

# Tornado – Hazard Profile

*See Severe Summer Weather Hazard Profile regarding additional hazards relating to summer weather.*

## Description

A tornado is a violently rotating column of air extending from a thunderstorm to the ground. The term "tornado" was derived from the Latin word, "tornare" which means "to make round by turning." A tornado is initially a cloud within the thunderstorm, composed of condensed water vapor. A tornado forms when a change in wind direction and increase in wind speed with increasing height creates a horizontal spinning effect in the lower atmosphere. This area of rotation may be two to six miles wide, extending through much of the storm. Most tornadoes form within this area of strong rotation when the rising air within the thunderstorm updraft tilts the rotating air from horizontal to vertical. Tornadoes may appear nearly transparent until the circulating wind in the funnel reaches the ground and picks up debris that eventually darkens the whole funnel.

Tornadoes are nature's most violent windstorm. In an average year, the United States experiences an average of 1,200 tornadoes that result in an average of 70 to 80 deaths and 1,500 injuries. Most fatalities occur when people are struck by flying debris or do not leave mobile homes and automobiles. Tornadoes can vary greatly in shape, size, and wind speed. Most tornadoes, 88 percent, have wind speeds less than 110 mph and a lifetime of less than ten minutes. These weak tornadoes result in less than five percent of tornado deaths. The average tornado moves from southwest to northeast, but tornadoes have been known to move in any direction. The average forward speed is 30 mph, but may vary from nearly stationary to 70 mph. Approximately 11 percent of all tornadoes have wind speeds between 110 and 205 mph and result in nearly 30 percent of all tornado deaths. These strong tornadoes may last 20 minutes or longer. Less than one percent of all tornadoes have resulted in 70 percent of all tornado deaths. These violent tornadoes can be over a mile wide with documented rotating winds of more than 250 mph, and they can have lifetimes exceeding one hour and stay on the ground for over 50 miles.

## Fujita Scales

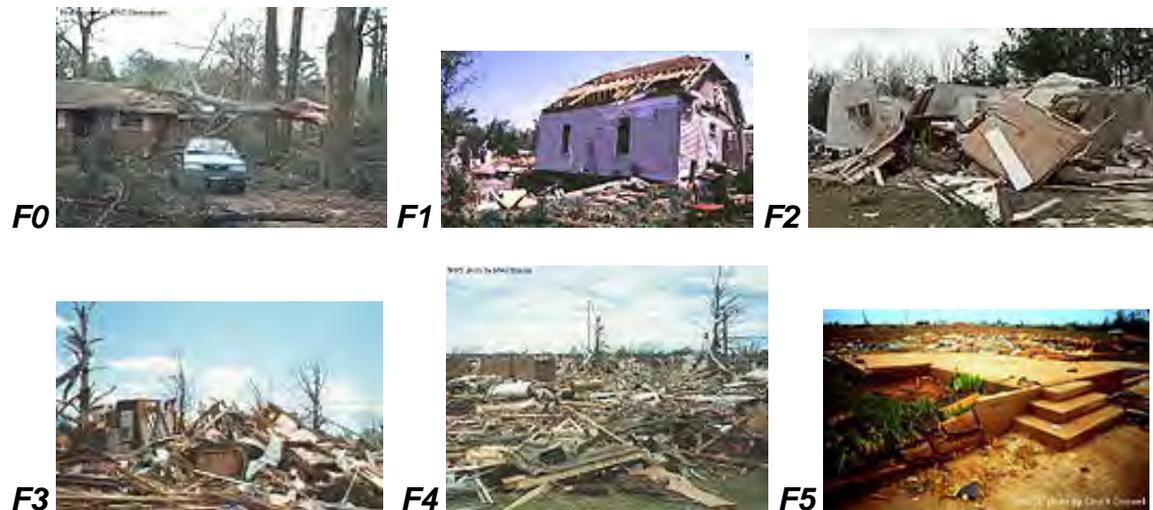
A funnel cloud is the rotating column of air extending out of a cloud base, but not yet touching the ground. The funnel cloud does not become a tornado until it touches the ground. Once in contact with the surface, it can create great damage over a small area. In 1971, Dr. Theodore Fujita developed the Fujita tornado damage scale to categorize various levels of tornado damage. In fact, Dr. Fujita’s first major case study on tornado damage was the 1957 Fargo tornado. (North Dakota State Water Commission, 2007)

In 2006, enhancements to this scale resulted in more accurate categorizations of damage and the associated wind speeds. The Enhanced Fujita (EF) scale was implemented in February 2007.

## Tornado Scales

Fujita Scale (through January 2007)		Enhanced Fujita Scale (Feb 2007 - current)	
Scale	Estimated Wind Speed	Scale	Estimated Wind Speed
F0	<73 mph	EF0	65-85 mph
F1	73-112 mph	EF1	86-110 mph
F2	113-157 mph	EF2	111-135 mph
F3	158-206 mph	EF3	136-165 mph
F4	207-260 mph	EF4	166-200 mph
F5	261-318 mph	EF5	>200 mph

Source: National Climatic Data Center, 2013.



Photos Source: Wikipedia



Figure 1A - Safe room wind speed map 2015 (courtesy of the ICC).

<https://iibec.org/giving-tornadoes-their-due/>

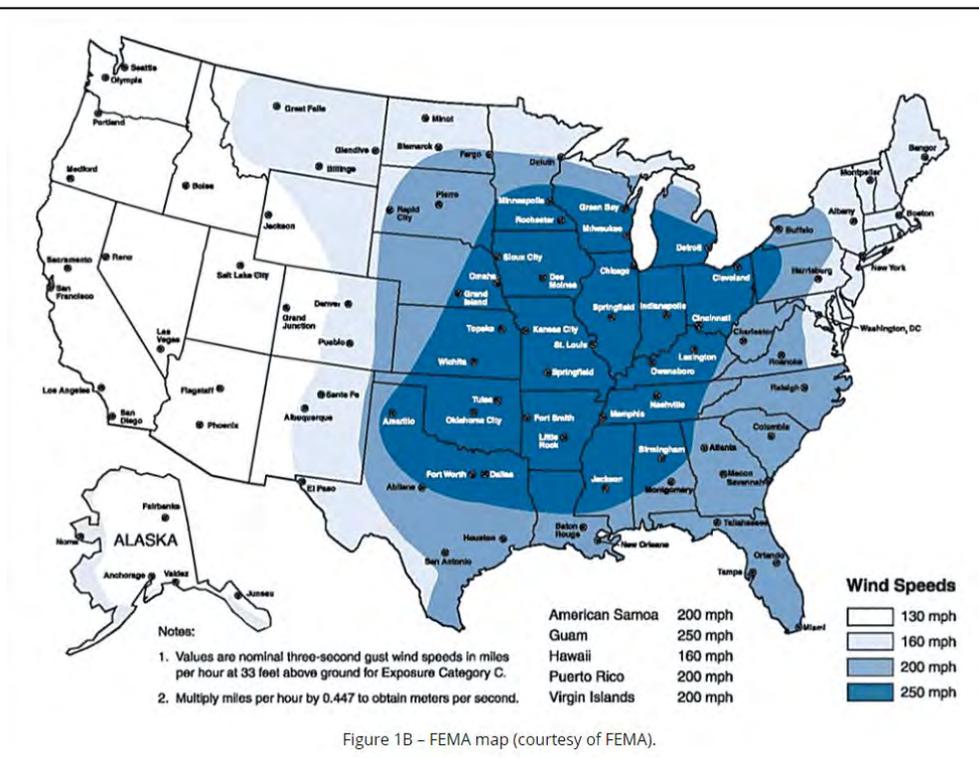


Figure 1B - FEMA map (courtesy of FEMA).

**Burleigh County Tornado Statistics** - January 1, 1950 through December 31, 2024:

- Total number of tornadoes: 49
- Deaths: 1 (1 on 07-01-1952)
- Injuries: 28 (26 on 07-01-1952, 2 on 11-01-2000)
- Highest rated tornado (EF) 2007-2024: EF1 (86 to 110 mph) on July 16, 2011 5:35 PM CDT to 5:46 PM CDT. Length: 4.05 miles from 8.5 miles north of Regan to 12.5 miles north of Regan. Width: 50 yards. Deaths: 0. Injuries: 0
- Highest rated tornado (F) 1950-2024: F4 (207-260 mph) on July 01, 1952 (data lists two F4 tornadoes on 07-01-1952). Length: 28 miles. Width: 150 yards. Deaths: 1. Injuries: 26.

**Estimated Annual Probability of a tornado of any magnitude Based on Historical Occurrences: \*2%**

**\*This estimate is for planning purposes only** – and is based on the following limited and short-term data and assumptions: There has been an average of 0.7 tornado events per year in Burleigh County from 1996 to 2025 (not all tornadoes are reported). The ratio or target size of Bismarck compared to the geographic square miles of Burleigh County is 2%. It’s assumed all of Burleigh County has equal chances.

When considering the statewide statistics regarding intensity of tornadoes since 1950, a majority of the estimated chance is for the weaker tornadoes (EF0 and EF1).

**Annual Tornado Frequency in ND since 1950, by EF Rating:**

Magnitude	Frequency
EF0/F0	13.4 per year
EF1/F1	5.4 per year
EF2/F2	2.0 per year
EF3/F3	0.6 per year
EF4/F4	0.2 per year
EF5/F5	0.04 per year

Source: NCEI, 2023

The peak time of the year for tornadoes in North Dakota is from the end of May through the beginning of August, with most tornadoes in the state occurring between 3:00 p.m. and 11:00 p.m. in the months of June, July, and August; however, tornadoes have been reported as early as March 26 and as late as November 1.



**Statewide Tornado Statistics\_(1950 through 2024):**

- Tornado deaths 30.
- Tornado injuries 388.
- Earliest tornado (calendar year) March 26, 2003 Stutsman County.
- Latest tornado (calendar year) November 1, 2000 Bismarck/Mandan area.
- Most tornadoes in a year is 61 in 1999.
- Least tornadoes in a year is 2 in 1950, 1951, and 1961.
- Most tornadoes in a calendar day is 24 on June 11, 1976.
- Most tornadoes in any 24-hour period is 29 on June 11-12, 1976.
- There were 30 tornadoes, 24 on June 11 and 6 on June 12. One occurred outside the 24-hour window.
- NCDC web site is missing June 1993 (11 tornadoes in 12 counties) and July 1993 (22 tornadoes in 23 counties) data.
- There were 5 tornadoes in 5 counties in August for a total of 38 in 40 for the year. NCDC web site is missing 3 tornadoes in Kidder County, 07-01-1952, 06-17-1956, and 07-04-1960. They are listed for Burleigh County and based on LAT/LON most likely crossed into Kidder County.

This data was compiled from several sources and contains the best information available. Due to difficulties inherent in the collection of weather data it may not be all inclusive.

