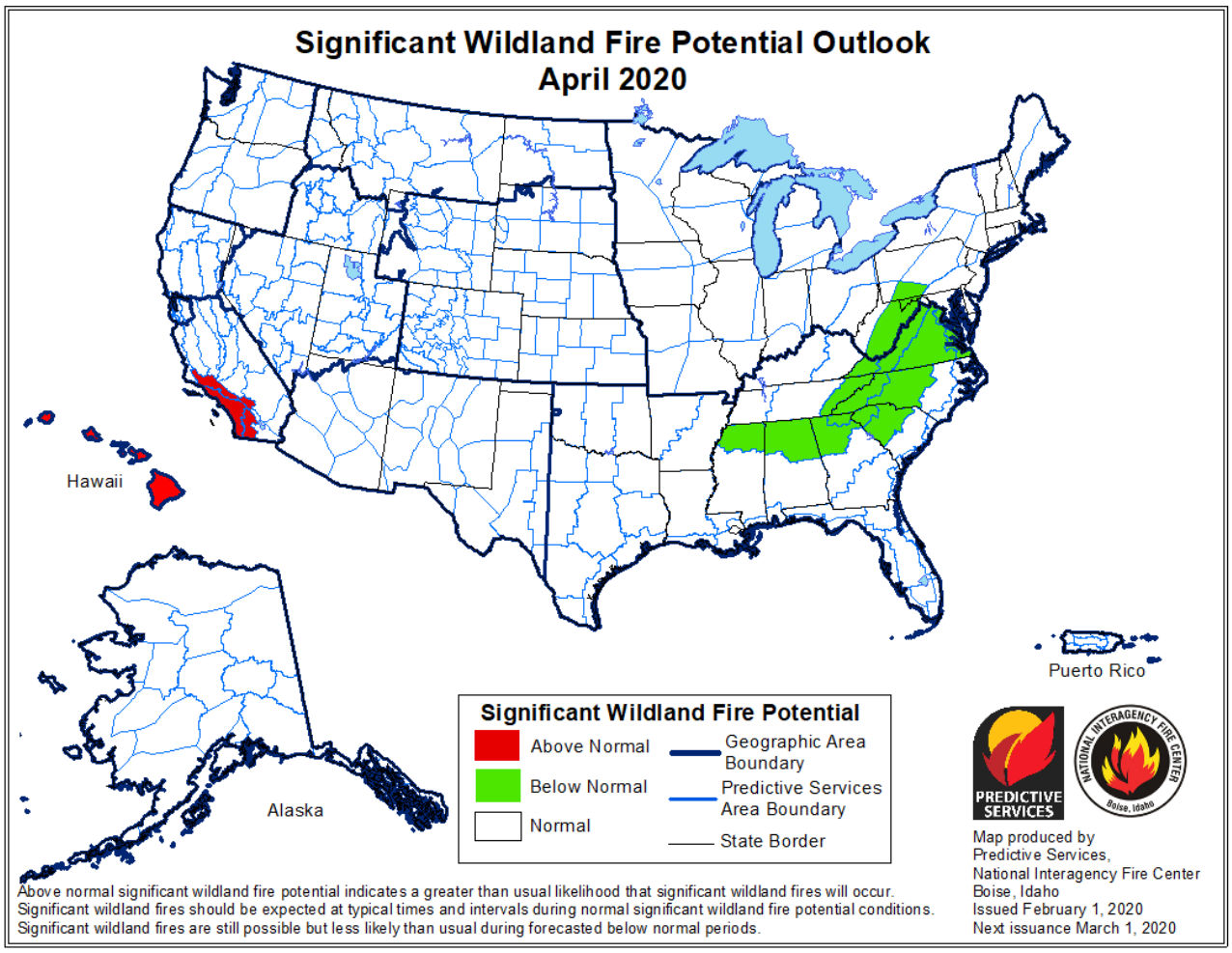


Source: https://vividmaps.com

Identified Impacts

- 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
- Property Damage
- School Closure

National Weather Service Fire Weather

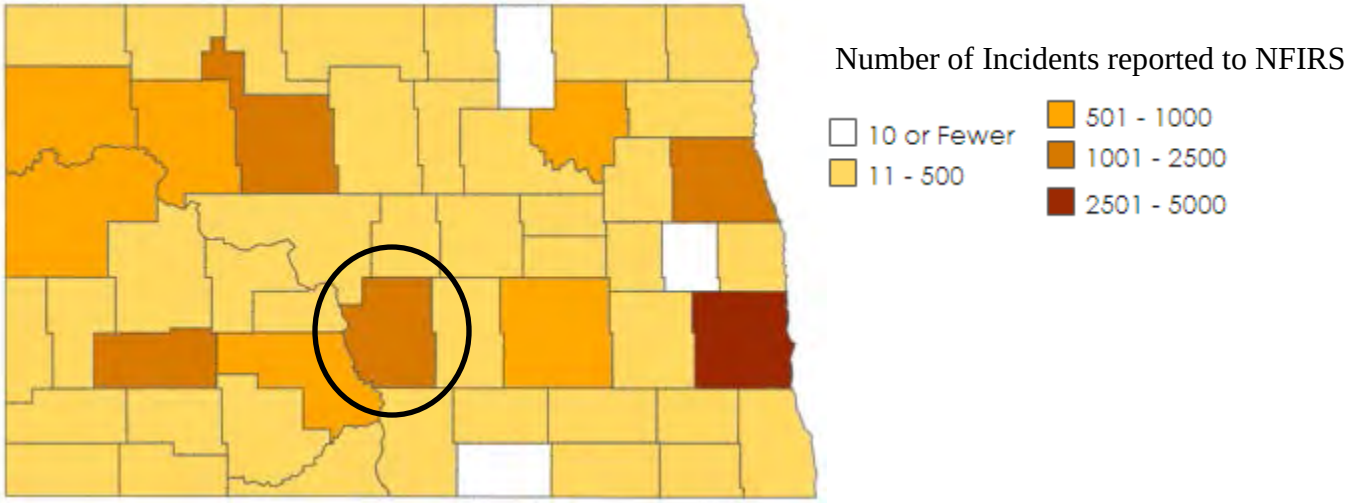


Source: [NOAA National Weather Service, Fire Weather]

History

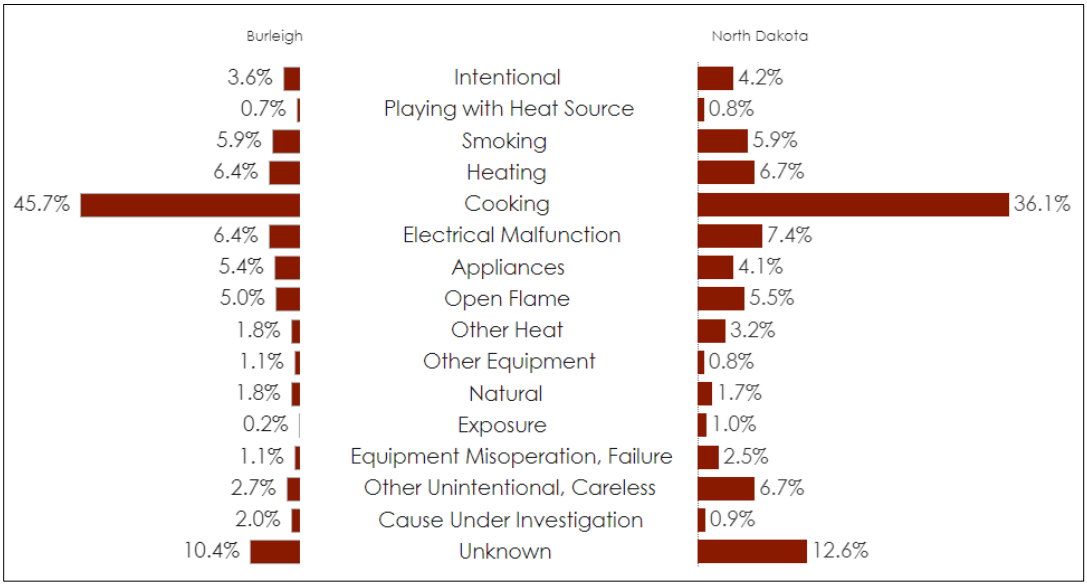
National Fire Incident Reporting System (NFIRS)

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%
Burleigh	29.29%	9.68%	15.82%	42.55%	2.66%

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)	406	1.68 %	404	6	2	0	0	0	412
Vehicle Fires (130-138)	149	0.62 %	149	1	0	0	0	0	150
Other Fires (100, 140-173)	352	1.46 %	342	11	10	0	0	0	363
Total Fires	907	3.75 %	895	18	12	0	0	0	925
Pressure Ruptures, Explosion, Overheat (200-251)	30	0.12 %	30	0	0	0	0	0	30
RESCUE CALLS									
Emergency Medical Treatment (300-323)	15,865	65.61 %	15,832	3	33	0	0	0	15,868
All Others (331-381)	240	0.99 %	236	2	2	2	0	0	242
Total Rescue Calls	16,105	66.60 %	16,068	5	35	2	0	0	16,110
Hazardous Condition Calls (400-482)	840	3.47 %	827	2	13	0	0	0	842
Service Calls (500-571)	656	2.71 %	656	5	0	0	0	0	661
Good Intent Calls (600-671)	2,035	8.42 %	2,033	0	2	0	0	0	2,035
Severe Weather or Natural Disaster Calls (800-815)	10	0.04 %	10	0	0	0	0	0	10
Special Incident Calls (900-911)	16	0.07 %	16	0	0	0	0	0	16
Unknown Incident Type (UUU)	0	0.00 %	0	0	0	0	0	0	0
FALSE CALLS									
Malicious Calls (710-715, 751)	278	1.15 %	278	1	0	0	0	0	279
Other False Calls (700, 721-746)	3,305	13.67 %	3,301	0	4	0	0	0	3,305
Total False Calls	3,583	14.82 %	3,579	1	4	0	0	0	3,584
TOTAL CALLS	**24,182**	**100.00 %**	**24,114**	**31**	**66**	**2**	**0**	**0**	**24,213**

Total Incidents With Exposure Fires	0	Total Fire Dollar Loss	$ 13,130,011.00
Total Exposure Fires	0	Total Dollar Loss	$ 14,017,888.00

Casualty Summary	Civilian	Fire Service
Fire Related Injuries	1	3
Non-Fire Injuries	0	4
Fire Related Deaths	0	0
Non-Fire Deaths	0	0

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

Location	County/Zone	St.	Date	Time	T.Z.	Type	Dth	Inj	PrD	CrD
BURLEIGH (ZONE)	BURLEIGH (ZONE)	ND	04/12/2015	17:00	CST-6	Wildfire	0	0	200.00K	0.00K
BURLEIGH (ZONE)	BURLEIGH (ZONE)	ND	07/18/2006	14:00	CST	Wildfire	0	0	0.00K	0.00K
BURLEIGH (ZONE)	BURLEIGH (ZONE)	ND	04/08/2005	14:00	CST	Wildfire	0	3	0.00K	0.00K
BISMARCK	BURLEIGH CO.	ND	04/09/2003	14:14	CST	Wildfire	0	1	0.00K	0.00K
MC KENZIE	BURLEIGH CO.	ND	03/24/2003	13:35	CST	Wildfire	0	0	0.00K	0.00K
Totals:							0	4	200.00K	0.00K

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

Several wildland fires occur annually; some of the more significant incidents are listed below:

April 12-15, 2015 – An abandoned campfire developed into a large wildfire in southwest Burleigh County, south of Bismarck, by the afternoon of April 13th, which led to the evacuation of approximately 20 residences. It is believed that the fire initially started on April 12th. The fire was assumed contained the evening of April 13th and work was done to extinguish hot spots. The fire re-intensified on April 14th as relative humidity values dropped to around 15%, and southerly winds gusted to nearly 40 mph. This led to the evacuation of multiple neighborhoods south of the City of Bismarck, along with the University of Mary campus. The North Dakota Department of Health urged residents of Bismarck to use caution as the smoke was pushing over parts of the city. The fire was re-contained the evening of the 14th. Thirty-four separate agencies were involved in the wildfire response, and approximately 2,000 acres were burned. No lives or homes were lost. ND National Guard air support for fire suppression was utilized.

May 24, 2008 – A prescribed burn at the Long Lake Wildlife Refuge escaped containment, burning over 650 acres of private and refuge land.

July 18, 2006 - A fire, 15 miles north of Bismarck, quickly consumed 500 acres of vegetation after igniting in tall grass near a farmstead. The fire spread to the structures on the farm. Two barns, a granary, and corrals were lost to the fire before it was brought under control.

April 8, 2005 - Strong southerly winds gusting to 45 mph combine with low relative humidities and dry pastures, created red flag conditions in North Dakota. A large grass fire developed east of Wilton. The fire became very large in size, creating its own weather conditions. Winds shifted entrapping 3 rural firefighters. One firefighter suffered a broken leg while two others suffered second and third-degree burns.

April 9, 2003 – McLean Bottoms fire disaster (Burleigh and Emmons County). Wildland fire occurred on US Army Corps of Engineer land in Emmons County along the Missouri River. The fire continued to spread into Burleigh County on Corps land leased by North Dakota Game and Fish. Estimated 6,500 acres lost.

March 24, 2003 - Grass fire one mile north and one mile east of McKenzie (5700 NE 249th St).

Flood

(including riverine, levee failure, closed basin, ice jam, and flash floods)

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.

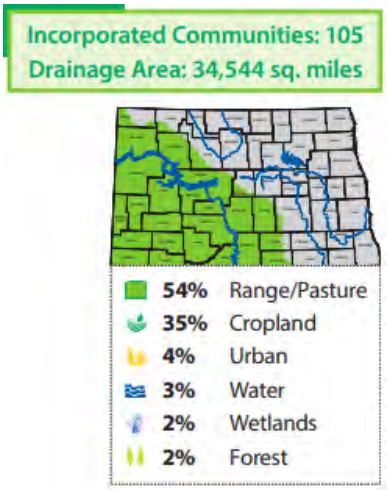
Floodplain Management in North Dakota: North Dakota has recognized that good floodplain management involves the utilization of a variety of tools to reduce the impact of flood disasters. It is also recognized that a balance must be reached between the three aspects of floodplain management which are: 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.

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



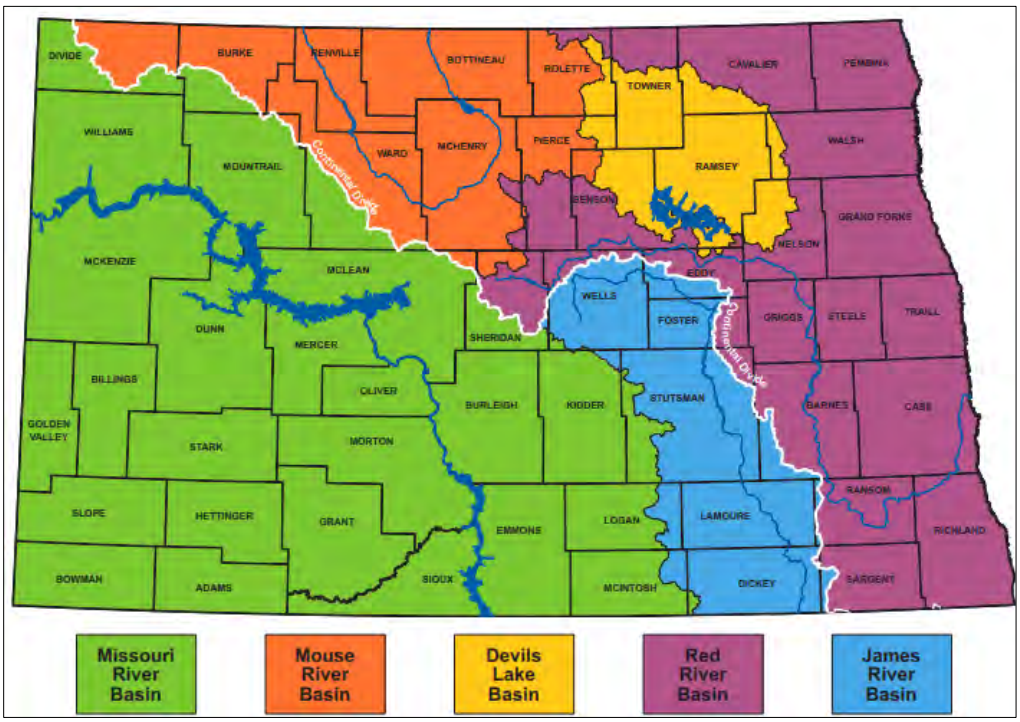
Historically, the Missouri River has had the best water quality of any river in the state.

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

Hydrologic Analyses

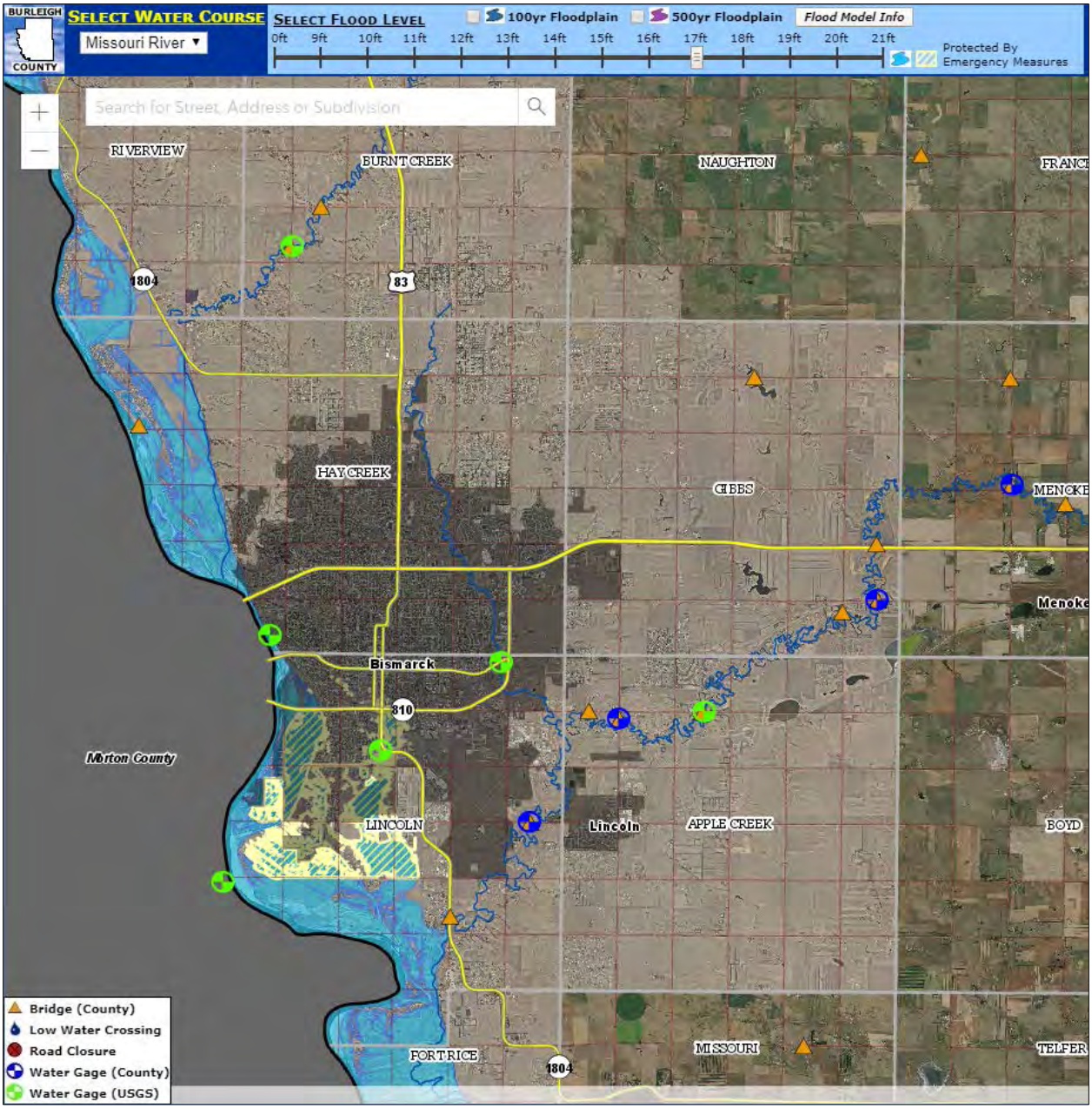
Hydrologic analyses were completed on the following areas as part of the Flood Insurance Study, Burleigh County, North Dakota, and Incorporated Areas, Revised: August 4, 2014 (available from the FEMA Map Service Center, Product 38015CV000B):

- Apple Creek
- Burnt Creek
- Grande Prairie Watersheds (Remmick, Grande Prairie Estates, Wachter)
- Hay Creek and North Valley Tributary
- Jackman Coulee
- Landfill Watershed
- Missouri River
- North 4th Street Watershed
- North Washington Street Watershed

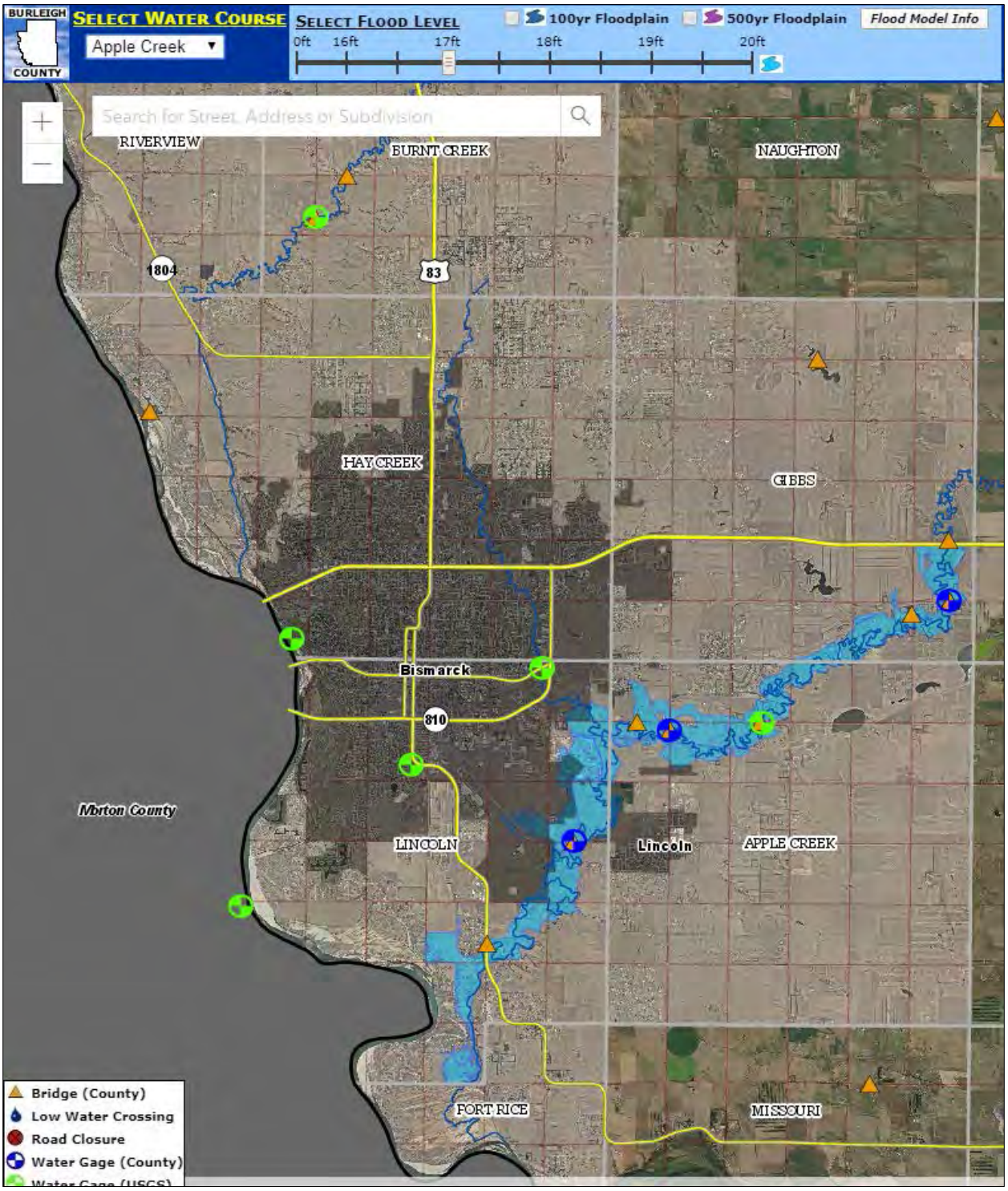
Mapping

Burleigh County maintains a Flood & Elevation Tool for Apple Creek and the Missouri River which is intended to assist residents with data related to their location. An address can be entered in the search box and they can toggle amongst different flood levels. In addition to flood stage levels, the following are also displayed: elevations, floodplains, tax parcels, road closures and water gages. https://www.burleighco.com/maps/apple-creek-flood-mapping/

Missouri River



Apple Creek


BURLEIGH COUNTY
SELECT WATER COURSE
Apple Creek
SELECT FLOOD LEVEL
0ft 16ft 17ft 18ft 19ft 20ft
100yr Floodplain
500yr Floodplain
Flood Model Info
Search for Street, Address or Subdivision
RIVERVIEW
BURNT CREEK
NAUGHTON
1804
83
HAY CREEK
GIBBS
Bismarck
810
Morton County
LINCOLN
Lincoln
APPLE CREEK
FORT RICE
MISSOURI
Bridge (County)
Low Water Crossing
Road Closure
Water Gage (County)

Identified Impacts
Short-duration, high-intensity spring rainstorms, in combination with snowmelt and ice jams, are a cause of flooding on the Missouri River and Burnt and Apple Creeks in Burleigh County. High-intensity summer rainstorms also cause minor flooding on Burnt and Apple Creeks.