<https://www.weather.gov/bis/ndtorhistory>

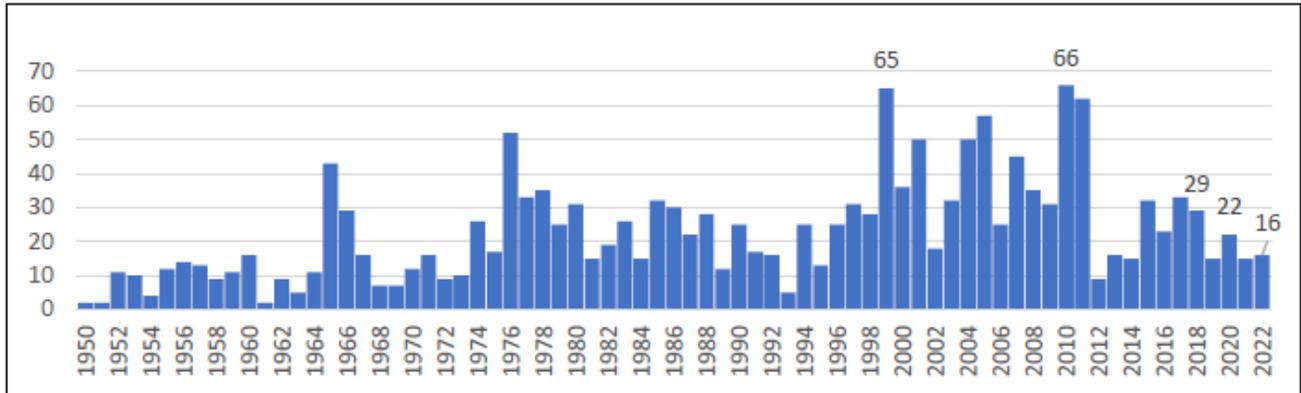
For a tornado to be counted in these statistics, it must be reported, and it is entirely possible for a tornado to occur in the state without anyone knowing it.

Note that these findings may be more indicative of the spotter networks in the state rather than the actual occurrence. The state also conducts cloud seeding operations in the western part of the state for hail suppression.

**Deadly Tornadoes in North Dakota 1950-2024**

Location	Date	Magnitude	Fatalities	Injuries
Cass County (Enderlin)	June 20, 2025	EF3	3	
Stutsman County	June 20, 2025	EF2	1	
Burleigh and Kidder Counties	July 1, 1952	F4	*2 fatalities (1 per county)	*26 injuries (total from both counties)
Morton County	May 29, 1953	F5	2 fatalities	20 injuries
Richland County	July 2, 1955	F4	2 fatalities	19 injuries
Cass County	June 20, 1957	F5	*10 fatalities	103 injuries
Cavalier County	June 24, 1966	F1	1 fatality	1 injury
Hettinger County	June 29, 1975	F4	1 fatality	4 injuries
Elgin, Grant County	July 4, 1978	F4	5 fatalities	35 injuries
12 miles South of Greene Renville County	July 23, 1997	F2	1 fatality	2 injuries
Northwood, Grand Forks County	August 26, 2007	EF4	1 fatality	18 injuries
10 miles north-northeast of Niobe, Ward County	August 12, 2010	EF3	1 fatality	1 injury

### North Dakota Tornadoes by Year, 1950 – 2022:



Source: NCEI, 2023

#### Data Limitations (statewide):

Summer storms can be such isolated events that the vulnerability to a particular area can be hard to determine. Weather data is often limited by the observations taken, and events in the National Climatic Data Center database are only recorded if reported to the National Weather Service. The addition of trained spotters to the area may improve data collection.

# Vulnerability Assessment

Vulnerability: Characteristics of community assets that make them susceptible to damage from a given hazard.

Note: Loss / Impact and Vulnerabilities are assumed to be cumulative from previous columns to the left. Tornado intensity is determined AFTER the incident and is based on level of damage.

Tornado Intensity =	<b>EF 0 - EF 1</b> <b>“Weak”</b>	<b>EF 2 - EF 3</b> <b>“Strong”</b>	<b>EF 4 – EF 5</b> <b>“Violent”</b>
<b>Probability</b>	“Possible” <i>Highest Probability (and frequency)</i>	“Possible” <i>Lower Probability (and frequency)</i>	“Unlikely” <i>Lowest Probability (and frequency)</i>
<b>Speed of Onset</b>	15 minutes approximately	15 minutes approximately	15 minutes approximately
<b>Duration</b>	Less than 30 minutes	Less than 30 minutes	Less than 30 minutes
<b>Geographic Area</b>	300 yards wide  1 to 2 miles long is typical	1 mile wide is possible but wide rare (EF3) 1 to 2 miles long Is typical – can be longer	1 mile wide is possible but rare  1 to 2 miles long is typical – can be longer
<b>Death / Injury</b>	<ul style="list-style-type: none"> <li>1. Primary Causes</li> <li>1. Flying Debris <i>Non-secure outdoor items</i></li> <li>A. Mobile home occupancy</li> <li>B. Motor Home</li> <li>C. Camp sites</li> <li>D. Being Caught Outdoors</li> <li>E. In a vehicle</li> <li>F. Insufficient shelter</li> <li>G. Windows</li> <li>H. Smaller detached buildings</li> </ul> <ul style="list-style-type: none"> <li>A. Highest vulnerability</li> </ul>	<ul style="list-style-type: none"> <li>1. Flying Debris <i>Secured items</i></li> <li>2. Structure collapse <i>Average “stick” construction</i></li> <li>A. Homes / buildings of average “stick” construction</li> <li>B. High population density within “average construction” structures</li> </ul>	<ul style="list-style-type: none"> <li>1. Flying Debris</li> <li>2. Structure collapse <i>All structures</i></li> <li>A. All Structures</li> <li>B. All structures with high population density</li> </ul>

Tornado Intensity =	EF 0 - EF 1 "Weak"	EF 2 - EF 3 "Strong"	EF 4 – EF 5 "Violent"
<b>Mass Casualty Incident</b>			Burleigh County July 1, 1952 1 Death 26 Injuries 28 miles long 150 yards wide  Also, see Table "Deadly Tornadoes in ND" on page 6
<b>Property Losses</b> (points of vulnerability – high priority)	1. Mobile home 2. Motor Home 3. Windows/doors 4. Trees	1. Homes / buildings of average "stick" construction	1. All Structures
<b>Environmental</b>	1. Debris 2. Hazardous Waste debris	1. HazMat Releases 2. Oil Refinery - Mandan	1. HazMat Releases 2. Oil Refinery - Mandan
<b>COG/COOP</b>	1. Employee / family casualties 2. Key personnel – Orders of Succession	1. Employee / Family casualties 2. Key personnel – Orders of Succession	1. Employee / Family casualties 2. Key personnel – Orders of Succession 3. Property / Building(s) Destroyed 4. Equipment destroyed
<b>Critical Facilities</b>	1. Windows 2. Garages 3. Doors 4. Large Span Roofs  Structure – depending on design / materials	1. Windows 2. Garages 3. Doors 4. Large Span Roofs  Structure – depending on design / materials	1. Response agencies (includes 911) 2. City Buildings - Airport 3. Hospitals 4. Ambulance Service

Tornado Intensity =	EF 0 - EF 1 “Weak”	EF 2 - EF 3 “Strong”	EF 4 – EF 5 “Violent”
<b>Critical Infrastructure</b>	<ol style="list-style-type: none"> <li>Electricity - Substations &amp; Overhead Power Lines</li> <li>Streets Blocked</li> <li>Communications</li> </ol>	<ol style="list-style-type: none"> <li>Electricity - Substations &amp; Overhead Power Lines</li> <li>Streets Blocked</li> <li>Communications</li> </ol>	<ol style="list-style-type: none"> <li>Electricity - Substations &amp; Overhead Power Lines</li> <li>Streets Blocked</li> <li>Communications</li> </ol>
<b>Schools</b>	<ol style="list-style-type: none"> <li>Portable Classrooms</li> <li>Windows</li> <li>Doors</li> <li>Large Span roofs</li> <li>Loss of roofing materials</li> </ol>	High end EF 3: <ol style="list-style-type: none"> <li>All Schools structurally damaged</li> <li>Loss of non-bearing walls</li> <li>Loss of load bearing walls</li> <li>Interior walls of 2<sup>nd</sup> floor or higher collapsed</li> </ol>	<ol style="list-style-type: none"> <li>Structures Destroyed</li> </ol> Most Elementary Schools (BPS) do NOT have basements for sheltering
<b>High Risk Facilities (chemical)</b>	<ol style="list-style-type: none"> <li>Windows</li> <li>Garages/doors</li> <li>Doors</li> <li>Large Span Roofs</li> </ol>	<ol style="list-style-type: none"> <li>Windows</li> <li>Garages/ doors</li> <li>Doors</li> <li>Large Span Roof</li> </ol>	<ol style="list-style-type: none"> <li>Water Treatment Plant</li> <li>Waste Water Treatment Plant</li> <li>All Haz Mat storage facilities</li> </ol>
<b>Specific Populations:</b> Public Assembly, Vulnerable / Special Populations	<ol style="list-style-type: none"> <li>Outdoor Recreation Areas</li> <li>Public Assembly (high population densities)</li> <li>Special Outdoor events</li> </ol>	<ol style="list-style-type: none"> <li>Outdoor Recreation Areas</li> <li>Public Assembly (high population densities)</li> <li>Special Outdoor Events</li> </ol>	<ol style="list-style-type: none"> <li>Outdoor Recreation Areas</li> <li>Public Assembly (high population densities)</li> <li>Special Outdoor Events</li> </ol>
<b>Economy</b> (community wide)	Minor	Moderate	Catastrophic <i>Significant recovery challenges</i>
<b>OTHER:</b>	Mobile HazMat (truck)	Mobile Hazmat	Mobile Hazmat – including railroad