Floodplains consist primarily of cropland and open rangeland with some brushy and wooded areas along the Missouri River bottoms. Some roads and residential and commercial facilities are located in the Missouri River floodplain, particularly in the area south of the City of Bismarck.

(Source: Flood Insurance Study, Burleigh County, North Dakota, and Incorporated Areas, Revised: August 4, 2014 available from the FEMA Map Service Center, Product 38015CV000B)

- 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/Overcrowded Medical Facilities
- Loss of Potable Water
- Loss of Power
- Mass Casualties
- Property Damage
- School Closure
- Sewer Backup

History

Flood

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
WILTON	BURLEIGH CO.	ND	08/01/2011	00:00	CST-6	Flood		0	0	0.00K	0.00K
WILTON	BURLEIGH CO.	ND	07/01/2011	00:00	CST-6	Flood		0	0	0.00K	0.00K
WILTON	BURLEIGH CO.	ND	06/02/2011	00:00	CST-6	Flood		0	0	20.000M	0.00K
WILTON	BURLEIGH CO.	ND	04/01/2009	00:00	CST-6	Flood		0	0	558.00K	0.00K
WILTON	BURLEIGH CO.	ND	03/06/2009	00:00	CST-6	Flood		0	0	530.00K	0.00K
MENOKEN	BURLEIGH CO.	ND	06/07/2007	00:00	CST-6	Flood		0	0	50.00K	100.00K
BISMARCK	BURLEIGH CO.	ND	08/31/2002	19:05	CST	Flood		0	0	0.00K	0.00K
BISMARCK	BURLEIGH CO.	ND	07/27/2001	02:00	CST	Flood		0	0	0.00K	0.00K
BISMARCK	BURLEIGH CO.	ND	07/26/2001	22:00	CST	Flood		0	0	0.00K	0.00K
BURLEIGH (ZONE)	BURLEIGH (ZONE)	ND	02/26/2000	11:58	CST	Flood		0	0	0.00K	0.00K
BISMARCK ARPT	BURLEIGH CO.	ND	08/12/1999	00:00	CST	Flood		0	0	0.00K	0.00K
BURLEIGH (ZONE)	BURLEIGH (ZONE)	ND	03/20/1999	09:00	CST	Flood		0	0	0.00K	0.00K
BURLEIGH (ZONE)	BURLEIGH (ZONE)	ND	03/21/1997	08:00	CST	Flood		0	0	150.00K	0.00K
Totals:								0	0	1.288M	100.00K

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

Some of the more significant events include:

March 30, 2019 – Apple Creek crested at 16.37' (Moderate Flood Stage is 16') after a period of rapid thaw. Self-fill sandbag sites were established, and several roads were closed to include Apple Creek Road (between 80th St SE and 93rd St SE). Apple Valley Subdivision experienced water encroachment, and the Apple Creek Golf Course was inundated.

Photo Credit: Burleigh County Sheriff's Department

2011 - Since the construction of Garrison Dam, the 2011 flood event is the flood of record with a peak mean daily discharge of 154,000. This event occurred as a result of high mountain snow pack and a very significant and widely distributed system that brought extensive rain throughout eastern Montana. Prior to the 2011 event, the maximum peak discharge that has occurred since 1953 on the Missouri River was 68,900 cubic feet per second (cfs). This occurred on July 13, 1975. Prior to the 2011 event, the highest record of flooding at the Bismarck stream gage since the completion of Garrison Dam was 16.11 feet (1634.39 NGVD 29), which occurred in March of 2009, because of ice conditions and ice jams.

June 26, 2009 - One to three inches of rain fell over the Bismarck area in 45 minutes. The heaviest rainfall occurred across northern sections of the city. This resulted in widespread street flooding and overturned manhole covers. A few homes suffered water damage to basements. Property damage estimated at $25K.

February 25, 2009 - An ice jam on the Missouri River at Bismarck, and recent melting snow, caused a drainage canal to back up and overflow into south Bismarck. This occurred in the vicinity of University Drive and Wachter Avenue, and for several blocks around there. Damage was mostly confined to a mobile home park, which was lower in elevation than the surrounding terrain. The homes were elevated within the park and so damage was minimal. Bismarck city crews took action that resulted in the flood waters receding. Property damage estimated at $20K.

June 12, 2007 - Very heavy rain of 2.50 inches fell in 30 minutes time 7 miles south of Driscoll. A total of 4.50 inches of rain was measured 2 miles northeast of Driscoll. Water was reportedly standing everywhere and water covered roads including in the city of Driscoll. Several roads were washed out. Water was up to 4 inches deep in some homes basements in Driscoll. In the early afternoon of Tuesday June 12th, Tornado Watch 389 was issued in anticipation of severe thunderstorms developing during the afternoon hours. Several severe thunderstorm and tornado warnings were issued. One report of a severe thunderstorm wind gust and two confirmed tornado reports were received during the mid-afternoon hours. In addition, very heavy rain fell over large portions of central North Dakota, prompting several flash flood warnings during the late afternoon and early evening hours. Began 2 Miles North East of Driscoll and ended 7 Miles South West of Driscoll. Property damage estimated at $250K, crop damage estimated at $50K.

June 7, 2007 - Several county roads were closed due to water over them. Low lying areas north of Menoken were flooded with water standing in fields. Thunderstorms followed by showers and then areas of steady rain on June 6 and 7 resulted in flooding in parts of southern North Dakota. Five to six (5 to 6) inches of rain was common over the two day period, 10 Miles North of Menoken. Property damage estimated at $50K, crop damage estimated at $100K.

August 23, 2004 - Streets and underpasses flooded causing several major arteries to be closed. Water flowed across yards and into several basements of homes.

July 27, 2001 - Rainfall of 3 to 4 inches over Bismarck caused flooding of streets and underpasses. Many back roads near the Missouri River were water covered at times and a few washed out. Two mudslides on River Road covered the northbound lanes.

July 26, 2001 - Around 2 inches of rain fell in a very short time causing street flooding and pooling of water in Bismarck.

June 9, 2001 - Widespread street flooding throughout the City of Bismarck with a foot or more of water covered the roads. Travel not advised. Up to 12 feet of water accumulated in the railroad underpasses in town.

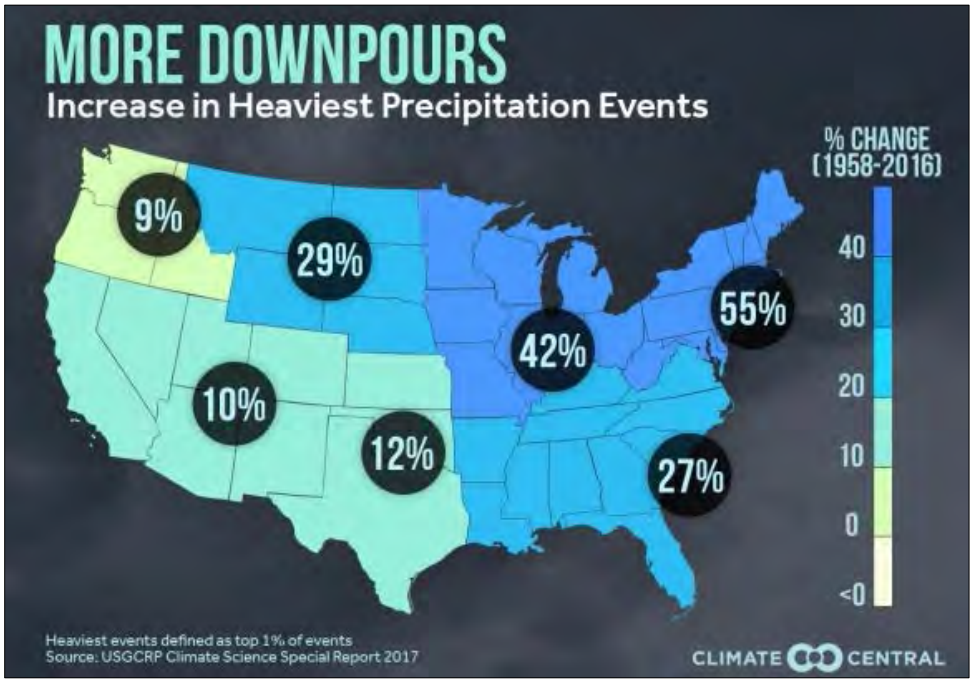
February 26, 2000 – Rapid snowmelt and heavy rain resulted in extensive runoff throughout Burleigh County. Unseasonably warm temperatures, as well as frozen grounds and ice and snow plugged culverts, also factored into the extensive runoff. Fifteen roadways were overtopped by runoff resulting in closure of these roads. Apple Creek near Menoken rose 10 feet from February 25th through the 27th weekend, cresting 16.6 feet. The flood stage is 15 feet. The flood warning remained in effect until March 1st, 2000 when levels fell below flood stage.

August 12, 1999 – Periods of heavy rainfall ranging from 4 to 7 inches saturated much of Morton and Burleigh counties. Hardest impact was felt in the cities of Bismarck and Mandan. Two hundred twenty one (221) homes and businesses received water damage. Twelve (12) road sites were damaged and a significant mudslide closed portions of Highway 1804 in north Bismarck.

March 20, 1999 – Flooding along Apple Creek near the City of Menoken in Burleigh County due to snowmelt and ice jams resulted in washed out roads and flooded fields. Many roads near the river were closed and barricaded. The flood stage on Apple Creek is 15 feet. The river crested at 16.2 feet on the evening of the 24th.

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

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

A number of Special Flood Hazard Areas (SFHA) are located within the County. Special Flood Hazard Areas (identified on our maps as 'A' or 'AE' zones) are defined as the area that will be inundated by the flood event having a 1% chance of being equaled or exceeded in any given year. Portions of unincorporated Burleigh County, City of Bismarck, City of Lincoln, and the City of Wing include SFHAs. The City of Wilton has no SFHAs.

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
380149	Bismarck, City of	Participating	09/18/85	08/04/14	09/18/85
380017	Burleigh County	Participating	09/18/85	08/04/14	09/18/85
385396	Lincoln, City of	Participating	05/12/08	08/04/14	07/19/05
380065	Wilton, City of	Participating	04/25/97	(NSFHA)	08/19/10
380213	Wing, City of	Participating	08/19/80	08/04/14	08/19/80

Source: Dionne Haynes, State NFIP Coordinator

Burleigh County continues to foster participation from the City of Regan. Additional NFIP strategies are listed in the Appendices.

Flood Insurance Study (FIS)

The last Flood Insurance Study (FIS), Revised 8-04-14, covered the jurisdiction of Burleigh County and incorporated areas and is available from the FEMA Map Service Center, Product 38015CV000B. The Study reaffirms the history of the principal flood problems on pages 6-7.

Source: Flood Insurance Study, Burleigh County, North Dakota, and Incorporated Areas, Revised: August 4, 2014 available from the FEMA Map Service Center, Product 38015CV000B

After the 2011 flood event, Burleigh County pursued acquisitions through FEMA and did not meet the required Benefit Cost Analysis to proceed. Numerous residents did not want to participate which would have resulted in a "patchwork" process.

Additionally, vulnerability is further addressed utilizing the Burleigh County Damage Estimator to determine estimate population, critical infrastructure, and structures impacted with assessed value for flood inundation.

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
380149	Bismarck, City of	$413,327	0	285	564	$165,467,600	412	$6,950,004
380017	Burleigh County	$172,693	0	123	229	$67,484,500	265	$8,305,874
	County Total:	$586,020	0	408	793	$232,952,100	677	$15,255,878

Source: Dionne Haynes, State NFIP Coordinator

Community Repetitive Loss

COMMUNITY : BISMARCK, CITY OF

Community | State | Regional | National

	AE, A1-30, AO, AH, A	VE, V1-30, V	B, C, X	TOTAL
RL Buildings (Total)	26	0	0	26
RL Buildings (Insured)	23	0	0	23
RL Losses (Total)	53	0	0	53
RL Losses (Insured)	47	0	0	47
RL Payments (Total)	$2,348,596.70	$.00	$.00	$2,348,596.70
Building	$2,189,274.19	$.00	$.00	$2,189,274.19
Contents	$159,322.51	$.00	$.00	$159,322.51
RL Payments (Insured)	$2,153,650.92	$.00	$.00	$2,153,650.92
Building	$1,995,460.35	$.00	$.00	$1,995,460.35
Contents	$158,190.57	$.00	$.00	$158,190.57

Post - FIRM SFHA RL Buildings:	12
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 : BURLEIGH COUNTY *

Community | State | Regional | National

	AE, A1-30, AO, AH, A	VE, V1-30, V	B, C, X	TOTAL
RL Buildings (Total)	3	0	0	5
RL Buildings (Insured)	3	0	0	3
RL Losses (Total)	6	0	0	10
RL Losses (Insured)	6	0	0	6
RL Payments (Total)	$112,004.16	$.00	$.00	$130,468.46
Building	$109,492.17	$.00	$.00	$122,171.29
Contents	$2,511.99	$.00	$.00	$8,297.17
RL Payments (Insured)	$112,004.16	$.00	$.00	$112,004.16
Building	$109,492.17	$.00	$.00	$109,492.17
Contents	$2,511.99	$.00	$.00	$2,511.99

Post - FIRM SFHA RL Buildings:	2
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

(including landslide, earthquake, abandoned land mines, expansive/unstable soils, environmental minerals, meteorite falls, volcanic hazards)

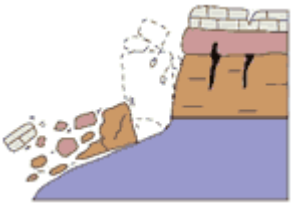
Frequency	Likely (10-100% probability in the next year, or at least 1 chance in the next 10 years)
Severity	Negligible (Less than 10% of jurisdiction affected)
Risk Class	D
Seasonal Pattern	Spring and Summer
Duration	1 to 10 days
Speed of Onset	Hours to days
Location	Countywide (areas along Missouri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

Description

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

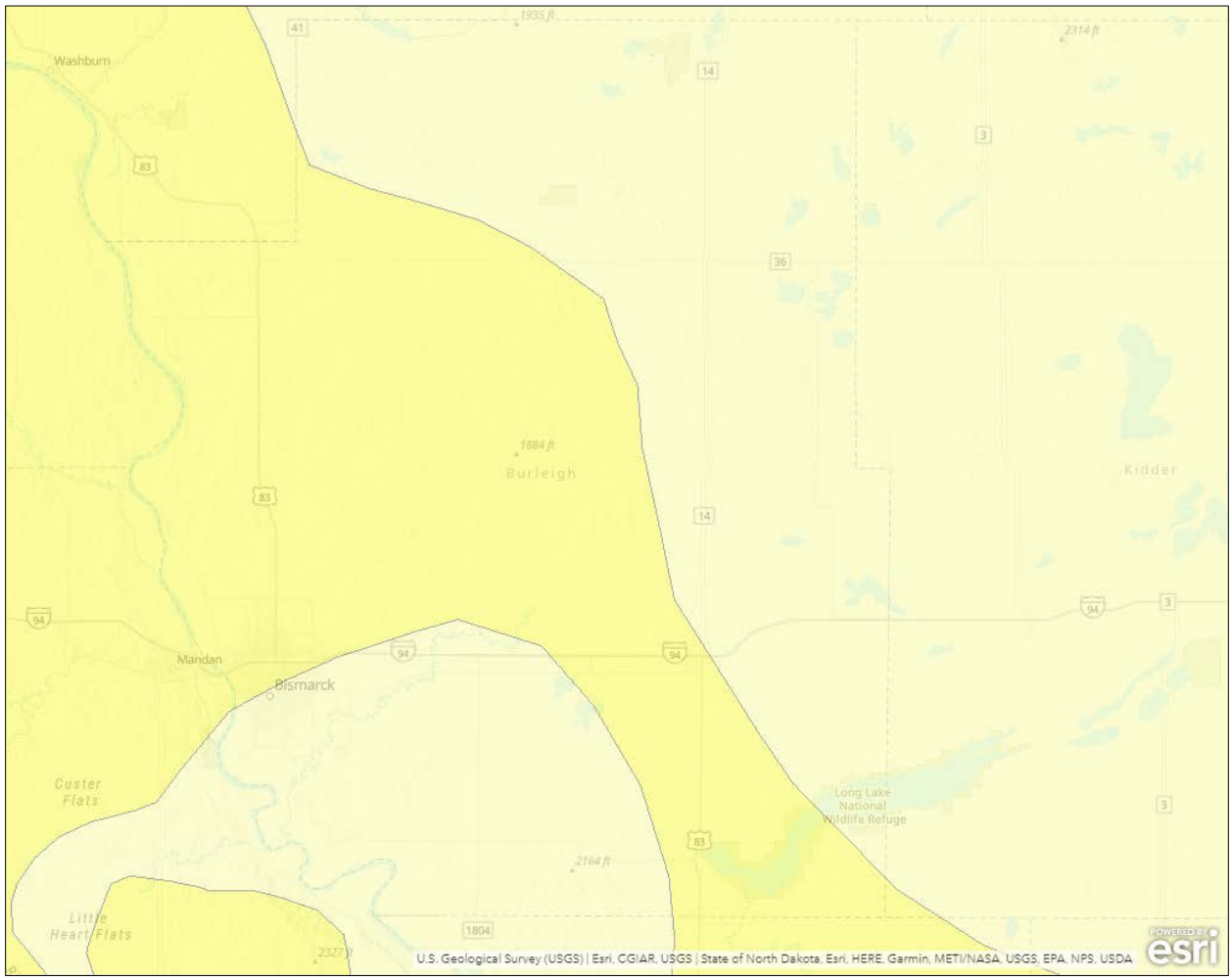
Landslide

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:

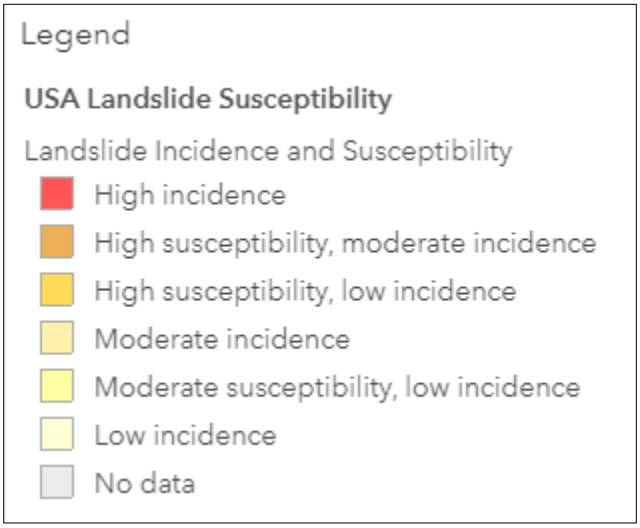


- erosion by rivers, glaciers, or ocean waves create oversteepened slopes
- rock and soil slopes are weakened through saturation by snowmelt or heavy rains
- earthquakes create stresses that make weak slopes fail
- earthquakes of magnitude 4.0 and greater have been known to trigger landslides
- volcanic 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

- Blocked Roads
- Building Collapse
- Business Interruptions
- Delayed Emergency Response
- Downed Power Lines
- Downed Trees
- Evacuation (Localized)
- Loss of Potable Water
- Loss of Power
- Property Damage

History

There is some history of geologic hazards in Burleigh County, and landslide susceptibility has been identified for the western edge of Burleigh County which borders the Missouri River.

An area of rural Burleigh County along the southern portion of Apple Creek has experienced some bank failures and slumping. The area above this portion of Apple Creek is home to the University of Mary Campus.

March 4, 2020: River Road was closed between Wilderness Cove Road and Sandy River Drive due to debris and material on the roadway. Opened the next day.

December 22, 2019: River Road was closed between Burnt Boat Road and Sandy River Drive due to a landslide. Debris was removed and road was re-opened on December 30, 2019. The area continues to be monitored for movement.

2018 to present: University of Mary campus sits upon a bluff and has experienced slumping. The area is currently undergoing phases of bank stabilization through a series of mitigation grants.

2011 – Double Ditch is an earth lodge village that was home to thousands of Mandan people from 1490-1785. It has been owned by the State of ND since 1936 and began seriously eroding after the 2011 floods which caused the land to slump, crack, and erode at the site north of Bismarck (off of Hwy 1804) and exposed remains of 18 ancient inhabitants. The ND Legislature appropriated $3.5 million to stabilize the site, and pilons (some as deep as 95') were erected within the banks of the Missouri to hold up the village. The ND Historical Society will monitor any further slumping at Double Ditch with a drone for biannual inspections.

Source: Forum News Service

July 27, 2001 - Rainfall of 3 to 4 inches over Bismarck caused flooding of streets and underpasses. Many back roads near the Missouri River were water covered at times and a few washed out. Two mudslides on River Road covered the northbound lanes.

August 12, 1999 – Periods of heavy rainfall ranging from 4-7" saturated much of Morton and Burleigh counties. Hardest impact was felt in the cities of Bismarck and Mandan. Two hundred twenty one (221) homes and businesses received water damage. Twelve (12) road sites were damaged and a significant mudslide closed portions of Highway 1804 in north Bismarck.

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 Burleigh County Emergency Management.