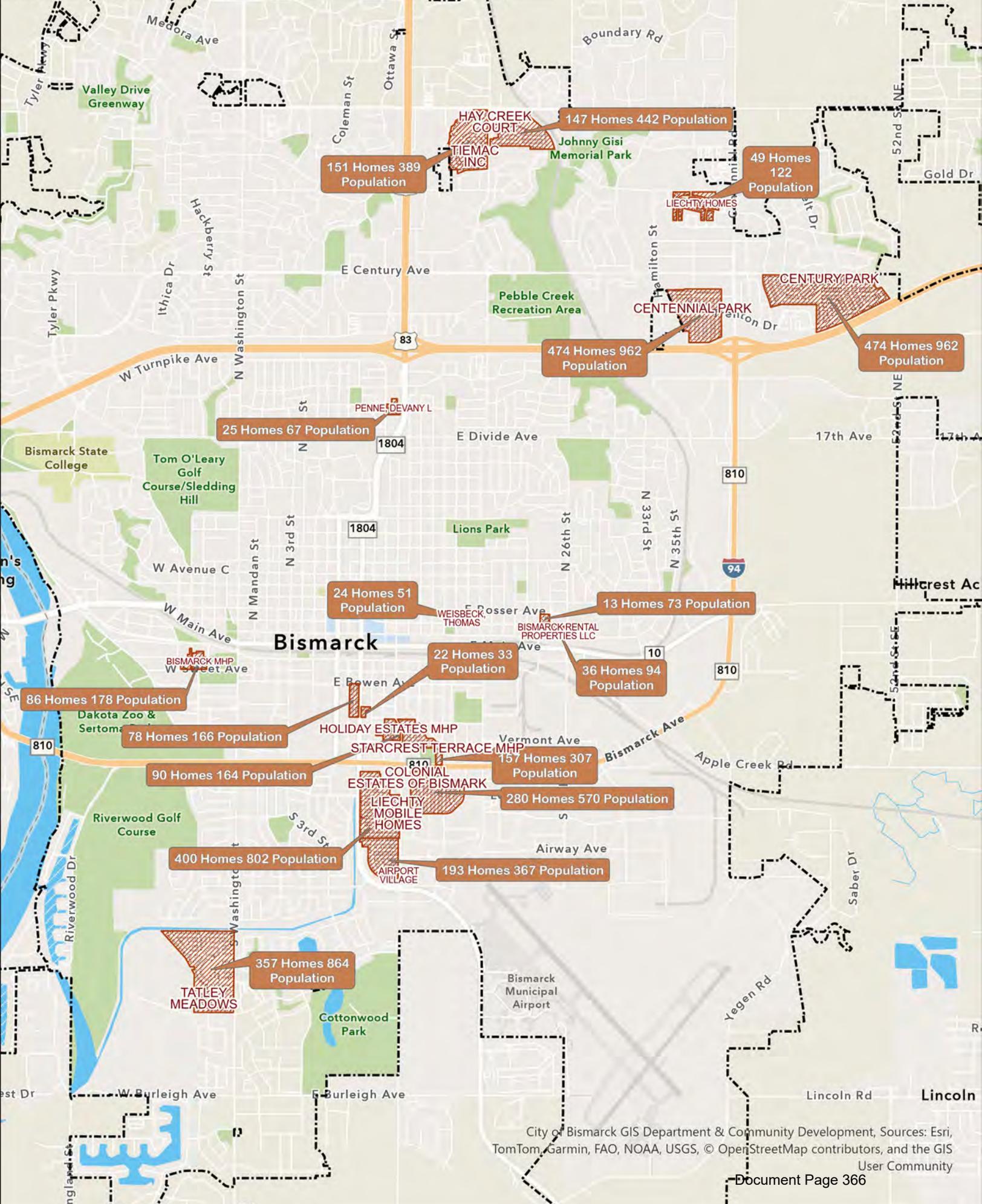
The Federal Emergency Management Agency places the majority of North Dakota in Zone II (160 mph) for structural wind design; however, southeastern and south central North Dakota are in Zone III (200 mph).

Source: Federal Emergency Management Agency, 2004 via 2014 ND DES Mitigation Plan

**Mobile Home Parks within Bismarck**

<b>NAME</b>	<b>PROPERTY ADDRESS</b>	<b>UNITS</b>	<b>POPULATION ESTIMATE</b>
Capitol Park Village	1821 N 11th St	28	49
18th St/Thayer Av	1713 E Rosser Av	28	31
Bismarck Mobile Home Park	2406 E Thayer Av	34	78
Dakota Mobile Home Park	2520 E Broadway Av	51	89
Holiday Park	600 S 9th St	109	197
Airport Village	1437 University Dr	192	404
Century Centennial	2500 Centennial Rd	265	542
Century Park	4191 E Century Av	475	956
Colonial Estates	1501 E Bismarck Ex	282	599
Hay Creek Court	4005 NE 19th St	132	263
Parkview Estates	614 W Sweet Av	87	192
North Valley	4224 N 19th St	151	335
Skyway Park Village	1119 University Dr	397	689
Stardust Terrace	725 S 12th St	254	630
Tatley Meadows	2200 S Washington St	362	769
<b>TOTAL</b>		<b>2,847</b>	<b>5,823</b>

# Bismarck DRAFT Mobile Home Map



Mobile homes are regulated by HUD. The International Building Code requirements do not apply to mobile homes. Therefore, mobile homes are exempt from this particular International Building Code: Chapter 16 Structural Design - Section 1609 Wind Loads.

International Building Code - Chapter 16 Structural Design - Section 1609 Wind Loads:

**1609.1 Applications** states “Buildings, structures and parts thereof shall be designed to withstand the minimum wind loads prescribed herein. Decreases in wind loads shall not be made for the effect of shielding by other structures.”

- 105 MPH (3 second gust) 33 feet above ground for Risk Category I Buildings and other Structures
- 115 MPH (3 second gust) 33 feet above ground for Risk Category II Buildings and other Structures
- 120 MPH (3 second gust) 33 feet above ground for Risk Category III and IV Buildings and other Structures

Source: [http://publicecodes.cyberregs.com/icod/ibc/2012/icod\\_ibc\\_2012\\_16\\_par090.htm](http://publicecodes.cyberregs.com/icod/ibc/2012/icod_ibc_2012_16_par090.htm)

The table on the following page, extracted from the 2012 International Building Code is used to identify the risk category of buildings and other structures.

**STRUCTURAL DESIGN**

structural system resulting from torsion due to eccentricity between the center of application of the lateral forces and the center of rigidity of the lateral force-resisting system.

Every structure shall be designed to resist the overturning effects caused by the lateral forces specified in this chapter. See Section 1609 for wind loads, Section 1610 for lateral soil loads and Section 1613 for earthquake loads.

**1604.5 Risk category.** Each building and structure shall be assigned a *risk category* in accordance with Table 1604.5. Where a referenced standard specifies an occupancy cate-

gory, the *risk category* shall not be taken as lower than the occupancy category specified therein.

**1604.5.1 Multiple occupancies.** Where a building or structure is occupied by two or more occupancies not included in the same *risk category*, it shall be assigned the classification of the highest *risk category* corresponding to the various occupancies. Where buildings or structures have two or more portions that are structurally separated, each portion shall be separately classified. Where a separated portion of a building or structure provides required

**TABLE 1604.5  
RISK CATEGORY OF BUILDINGS AND OTHER STRUCTURES**

RISK CATEGORY	NATURE OF OCCUPANCY
I	Buildings and other structures that represent a low hazard to human life in the event of failure, including but not limited to: <ul style="list-style-type: none"> <li>• Agricultural facilities.</li> <li>• Certain temporary facilities.</li> <li>• Minor storage facilities.</li> </ul>
II	Buildings and other structures except those listed in Risk Categories I, III and IV
III	Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to: <ul style="list-style-type: none"> <li>• Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300.</li> <li>• Buildings and other structures containing elementary school, secondary school or day care facilities with an occupant load greater than 250.</li> <li>• Buildings and other structures containing adult education facilities, such as colleges and universities, with an occupant load greater than 500.</li> <li>• Group I-2 occupancies with an occupant load of 50 or more resident care recipients but not having surgery or emergency treatment facilities.</li> <li>• Group I-3 occupancies.</li> <li>• Any other occupancy with an occupant load greater than 5,000<sup>a</sup>.</li> <li>• Power-generating stations, water treatment facilities for potable water, waste water treatment facilities and other public utility facilities not included in Risk Category IV.</li> <li>• Buildings and other structures not included in Risk Category IV containing quantities of toxic or explosive materials that:                             <ul style="list-style-type: none"> <li>Exceed maximum allowable quantities per control area as given in Table 307.1(1) or 307.1(2) or per outdoor control area in accordance with the <i>International Fire Code</i>; and</li> <li>Are sufficient to pose a threat to the public if released<sup>b</sup>.</li> </ul> </li> </ul>
IV	Buildings and other structures designated as essential facilities, including but not limited to: <ul style="list-style-type: none"> <li>• Group I-2 occupancies having surgery or emergency treatment facilities.</li> <li>• Fire, rescue, ambulance and police stations and emergency vehicle garages.</li> <li>• Designated earthquake, hurricane or other emergency shelters.</li> <li>• Designated emergency preparedness, communications and operations centers and other facilities required for emergency response.</li> <li>• Power-generating stations and other public utility facilities required as emergency backup facilities for Risk Category IV structures.</li> <li>• Buildings and other structures containing quantities of highly toxic materials that:                             <ul style="list-style-type: none"> <li>Exceed maximum allowable quantities per control area as given in Table 307.1(2) or per outdoor control area in accordance with the <i>International Fire Code</i>; and</li> <li>Are sufficient to pose a threat to the public if released<sup>b</sup>.</li> </ul> </li> <li>• Aviation control towers, air traffic control centers and emergency aircraft hangars.</li> <li>• Buildings and other structures having critical national defense functions.</li> <li>• Water storage facilities and pump structures required to maintain water pressure for fire suppression.</li> </ul>

a. For purposes of occupant load calculation, occupancies required by Table 1004.1.2 to use gross floor area calculations shall be permitted to use net floor areas to determine the total occupant load.

b. Where approved by the building official, the classification of buildings and other structures as Risk Category III or IV based on their quantities of toxic, highly toxic or explosive materials is permitted to be reduced to Risk Category II, provided it can be demonstrated by a hazard assessment in accordance with Section 1.5.3 of ASCE 7 that a release of the toxic, highly toxic or explosive materials is not sufficient to pose a threat to the public.

<b>Changes in Vulnerability</b> Since the previous plan update in 2020.	
Increase in Vulnerability	Decrease in Vulnerability
As the community continues to grows (via annexations), the existing outdoor warning siren system (sirens) may not provide for adequate coverage in those new areas, including outdoor recreational areas and residential areas.	Three new outdoor warning sirens were added in 2023. The new sirens are located in north Bismarck; one in the northwest, north central, and northeast part of Bismarck due to community growth

**Risk**

See Section 10 of this plan document for risk assessment and hazard ranking of all hazards addressed in this plan.

**Relationship to other Hazards:** A Tornado event may initiate or contribute to the cause of additional hazards including Geologic Hazard (impact to trees/vegetation promoting soil instability), Fire (interaction with power lines and causing sparks or arching), as well as transportation incidents such as Train Derailment or Aircraft Accident.

**Future Conditions**

- **Location:** The location will remain the same, with the exception of additional areas as annexed into the city.
- **Extent/Intensity:** See “Anticipated Future Climate Impact” below.
- **Frequency:** See “Anticipated Future Climate Impact” below.
- **Duration:** The duration of tornado hazards is not projected to change.

**Anticipated Future Climate Impact – Tornado Hazard**

Through the end of this century in North Dakota, expect more frequent, larger, and longer duration thunderstorms with an increase in intense rain and flooding, and an increase in relative size (areal coverage) of the impact areas of any corresponding tornadoes. Not necessarily more intense tornadoes, but tornadoes with a larger damage footprint.