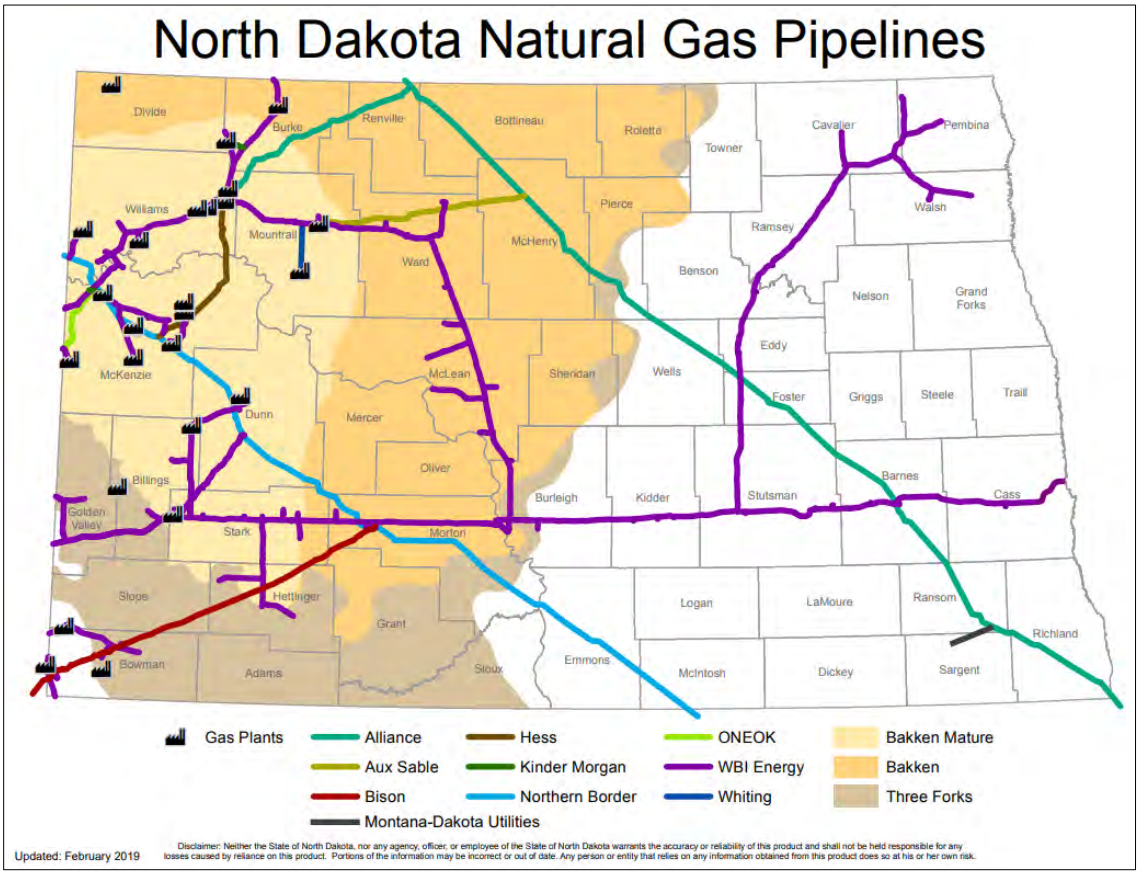
The County is exposed to and is at risk from accidents and/or incidents involving hazardous materials. The economy is based upon agriculture, manufacturing, and industry. All of these rely on the production, use, storage, transportation, etc. of hazardous materials. Explosives, flammable liquids, flammable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

Hazardous materials are transported via three modes into and within Burleigh County:

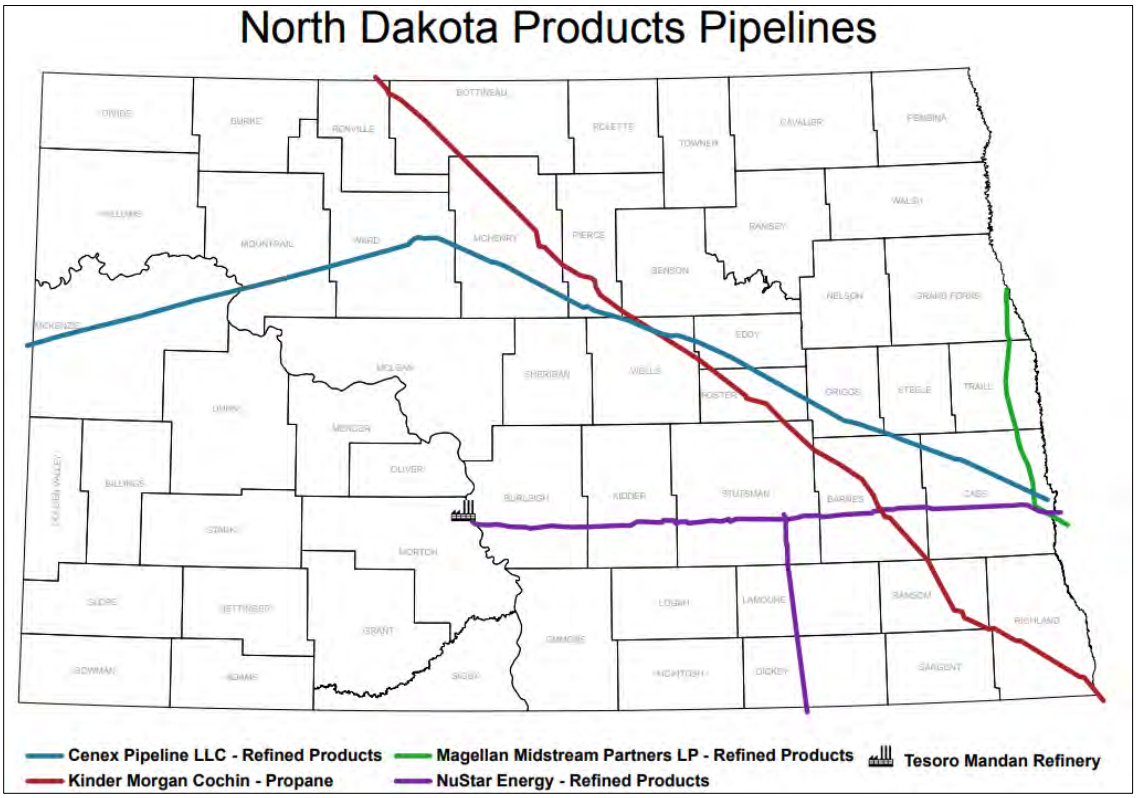
Highways: I-94 and ND 36 run east-west through the county. US-83, ND 1804, ND 41, and ND 14 run north-south through the county. (Attachment 3: Major Roadways in Burleigh County)

Rail: BNSF owns/operates all railways in the county.

Air: The Bismarck Airport is the only airport in the area with significant air hazardous material transportation activity.



Source: ND Pipeline Authority website



Source: ND Pipeline Authority website

Identified Impacts

- Blocked Roads
- Building Collapse
- Business Interruptions
- Delayed Emergency Response
- Downed Power Lines
- Downed Trees
- Evacuation (Full)
- 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
- Loss of Power
- Mass Casualties
- Property Damage
- School Closure

History

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

Incident ID	Date Reported	Date Incident	Twn Rng Sec	Latitude	Longitude	Contaminant	Volume	Units	Contained
EIR9365	1/9/2020	1/9/2020	13808001	46.8041	-100.7307	Gasoline	275	gallons	Yes
EIR9191	8/15/2019	8/15/2019	13808010	46.7941	-100.7539	Diesel fuel	20	gallons	Yes
EIR8155	7/11/2019	7/11/2019	13808002	46.7971	-100.7369	Mineral Oil (non-PCB)	80	gallons	Yes
EIR8075	5/13/2019	5/13/2019	13808002	46.805	-100.7485	lime	5	cubic yards	Yes
EIR8040	4/12/2019	4/9/2019	13808001	46.8042	-100.7273	Diesel fuel	15	gallons	Yes
EIR5896	11/1/2018	11/1/2018	14008029	46.9218	-100.8048	diesel fuel ran out of truck fuel tank into creek	35	gallons	Yes
EIR5849	9/13/2018	9/13/2018	13908030	46.8238	-100.8284	hydraulic oil, approx. 1 quart			Yes
EIR5832	8/28/2018	8/28/2018	13908036	46.8118	-100.7308	nitrogen fertilizer and Vessel herbicide	50	gallons	Yes
EIR5774	7/3/2018	7/3/2018	13908036	46.8137	-100.7273	Mineral Oil	100	gallons	Yes
EIR5770	6/29/2018	6/27/2018	13808012	46.7854	-100.7195	Soil sample sent in, waiting on results, odor suggests hydraulic fluid.			Yes
EIR5730	5/30/2018	5/29/2018	13808004	46.8051	-100.7806	Diesel Fuel	100	gallons	Yes
EIR5720	5/17/2018	5/17/2018	13707908	46.6975	-100.6794	Cornerstone Plus (roundup), Class Act NG (non ionic surfactant)			Yes
EIR5678	4/16/2018	4/16/2018	13808011	46.7912	-100.7478	10/40 Motor Oil	55	gallons	Yes
EIR5600	1/4/2018	1/2/2018	13808003	46.8033	-100.7629	Geomelt 55	12000	gallons	Yes
EIR5540	10/4/2017	10/4/2017	13907936	46.8114	-100.5985	Septic water	15	gallons	Yes
EIR5505	9/5/2017	9/5/2017	13808004	46.7961	-100.7942	Diesel Fuel	25	gallons	Yes
EIR5503	8/31/2017	8/22/2017	13908034	46.8161	-100.7527	Unleaded Gasoline			Yes
EIR5472	7/26/2017	7/26/2017	13808003	46.8061	-100.772	Diesel Fuel	30	gallons	Yes
EIR5473	7/25/2017	7/22/2017	13908033	46.8193	-100.7754	Mineral Oil (0 ppm PCB)	2	gallons	Yes
EIR5465	7/19/2017	7/19/2017	13908023	46.8412	-100.7326	Anhydrous Ammonia	20	gallons	Yes
EIR5450	7/5/2017	7/5/2017	13808004	46.7953	-100.7943	Clear Diesel	15	gallons	Yes
EIR5652	3/9/2018	5/22/2017	13808003	46.8049	-100.7728	Diesel			No
EIR5394	5/3/2017	4/5/2017	13908021	46.8465	-100.7878	hydraulic oil of unknown type			Yes
EIR5353	3/24/2017	3/23/2017	13808003	46.7961	-100.7597	Mineral oil (0 ppm PCB)	20	gallons	Yes

EIR5448	7/1/2017	11/15/2016	13808020	46.7586	-100.8079	non-hazardous hydraulic fluid. any minor spills are to be diluted with water if not in water already. was replaced wtih PC Hydrex AW HYD 15 gallons.	25	gallons	No
EIR5220	9/8/2016	9/8/2016	14208010	47.1424	-100.7922	#2 clear diesel	130	gallons	Yes
EIR4193	8/10/2016	8/10/2016	13908028	46.8257	-100.7772	Used motor oil	1	gallons	No
EIR4165	7/13/2016	7/13/2016	13908022	46.8366	-100.5839	Diesel Fuel	40	gallons	Yes
EIR4164	7/12/2016	7/12/2016	13908033	46.8212	-100.7754	Mineral Oil (previous test of unit indicates 0 ppm PCB)	0	gallons	Yes
EIR4125	6/11/2016	6/11/2016	13908031	46.8125	-100.8205	Slaked Lime Solids	50000	gallons	Yes
EIR4070	4/22/2016	4/18/2016	13908027	46.8308	-100.7713	Diesel Fuel	50	gallons	Yes
EIR3989	12/24/2015	12/24/2015	13808015	46.7755	-100.7571	Type 4 Aircraft Anti-Icing Fluid (Propylene Glycol)	200	gallons	Yes
EIR3974	12/2/2015	12/2/2015	13808003	46.8048	-100.7728	diesel fuel			Yes
EIR3891	9/3/2015	8/31/2015	13908026	46.8243	-100.7466	Mineral Oil - Awaiting test to determine if PCBs are present	18	gallons	Yes
EIR3839	7/30/2015	7/17/2015	14208034	47.071	-100.7953	Diesel-contaminated surface water/groundwater			Yes
EIR3790	6/26/2015	6/26/2015	14108026	46.9976	-100.7879	?	0	pounds	Yes
EIR3779	6/15/2015	6/13/2015	13808010	46.791	-100.7585	Mineral Oil from transformer (<2ppm PCB as indicated on name plate of transformer; manufactured date of 1/97)	9	gallons	Yes
EIR3777	6/11/2015	6/9/2015	13908032	46.8203	-100.8151	Less than one gallon of mineral oil (test for PCB content is being conducted and we will provide results as they become available to us)	1	gallons	Yes
EIR3769	4/24/2015	4/25/2015	13808001	46.7952	-100.7297	Hydraulic Fluid	3	gallons	Yes
EIR3552	11/14/2014	11/13/2014	13908034	46.8148	-100.7589	The mercury found has not been released to the environment.			Yes
EIR3430	8/20/2014	8/8/2014	13808007	46.7873	-100.8163	Gasoline	15	gallons	No

EIR3312	5/8/2014	4/30/2014	13907829	46.8362	-100.5428	Diesel fuel	60	gallons	Yes
EIR3303	5/1/2014	4/24/2014	14208003	47.1186	-100.7924	Diesel fuel	300	gallons	No
EIR3300	4/28/2014	4/21/2014	13808019	46.753	-100.823	Gasoline			Yes
EIR3264	3/25/2014	3/24/2014	13907830	46.8372	-100.5623	Motor oil (hydraulic or lubricating oil)	1	pounds	No
EIR2037	9/5/2013	9/4/2013	13908033	46.8164	-100.7836	gasoline and waste oil - benzene, ethylbenzene	0	gallons	
EIR2000	7/26/2013	7/26/2013	13908031	46.8223	-100.8165	Ethylene Glycol	50	gallons	
EIR1983	7/15/2013	7/14/2013	13907926	46.8304	-100.6148	diesel fuel	5	gallons	
EIR2123	11/27/2013	7/9/2013	13907828	46.8303	-100.5307	CenexTMS 15w/40 motor oil			
EIR1920	5/8/2013	5/1/2013	13907927	46.8306	-100.6358	8-20-5-4 Liquid fertilizer	963	gallons	
EIR1868	2/5/2013	2/5/2013	13907628	46.8296	-100.2782	diesel fuel	85	gallons	
EIR1826	11/27/2012	11/24/2012	13808015	46.7729	-100.763	ethylene glycol	1600	gallons	
EIR1780	8/23/2012	8/23/2012	13908030	46.8307	-100.8244	Unknown			
EIR1778	8/6/2012	8/4/2012	13807917	46.7669	-100.6844	Produced Water			
EIR1779	8/2/2012	7/31/2012	13808007	46.7864	-100.8269	Diesel			
EIR1578	12/5/2011	12/4/2011	13908027	46.8309	-100.7624	Diesel Fuel	90	gallons	
EIR1376	3/18/2011	3/18/2011	13808000	46.7657	-100.7737	Jet Fuel			
EIR1355	2/12/2011	2/12/2011	13808008	46.7939	-100.7951	10% Alcohol and gasoline	50	gallons	
EIR1344	1/6/2011	1/1/2011	13908025	46.8307	-100.7202	diesel fuel	75	gallons	
EIR1343	1/3/2011	1/1/2011	13908025	46.8307	-100.7202	Diesel Fuel	75	gallons	
EIR1279	8/4/2010	8/2/2010	13908027	46.8309	-100.7624	Oil Based Traffic Paint	25	gallons	
EIR1267	7/9/2010	7/7/2010	14008000	46.9327	-100.772	Unknown			
EIR1263	6/28/2010	6/26/2010	13908032	46.8164	-100.8047	Non-PCB Mineral Oil	0	gallons	
EIR1236	4/13/2010	4/13/2010	13907930	46.8307	-100.6991	Potentially Toxic Air Contminants from the Burning of Municipal Solid Waste (garbage)			
EIR1231	4/1/2010	3/31/2010	13808002	46.8088	-100.738	Engine Oil/Water	25	gallons	
EIR1168	7/23/2009	7/23/2009	13908025	46.83	-100.7271	Super Corr 3B, a solvent containing xylene and proprietary ingredients.	30	gallons	
EIR1165	7/16/2009	7/16/2009	13907825	46.83	-100.4672	Minerial oil, PCB concentration oil the oil is unknown at this time. Oil sent in for PCB testing.			
EIR1114	3/17/2009	3/17/2009	13808003	46.802	-100.7626	Mineral oil with <1 ppm PCBs	2	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 Burleigh 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. Burleigh 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.

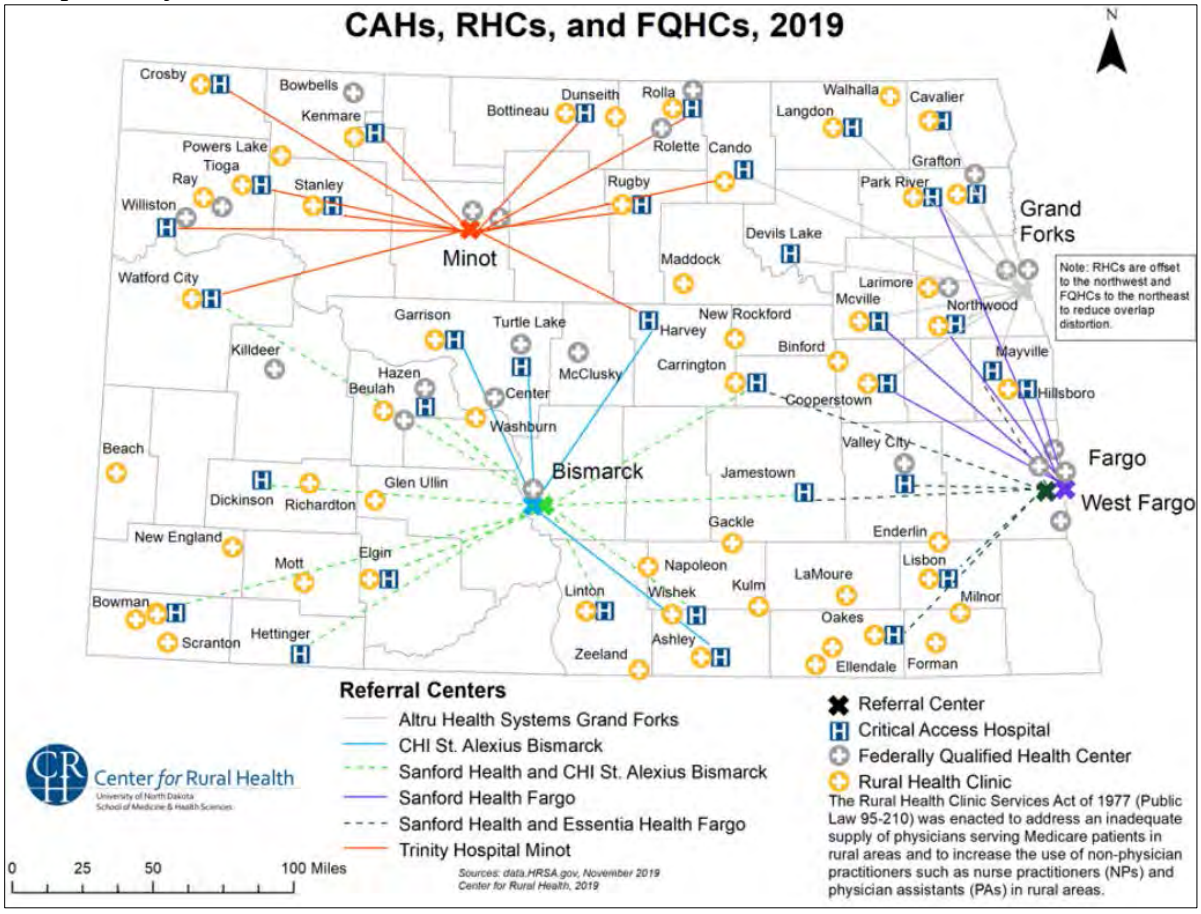
Identified Impacts
- Business Interruptions
- Delayed Emergency Response
- Increased Public Safety Runs
- Livestock Injury/Death
- Loss of Economy
- Loss/Overcrowded Medical Facilities
- Loss of Potable Water
- Mass Casualties
- School Closure

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

CHI St. Alexius Medical Center

2019-2021

- Opioids
- Food insecurity
- Domestic violence

2016-2018

- Chronic diseases/mental health/diabetes with a focus on diabetics
- Violence prevention/violence against women
- Obesity/childhood obesity

Sanford Bismarck Medical Center

2019-2021

- Health care access
- Behavioral health and substance abuse

2016-2018

- Access to affordable healthcare – cost of care services, insurance, and medications
- Addiction management – prevention, education, intervention, and recovery services
- Aging services – cost and availability of long-term care, availability of memory care and access to affordable home-based services; homelessness and access to affordable housing
- Mental health – depression, stress, substance abuse
- Physical health – chronic disease, obesity, poor nutrition, and inactivity
- Underage drinking and substance abuse

Burleigh County Board of Health

2014

- Elevated rate of excessive drinking
- Cost/adequacy of health insurance
- Concerns about availability of emergency services
- Cost of healthcare services
- Availability of resources to help elderly stay in their homes

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

History

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

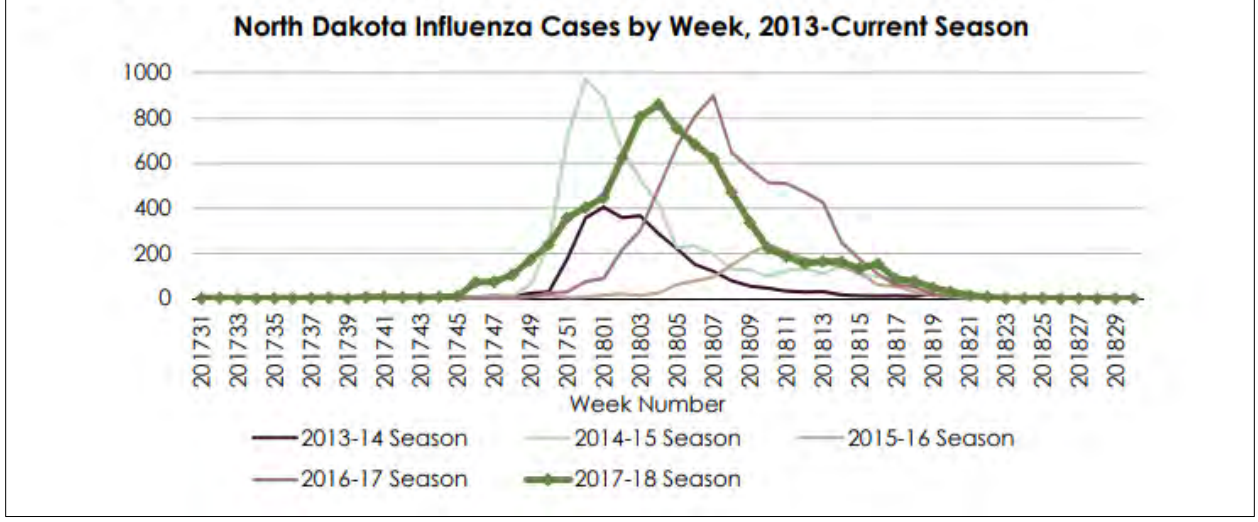
Burleigh County Influenza Season Summary

Season	Cases Identified in Burleigh County	Cases Identified in North Dakota
2017-2018	1,029	7,507
2015-2016	280	1,942
2014-2015	1,177	6,443
2013-2014	550	2,922
2012-2013	1,142	4,833
2012-2013	1,142	4,833
2011-2012	367	1,487
2010-2011	438	2,089
2009-2010	618	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

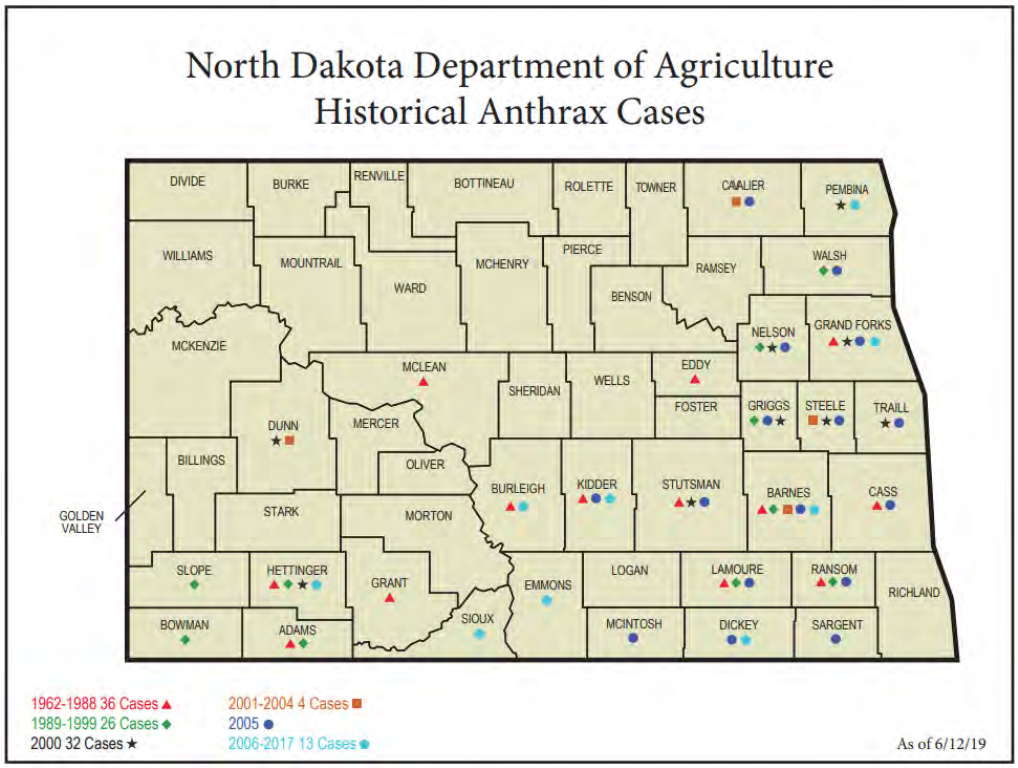
A comprehensive list of reportable conditions is maintained by the ND Department of Agriculture and available on their website.

Anthrax

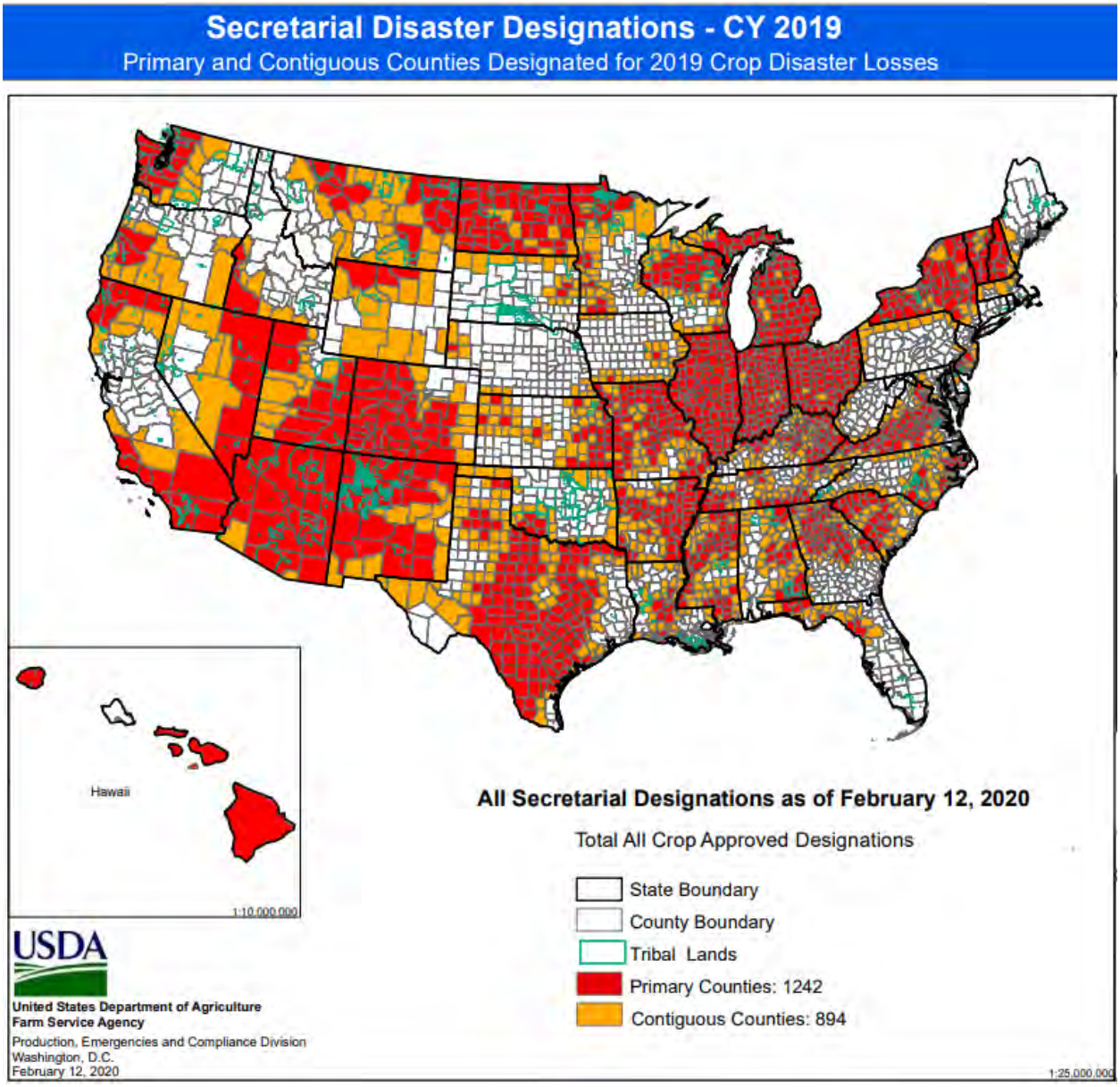
"Anthrax occurs worldwide and is associated with sudden death of cattle and sheep. Anthrax can infect all warm-blooded animals, including humans. The anthrax organism (Bacillus anthracis) has the ability to form spores and become resistant to adverse conditions. Pasteurization or ordinary disinfectants 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)

Burleigh County has a low case history:

Anthrax Cases in Burleigh County	
2010, 2013, 2014, 2015, 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
(including downbursts, extreme heat, hail, lightning, high wind, and tornado)

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

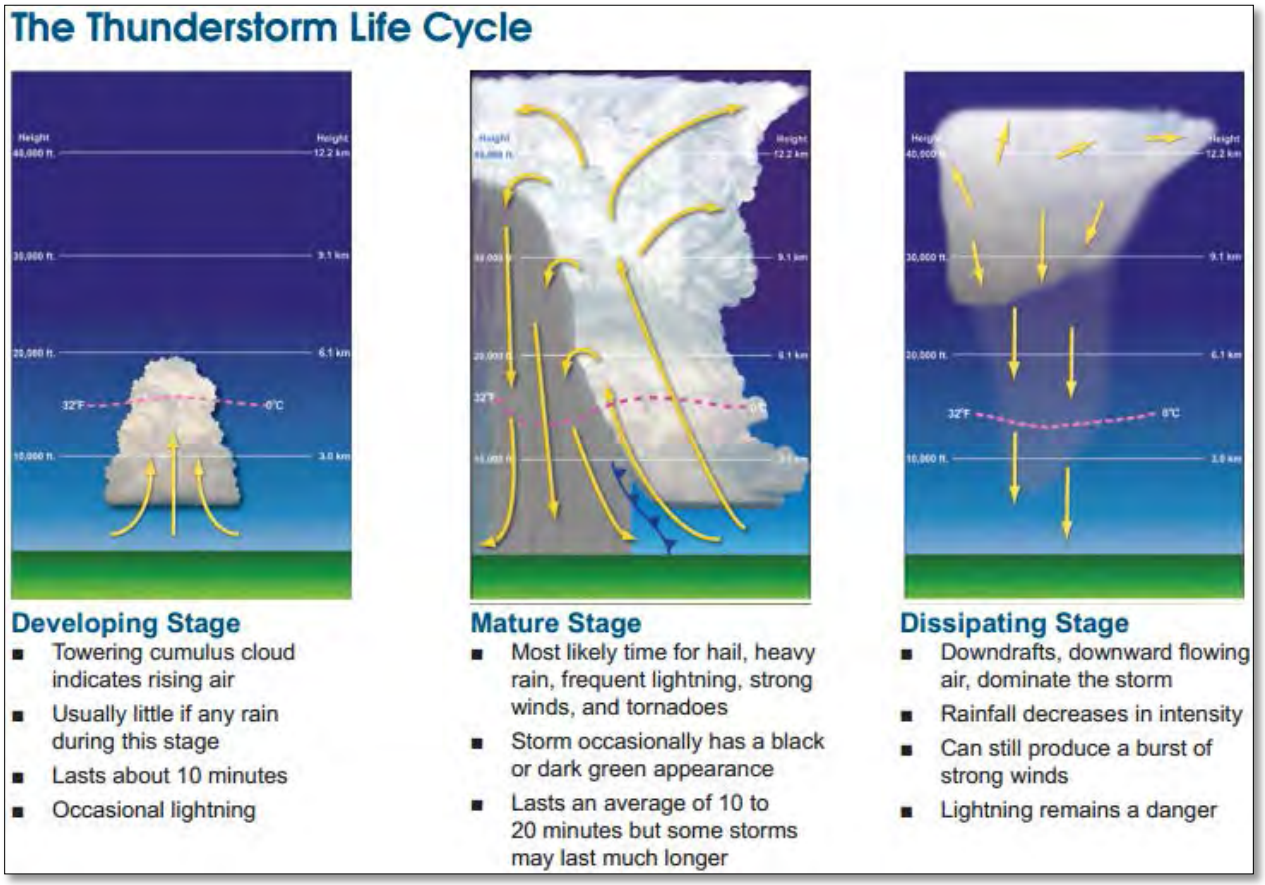
Tornadoes:
- Cause an average of 60-65 fatalities and 1,500 injuries each year
- Can produce wind speeds in excess of 200 mph
- Can be 1 mile wide and stay on the ground over 50 miles

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

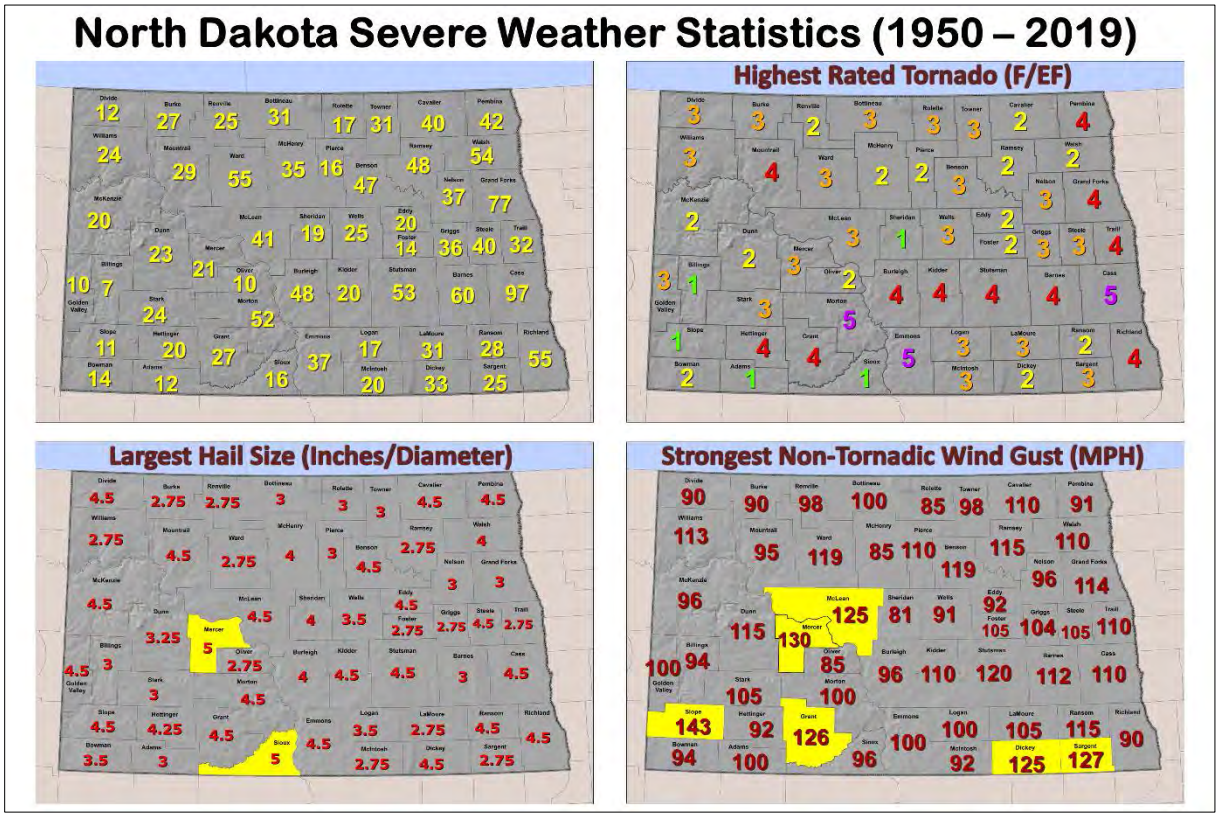
Dissipation Stage

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

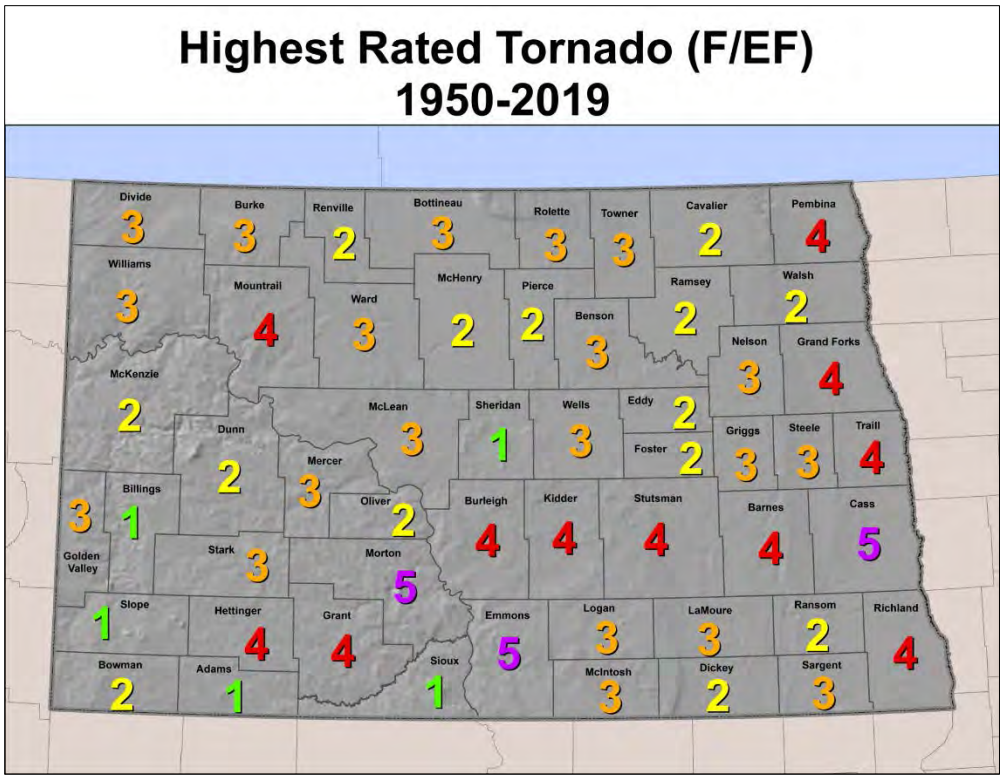
.

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

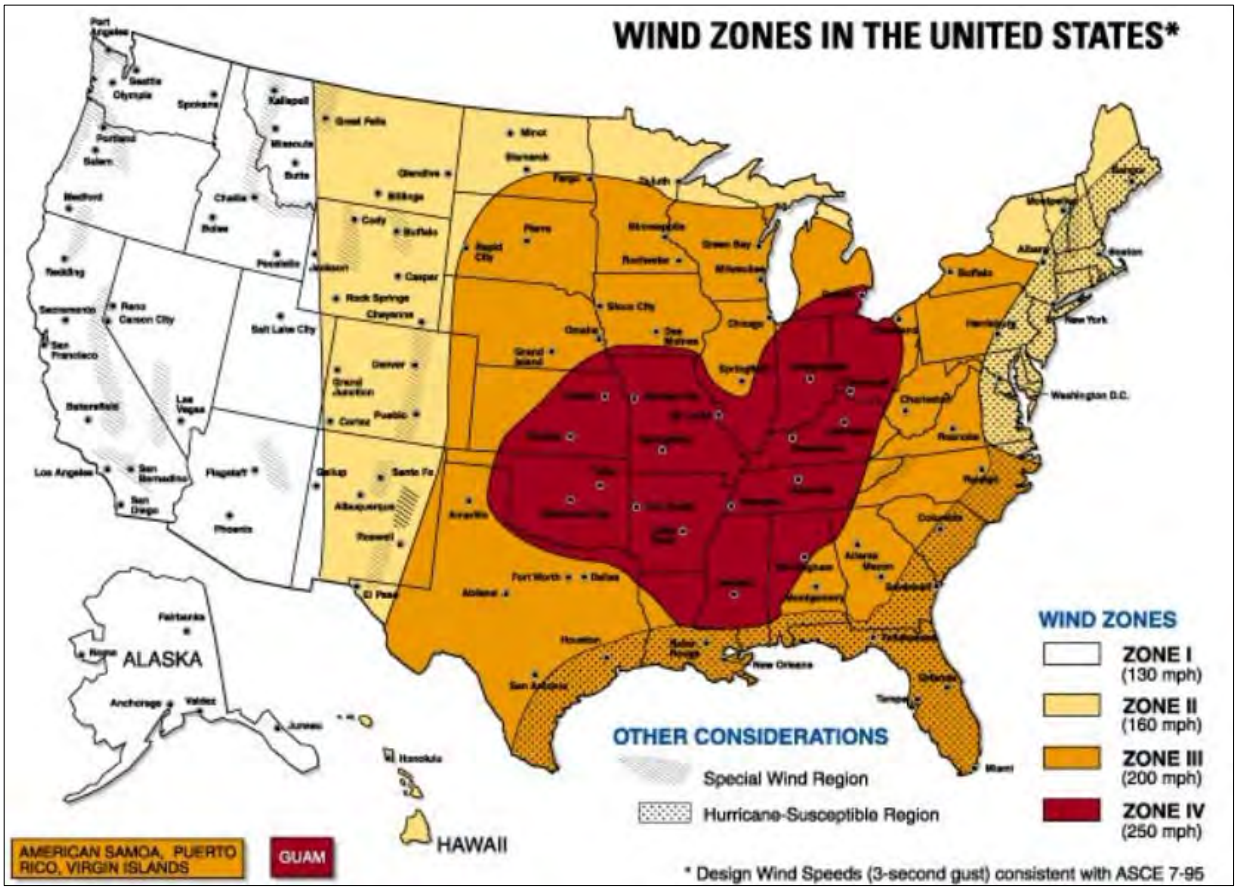
Wind

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). Burleigh County is within the Zone II designation.

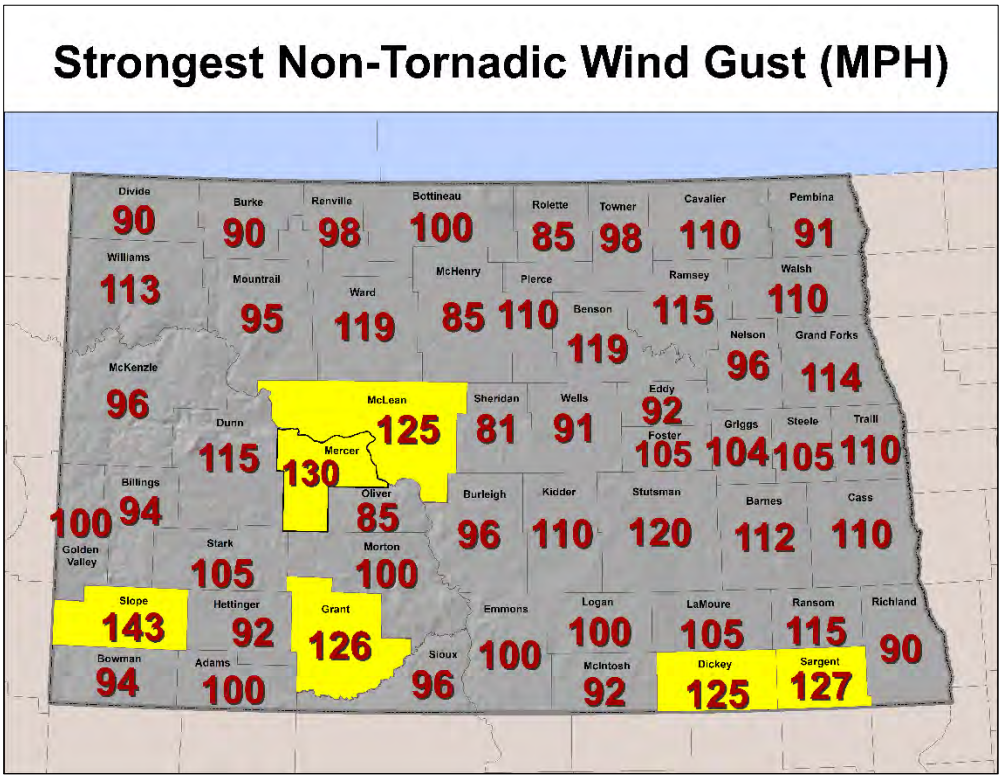
United States Wind Zones



Source: Federal Emergency Management Agency, Wind Zones website

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.

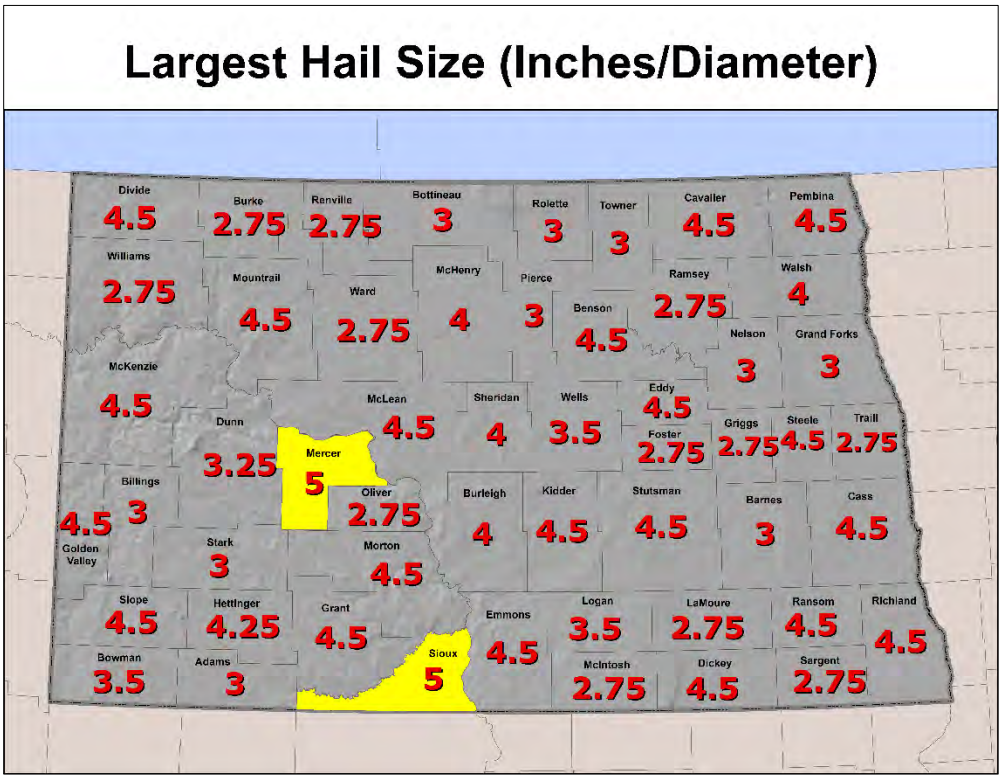


Source: National Weather Service Weather Forecast Office, Bismarck, ND website

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

- Blocked Roads
- Building Collapse
- Business Interruptions
- Delayed Emergency Response
- Downed Power Lines
- Downed Trees
- Evacuation (Localized)
- Explosion
- 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
- Property Damage
- School Closure
- Sewer Backup

History

Lightning

Location	Date	Time	T.Z.	Type	Dth	Inj	PrD	CrD
BISMARCK	07/30/2011	02:00	CST-6	Lightning	0	0	190.00K	0.00K
WING	07/27/2010	02:25	CST-6	Lightning	0	0	8.00K	0.00K
BALDWIN	06/26/2010	07:28	CST-6	Lightning	0	0	1.00K	0.00K
MENOKEN	07/16/2008	04:00	CST-6	Lightning	0	0	5.00K	0.00K
BISMARCK	08/02/1996	21:00	CST	Lightning	0	0	2.00K	0.00K
Totals:					0	0	206.00K	0.00K