<b>EF0 – EF2 Tornado Impact Damage Level Indicators</b> <a href="http://www.spc.noaa.gov/efscale/ef-scale.html">http://www.spc.noaa.gov/efscale/ef-scale.html</a>				
Type	Property Type	Expected Wind Speed	EF Scale	Description
TS	Trees – Softwood	60	EF0	Small limbs broken (up to 1” diameter)
TH	Trees – Hardwood	60	EF0	Small limbs broken (up to 1” diameter)
TH	Trees – Hardwood	74	EF0	Large branches broken (up to 3” diameter)
MHSW	Single Wide Manufactured Mobile Home	74	EF0	Loss of shingles or partial uplift of one-piece metal roof covering
MHDW	Manufacture Home – Double Wide	78	EF0	Damaged porches or carports
FR12	One and Two-Family Residences	79	EF0	Loss of roof covering material (>20%), gutters and/or awning; loss of vinyl or metal siding
MHDW	Manufacture Home – Double Wide	83	EF0	Broken Windows
TS	Trees – Softwood	87	EF1	Uprooted
MHSW	Single Wide Manufactured Mobile Home	87	EF1	Unit slides off block piers but remains upright
MHDW	Manufacture Home – Double Wide	88	EF1	Uplift of roof deck and loss of significant roof covering material (>20%)
MHSW	Single Wide Manufactured Mobile Home	89	EF1	Complete uplift of roof; most walls remain standing
TH	Trees – Hardwood	91	EF1	Uprooted
MHDW	Manufacture Home – Double Wide	93	EF1	Complete uplift of roof; most walls remain standing
MHDW	Manufacture Home – Double Wide	94	EF1	Unit slides off CMU block piers
FR12	One and Two-Family Residences	96	EF1	Broken glass in doors and windows
MHDW	Manufacture Home – Double Wide	97	EF1	Removal of entire roof structure leaving most walls standing
FR12	One and Two-Family Residences	97	EF1	Uplift of roof deck and loss of significant roof covering material (>20%); collapse of chimney; garage doors collapse inward; failure of porch or carport.
MHSW	Single Wide Manufactured Mobile Home	98	EF1	Unit rolls on its side or upside down; remains essentially intact
TS	Trees – Softwood	104	EF1	Trunks Snapped
<b>MHSW</b>	<b>Single Wide Manufactured Mobile Home</b>	<b>105</b>	<b>EF1</b>	<b>Destruction of roof and walls, leaving floor and undercarriage in place</b>
MHSW	Single Wide Manufactured Mobile Home	109	EF1	Unit rolls or vaults; roof and walls separate from floor and undercarriage
TH	Trees – Hardwood	110	EF1	Trunks Snapped
SBO	Small Barns and Farm Outbuildings (sheds)	112	EF2	Total destruction of building

<b>MHDW</b>	<b>Manufacture Home – Double Wide</b>	<b>113</b>	<b>EF2</b>	<b>Complete destruction of roof and walls leaving undercarriage in place</b>
MHDW	Manufacture Home – Double Wide	114	EF2	Unit rolls, displaces or vaults
MHSW	Single Wide Manufactured Mobile Home	118	EF2	Undercarriage separates from unit; rolls, tumbles and is badly bent
FSP	Free Standing Light Poles, Luminary Poles, Flag Poles	118	EF2	Collapsed Pole
ETL	Electrical Transmission Lines	118	EF2	Broken wood poles
MBS	Metal Building Systems	118	EF2	Buckling of roof purlins
SRB	Small Retail Building	119	EF2	Uplift or collapse of entire roof structure
FR12	One and Two-Family Residences	121	EF2	Entire house shifts off foundation
MAM	Masonry Apartments or Motels	121	EF2	Uplift of pre-cast or cast-in-place concrete roof decking
FR12	One and Two-Family Residences	122	EF2	Large sections of roof structure removed; most walls remain standing
SM	Strip Mall	122	EF2	Uplift or collapse of entire roof structure
M	Motels	123	EF2	Uplift or collapse of roof structure leaving most walls standing
<b>WHB</b>	<b>Warehouse Building</b>	<b>124</b>	<b>EF2</b>	<b>Collapse of pre-cast concrete tilt-up panels</b>
SPB	Small Professional Building	124	EF2	Uplift or collapse of entire roof structure
ACT	Apartments, Condos, and Townhouses	124	EF2	Uplift of roof decking; significant loss of roof covering (>20%)
<b>ES</b>	<b>Elementary School</b>	<b>125</b>	<b>EF2</b>	<b>Uplift or collapse of roof structure</b>
<b>JHSH</b>	<b>Junior or Senior High School</b>	<b>125</b>	<b>EF2</b>	<b>Uplift or collapse of roof structure</b>
<b>ASR</b>	<b>Automobile Showroom</b>	<b>126</b>	<b>EF2</b>	<b>Exterior Walls Collapsed</b>
<b>MHSW</b>	<b>Single Wide Manufactured Mobile Home</b>	<b>127</b>	<b>EF2</b>	<b>Complete destruction of unit; debris blown away</b>
MHSW	Single Wide Manufactured Mobile Home	127	EF2	Undercarriage separates from floor, rolls and tumbles, badly bent
<b>ASB</b>	<b>Automobile Service Building</b>	<b>128</b>	<b>EF2</b>	<b>Collapse of load-bearing walls</b>
LSM	Large Shopping Mall	128	EF2	Roof structure uplifted or collapsed
MROB	Mid-Rise Building	129	EF2	Broken curtain wall panel anchors
HROB	High-Rise Building	129	EF2	Broken curtain wall panel anchors
TS	Trees – Softwood	131	EF2	Trees debarked with only stubs of largest branches remaining
IB	Institutional Building	131	EF2	Damaged curtain walls or other wall cladding
<b>FR12</b>	<b>One and Two-Family Residences</b>	<b>132</b>	<b>EF2</b>	<b>Exterior walls collapsed</b>
<b>FST</b>	<b>Free-Standing Towers</b>	<b>133</b>	<b>EF2</b>	<b>Collapsed cell-phone tower</b>
SSC	Service Station Canopy	133	EF2	Complete destruction of Canopy
LRB	Low-Rise Building	133	EF2	Uplift of lightweight roof structure
<b>MHDW</b>	<b>Manufacture Home – Double Wide</b>	<b>134</b>	<b>EF2</b>	<b>Complete destruction of unit; debris blows away</b>
LIRB	Big Box Stores – Large Isolated Retail Building	134	EF2	Uplift and removal of roof structure

**Relative Vulnerability of Property and Structure Types**

\*Based on **Damage Level Indicators**

Expected Wind Speed and associated EF Scale **to cause destruction of property**

<http://www.spc.noaa.gov/efscale/ef-scale.html>

*Type	Property Type	Expected Wind Speed	EF Scale	Description
TS	Trees – Softwood	87	EF1	Uprooted
TH	Trees – Hardwood	91	EF1	Uprooted
TS	Trees – Softwood	104	EF1	Trunks Snapped
TH	Trees – Hardwood	110	EF1	Trunks Snapped
SBO	Small Barns and Farm Outbuildings (sheds)	112	EF2	Total destruction of building
FSP	Free Standing Light Poles, Luminary Poles, Flag Poles	118	EF2	Collapsed Pole
MHSW	Single Wide Manufactured Mobile Home	127	EF 2	Complete destruction of unit; debris blown away
TS	Trees – Softwood	131	EF2	Trees debarked with only stubs of largest branches remaining
SSC	Service Station Canopy	133	EF2	Complete destruction of canopy
MHDW	Double Wide Manufactured Mobile Home	134	EF2	Complete destruction of unit; debris blown away
FST	Free Standing Tower	136	EF3	Collapsed micro-wave tower
ETL	Electrical Transmission Line	141	EF3	Collapsed metal truss towers
TH	Trees – Hardwood	143	EF3	Trees debarked with only stubs of largest branches remaining
ES	Elementary School (see additional entry below)	153	EF3	Collapse of load bearing walls
MBS	Metal Building System	155	EF3	Total destruction of building
SPB	Small Professional Building (single story, less than 5,000 sf)	157	EF3	Total destruction of entire building
ASB	Automotive Service Building	157	EF3	Complete Destruction of all or a large section of the building
ASR	Automobile Showroom	157	EF3	Complete Destruction of all or a large section of the building
WHB	Warehouse Buildings (non-metal buildings)	158	EF3	Total destruction of large section of building or entire building
SRB	Small retail building (ex: fast food restaurant)	167	EF4	Total destruction of entire building
SM	Strip Mall	171	EF4	Complete destruction of all or a large section of building

LIRB	“Big Box” Store. Large Isolated Retail Building	173	EF4	Complete Destruction of all or a large section of the building
ES	Elementary Schools	176	EF4	Total destruction of a large section of building or entire building
MAM	Masonry Apartments or Motels	180	EF4	Total destruction of large section of building
ACT	Apartments, Condos, and Townhouses (3 stories or less)	180	EF4	Almost total destruction of top two stories
ACT	Apartments, Condos, and Townhouses (3 stories or less)	>180	EF4	Total Destruction of entire building
LRB	Low Rise Building	188	EF4	Complete Destruction of all or a large section of the building
M	Motels (4 or fewer stories)	190	EF4	Total destruction of entire building
JHSH	Junior or Senior High School	192	EF4	Complete Destruction of all or a large section of the building
FR12	One and Two Family Residences	200	EF4	Destruction of engineered and/or well constructed residence; slab swept clean
LSM	Large Shopping Mall	204	EF5	Complete Destruction of all or a large section of the building
IB	Institutional building (ex: hospitals, university buildings)	210	EF5	Significant damage to building envelope
MROB	Mid-Rise building (5-20 stories)	210	EF5	Permanent structural deformation
HROB	High-Rise > 20 stories	228	EF5	Significant structural deformation

**Single-Wide Mobile Homes**

<b>Damage Description</b>	<b>Wind Speed Range (expected in parentheses)</b>
Threshold of visible damage	51-76 mph (61 mph)
Loss of shingles or partial uplift of one-piece metal roof covering	61-92 mph (74 mph)
Unit slides off block piers but remains upright	72-103 mph (87 mph)
Complete uplift of roof; most walls remain standing	73-112 mph (89 mph)
Unit rolls on its side or upside down; remains essentially intact	84-114 mph (98 mph)
Destruction of roof and walls leaving floor and undercarriage in place	87-123 mph (105 mph)
Unit rolls or vaults; roof and walls separate from floor and undercarriage	96-128 mph (109 mph)
Undercarriage separates from unit; rolls, tumbles and is badly bent	101-136 mph (118 mph)
Complete destruction of unit; debris blown away	110-148 mph (127 mph)

**One and Two Family Residences**

<b>Damage Description</b>	<b>Wind Speed Range (expected in parentheses)</b>
Threshold of visible damage	53-80 mph (65 mph)
Loss of roof covering material (<20%), gutters, and/or awning; loss of vinyl or metal siding	63-97 mph (79 mph)
Broken glass in doors and windows	79-114 mph (96 mph)
Uplift of roof deck and loss of significant roof covering material (>20%); collapse of chimney; garage doors collapse inward; failure of porch or carport	81-116 mph (97 mph)
Entire house shifts off foundation	103-141 mph (121 mph)
Large sections of roof structure removed, most walls remain standing	104-142 mph (122 mph)
Top floor exterior walls collapsed	113-153 mph (132 mph)
Most interior walls of top story collapsed	128-173 mph (148 mph)
Most walls collapsed in bottom floor, except small interior rooms	127-178 mph (152 mph)
Total destruction of entire building	142-198 mph (170 mph)

**School Building (Junior or Senior High School)**

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

Source: Storm Prediction Center, 2007

# Previous Occurrences - Tornado

**June 27, 2025.** Three tornadoes occurred within 8 miles of Bismarck. Statewide, 9 tornadoes occurred on June 27.



Photo Credit Krimsin King  
North Bismarck 10:32 PM

Approximate Time (CDT)	General Location
7:41 PM	6 SW Hannover
8:29 PM	8 NNE Crown Butte Lake
10:14 PM	4 WSW Temvik
10:19 PM	2 W Temvik
10:24 PM	8 N Bismarck
10:29 PM	7 N Bismarck
10:43 PM	3 WNW Menoken
11:06 PM	8 SE Driscoll
11:10 PM	6 SSW Mckenzie

The tornado 8 miles north of Bismarck was rated as an EF-1. The tornado 7 miles north is rated EF-Unknown (no known damage). The tornado northeast of McDowell Dam (3 WNW of Menoken) was also rated EF-Unknown.