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

Tornado

Location	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
REGAN	07/16/2011	16:35	CST-6	Tornado	EF1	0	0	10.00K	0.00K
MENOKEN	08/11/2008	12:08	CST-6	Tornado	EF0	0	0	0.00K	0.00K
BALDWIN	07/28/2008	20:25	CST-6	Tornado	EF0	0	0	0.00K	0.00K
BALDWIN	07/10/2008	17:10	CST-6	Tornado	EF0	0	0	0.00K	0.00K
STERLING	06/16/2007	23:57	CST-6	Tornado	EF0	0	0	0.00K	0.00K
MOFFIT	06/16/2007	23:25	CST-6	Tornado	EF0	0	0	0.00K	0.00K
BISMARCK ARPT	06/06/2005	23:02	CST	Tornado	F1	0	0	0.00K	0.00K
BISMARCK	06/23/2002	18:55	CST	Tornado	F0	0	0	0.00K	0.00K
DRISCOLL	05/30/2001	13:50	CST	Tornado	F0	0	0	0.00K	0.00K
WILTON	11/01/2000	15:05	CST	Tornado	F0	0	0	0.00K	0.00K
BISMARCK	11/01/2000	14:33	CST	Tornado	F2	0	0	55.00K	0.00K
BISMARCK	11/01/2000	13:55	CST	Tornado	F1	0	2	0.00K	0.00K
ARENA	06/25/1999	21:24	CST	Tornado	F1	0	0	0.00K	0.00K
WING	06/06/1999	13:20	CST	Tornado	F0	0	0	0.00K	0.00K
REGAN	06/06/1999	12:30	CST	Tornado	F0	0	0	20.00K	0.00K
DRISCOLL	06/03/1999	16:50	CST	Tornado	F1	0	0	75.00K	0.00K
DRISCOLL	06/03/1999	16:43	CST	Tornado	F0	0	0	0.00K	0.00K
BISMARCK	06/18/1998	14:10	CST	Tornado	F0	0	0	0.00K	0.00K
WILTON	05/13/1998	20:10	CST	Tornado	F0	0	0	0.00K	0.00K
BISMARCK	08/05/1997	17:10	CST	Tornado	F0	0	0	0.00K	0.00K
BURLEIGH CO.	06/16/1992	17:20	CST	Tornado	F0	0	0	0.00K	0.00K
BURLEIGH CO.	05/30/1985	14:24	CST	Tornado	F0	0	0	0.00K	0.00K
BURLEIGH CO.	05/30/1985	13:55	CST	Tornado	F2	0	0	25.00K	0.00K
BURLEIGH CO.	05/10/1985	14:15	CST	Tornado	F1	0	0	25.00K	0.00K
BURLEIGH CO.	05/10/1985	14:12	CST	Tornado	F1	0	0	0.00K	0.00K
BURLEIGH CO.	05/10/1985	14:10	CST	Tornado	F0	0	0	0.00K	0.00K
BURLEIGH CO.	07/17/1983	20:50	CST	Tornado	F0	0	0	0.03K	0.00K
BURLEIGH CO.	07/30/1981	18:00	CST	Tornado	F3	0	0	250.00K	0.00K
BURLEIGH CO.	08/03/1980	17:00	CST	Tornado	F1	0	0	2.50K	0.00K
BURLEIGH CO.	08/21/1979	16:55	CST	Tornado	F0	0	0	0.00K	0.00K
BURLEIGH CO.	06/15/1978	20:25	CST	Tornado	F0	0	0	0.00K	0.00K
BURLEIGH CO.	06/11/1976	20:32	CST	Tornado	F1	0	0	0.00K	0.00K
BURLEIGH CO.	06/11/1976	16:15	CST	Tornado	F1	0	0	0.00K	0.00K
BURLEIGH CO.	06/17/1968	17:00	CST	Tornado	F0	0	0	0.00K	0.00K

BURLEIGH CO.	06/19/1965	20:00	CST	Tornado	F0	0	0	0.00K	0.00K
BURLEIGH CO.	06/18/1965	19:55	CST	Tornado		0	0	0.00K	0.00K
BURLEIGH CO.	07/04/1960	16:45	CST	Tornado	F0	0	0	0.00K	0.00K
BURLEIGH CO.	07/02/1960	11:20	CST	Tornado	F0	0	0	0.00K	0.00K
BURLEIGH CO.	07/16/1957	20:00	CST	Tornado	F2	0	0	2.50K	0.00K
BURLEIGH CO.	05/01/1957	17:45	CST	Tornado	F0	0	0	0.00K	0.00K
BURLEIGH CO.	05/01/1957	17:20	CST	Tornado		0	0	2.50K	0.00K
BURLEIGH CO.	06/17/1956	18:30	CST	Tornado	F2	0	0	250.00K	0.00K
BURLEIGH CO.	07/01/1952	18:36	CST	Tornado	F4	0	1	250.00K	0.00K
BURLEIGH CO.	07/01/1952	18:00	CST	Tornado	F4	1	25	250.00K	0.00K
BURLEIGH CO.	06/14/1951	11:30	CST	Tornado		0	0	0.00K	0.00K
Totals:						1	28	1.218M	0.00K

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

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.	Wind Type	Mag	Dth	Inj	PrD	CrD
MOFFIT	09/20/2019	16:12	CST-6	Thunderstorm	54 kts. MG	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	08/06/2019	15:41	CST-6	Thunderstorm	62 kts. MG	0	0	0.00K	0.00K
STERLING	08/06/2019	15:39	CST-6	Thunderstorm	59 kts. MG	0	0	0.00K	0.00K
FT LINCOLN	08/06/2019	15:05	CST-6	Thunderstorm	52 kts. EG	0	0	0.00K	0.00K
REGAN	07/13/2019	00:20	CST-6	Thunderstorm	78 kts. EG	0	0	250.00K	100.00K
MOFFIT	06/07/2019	23:47	CST-6	Thunderstorm	56 kts. MG	0	0	0.00K	0.00K
BURLEIGH	01/27/2019	17:00	CST-6	High Wind	57 kts. MG	0	0	0.00K	0.00K
STERLING	07/08/2018	01:18	CST-6	Thunderstorm	61 kts. MG	0	0	0.00K	0.00K
MOFFIT	07/08/2018	01:00	CST-6	Thunderstorm	78 kts. EG	0	0	150.00K	0.00K
WILTON	07/03/2018	23:00	CST-6	Thunderstorm	58 kts. MG	0	0	0.00K	0.00K
MOFFIT	07/03/2018	04:47	CST-6	Thunderstorm	79 kts. MG	0	0	0.00K	0.00K
BISMARCK	07/03/2018	04:18	CST-6	Thunderstorm	56 kts. EG	0	0	1.00K	0.00K
(BIS)BISMARCK MUNI A	07/03/2018	04:14	CST-6	Thunderstorm	54 kts. MG	0	0	0.00K	0.00K
STERLING	06/29/2018	01:03	CST-6	Thunderstorm	50 kts. MG	0	0	0.00K	0.00K
MOFFIT	06/29/2018	00:47	CST-6	Thunderstorm	63 kts. MG	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	06/29/2018	00:35	CST-6	Thunderstorm	55 kts. MG	0	0	0.00K	0.00K
BISMARCK	06/29/2018	00:30	CST-6	Thunderstorm	61 kts. EG	0	0	0.00K	0.00K
BISMARCK	06/29/2018	00:27	CST-6	Thunderstorm	65 kts. EG	0	0	0.00K	0.00K
BISMARCK	06/29/2018	00:15	CST-6	Thunderstorm	63 kts. MG	0	0	0.00K	0.00K
BALDWIN	06/29/2018	00:09	CST-6	Thunderstorm	65 kts. EG	0	0	15.00K	0.00K
BURLEIGH	11/29/2017	11:00	CST-6	High Wind	59 kts. MG	0	0	0.00K	0.00K
MOFFIT	07/21/2017	22:47	CST-6	Thunderstorm	56 kts. MG	0	0	0.00K	0.00K
STERLING	07/04/2017	17:41	CST-6	Thunderstorm	50 kts. MG	0	0	0.00K	0.00K
BISMARCK ARPT	06/27/2017	20:04	CST-6	Thunderstorm	50 kts. MG	0	0	0.00K	0.00K
BURLEIGH	03/07/2017	06:00	CST-6	High Wind	57 kts. MG	0	0	0.00K	0.00K
BURLEIGH	01/30/2017	09:00	CST-6	High Wind	38 kts. MS	0	0	0.00K	0.00K
STERLING	09/07/2016	13:45	CST-6	Thunderstorm	52 kts. EG	0	0	0.00K	0.00K
WING	09/04/2016	07:40	CST-6	Thunderstorm	65 kts. EG	0	0	75.00K	10.00K
WILTON	09/04/2016	07:15	CST-6	Thunderstorm	70 kts. EG	0	0	100.00K	30.00K
WING	07/16/2016	12:30	CST-6	Thunderstorm	52 kts. EG	0	0	0.00K	0.00K
MOFFIT	06/22/2016	00:20	CST-6	Thunderstorm	73 kts. MG	0	0	0.00K	0.00K

BISMARCK	06/21/2016	23:50	CST-6	Thunderstorm	75 kts. EG	0	0	20.00K	0.00K
BISMARCK	06/21/2016	23:40	CST-6	Thunderstorm	65 kts. MG	0	0	250.00K	0.00K
(BIS)BISMARCK MUNI A	06/17/2016	03:23	CST-6	Thunderstorm	50 kts. MG	0	0	0.00K	0.00K
BURLEIGH	02/07/2016	00:00	CST-6	High Wind	54 kts. MG	0	0	0.00K	0.00K
BURLEIGH	11/18/2015	13:00	CST-6	High Wind	52 kts. MG	0	0	0.00K	0.00K
BURLEIGH	10/11/2015	12:00	CST-6	High Wind	65 kts. MG	0	0	0.00K	0.00K
BURLEIGH	08/22/2015	15:00	CST-6	High Wind	51 kts. MG	0	0	0.00K	0.00K
BURLEIGH	07/28/2015	14:00	CST-6	High Wind	56 kts. MG	0	0	0.00K	0.00K
BISMARCK	07/27/2015	21:59	CST-6	Thunderstorm	52 kts. EG	0	0	0.00K	0.00K
REGAN	07/23/2015	19:00	CST-6	Thunderstorm	52 kts. EG	0	0	0.00K	0.00K
MOFFIT	06/19/2015	20:47	CST-6	Thunderstorm	53 kts. MG	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	06/19/2015	20:10	CST-6	Thunderstorm	66 kts. MG	0	0	0.00K	0.00K
BISMARCK	06/19/2015	20:04	CST-6	Thunderstorm	69 kts. MG	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	06/19/2015	20:03	CST-6	Thunderstorm	71 kts. MG	0	0	1.000M	0.00K
(BIS)BISMARCK MUNI A	06/19/2015	20:01	CST-6	Thunderstorm	78 kts. EG	0	0	350.00K	0.00K
BALDWIN	06/19/2015	19:49	CST-6	Thunderstorm	52 kts. EG	0	0	0.00K	0.00K
BURLEIGH	01/08/2015	07:30	CST-6	High Wind	51 kts. MG	0	0	0.00K	0.00K
DRISCOLL	07/21/2014	17:05	CST-6	Thunderstorm	52 kts. EG	0	0	0.00K	0.00K
WILTON	07/21/2014	16:42	CST-6	Thunderstorm	65 kts. EG	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	07/21/2014	16:33	CST-6	Thunderstorm	52 kts. EG	0	0	0.00K	0.00K
FT LINCOLN	07/21/2014	16:25	CST-6	Thunderstorm	52 kts. EG	0	0	0.00K	0.00K
FT LINCOLN	07/21/2014	16:24	CST-6	Thunderstorm	52 kts. EG	0	0	0.00K	0.00K
MOFFIT	07/05/2014	19:50	CST-6	Thunderstorm	61 kts. EG	0	0	10.00K	0.00K
MOFFIT	07/05/2014	19:50	CST-6	Thunderstorm	65 kts. MG	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	07/05/2014	19:30	CST-6	Thunderstorm	65 kts. EG	0	0	175.00K	0.00K
BURLEIGH	01/15/2014	20:00	CST-6	High Wind	59 kts. MG	0	0	0.00K	0.00K
BISMARCK	08/30/2013	20:10	CST-6	Thunderstorm	52 kts. EG	0	0	0.00K	0.00K
DRISCOLL	08/29/2013	03:27	CST-6	Thunderstorm	52 kts. EG	0	0	0.00K	0.00K
BISMARCK	08/29/2013	02:48	CST-6	Thunderstorm	52 kts. MG	0	0	0.00K	0.00K
BISMARCK	07/21/2013	18:21	CST-6	Thunderstorm	52 kts. EG	0	0	0.00K	0.00K
BISMARCK	07/08/2013	21:40	CST-6	Thunderstorm	52 kts. EG	0	0	0.00K	0.00K
REGAN	06/22/2013	21:50	CST-6	Thunderstorm	61 kts. EG	0	0	35.00K	0.00K
BISMARCK	06/22/2013	21:21	CST-6	Thunderstorm	61 kts. EG	0	0	30.00K	0.00K
BISMARCK	06/22/2013	21:05	CST-6	Thunderstorm	56 kts. EG	0	0	20.00K	0.00K
BISMARCK	06/22/2013	21:00	CST-6	Thunderstorm	65 kts. EG	0	0	40.00K	0.00K
(BIS)BISMARCK MUNI A	06/22/2013	20:30	CST-6	Thunderstorm	52 kts. EG	0	0	0.00K	0.00K

BISMARCK	06/22/2013	20:26	CST-6	Thunderstorm	61 kts. EG	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	06/22/2013	20:24	CST-6	Thunderstorm	61 kts. EG	0	0	0.00K	0.00K
BURLEIGH	05/14/2013	05:00	CST-6	High Wind	56 kts. MG	0	0	0.00K	0.00K
BURLEIGH	10/17/2012	21:00	CST-6	High Wind	52 kts. MG	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	08/28/2012	02:30	CST-6	Thunderstorm	52 kts. EG	0	0	0.00K	0.00K
DRISCOLL	08/24/2012	19:15	CST-6	Thunderstorm	52 kts. EG	0	0	0.00K	0.00K
WING	08/24/2012	18:04	CST-6	Thunderstorm	52 kts. EG	0	0	0.00K	0.00K
REGAN	08/24/2012	17:30	CST-6	Thunderstorm	52 kts. EG	0	0	0.00K	0.00K
DRISCOLL	07/12/2012	22:10	CST-6	Thunderstorm	59 kts. MG	0	0	0.00K	0.00K
BISMARCK	07/11/2012	21:40	CST-6	Thunderstorm	52 kts. MG	0	0	0.00K	0.00K
FT LINCOLN	07/11/2012	21:40	CST-6	Thunderstorm	52 kts. EG	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	07/11/2012	21:36	CST-6	Thunderstorm	61 kts. EG	0	0	0.00K	0.00K
BISMARCK	07/11/2012	21:35	CST-6	Thunderstorm	52 kts. MG	0	0	0.00K	0.00K
BISMARCK	07/11/2012	21:33	CST-6	Thunderstorm	52 kts. EG	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	06/15/2012	21:17	CST-6	Thunderstorm	53 kts. MG	0	0	0.00K	0.00K
BISMARCK	06/13/2012	22:32	CST-6	Thunderstorm	56 kts. EG	0	0	0.00K	0.00K
BISMARCK	06/13/2012	22:21	CST-6	Thunderstorm	52 kts. EG	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	06/13/2012	22:18	CST-6	Thunderstorm	52 kts. MG	0	0	0.00K	0.00K
BISMARCK	06/13/2012	22:14	CST-6	Thunderstorm	56 kts. EG	0	0	0.00K	0.00K
BURLEIGH	10/07/2011	10:00	CST-6	High Wind	35 kts. MS	0	0	0.00K	0.00K
BURLEIGH	09/20/2011	03:00	CST-6	High Wind	35 kts. ES	0	0	0.00K	0.00K
FT LINCOLN	08/15/2011	20:30	CST-6	Thunderstorm	61 kts. EG	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	08/15/2011	20:10	CST-6	Thunderstorm	62 kts. MG	0	0	0.00K	0.00K
BISMARCK	08/15/2011	19:53	CST-6	Thunderstorm	52 kts. MG	0	0	0.00K	0.00K
BISMARCK	08/05/2011	18:32	CST-6	Thunderstorm	52 kts. EG	0	0	0.00K	0.00K
STERLING	07/31/2011	22:35	CST-6	Thunderstorm	70 kts. EG	0	0	40.00K	0.00K
BISMARCK	07/31/2011	22:18	CST-6	Thunderstorm	68 kts. MG	0	0	0.00K	0.00K
BISMARCK	07/31/2011	22:10	CST-6	Thunderstorm	74 kts. EG	0	0	35.00K	0.00K
(BIS)BISMARCK MUNI A	07/31/2011	21:56	CST-6	Thunderstorm	59 kts. MG	0	0	0.20K	0.00K
BISMARCK	07/31/2011	21:45	CST-6	Thunderstorm	61 kts. EG	0	0	35.00K	0.00K
STERLING	07/30/2011	03:00	CST-6	Thunderstorm	52 kts. EG	0	0	0.00K	0.00K
BISMARCK	07/22/2011	22:01	CST-6	Thunderstorm	56 kts. EG	0	0	15.00K	0.00K
MOFFIT	07/10/2011	13:14	CST-6	Thunderstorm	83 kts. EG	0	0	250.00K	0.00K
(BIS)BISMARCK MUNI A	07/10/2011	12:52	CST-6	Thunderstorm	65 kts. EG	0	0	0.00K	0.00K
BISMARCK	06/12/2011	21:20	CST-6	Thunderstorm	61 kts. EG	0	0	0.00K	0.00K
BURLEIGH	05/31/2011	09:00	CST-6	High Wind	35 kts. ES	0	0	0.00K	0.00K

BURLEIGH	02/13/2011	09:00	CST-6	High Wind	38 kts. MS	0	0	20.00K	0.00K
BURLEIGH	10/26/2010	11:00	CST-6	High Wind	53 kts. MG	0	0	0.00K	0.00K
BURLEIGH	08/13/2010	00:47	CST-6	High Wind	70 kts. MG	0	0	0.00K	0.00K
MOFFIT	08/11/2010	23:47	CST-6	Thunderstorm	59 kts. MG	0	0	0.00K	0.00K
BISMARCK	08/02/2010	14:40	CST-6	Thunderstorm	56 kts. EG	0	0	0.00K	0.00K
BISMARCK	08/02/2010	14:25	CST-6	Thunderstorm	61 kts. MG	0	0	0.00K	0.00K
MOFFIT	06/22/2010	02:00	CST-6	Thunderstorm	71 kts. MG	0	0	30.00K	0.00K
BURLEIGH	06/18/2010	10:00	CST-6	High Wind	36 kts. MS	0	0	0.00K	0.00K
MOFFIT	06/17/2010	13:47	CST-6	Thunderstorm	53 kts. MG	0	0	0.00K	0.00K
BISMARCK	06/17/2010	13:06	CST-6	Thunderstorm	59 kts. MG	0	0	0.00K	0.00K
ARENA	06/17/2010	00:00	CST-6	Thunderstorm	52 kts. EG	0	0	0.00K	0.00K
BISMARCK	06/16/2010	23:20	CST-6	Thunderstorm	56 kts. EG	0	0	0.00K	0.00K
BISMARCK	06/16/2010	23:00	CST-6	Thunderstorm	56 kts. EG	0	0	0.00K	0.00K
BISMARCK	06/16/2010	22:52	CST-6	Thunderstorm	68 kts. MG	0	0	50.00K	0.00K
(BIS)BISMARCK MUNI A	06/16/2010	22:52	CST-6	Thunderstorm	61 kts. EG	0	0	10.00K	0.00K
MOFFIT	06/16/2010	22:47	CST-6	Thunderstorm	50 kts. MG	0	0	0.00K	0.00K
BURLEIGH	05/25/2010	09:00	CST-6	High Wind	52 kts. EG	0	0	30.00K	0.00K
MOFFIT	05/24/2010	19:53	CST-6	Thunderstorm	55 kts. MG	0	0	0.00K	0.00K
DRISCOLL	05/24/2010	19:53	CST-6	Thunderstorm	56 kts. MG	0	0	0.00K	0.00K
ARENA	05/24/2010	19:47	CST-6	Thunderstorm	78 kts. EG	0	0	400.00K	0.00K
WING	05/24/2010	19:44	CST-6	Thunderstorm	74 kts. EG	0	0	50.00K	0.00K
DRISCOLL	05/24/2010	19:35	CST-6	Thunderstorm	74 kts. EG	0	0	200.00K	0.00K
BISMARCK	07/09/2009	00:00	CST-6	Thunderstorm	52 kts. EG	0	0	5.00K	0.00K
BISMARCK	06/22/2009	17:40	CST-6	Thunderstorm	61 kts. EG	0	0	17.00K	0.00K
(BIS)BISMARCK MUNI A	05/12/2009	18:50	CST-6	Thunderstorm	52 kts. EG	0	0	4.00K	0.00K
MOFFIT	03/22/2009	10:35	CST-6	Thunderstorm	58 kts. MG	0	0	0.00K	0.00K
BURLEIGH	01/31/2009	13:30	CST-6	High Wind	35 kts. ES	0	0	0.00K	0.00K
BURLEIGH	10/26/2008	12:47	CST-6	High Wind	51 kts. MG	0	0	50.00K	0.00K
(BIS)BISMARCK MUNI A	07/30/2008	23:50	CST-6	Thunderstorm	70 kts. EG	0	0	40.00K	0.00K
BALDWIN	07/30/2008	23:30	CST-6	Thunderstorm	65 kts. EG	0	0	10.00K	0.00K
BURLEIGH	07/12/2008	11:47	CST-6	High Wind	37 kts. MS	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	06/26/2008	18:20	CST-6	Thunderstorm	60 kts. EG	0	0	4.00K	0.00K
BURLEIGH	05/19/2008	12:30	CST-6	High Wind	35 kts. MS	0	0	0.00K	0.00K
BURLEIGH	05/01/2008	18:00	CST-6	High Wind	52 kts. EG	0	0	15.00K	0.00K
BURLEIGH	03/24/2008	17:45	CST-6	High Wind	35 kts. MS	0	0	0.00K	0.00K
MENOKEN	07/01/2007	19:15	CST-6	Thunderstorm	65 kts. EG	0	0	40.00K	0.00K

BISMARCK ARPT	05/14/2007	01:18	CST-6	Thunderstorm	55 kts. MG	0	0	0.00K	0.00K
BURLEIGH	01/08/2007	18:00	CST-6	High Wind	59 kts. MG	0	0	0.00K	0.00K
MOFFIT	08/24/2006	15:00	CST	Thunderstorm	52 kts. EG	0	0	0.00K	0.00K
REGAN	06/30/2006	19:00	CST	Thunderstorm	57 kts. EG	0	0	2.00K	0.00K
DRISCOLL	07/02/2005	22:45	CST	Thunderstorm	52 kts. EG	0	0	0.00K	0.00K
BISMARCK ARPT	06/06/2005	23:02	CST	Thunderstorm	61 kts. EG	0	0	0.00K	0.00K
BURLEIGH	03/09/2005	22:00	CST	High Wind	46 kts. MS	0	0	0.00K	0.00K
BURLEIGH	12/20/2004	09:00	CST	High Wind	47 kts. MS	0	0	0.00K	0.00K
BURLEIGH	12/11/2004	18:00	CST	High Wind	42 kts. MS	0	1	0.00K	0.00K
(BIS)BISMARCK MUNI A	08/23/2004	19:27	CST	Thunderstorm	50 kts. MG	0	0	0.00K	0.00K
BURLEIGH	03/13/2004	12:58	CST	High Wind	53 kts. MS	0	0	0.00K	0.00K
BURLEIGH	11/29/2002	08:00	CST	High Wind	46 kts. M	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	08/08/2002	20:09	CST	Thunderstorm	68 kts. M	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	06/09/2002	00:06	CST	Thunderstorm	54 kts. M	0	0	0.00K	0.00K
BURLEIGH	02/11/2002	13:31	CST	High Wind	59 kts. M	0	0	0.00K	0.00K
BURLEIGH	11/01/2001	10:00	CST	High Wind	43 kts. M	0	0	0.00K	0.00K
DRISCOLL	07/22/2001	04:00	CST	Thunderstorm	61 kts. E	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	07/22/2001	03:32	CST	Thunderstorm	61 kts. M	0	0	0.00K	0.00K
WILTON	07/22/2001	03:27	CST	Thunderstorm	61 kts. E	0	0	0.00K	0.00K
WILTON	07/22/2001	03:00	CST	Thunderstorm	57 kts. E	0	0	0.00K	0.00K
BISMARCK	07/21/2001	00:05	CST	Thunderstorm	52 kts. E	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	07/19/2001	23:00	CST	Thunderstorm	52 kts. E	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	07/19/2001	22:32	CST	Thunderstorm	66 kts. M	0	0	50.00K	0.00K
BURLEIGH	05/22/2001	11:42	CST	High Wind	45 kts. M	0	0	0.00K	0.00K
BURLEIGH	05/20/2001	15:38	CST	High Wind	37 kts. M	0	0	0.00K	0.00K
BURLEIGH	05/07/2001	13:02	CST	High Wind	43 kts. M	0	0	0.00K	0.00K
BURLEIGH	04/05/2000	08:30	CST	High Wind	62 kts. M	0	10	0.00K	0.00K
BURLEIGH	09/24/1986	23:35	CST	Thunderstorm	73 kts.	0	1	0.00K	0.00K
Totals:						0	12	9.703M	240.00K

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
(BIS)BISMARCK MUNI A	09/20/2019	16:03	CST-6	Hail	0.75 in.	0	0	0.00K	0.00K
REGAN	08/25/2019	16:55	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
BISMARCK	08/25/2019	15:19	CST-6	Hail	2.00 in.	0	0	400.00K	0.00K
(BIS)BISMARCK MUNI A	08/06/2019	15:41	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
STERLING	08/06/2019	15:30	CST-6	Hail	1.75 in.	0	0	30.00K	0.00K
(BIS)BISMARCK MUNI A	08/06/2019	15:04	CST-6	Hail	1.50 in.	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	08/06/2019	14:56	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	07/08/2019	16:46	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	07/08/2019	16:12	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	07/08/2019	16:00	CST-6	Hail	1.50 in.	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	07/08/2019	16:00	CST-6	Hail	1.75 in.	0	0	0.00K	0.00K
MENOKEN	07/02/2019	18:45	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
BALDWIN	06/11/2019	14:27	CST-6	Hail	0.88 in.	0	0	0.00K	0.00K
FT LINCOLN	09/09/2018	02:05	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
BISMARCK	07/24/2018	23:10	CST-6	Hail	0.75 in.	0	0	0.00K	0.00K
BISMARCK	07/03/2018	23:14	CST-6	Hail	0.88 in.	0	0	0.00K	0.00K
BISMARCK	07/03/2018	23:12	CST-6	Hail	0.75 in.	0	0	0.00K	0.00K
BISMARCK	07/03/2018	23:10	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
FT LINCOLN	06/28/2018	02:00	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
BISMARCK	06/28/2018	01:50	CST-6	Hail	0.88 in.	0	0	0.00K	0.00K
BISMARCK	07/31/2017	17:35	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
FT LINCOLN	07/31/2017	17:11	CST-6	Hail	1.25 in.	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	07/21/2017	21:40	CST-6	Hail	0.88 in.	0	0	0.00K	0.00K
BISMARCK	07/21/2017	21:25	CST-6	Hail	1.75 in.	0	0	0.00K	0.00K
BISMARCK	07/04/2017	17:10	CST-6	Hail	0.75 in.	0	0	0.00K	0.00K
BISMARCK	07/04/2017	16:42	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
BISMARCK	07/04/2017	16:39	CST-6	Hail	0.88 in.	0	0	0.00K	0.00K
FT LINCOLN	06/27/2017	20:40	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	06/27/2017	20:32	CST-6	Hail	0.88 in.	0	0	0.00K	0.00K
STERLING	09/07/2016	13:45	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
DRISCOLL	08/31/2016	04:27	CST-6	Hail	0.88 in.	0	0	0.00K	0.00K
DRISCOLL	08/31/2016	04:02	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
MOFFIT	07/16/2016	15:51	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K

MC KENZIE	07/16/2016	15:12	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
ARENA	07/16/2016	12:40	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
BALDWIN	07/16/2016	12:19	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
BISMARCK	07/10/2016	20:27	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
BISMARCK	07/03/2016	20:00	CST-6	Hail	0.75 in.	0	0	0.00K	0.00K
BISMARCK	07/03/2016	19:45	CST-6	Hail	0.88 in.	0	0	0.00K	0.00K
DRISCOLL	06/17/2016	04:10	CST-6	Hail	2.50 in.	0	0	15.00K	20.00K
DRISCOLL	06/17/2016	04:10	CST-6	Hail	3.00 in.	0	0	50.00K	50.00K
BALDWIN	06/17/2016	03:40	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
BISMARCK	06/17/2016	03:30	CST-6	Hail	3.25 in.	0	0	50.000M	250.00K
BISMARCK	06/17/2016	03:25	CST-6	Hail	1.50 in.	0	0	0.00K	0.00K
MOFFIT	06/13/2015	16:08	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
REGAN	09/04/2014	01:20	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
REGAN	09/04/2014	01:15	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
BALDWIN	09/04/2014	01:05	CST-6	Hail	1.50 in.	0	0	0.00K	0.00K
BALDWIN	08/20/2014	18:00	CST-6	Hail	1.25 in.	0	0	0.00K	0.00K
MOFFIT	07/05/2014	19:50	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	07/05/2014	19:30	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
REGAN	08/30/2013	23:15	CST-6	Hail	0.88 in.	0	0	0.00K	0.00K
BISMARCK	08/30/2013	20:35	CST-6	Hail	0.80 in.	0	0	0.00K	0.00K
FT LINCOLN	08/30/2013	20:27	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	08/30/2013	20:25	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
BISMARCK	08/30/2013	20:20	CST-6	Hail	0.75 in.	0	0	0.00K	0.00K
BISMARCK	08/30/2013	20:20	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
BISMARCK	08/30/2013	20:18	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
BISMARCK	08/30/2013	20:10	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
MENOKEN	07/31/2013	00:10	CST-6	Hail	0.75 in.	0	0	0.00K	0.00K
BISMARCK	07/30/2013	23:55	CST-6	Hail	0.75 in.	0	0	0.00K	0.00K
BISMARCK	07/30/2013	23:55	CST-6	Hail	1.25 in.	0	0	0.00K	0.00K
BISMARCK	07/30/2013	23:50	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
BISMARCK	07/21/2013	18:25	CST-6	Hail	0.88 in.	0	0	0.00K	0.00K
BISMARCK	07/21/2013	18:15	CST-6	Hail	0.88 in.	0	0	0.00K	0.00K
BISMARCK	07/09/2013	15:26	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
WING	06/26/2013	14:25	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	06/22/2013	20:24	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
DRISCOLL	06/20/2013	16:45	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K

DRISCOLL	08/24/2012	19:15	CST-6	Hail	0.88 in.	0	0	0.00K	0.00K
STERLING	08/24/2012	18:55	CST-6	Hail	1.75 in.	0	0	0.00K	0.00K
WILTON	08/24/2012	17:28	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	08/03/2012	13:22	CST-6	Hail	0.75 in.	0	0	0.00K	0.00K
DRISCOLL	06/30/2012	07:35	CST-6	Hail	1.50 in.	0	0	0.00K	0.00K
MENOKEN	06/30/2012	06:55	CST-6	Hail	1.50 in.	0	0	0.00K	0.00K
BISMARCK	06/30/2012	06:52	CST-6	Hail	0.75 in.	0	0	0.00K	0.00K
BALDWIN	05/21/2012	19:05	CST-6	Hail	0.75 in.	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	08/22/2011	19:23	CST-6	Hail	0.75 in.	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	08/22/2011	19:23	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
ARENA	08/22/2011	19:20	CST-6	Hail	1.50 in.	0	0	0.00K	0.00K
ARENA	08/15/2011	20:50	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
BISMARCK	08/15/2011	20:15	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
BISMARCK	08/15/2011	20:10	CST-6	Hail	0.75 in.	0	0	0.00K	0.00K
BISMARCK	07/29/2011	22:16	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
BISMARCK	07/24/2011	17:31	CST-6	Hail	0.75 in.	0	0	0.00K	0.00K
DRISCOLL	07/24/2011	15:05	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
WING	07/16/2011	08:00	CST-6	Hail	0.88 in.	0	0	0.00K	0.00K
REGAN	07/16/2011	07:40	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	07/10/2011	12:53	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	07/10/2011	12:50	CST-6	Hail	1.25 in.	0	0	150.00K	0.00K
(BIS)BISMARCK MUNI A	07/10/2011	11:21	CST-6	Hail	0.75 in.	0	0	0.00K	0.00K
MOFFIT	06/07/2011	17:54	CST-6	Hail	2.00 in.	0	0	0.00K	0.00K
WILTON	05/09/2011	11:50	CST-6	Hail	0.75 in.	0	0	0.00K	0.00K
BISMARCK	08/02/2010	14:35	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
BISMARCK	07/20/2010	17:12	CST-6	Hail	0.75 in.	0	0	0.00K	0.00K
BISMARCK	07/20/2010	17:10	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
WILTON	07/10/2010	21:46	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	06/25/2010	16:49	CST-6	Hail	0.88 in.	0	0	0.00K	0.00K
FT LINCOLN	06/24/2010	18:16	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
MENOKEN	06/24/2010	18:08	CST-6	Hail	0.88 in.	0	0	0.00K	0.00K
FT LINCOLN	06/24/2010	18:08	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	05/24/2010	19:24	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
FT LINCOLN	07/19/2008	18:45	CST-6	Hail	2.75 in.	0	0	10.00K	0.00K
(BIS)BISMARCK MUNI A	07/19/2008	18:20	CST-6	Hail	2.75 in.	0	0	800.00K	0.00K
BISMARCK	07/21/2005	18:25	CST	Hail	2.50 in.	0	0	93.000M	0.00K

(BIS)BISMARCK MUNI A	06/09/2001	16:55	CST	Hail	1.75 in.	0	0	113.000 M	0.00K
BISMARCK	11/01/2000	14:40	CST	Hail	0.75 in.	0	0	0.00K	0.00K
WING	08/20/2000	21:45	CST	Hail	1.50 in.	0	0	0.00K	0.00K
BISMARCK	08/20/2000	21:11	CST	Hail	0.75 in.	0	0	0.00K	0.00K
(BIS)BISMARCK MUNI A	08/20/2000	18:12	CST	Hail	1.50 in.	0	0	0.00K	0.00K
BISMARCK	06/12/2000	23:10	CST	Hail	0.75 in.	0	0	0.00K	0.00K
WILTON	06/11/2000	18:30	CST	Hail	0.75 in.	0	0	0.00K	0.00K
WING	05/27/1998	17:15	CST	Hail	1.25 in.	0	0	0.00K	100.00K
WILTON	05/27/1998	16:20	CST	Hail	1.00 in.	0	0	5.00K	0.00K
Totals:						0	0	257.475 M	470.00K

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

Some of the more significant events include:

July 13, 2019 - Straight line winds severely damaged five large steel grain bins at a farm site in Regan. A separate hopper-style bin was rolled into a field. In addition, half of the roof on a new pole barn shop was torn off with insulation blown out. Crops in the area were also severely damaged.

July 8, 2019 - A strong short-wave trough pushed into southwest North Dakota during the late evening hours of July 7 where it encountered a moisture rich atmosphere with very strong instability. Two areas of thunderstorms developed producing severe wind gusts, with one storm becoming long lived as it tracked from far southwest North Dakota into the central part of the state. As moisture and instability increased towards the east, the severe thunderstorm winds increased resulting in many incidents of damage along its path. The strongest wind gust of 92 mph was measured in Kidder County near Robinson. Many large trees were uprooted. Power lines were down, and multiple buildings were heavily damaged in Moffit.

June 21, 2016 - Severe storms continued overnight with the threat switching to primarily strong winds over south central North Dakota where there were multiple reports of damage. The greatest damage was in Logan County where a high-voltage electrical transmission structure was toppled. Multiple trees were reported down in the Hoge Island area north of Bismarck with this storm. This caused substantial damage to many homes. Boat damage also occurred.

June 19, 2015 - Thunderstorms later in the evening became prolific straight line wind producers. The strongest winds were reported in Burleigh County, where winds blew up to 90 mph. Extensive tree and power line damage with some structural damage was reported in the city of Bismarck and surrounding rural areas. Power outages lasted up to 72 hours. Very strong thunderstorm winds were reported near the city of Lincoln. A camper rolled out of a yard. A stack of large hay bales collapsed. Garage doors buckled. Trees were uprooted and others snapped and there was a lot of damage to outside lawn furniture and children's play sets. Power lines were downed.

July 5, 2014 - Severe thunderstorm winds estimated at 75 miles per hour resulted in extensive damage across the Kimball Bottoms Recreation Area south of Bismarck. Several large cottonwood trees were snapped. Four vehicles where heavily damaged when the trees fell on them, and one camper trailer was crushed.

July 10, 2011 – SW Moffit. Considerable veering winds with height, strong instability, and favorable deep layer sheer produced a favorable environment for very large hail, damaging winds, and isolated tornadoes. Multiple severe thunderstorm warnings and several tornado warnings were issued during this event. Numerous reports of large hail and destructive thunderstorm winds were received. Double poled wood transmission lines were snapped in half. A heavy ranch sign with three foot long concrete anchors was ripped out of the ground. A camper was flipped off of the highway and tossed over a tree row 25 yards from the road.

July 21, 2005 - 2.50 inches of hail was reported in Bismarck. Nickel size to tennis ball size hail combined with 70 mph winds caused extensive and widespread damage in Bismarck. The larger hail fell on the north side of the city where most of the damage occurred. Numerous homes and vehicles damaged. There was damage to siding and roofs, and windows were broken. Property damage estimates were provided by the North Dakota Insurance Commissioner.

June 9, 2001 – 1.00 inch hail reported at the Bismarck Airport. An approaching upper level system provided lift to produce severe thunderstorms over central North Dakota Saturday afternoon and evening. Abundant low-level moisture combined with relatively cool air aloft lead to the formation of an incredible amount of hail with many of these storms. The hail caused a tremendous amount of damage to homes and vehicles in the Bismarck and Mandan area's. An estimated damage from the hail in the two cities amounted around $260 million. The wind speed associated with the storm ranged between 50 to 60 mph.

November 1, 2000 – A F1 (73-112 mph) tornado touched down near Highway 83 in Bismarck and traveled in a west, northwest direction. Forty-two homes sustained minor to moderate damage and injuring two people. The tornado began 6 miles north of Bismarck and ended 10 miles north, northwest of Bismarck. Length was 3 miles and width 50 yards.

November 1, 2000 – A F0 (40-72 mph) tornado touched down three miles west, northwest of Wilton. The tornado touched down in open country and moved in a west, northwest direction. The tornado remained in open country moving into McLean County. The tornado began 3 miles west, south west of Wilton and ended 2 miles west, northwest of Wilton. Length was 2 miles and width 40 yards.

May 16, 1996 – As the storm moved into the Bismarck area, the National Weather Service at the airport received a gust to 79 mph. A small plane was tipped over at the airport, with part of the airport terminal roof blown off. There was at least 1 mobile home that was destroyed. Significant damage was done to trees, buildings and road signs. An estimated 3,000 people in Bismarck lost power. The Melroe Company had its roof lifted off. Property damage from this storm is estimated at $3.2 million.

June 21, 1994 – Nine 80 foot power line towers were blown over from Wilton and southeast of Wilton. Trees were uprooted and building destroyed at a farm near Baldwin. Property damage from this storm is estimated at $500,000. Crop damage from this storm is estimated at $50,000.

July 16, 1993 – Severe thunderstorm with heavy rain and $227,273 in property damage and $227,273 in crop damage.

July 1, 1993 – Severe thunderstorm with heavy rain and $943,396 in property damage and $943,396 in crop damage.

July 1, 1993 - Hail in Burleigh County with $5,500,000 in property damage and $1,000,000 in crop damage.

7July 31, 1966 – Burleigh County tornadoes, heavy hail, high winds, heavy rain with $41,667 in property damage and $41,667 in crop damage.

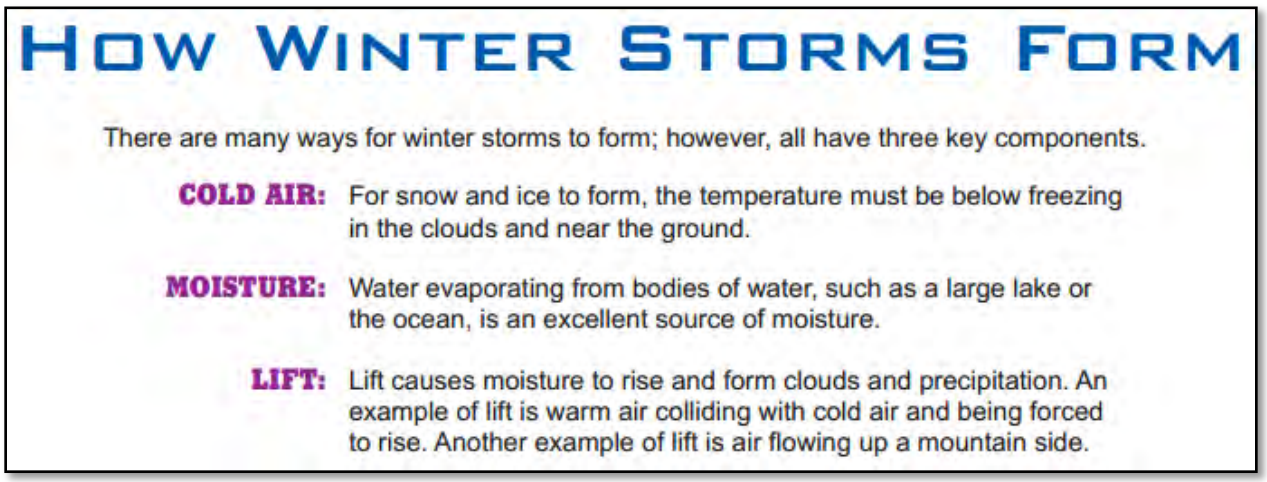
July 1, 1952 – Tornado with 26 injuries, 1 fatality, and $50,000 in property damage.

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

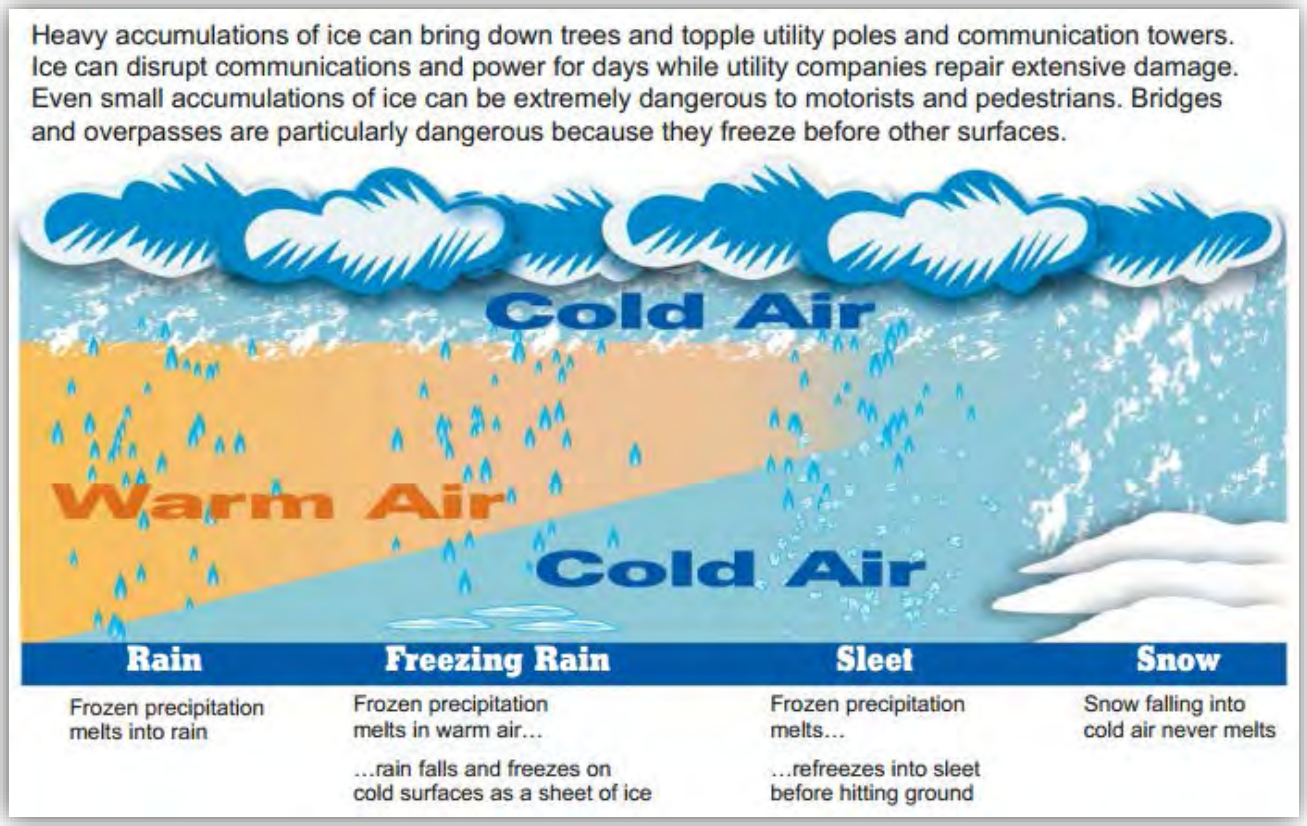
Frequency	Highly Likely (Nearly 100% probability in the next year)
Severity	Critical (25-50% of jurisdiction affected)
Risk Class	A
Seasonal Pattern	November to April
Duration	2 to 5 days
Speed of Onset	12 to 24 hours warning
Location	Countywide

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.

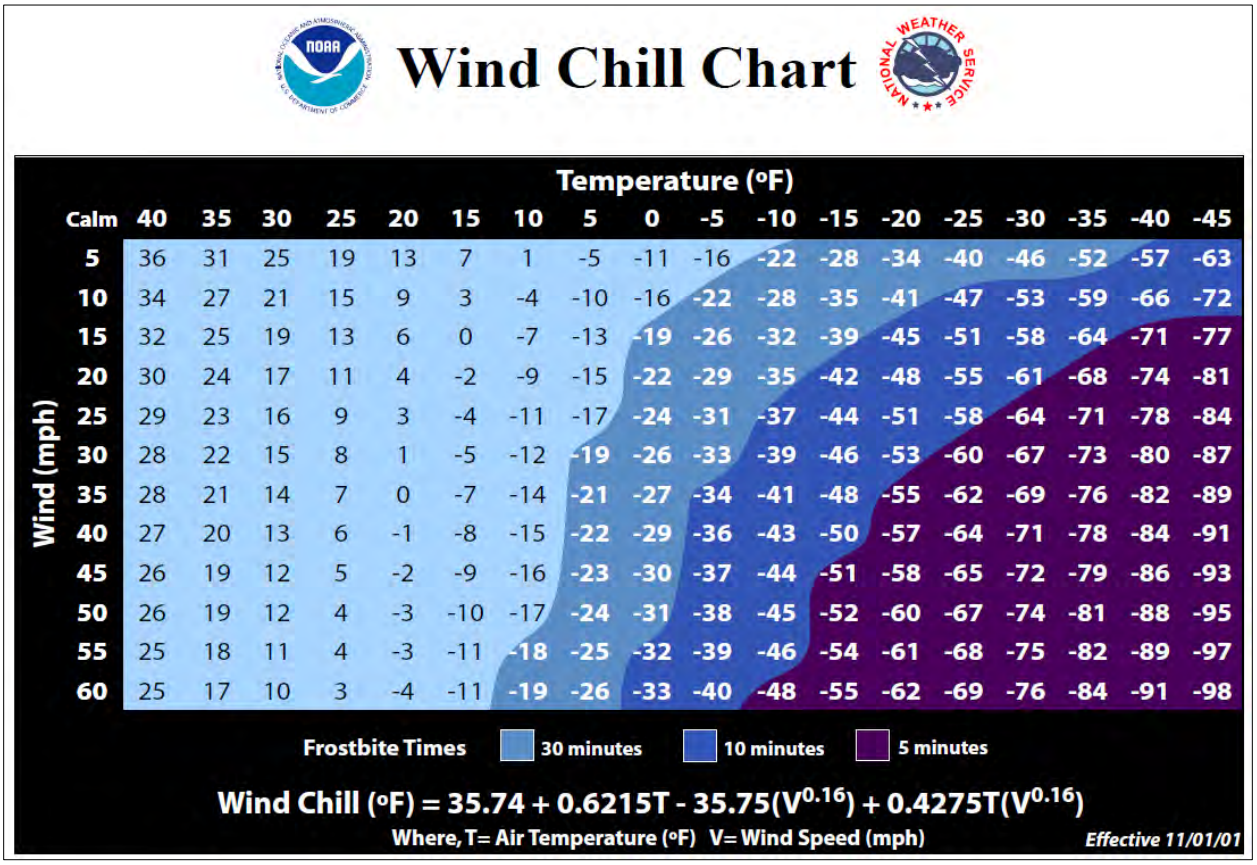
Sleet: Rain that turns to ice pellets before reaching the ground. Sleet also causes moisture on roads to freeze and become slippery.