## Derecho and Tornadoes on June 20, 2025

<https://www.weather.gov/bis/SevereWx06202025>

An outbreak of severe thunderstorms brought extreme winds, very large hail, and tornadoes across much of southern North Dakota from the late afternoon into the nighttime hours on Friday, June 20, 2025.

Multiple tornadoes occurred on June 20, 2025 in various locations throughout North Dakota. None occurred in Burleigh County. Per Bismarck Tribune article, the Weather Service stated there were thirteen (13) confirmed tornadoes in the state. [https://bismarcktribune.com/news/state-regional/article\\_a062eb73-1061-48bb-94c2-025fee0a2ce1.html#tracking-source=home-top-story](https://bismarcktribune.com/news/state-regional/article_a062eb73-1061-48bb-94c2-025fee0a2ce1.html#tracking-source=home-top-story)

**November 1, 2000:**

A tornado event on the 1st of November was a rare and unusual weather phenomenon to occur so late in the year in North Dakota. Five tornadoes hit south-central North Dakota, causing property damage and injuries. The majority of the damage and injuries occurred in the Bismarck area. Forty-two homes suffered minor to moderate damage. The tornadoes were rated F0 and F1, packing winds up to 90 mph. Another unusual phenomenon, these tornadoes traveled from east to west. The track was caused by an intense low-pressure system, centered over north-central South Dakota, spinning counterclockwise, allowing the low-level flow over Bismarck to move east to west. At the same time, these tornadoes were occurring, snow began to fall in the far western area of North Dakota. Winter storm watches and warnings were posted across north-west and central North Dakota that afternoon. Before this, the last recorded tornado to occur in the state was October 11th, 1979, in Sargent County in southeast North Dakota. [https://www.weather.gov/abr/This\\_Day\\_in\\_Weather\\_History\\_Nov\\_01](https://www.weather.gov/abr/This_Day_in_Weather_History_Nov_01)



The map above of the five tornadoes is from the [Midwest Regional Climate Center](#)

**June 18, 1965:** EF0 Tornado touched down in SW Bismarck at 7:55 PM. One-tenth of a mile and only 10 yards wide near the intersection of Anderson Street and Garden Drive.

Source: NWS Storm Prediction Center <http://www.spc.noaa.gov/gis/svrgis/> and on record at the Bismarck NWS office.

### Deadly Tornadoes in Burleigh County

Location	Date	Magnitude	Casualties
Burleigh and Kidder Counties	July 1, 1952	F4 28 miles long 150 yards wide	1 fatality 25 injuries

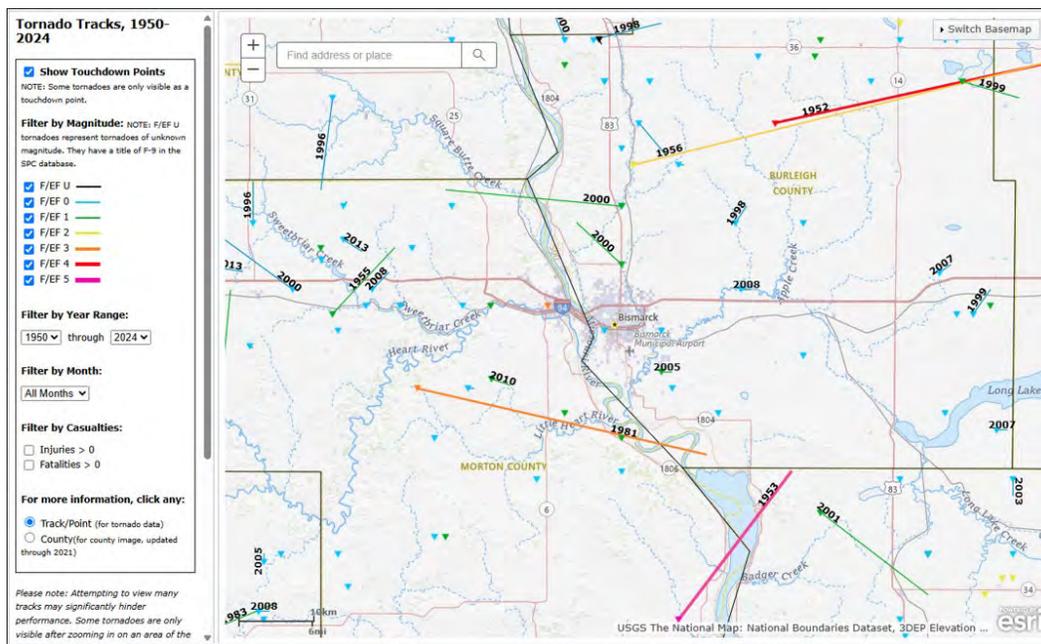
### 24 Tornado Events 1995-2025 Burleigh County

Magnitude	Number of Events	Percent
Unrated	3	not included in calculation
EF0	14	67%
EF1	6	28%
EF2	1	5%

<http://www.ncdc.noaa.gov/stormevents/>

Note: Of the 24 reported, three occurred on June 27, 2025. One rated as EF1, the other two not rated as of June 30, 2025.

Of **8 tornadoes** which have struck **within 8 miles of downtown Bismarck**, from 1950 **through 2024**, and affecting part of the current Bismarck-Mandan Metro area, **the 25 May 1978 event was rated EF3** ([NOAA Tornado Tracks](#), 2025; [StormData](#), 2025). This tornado mainly affected Mandan, with property damages their estimated at \$250k in 1978, which is over \$1.2M in 2025 dollars ([Alioth Finance](#), 2025). Likewise, the Fort Rice F5 Tornado of 29 May 1953, which tracked from far southeast Morton County into far northwest Emmons County, ending just shy of the Burleigh County line, or 20 miles southeast of downtown Bismarck, produced an estimated \$500k in 1953 dollars, which is over \$5.9M in 2025 dollars.



# Train Derailment – Hazard Profile

## Description

For purposes of this plan, a train derailment is a technological or human-caused transportation incident that involves a derailment of one or more engines or train cars. Bismarck has experienced three train derailment incidents since 2002 (within city limits). This hazard profile is intended to illustrate the risk and vulnerabilities relating to both the east/west railroad line (BNSF) as well as the north/south railroad line (DMVW) through Bismarck. The magnitude or impact of a train derailment transportation incident will vary widely depending on the incident location, product involved, and the existence of cascading hazards such as fire, explosion, and/or hazardous materials release. A train derailment transportation incident has potential to be the cause of mass casualties. A mass casualty event can be defined as an incident resulting in a number of deaths and/or injuries that overwhelms local resources and capabilities. Although Bismarck does not have primary responsibility or authority to mitigate or prevent train derailments from occurring, Bismarck has developed this mitigation plan section to better identify vulnerabilities and identify mitigation opportunities or recommendations to share with stakeholders as well as those that might be pursued at the local level.

Deaths, Injuries, and Evacuations per Train Incident Reports Bismarck/Burleigh 1975-2025					
# of Deaths	# of Injuries	People Evacuated	Year	Location	Railroad
0	2	0	1995	Sterling	BN
0	1	0	1987	Regan	BN
0	1	0	1977	Bismarck	BN
0	1	0	1976	Driscoll	BN

No deaths or evacuations reported for Bismarck/Burleigh Incidents from 1975-2019.

Two Incident Reports Involving Hazardous Materials 1975-2025					
# of Hazmat Cars Derailed Or Damaged	Total # of Hazmat Cars	Total # of Cars	Incident Year	Location	Railroad
0	3	81	1976	Driscoll	BN
0	1	17	1978	Bismarck	SOO

Product Involved – Train Derailments				
<u>Incident Date</u>	<u>Railroad</u>	<u>Location</u>	<u>Description</u>	<u>Product</u>
August 8, 2021	BNSF	Just outside Bismarck city limits near Yegan Road and Apple Creek Road	The coal was spilled into an adjacent wetland. Estimated coal spilled was 4,200,000 pounds and was recovered.	Coal Cars - 17
March 18, 2011	BNSF	East Main – near 100 block of South Airport Road. Blocked 26 <sup>th</sup> street crossing	14 coal cars derailed – 13 destroyed. The train blocked several crossings including 26 <sup>th</sup> Street and Airport Road.	Coal Cars - 14
July 10, 2010	BNSF	Near 93 <sup>rd</sup> Street	Rail cars filled with coal derailed and were lying on the bank of the Apple Creek east of Bismarck.	Coal Cars - 30
July 5, 2003	BNSF	Near State Penitentiary in Bismarck	Coal was spilled against the trestle on the Expressway Bridge. No cars hit the bridge.	Coal Cars – 37 100 ton of coal each
September 5, 2002	DMVW	Intersection of Rosser and North 35 <sup>th</sup> Street	Dakota Missouri Valley & Western Railroad authorities said they believe work on the tracks and 90-degree heat caused the rails to shift outward about four feet and the train to derail at 3:30 p.m. (source: Bismarck Tribune)	Fly Ash 7 Cars