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

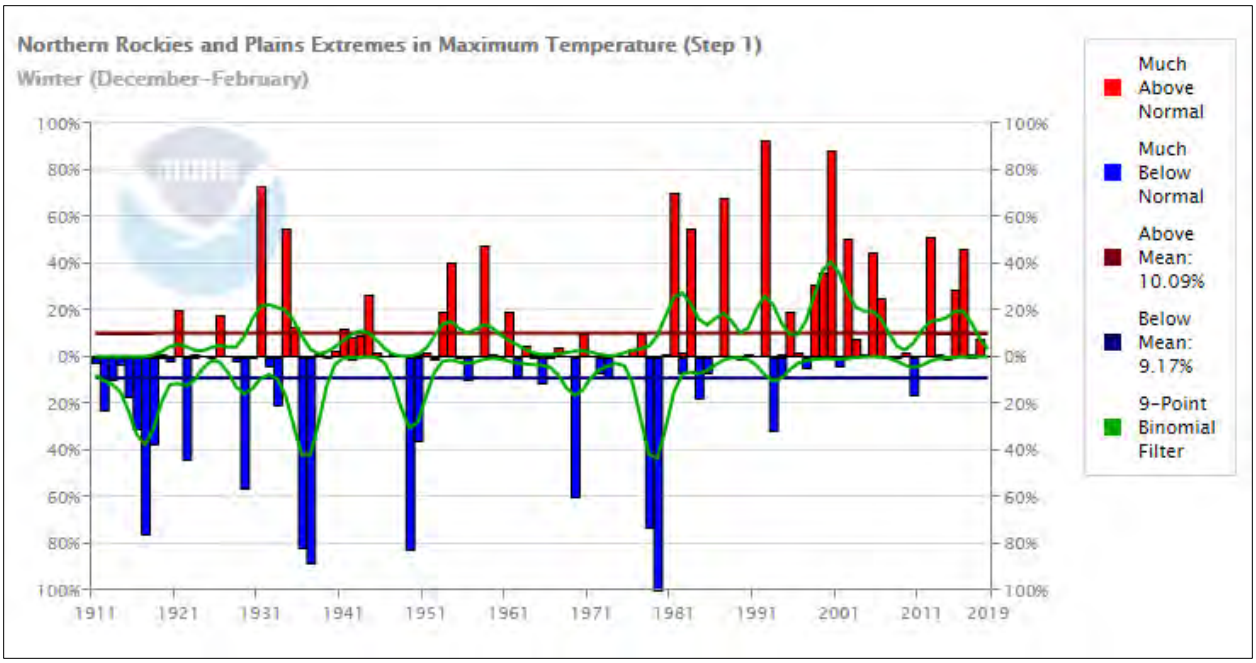
Snow Showers: Snow falling at varying intensities for brief periods of time. Some accumulation is possible.

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

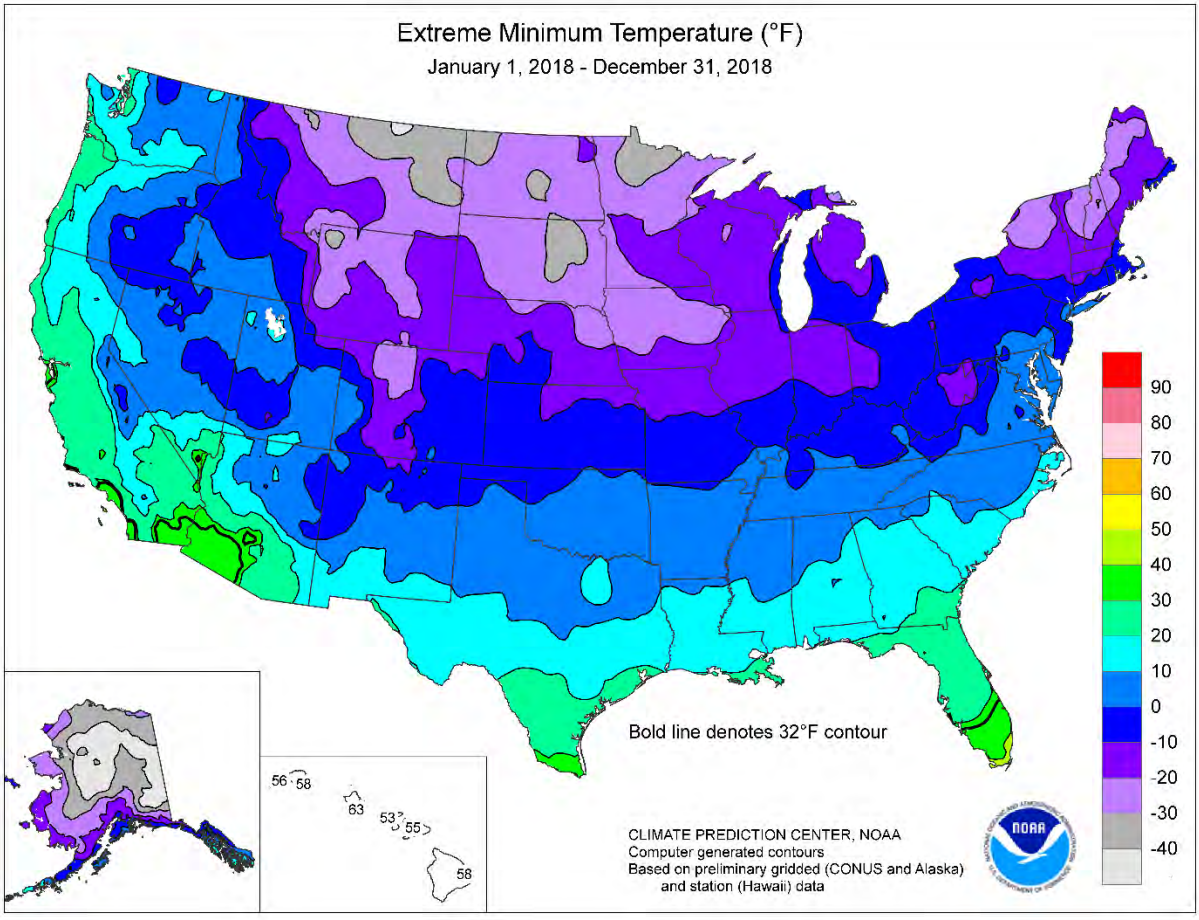
Wind Chill: A measure of how cold people feel due to the combined effect of wind and cold temperatures; the Wind Chill Index is based on the rate of heat loss from exposed skin. Both cold temperatures and wind remove heat from the body; as the wind speed increases during cold conditions, a body loses 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.



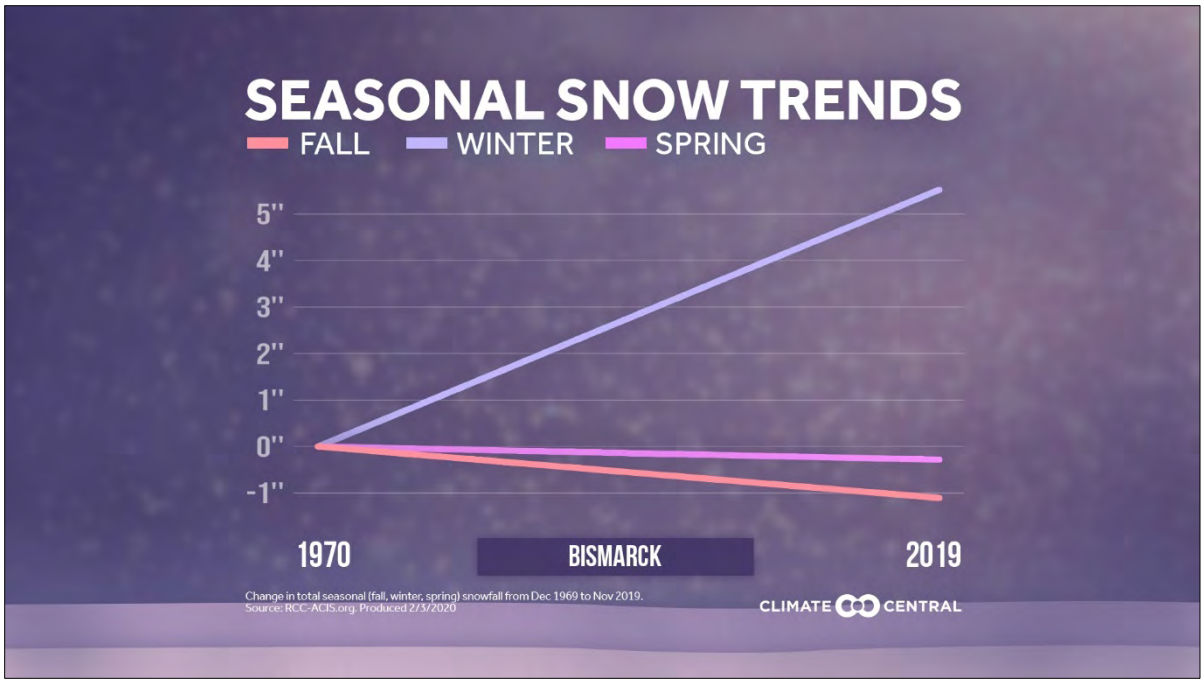
Source: National Weather Service, National Oceanic and Atmospheric Administration, Winter Storm Safety, website



Source: www.ncdc.noaa.gov

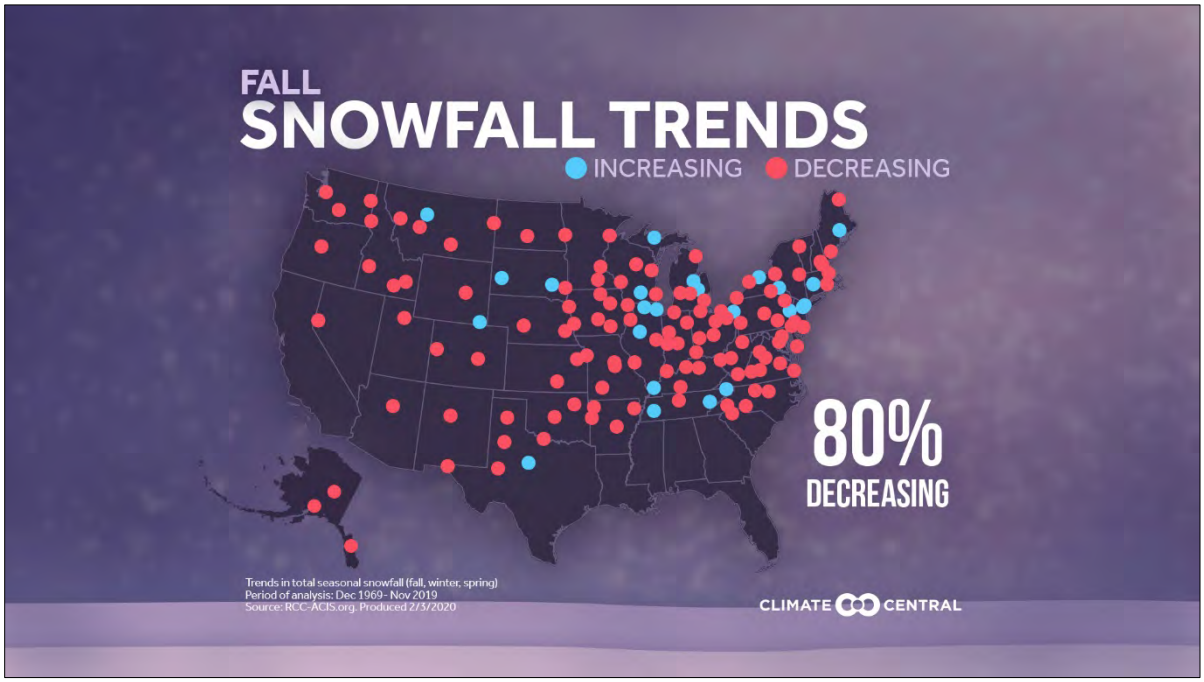


https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/12cmin0.png



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

- 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/Overcrowded Medical Facilities
- Loss of Potable Water
- Loss of Power
- 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	Dth	Inj	PrD	CrD
BURLEIGH	10/10/2019	21:00	CST-6	Heavy Snow	0	0	0.00K	0.00K
BURLEIGH	03/13/2019	22:00	CST-6	Blizzard	0	0	0.00K	0.00K
BURLEIGH	03/09/2019	01:00	CST-6	Heavy Snow	0	0	0.00K	0.00K
BURLEIGH	02/03/2019	12:00	CST-6	Heavy Snow	0	0	0.00K	0.00K
BURLEIGH	01/29/2019	00:00	CST-6	Extreme Cold/wind Chill	0	0	0.00K	0.00K
BURLEIGH	12/26/2018	09:00	CST-6	Heavy Snow	0	0	0.00K	0.00K
BURLEIGH	11/16/2018	05:00	CST-6	Heavy Snow	0	0	250.00K	0.00K
BURLEIGH	03/05/2018	07:00	CST-6	Heavy Snow	0	0	0.00K	0.00K
BURLEIGH	01/02/2017	09:00	CST-6	Heavy Snow	0	0	0.00K	0.00K
BURLEIGH	12/25/2016	14:00	CST-6	Blizzard	0	0	0.00K	0.00K
BURLEIGH	12/05/2016	20:00	CST-6	Blizzard	0	0	0.00K	0.00K
BURLEIGH	11/27/2016	22:00	CST-6	Heavy Snow	0	0	0.00K	0.00K
BURLEIGH	03/31/2014	05:00	CST-6	Blizzard	0	0	0.00K	0.00K
BURLEIGH	03/01/2014	00:00	CST-6	Extreme Cold/wind Chill	0	0	0.00K	0.00K
BURLEIGH	01/26/2014	07:00	CST-6	Blizzard	0	0	0.00K	0.00K
BURLEIGH	01/22/2014	21:00	CST-6	Extreme Cold/wind Chill	0	0	0.00K	0.00K
BURLEIGH	01/04/2014	04:00	CST-6	Extreme Cold/wind Chill	0	0	0.00K	0.00K
BURLEIGH	12/06/2013	21:00	CST-6	Extreme Cold/wind Chill	0	0	0.00K	0.00K
BURLEIGH	12/03/2013	03:00	CST-6	Heavy Snow	0	0	0.00K	0.00K
BURLEIGH	04/14/2013	09:00	CST-6	Blizzard	0	0	0.00K	0.00K
BURLEIGH	04/14/2013	03:00	CST-6	Winter Storm	0	0	0.00K	0.00K
BURLEIGH	01/30/2013	20:00	CST-6	Extreme Cold/wind Chill	0	0	0.00K	0.00K
BURLEIGH	01/20/2013	20:00	CST-6	Extreme Cold/wind Chill	0	0	0.00K	0.00K
BURLEIGH	11/10/2012	10:00	CST-6	Heavy Snow	0	0	0.00K	0.00K
BURLEIGH	02/28/2012	23:00	CST-6	Heavy Snow	0	0	0.00K	0.00K
BURLEIGH	01/18/2012	06:00	CST-6	Extreme Cold/wind Chill	0	0	0.00K	0.00K
BURLEIGH	04/30/2011	13:00	CST-6	Blizzard	0	0	0.00K	0.00K
BURLEIGH	04/14/2011	19:00	CST-6	Heavy Snow	0	0	0.00K	0.00K
BURLEIGH	03/22/2011	10:00	CST-6	Winter Storm	0	0	0.00K	0.00K
BURLEIGH	03/11/2011	13:00	CST-6	Blizzard	0	0	0.00K	0.00K

BURLEIGH	02/08/2011	00:00	CST-6	Extreme Cold/wind Chill	0	0	0.00K	0.00K
BURLEIGH	02/01/2011	18:00	CST-6	Extreme Cold/wind Chill	0	0	0.00K	0.00K
BURLEIGH	02/01/2011	00:00	CST-6	Extreme Cold/wind Chill	0	0	0.00K	0.00K
BURLEIGH	01/31/2011	16:00	CST-6	Extreme Cold/wind Chill	0	0	0.00K	0.00K
BURLEIGH	10/26/2010	23:00	CST-6	Blizzard	0	0	0.00K	0.00K
BURLEIGH	05/06/2010	22:00	CST-6	Winter Weather	0	0	0.00K	0.00K
BURLEIGH	04/02/2010	04:00	CST-6	Winter Storm	0	0	2.000M	0.00K
BURLEIGH	03/09/2010	12:00	CST-6	Winter Weather	0	0	0.00K	0.00K
BURLEIGH	01/25/2010	09:00	CST-6	Blizzard	0	0	0.00K	0.00K
BURLEIGH	01/22/2010	12:00	CST-6	Winter Storm	0	0	0.00K	0.00K
BURLEIGH	01/21/2010	06:00	CST-6	Winter Weather	0	0	0.00K	0.00K
BURLEIGH	01/06/2010	21:00	CST-6	Extreme Cold/wind Chill	0	0	0.00K	0.00K
BURLEIGH	01/05/2010	15:00	CST-6	Winter Storm	0	0	0.00K	0.00K
BURLEIGH	03/30/2007	05:00	CST-6	Ice Storm	0	0	25.00K	0.00K
BURLEIGH	12/30/2006	04:00	CST-6	Heavy Snow	0	0	40.00K	0.00K
BURLEIGH	01/20/2006	07:00	CST	Winter Weather	0	0	15.00K	0.00K
BURLEIGH	12/29/2005	11:45	CST	Winter Weather	0	0	25.00K	0.00K
MC KENZIE	11/20/1997	18:00	CST	Winter Weather	1	12	20.00K	0.00K
BURLEIGH	04/04/1997	18:00	CST	Blizzard	0	1	2.500M	0.00K
BURLEIGH	01/09/1997	04:00	CST	Blizzard	0	5	1.530M	0.00K
BURLEIGH	01/04/1997	06:00	CST	Blizzard	0	2	250.00K	0.00K
BURLEIGH	01/29/1996	12:00	CST	Cold/wind Chill	1	0	0.00K	0.00K
Totals:					2	20	6.655M	0.00K

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

Some of the more significant events include:

November 16, 2018 – Southwest Burleigh County received six inches of snow. Over 90 traffic accidents occurred in the city of Bismarck resulting in three indirect injuries.

November 2, 2017 – Wilton received 14" of snow.

November 27, 2016: – Bismarck received 18.7" of snow.

April 2, 2010 – Five to twelve inches of heavy wet snow and sleet fell across Burleigh County. The combination of strong winds and the wet snow resulted in damages to electrical utilities, causing power outages across the county. In some areas it took several days to restore power. Preliminary damage assessments estimated there was around two million dollars in damage from this storm for Burleigh County. Western portions of the county were hit the hardest.

March 30, 2007 – One quarter to one half inch of freezing rain fell across Burleigh County, creating ice covered and dangerous roadways. A few brief power outages occurred in the Bismarck area due to broken tree limbs falling onto power lines.

December 30, 2006 – Ten inches of snow fell at National Weather Service Bismarck. At least 41 reports of accidents or vehicles in the ditches.

December 19, 2005 – Snow amounts totaled three to five inches over the area and a snow advisory was in effect. Forty accidents were reported in Bismarck, Burleigh County. Two people were injured (indirect) in one of the Bismarck accidents.

January 9, 1997 – Blizzard with one fatality and $1,530,556 in property damage.

April 4, 1997 – Blizzard with $1,354,545 in property damage.

March 23, 1996 – An early spring snowstorm moved up out of the 4-corners region of the country to bring another round of severe winter weather to the northern plains. Snowfall totals from the area include Minot AFB at 7 inches...Dickinson and Jamestown at 7.5 inches...Williston at 8 inches...Glen Ullin with 12 inches and Bismarck with 13 inches. I-94 in Morton County was reported to have 6-foot snowdrifts blocking lanes...and I-94 was closed from Saturday morning to Monday morning. Many travelers ended up being stranded for the weekend in North Dakota. Due to the warm weather received a few days before...roadways were warm. When the storm began...strong northeast to east winds blew the snow across the road...leaving the roadway wet. When the temperature began to fall, roadways became extremely icy. There were numerous reports of vehicles in the ditch, and a few rollovers were also reported. Many school across western and central North Dakota had Monday (25th) off due to the slow progress of the snow removal. Winds during the weekend averaged between 20 and 30 mph with higher gusts at times.

January 29, 1996 – A 57 year old Bismarck man died from a heart attack while operating a snow blower. The day before the man died, the Bismarck area received 5 inches of snow. On the day he died, high temperatures were in the teens below zero with wind chills from 40 to 60 below.

April 25, 1994 – A late season winter storm came a few days after temperatures of 80 degrees. Parts of southern North Dakota received almost a foot of heavy, wet snow. Some thunder occurred with the snowfall. Winds of 25 to 45 MPH caused blizzard conditions at times, and snow drifts three feet high. This late storm brought record seasonal snowfall to many parts of the state. Snowfall for the winter season topped 100 inches in some places. The storm closed schools and businesses, and shut down travel. Property damage from this storm is estimated at $50,000.

March 22, 1994 – Up to 14 inches of heavy, wet snow fell over much of southern North Dakota. The snow began in southwest and south central North Dakota the night of the 22nd, persisted throughout the day on the 23rd and lasted late into the night. The heaviest snowfall occurred in the southwest and south central sections, near the South Dakota border. Twelve inches of snow was reported in Bowman, in the southwest corner of the state. About eight inches of snow fell in the cities of Bismarck and Fargo.

November 22, 1993 – A slow moving and enormous storm over North America brought record single-storm snowfall to a large part of North Dakota. Over two feet of snow fell over a large part of central and southeastern North Dakota and most of North Dakota had over a foot of snow from this storm. The greatest snowfall amount was reported at Oakes, in Dickey County in southeastern North Dakota, 31 inches. At the National Weather Service office in Bismarck, 28.3 inches of snow was measured during the 108-hour snow event. This amount set a new single storm record for snow in Bismarck. The snow began the evening of the 22nd and did not end until the morning of the 27th. Except for about six hours during the day on the 26thm the snow was continuous through this period. The snowfall was intermittent over most of North Dakota during this lengthy evening. Fortunately, the wind was only 10 to 25 MPH during this storm, so it was well below blizzard conditions and blowing and drifting snow was not a problem. The storm occurred during the week of Thanksgiving, so many travelers were stranded. The prolonged snowfall kept snow removal crews working around the clock, and a few motorists crashed into the snowplows. Out in the rural areas, some farm buildings collapsed in the heavy snow. Property damage from this storm is estimated at $500,000.

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

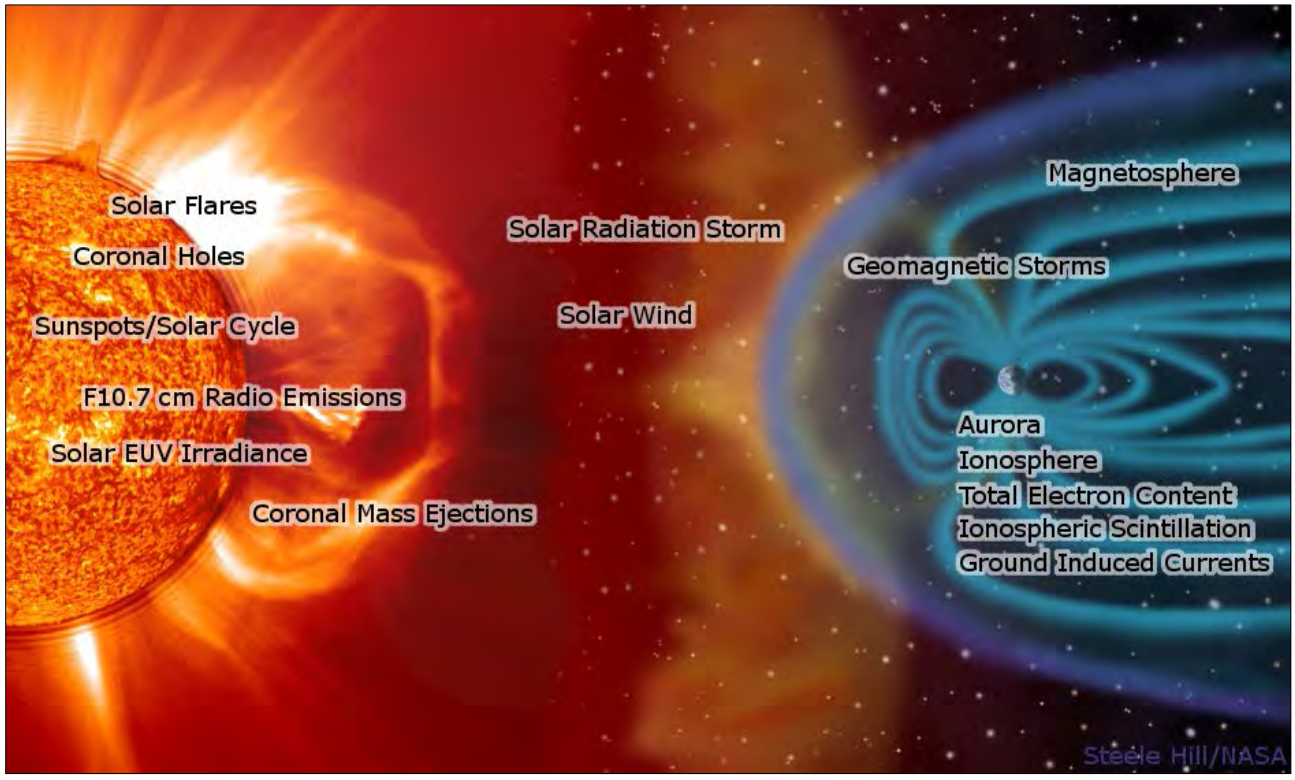
Scale	Description	Effect	Physical measure (Flux level of >= 10 MeV particles)	Average Frequency (1 cycle = 11 years)
S 5	Extreme	**Biological:** Unavoidable high radiation hazard to astronauts on EVA (extra-vehicular activity); passengers and crew in high-flying aircraft at high latitudes may be exposed 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.