<b><u>Most Common Hazardous Materials in Transport by BNSF (by Loaded Car Count)</u></b>		
<b>2013</b>	<b>2019</b>	<b>2024</b>
<ul style="list-style-type: none"> <li>• Petroleum Crude Oil – 85%</li> <li>• Liquefied Petroleum Gas – 4%</li> <li>• Anhydrous Ammonia – 2%</li> <li>• Alcohols – NOS – 2%</li> <li>• Diesel Fuel – 1.5%</li> <li>• Environmentally Hazardous Substances, Liquid NOS – 1%</li> <li>• Petroleum Distillates, NOS - &lt;1</li> </ul>	<ul style="list-style-type: none"> <li>• Petroleum Crude Oil – 40%</li> <li>• Liquefied Petroleum Gas – 14%</li> <li>• Anhydrous Ammonia – 0%</li> <li>• Alcohols – NOS – 3%</li> <li>• Diesel Fuel – 5%</li> <li>• Environmentally Hazardous Substances, Liquid NOS – 5%</li> <li>• Petroleum Distillates, NOS - 14%</li> <li>• Butane – 4%</li> <li>• Elevated Temperature Liquid, NOS – 3%</li> <li>• Isobutane – 2%</li> <li>• Hydrocarbons, Liquid, NOS – 2%</li> </ul>	<ul style="list-style-type: none"> <li>• Petroleum Crude Oil – 31%</li> <li>• Butane – 10%</li> <li>• Environmentally Hazardous Substances, Liquid NOS – 8%</li> <li>• Diesel Fuel – 7%</li> <li>• Elevated Temperature Liquid, NOS – 5%</li> <li>• Liquefied Petroleum Gas – 5%</li> <li>• Propane – 2%</li> <li>• Isobutane – 2%</li> <li>• Fuel Oil – 1%</li> <li>• Methanol – 1%</li> <li>• Gasoline – 1%</li> </ul> <p>Other hazardous materials are listed (less than 1% of shipments) including Anhydrous Ammonia listed at 0% of shipments.</p>

	<b>2013</b>	<b>2020</b>
# of Trains Per Day (24 hours)	18	16
<b><i>Distribution:</i></b>		
<i>Coal</i>	8 – 44%	4 – 44%
<i>Mixed Merchandise (including hazmat)</i>	4 – 22%	4 – 25%
<i>Grain</i>	3 – 17%	4 – 25%
<i>Crude Oil</i>	3 – 17%	1 – 5%
Average Train length (cars)	110 cars	92 cars
Train Length – High		129 cars
Train Length - Low		6 cars (local train)
Averages identified within this table were provided to Bismarck Emergency Management by a BNSF representative in January 2014 and September 2020. These averages are provided for planning purposes only. Actual number of trains will vary.		

In 2013, the average number of trains carrying crude was 3 per day. During the time period of June 2014 through September 2017, the average number of crude oil trains per week was 11.8 with the number declining to a typical number of 4 oil trains per week in 2017.

# Vulnerability Assessment

**Vulnerability:** Characteristics of community assets that make them susceptible to damage from a given hazard.

Vulnerabilities identified within the table are within ½ mile of the railroad. The properties and populations noted in the table are representative of the significant vulnerabilities within ½ mile radius of the railroad lines. Due to the extensive number of properties within a ½ mile, not all are listed.

Maps illustrating the ½ mile radius from the railroad lines follow the vulnerability table.

Scenario	Train Derailment Fire/HazMat – Significant Event	
<b>Probability</b>	Possible	
<b>Speed of Onset</b>	No Notice Event	
<b>Duration</b>	Minutes to occur. Hours, days, weeks for response and recovery.	
<b>Geographic Area</b>	See maps included, this section.	
<b>Death / Injury</b> 1. Primary Causes  A. Highest vulnerability	1. Fire 2. Explosion/projectiles 3. Inhalation Hazards  A. Those within close proximity to the railroad lines (1/4 mile) B. Those within close proximity to the railroad lines (1/2 mile) C. Those downwind of hazmat release.	
<b>Mass Casualty Incident</b>	Yes, potentially significant	
<b>Property Losses</b> (points of vulnerability – high priority)	1. All Structures within ¼ to ½ mile radius of incident.	
<b>Environmental</b>	1. Storm Water System – Hazardous Materials 2. Air, Water, Soil contamination depending on material involved 3. Missouri River 4. Hay Creek	
<b>COG/COOP</b>	1. Public Health – Bismarck/Burleigh 2. City/County Building 3. Water Treatment Plant 4. Public Works and proximity of Praxair	
<b>Critical Facilities</b>	1. Public Health 2. City/County Office Building 3. Fraine Barracks – DES, NDNG 4. Water Treatment Plant 5. Waste Water Treatment Plant – via spill,	14. ND State Penitentiary 15. US Postal Processing and Distribution 16. Post Office 17. ND State Lab 18. ND Department of Health Warehouse

Scenario	Train Derailment Fire/HazMat – Significant Event	
	drainage system 6. Metro Area Ambulance – South 7. Sanford Health 8. Sanford Health Powerhouse 9. St. Alexius Medical Center 10. St. Alexius Purchasing / Warehouse 11. Burleigh County Courthouse 12. Burleigh County Social Services 13. Public Works Department	19. MDU – Airport Road 20. MDU Operations – 4 <sup>th</sup> Street 21. Civic Center 22. Bismarck Police Department 23. Metro Area Ambulance – North 24. Metro Area Ambulance - South 25. Bank of North Dakota
<b>Critical Infrastructure</b>	1. Western Area Power Substation 2. Clear Channel Radio 3. KFYZ 4. BisMan Transit 5. Missouri River Train Bridge 6. Railroad Bridge over Main Avenue 7. Railroad Bridge over Washington Street 8. Main Avenue Bridge over Washington Street	9. Railroad Bridge over 7 <sup>th</sup> Street 10. Railroad Bridget over 9 <sup>th</sup> Street 11. Railroad Bridge over Bismarck Expressway 12. Railroad over Hay Creek (3 locations) 13. I-94 Bridge over Railroad
<b>Schools</b>	1. Bismarck State College 2. Roosevelt Elementary 3. Cathedral Elementary 4. St. Mary's Elementary 5. St. Mary's Preschool and Daycare 6. Rita Murphy Elementary 7. Shiloh Christian School 8. Child's Hope Learning Center 9. Kidz First Daycare 10. Angel Academy 11. First Presbyterian Church Daycare	12. Highland Acres Elementary 13. South Central High School 14. Robert Miller Elementary 15. Door of Hope 16. Little Einsteins 17. Kinder Kidz Daycare 18. Believe and Blossom 19. Angel Academy 20. Merry Go Round Daycare 21. First Steps Learning Center 22. The After School Place
<b>High Risk Facilities (chemical)</b>	1. Water Treatment Plant 2. LaFarge 3. Ferrell Gas 4. Praxair (9 <sup>th</sup> Street) 5. Praxair (near Public Works)	
<b>Specific Populations:</b> Public Assembly, Vulnerable / Special Populations	1. Edgewood Vista 2. St. Vincent's Care Center 3. Marillac Manor 4. Dakota Boys Ranch 5. Elks Pool 6. Custer Home 7. Front Street Plaza 8. Patterson Place	

Scenario	Train Derailment Fire/HazMat – Significant Event
	9. The Terrace (Assisted Living) 10. Radisson Inn 11. Crescent Manor 12. Bismarck Community Bowl 13. Kirkwood Mall 14. Bismarck Transition Center 15. ND State Penitentiary
<b>Economy</b> (community wide)	Significant impact
<b>Other</b>	

<b>Changes in Vulnerability</b> Since the previous plan update in 2020.	
Increase in Vulnerability	Decrease in Vulnerability
Additional development in NE Bismarck would include properties near the north/south rail line (DMVWW).	No changes. See hazard specific mitigation capabilities in Section 3.

**Risk**

See Section 10 of this plan document for risk assessment and hazard ranking of all hazards addressed in this plan.

**Relationship to other Hazards:** A train derailment may involve hazardous materials. This hazard profile focuses on the relationship between the two hazards. A train derailment may also initiate a fire, either associated with train car content, or may involve adjacent property. Other hazards, such as tornado, may initiate a train derailment with potential cascading effects of fire and/or hazardous materials release.

**Future Conditions**

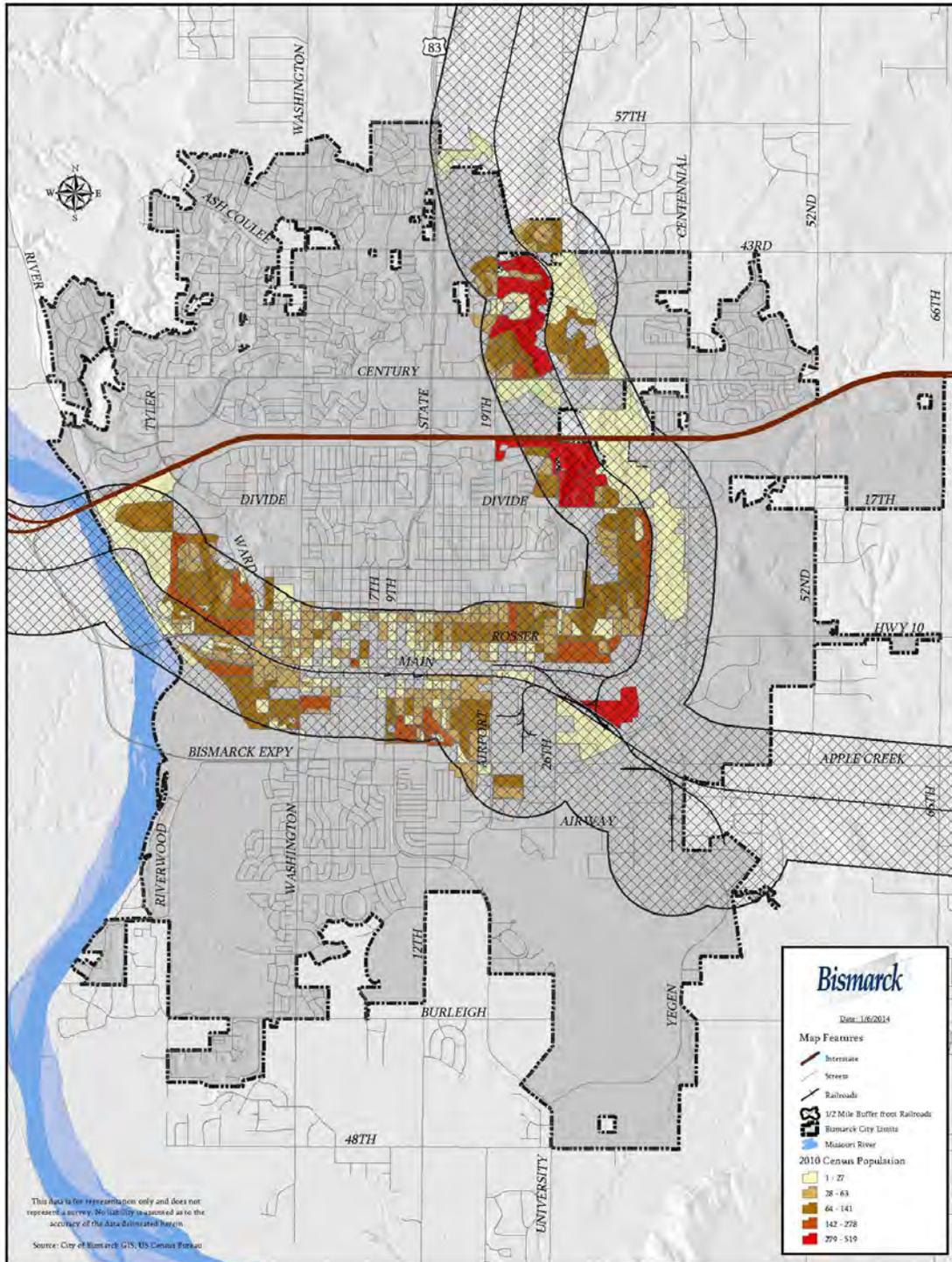
- **Location:** No change.
- **Extent/Intensity:** No change.
- **Frequency:** No change.
- **Duration:** No change expected relating to this hazard.

**Anticipated Future Climate Impact – Train Derailment Hazard**

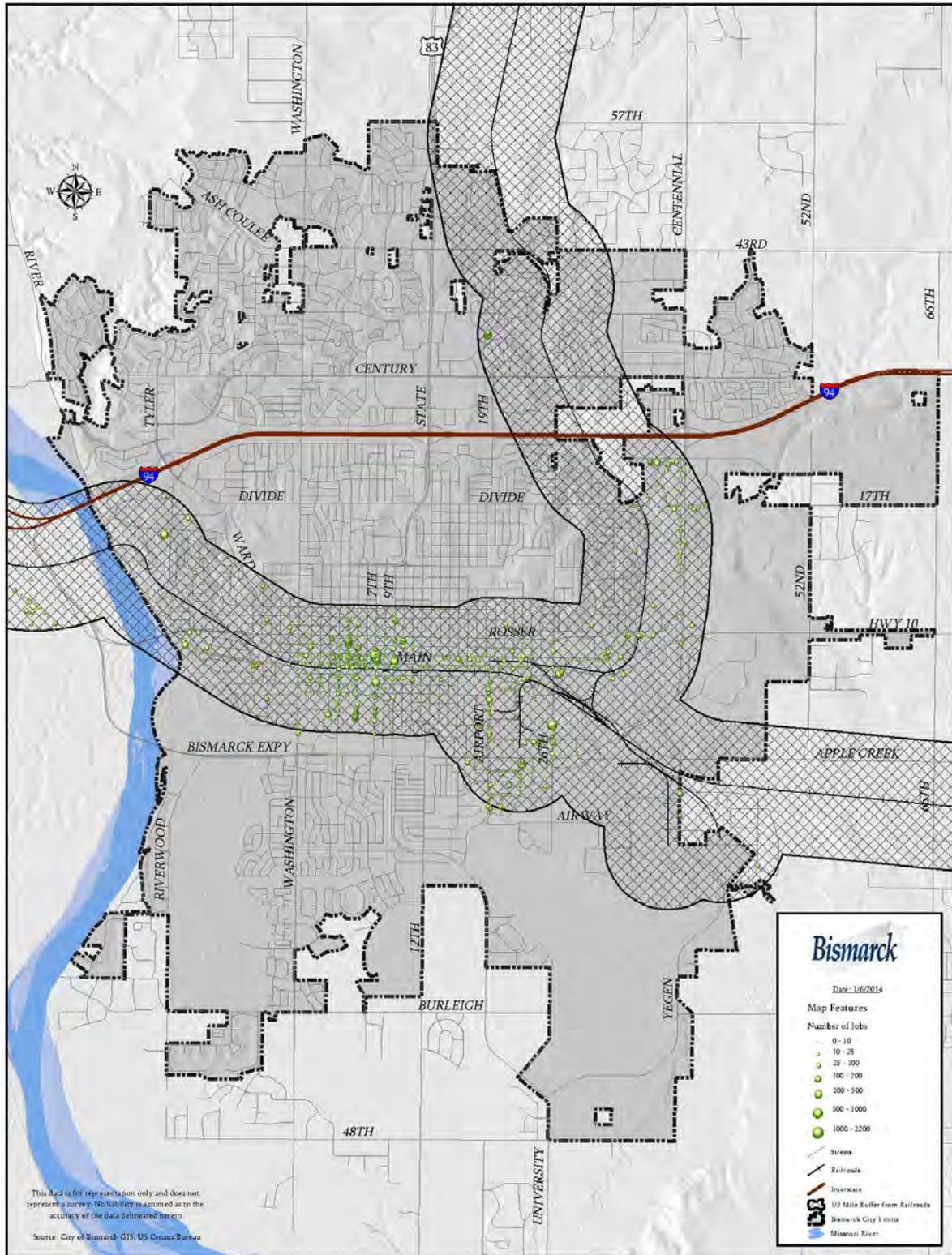
Through the end of this century in North Dakota, expect more frequent, larger, more intense, and/or longer duration droughts, floods, summer storms, winter storms, and attendant impacts - most of which are expected to adversely impact corresponding transportation corridors and lead to more frequent transportation incidents. Projected changes in these natural hazards will indirectly impact transportation incidents, primarily through a potential increase in hazardous **road, rail, and runway** conditions.

### Population and Property Estimates

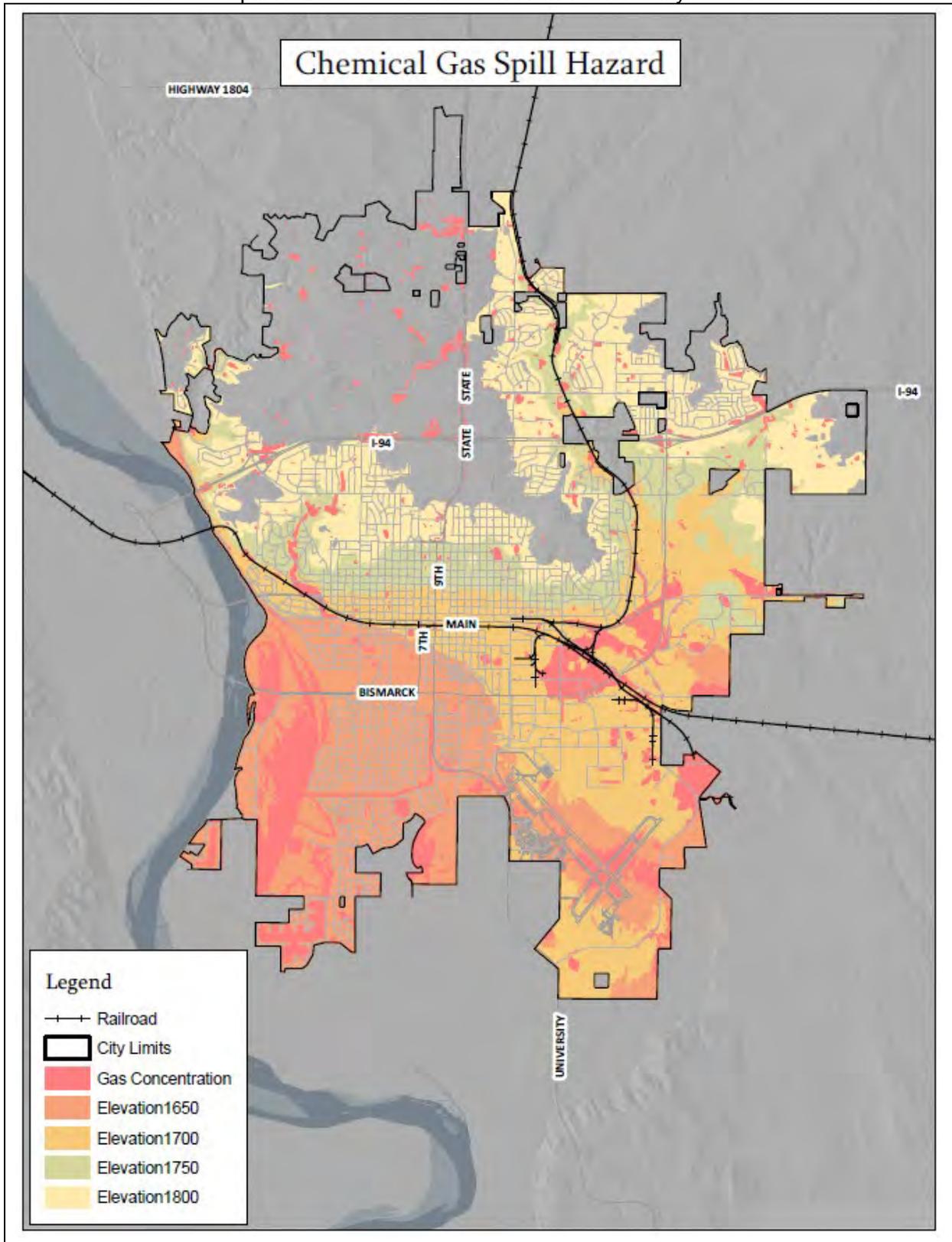
- Total City of Bismarck population within ½ mile: 17,796
- Total Burleigh County Population within ½ mile of railroad: 25,125
- Buildings within ½ mile (Bismarck): 9,384



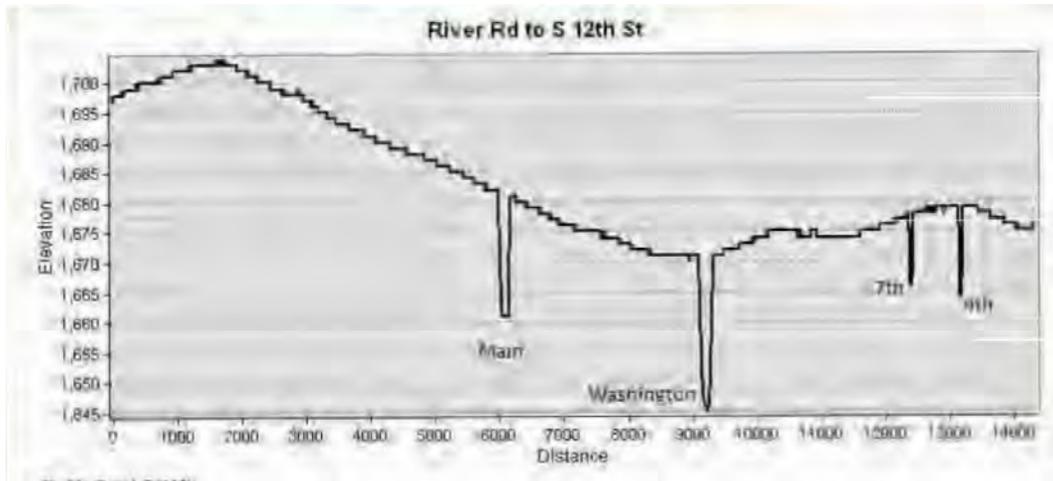
Employment Estimates 22,068 jobs within 1/2 mile radius of railroad.