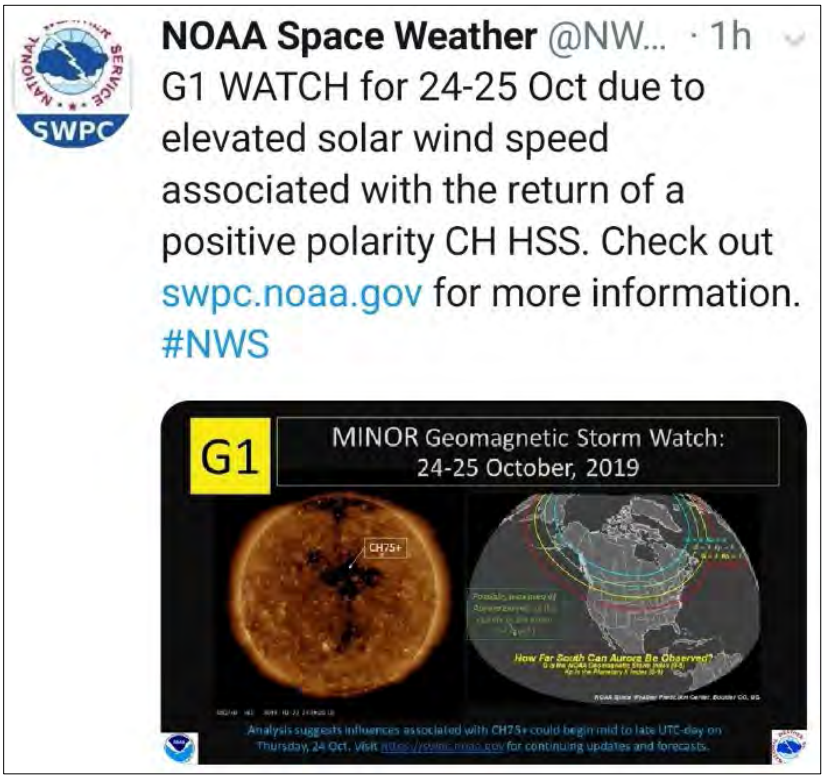
Satellite Drag

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

- 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
- 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
(including vehicular, railway, and aircraft accidents)

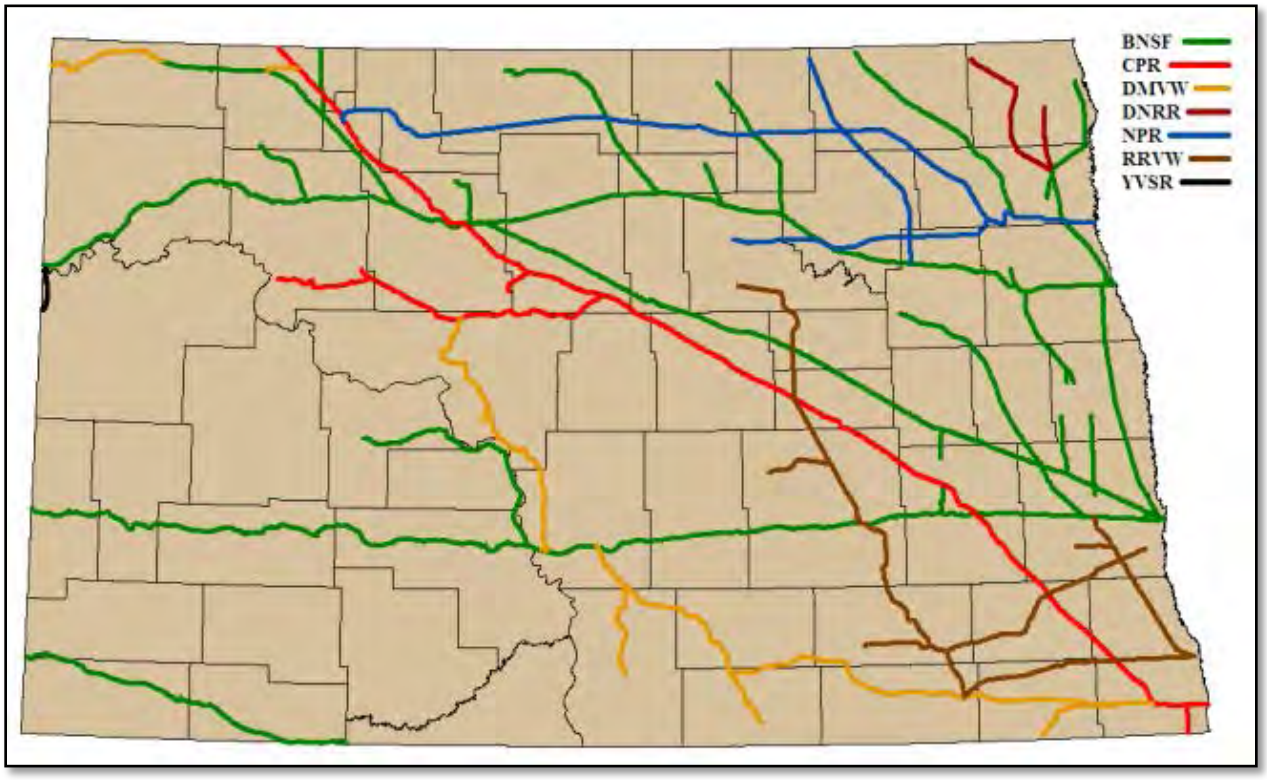
Frequency	Likely (10-100% probability in the next year, or at least 1 chance in next 100 years.)
Severity	Negligible (Less than 10% of jurisdiction affected)
Risk Class	C
Seasonal Pattern	None
Duration	Hours
Speed of Onset	No warning
Location	Countywide

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

Burleigh County has one municipal airport, railroads, and several major highways.

Railroad

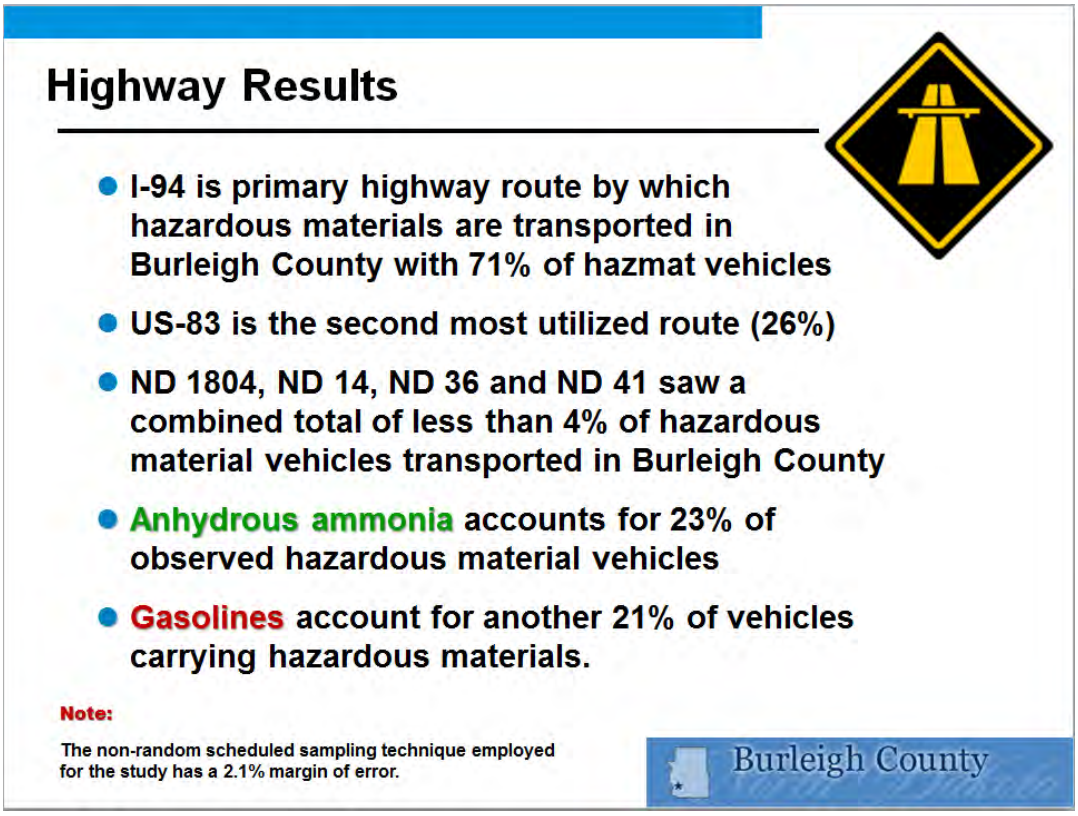
Two railroads traverse the county: Burleigh Northern Santa Fe (BNSF) and the Dakota, Missouri Valley Western Railroad (DMVW).



Source: ND State Rail Plan, December 2007

Vehicle

Interstate 94 is a primary, east/west transportation route intersecting Burleigh County and the City of Bismarck and is north of the City of Lincoln. U.S. Highway 83 is the second most utilized route and runs north/south, intersecting Burleigh County and the Cities of Bismarck and Wilton. The most predominant products observed in the study were anhydrous ammonia and gasolines. (See Attachment 3, Major Roadways in Burleigh County)



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

Identified Impacts

- Blocked Roads
- Business Interruptions
- Delayed Emergency Response
- Evacuation (Localized)
- Explosion
- HAZMAT Release
- Increased Public Safety Runs
- Loss of Economy
- Loss/Overcrowded Medical Facilities
- Mass Casualties
- Property Damage

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

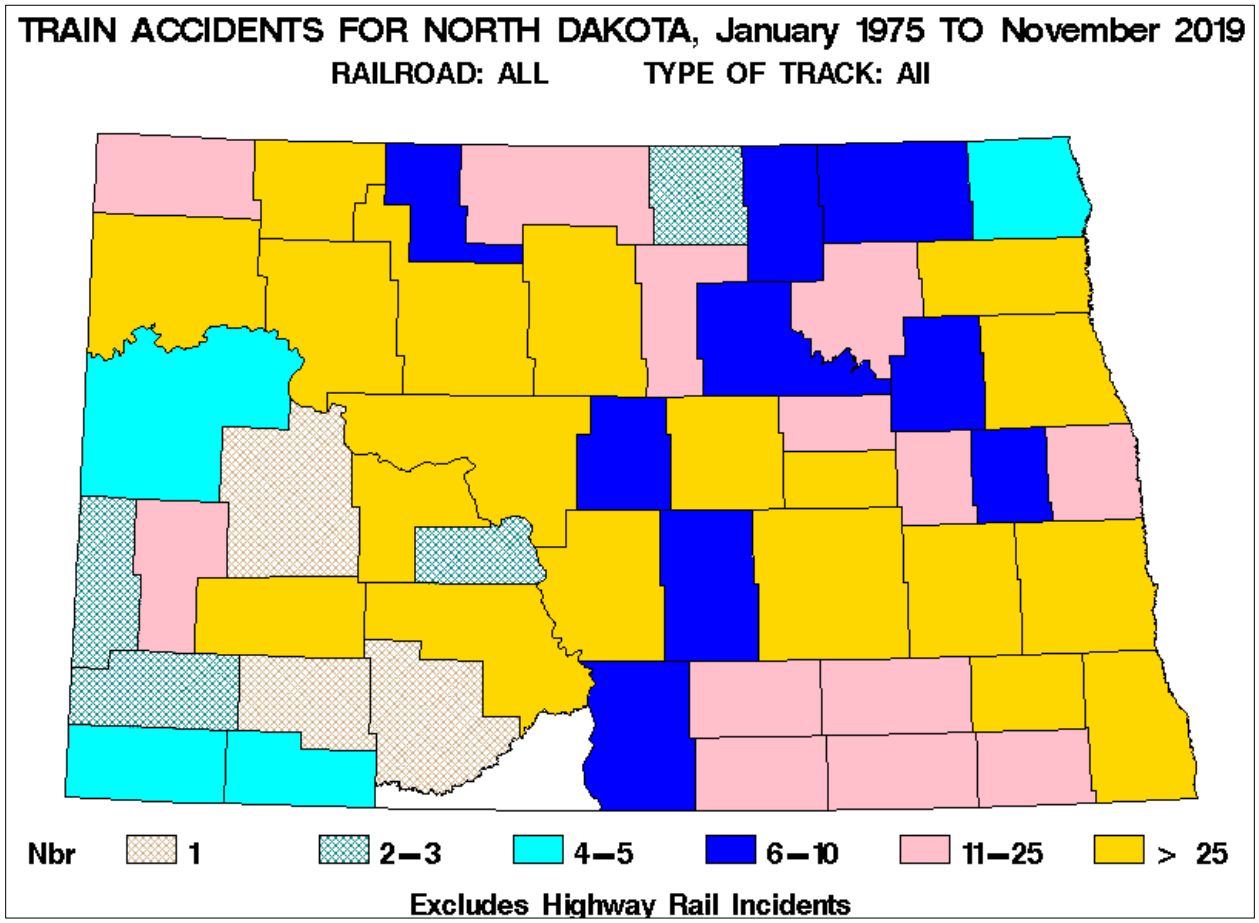
Aviation

Report(s)	Event Date	Location	Make/Model	Registration Number	NTSB No.	Event Severity
Final Report PDF | HTML Data Summary (PDF)	04/04/2010	Bismarck, ND	MAULE M-5-210C	N62040	CEN10CA191	Nonfatal
Final Report PDF | HTML Data Summary (PDF)	07/23/2009	Bismarck, ND	RAYTHEON AIRCRAFT COMPANY C90A	N405DD	CEN09CA470	Nonfatal
Final Report PDF | HTML Data Summary (PDF)	06/04/2007	Bismarck, ND	LEARJET 36	N136DH	ENG07IA030	Incident
Final Report PDF | HTML Data Summary (PDF)	05/03/2005	Bismarck, ND	Piper PA-31T	N2338V	CHI05LA109	Nonfatal
Final Report PDF | HTML Data Summary (PDF)	08/06/2000	Bismarck, ND	Summers RV4	N131DS	CHI00LA246	Nonfatal
Final Report PDF | HTML Data Summary (PDF)	07/20/1998	Bismarck, ND	Cessna R182	N9142C	CHI98LA266	Nonfatal
Final Report PDF | HTML Data Summary (PDF)	04/07/1998	Bismarck, ND	Cessna 208B	N868FE	CHI98FA119	Fatal(1)
Final Report PDF | HTML Data Summary (PDF)	03/10/1993	Bismarck, ND	BELLANCA 7GCBC	N88384	CHI93LA128	Nonfatal
Final Report PDF | HTML Data Summary (PDF)	06/01/1991	Bismarck, ND	CESSNA 172P	N5478K	CHI91DTG01	Fatal(1)
Final Report PDF | HTML Data Summary (PDF)	12/19/1987	Bismarck, ND	CESSNA T210R	N7381U	DEN88LA038	Nonfatal

Report(s)	Event Date	Location	Make/Model	Registration Number	NTSB No.	Event Severity
Final Report PDF | HTML Data Summary (PDF)	03/06/1987	Bismarck, ND	BEECH 58	N9025V	DEN87LA062	Nonfatal
Final Report PDF | HTML Data Summary (PDF)	02/06/1986	Bismarck, ND	PIPER PA-34-200	N55654	DEN86FA075	Fatal(1)
Final Report PDF | HTML Data Summary (PDF)	11/01/1985	Bismarck, ND	BEECH A36TC	N3663K	DEN86LA017	Nonfatal
Final Report PDF | HTML Data Summary (PDF)	09/30/1984	Bismarck, ND	BEECH C24R	N6703W	DEN84LA304	Nonfatal
Final Report PDF | HTML Data Summary (PDF)	12/14/1983	Bismarck, ND	MOONEY M20J	N1151N	DEN84FA042	Nonfatal
Final Report PDF | HTML Data Summary (PDF)	08/22/1982	Bismarck, ND	CESSNA 190	N3004B	DEN82DA171	Nonfatal
Final Report PDF | HTML Data Summary (PDF)	05/06/1982	Bismarck, ND	CESSNA 402A	N4504Q	DEN82DA079	Nonfatal

Source: National Transportation Safety Board website

Railroad



Source: Federal Railroad Administration Office of safety Analysis website

County	Totals				Type of Accident			Causes				
	Accs	Kld	Inj	Reportable Damage	Coll	Der	Othr	Eqp	Hmn	Othr	Sig	Trk
ADAMS	5	0	0	1,854,836	-	5	-	3	1	-	-	1
BARNES	45	1	4	4,010,565	-	41	4	12	9	4	-	20
BENSON	7	0	2	1,147,455	-	7	-	-	-	-	-	7
BILLINGS	13	0	1	3,088,938	-	10	3	4	3	-	-	6
BOTTINEAU	12	0	1	1,434,651	-	12	-	-	-	3	-	9
BOWMAN	4	0	0	437,139	-	4	-	1	-	-	-	3
BURKE	40	0	1	1,578,793	3	35	2	3	10	6	-	21
BURLEIGH	31	0	5	7,489,185	-	28	3	7	3	4	-	17
CASS	139	1	10	35,987,825	9	114	16	33	27	10	-	69
CAVALIER	9	0	1	628,423	-	9	-	1	1	1	-	6
DICKEY	24	0	0	1,791,838	1	23	-	1	5	2	-	16
DIVIDE	20	1	0	527,609	-	20	-	-	1	-	-	19
DUNN	1	0	0	17,020	-	1	-	-	-	-	-	1
EDDY	12	0	0	768,468	-	10	2	5	3	2	-	2
EMMONS	6	0	0	117,500	-	6	-	-	-	-	-	6
FOSTER	29	0	8	8,527,796	-	25	4	7	5	4	-	13
GOLDEN VALLEY	3	0	0	159,281	-	3	-	2	1	-	-	-
GRAND FORKS	85	0	5	4,282,629	16	62	7	11	34	6	-	34
GRANT	1	0	0	8,401	-	1	-	-	-	-	-	1
GRIGGS	17	0	1	7,686,221	-	15	2	5	2	5	-	5
HETTINGER	1	0	0	3,733	1	-	-	-	-	1	-	-
KIDDER	6	0	0	2,638,666	-	5	1	3	-	1	-	2
LA MOURE	12	0	1	455,857	-	12	-	-	1	-	-	11
LOGAN	16	0	1	669,858	-	16	-	-	1	1	-	14
MCHENRY	65	0	2	7,212,742	4	55	6	16	13	8	-	28
MCINTOSH	11	0	0	1,226,759	-	11	-	-	2	-	-	9
MCKENZIE	4	0	2	51,636	-	4	-	1	-	-	-	3
MCLEAN	30	1	4	2,781,107	1	28	1	5	5	3	-	17
MERCER	36	0	0	1,876,231	2	31	3	3	4	6	-	23
MORTON	88	1	4	9,695,838	18	57	13	13	36	7	-	32
MOUNTRAIL	37	1	2	7,965,982	-	32	5	9	8	3	-	17
NELSON	6	0	0	243,453	1	5	-	-	1	1	-	4
OLIVER	3	0	0	601,001	-	3	-	-	-	-	-	3
PEMBINA	5	0	0	90,844	-	5	-	-	-	-	-	5
PIERCE	19	0	0	3,836,574	-	15	4	10	2	4	-	3
RAMSEY	24	0	3	967,281	1	19	4	4	7	2	-	11
RANSOM	27	0	0	1,107,501	3	20	4	2	10	5	-	10
RENVILLE	7	0	0	540,065	-	7	-	-	-	-	-	7
RICHLAND	50	0	2	4,522,980	1	46	3	9	8	2	-	31
ROLETTE	2	0	0	30,930	-	2	-	-	1	1	-	-
SARGENT	25	0	0	3,238,352	-	25	-	3	1	2	-	19
SHERIDAN	8	0	0	139,510	-	8	-	-	-	1	-	7
SLOPE	3	0	0	52,140	1	2	-	2	-	-	-	1
STARK	39	2	2	7,244,589	2	36	1	10	12	3	-	14
STEELE	9	0	4	1,518,838	1	8	-	3	-	2	-	4
STUTSMAN	65	0	3	6,159,579	7	49	9	16	13	10	-	26
TOWNER	10	0	0	1,509,159	-	9	1	-	2	1	-	7
TRAILL	16	0	1	1,203,436	1	13	2	2	4	4	-	6
WALSH	29	0	2	3,075,466	-	29	-	1	3	-	-	25
WARD	139	1	1,450	10,406,028	23	92	24	31	60	11	2	35
WELLS	53	0	0	6,278,629	10	37	6	14	20	8	-	11
WILLIAMS	49	0	0	17,071,492	3	36	10	13	17	9	-	10

Causes: Eqp=Equipment Defect Hmn=Human factor Sig=Signal Defect Trk=Track Defect Othr=Other
Excludes Highway Rail Incidents

March 18, 2011 – An eight-car Burlington Northern Santa Fe train derailment at the 100 block of south Airport Road spilled tons of coal and damaged 13 railcars.

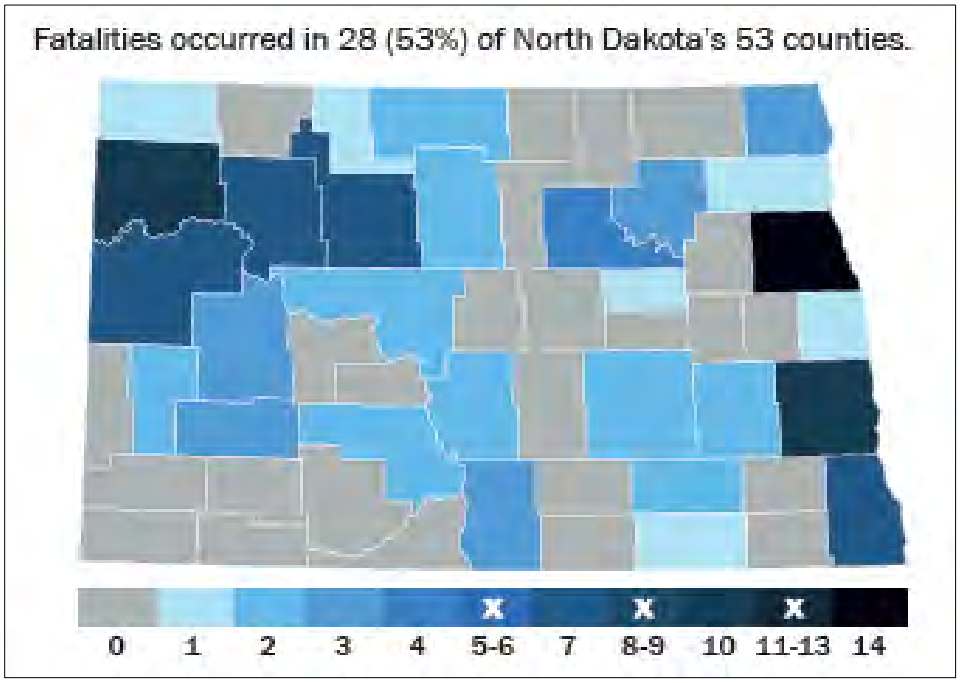
July 10, 2010 - A 31-car Burlington Northern Santa Fe train derailment east of Bismarck (near Apple Creek between 66th St and 93rd St) spilled tons of coal and no injuries were reported.

July 17-2006 – A 20-car Burlington Northern Santa Fe train derailment near McKenzie spilled soybeans.

July 5, 2003 – A Burlington Northern Santa Fe train derailment south of the ND State Penitentiary spilled 36 cars of coal from a 123-car train. Each car was estimated to contain 100 tons of coal. No injuries reported.

September 5, 2002 – A seven-car Dakota Missouri Valley and Western Railroad train derailment at the intersection of Rosser Avenue and 35th Street N, Bismarck resulted in a spill of fly ash.

Vehicle



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

Attachments

Separate document.

Appendices

Separate document.

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