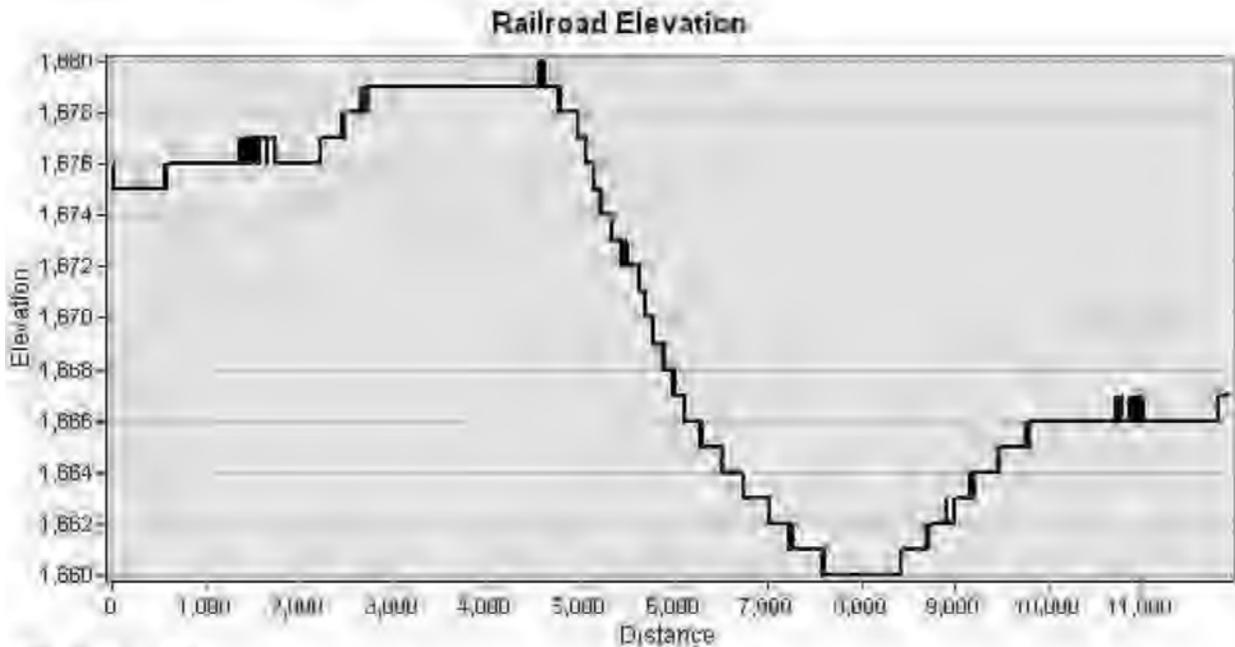
Chemical Gas Spill Hazard – Concentration Risk/Vulnerability based on elevation



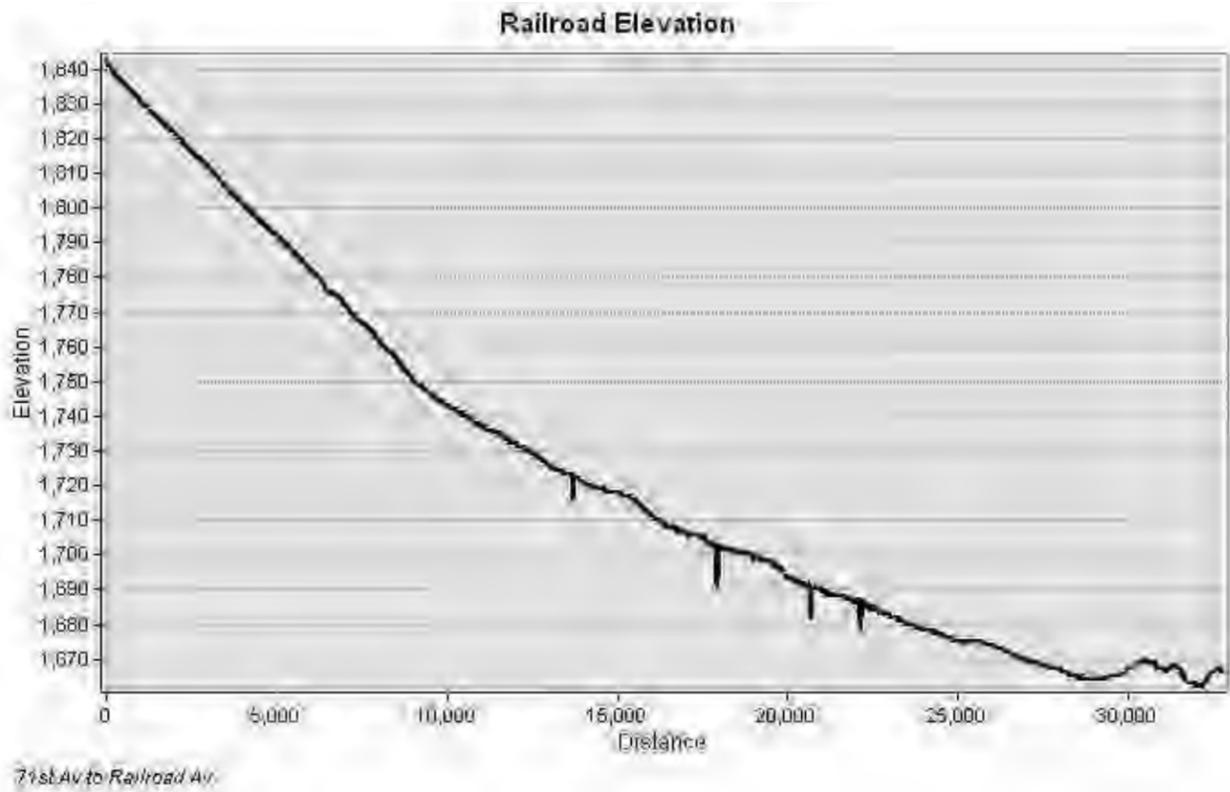
The elevation changes from River Road to South 12<sup>th</sup> Street (BNSF line) range from an elevation of approximately 1700 feet down to an elevation of 1,675 at the Washington Street bridge location. This is a 25-foot gradual elevation change in just under a 2-mile distance.



The elevation changes between South 12<sup>th</sup> Street and Yegen Road (BNSF line) range from an elevation of approximately 1680 feet down to an elevation of 1,660. bridge location. This is a 20-foot elevation change within about ½ mile.



The elevation changes between 71<sup>st</sup> Avenue NE and Railroad Avenue (DMVWW line) range from an elevation of approximately 1840 feet down to an elevation of 1,670. This is a 170-foot elevation change within about 5 ½ miles.



## Previous Occurrences & Causes

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# of Deaths	# of Injuries	People Evacuated	Year	Location	Railroad
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0	1	0	1977	Bismarck	BN
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No deaths or evacuations reported for Bismarck/Burleigh Incidents from 1975-2019.

Two Incident Reports Involving Hazardous Materials 1975-2025					
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0	1	17	1978	Bismarck	SOO

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<u>Incident Date</u>	<u>Railroad</u>	<u>Location</u>	<u>Description</u>	<u>Product</u>
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July 10, 2010	BNSF	Near 93 <sup>rd</sup> Street	Rail cars filled with coal derailed and were lying on the bank of the Apple Creek east of Bismarck.	Coal Cars - 30
July 5, 2003	BNSF	Near State Penitentiary in Bismarck	Coal was spilled against the trestle on the Expressway Bridge. No cars hit the bridge.	Coal Cars – 37 100 ton of coal each
September 5, 2002	DMVW	Intersection of Rosser and North 35 <sup>th</sup> Street	Dakota Missouri Valley & Western Railroad authorities said they believe work on the tracks and 90-degree heat caused the rails to shift outward about four feet and the train to derail at 3:30 p.m. (source: Bismarck Tribune)	Fly Ash 7 Cars

### Bismarck/Burleigh Train Derailments 1975-2019 (45 years)

Unless otherwise specified, train derailment statistics within this plan section are derived by Bismarck Emergency Management from the Federal Railroad Administration website:

<http://safetydata.fra.dot.gov/OfficeofSafety/Default.aspx>

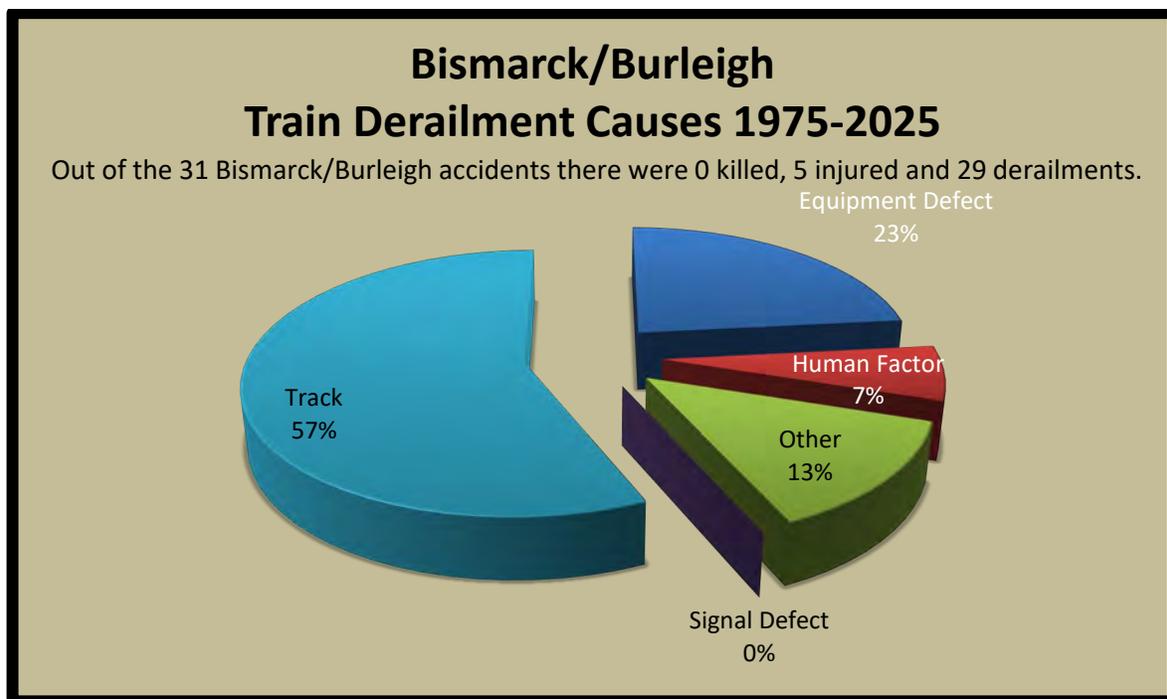
- **Total Number of Train Derailment Incident Reports from 1975-2025 for Burleigh County: 31**
- **Incidents In or Near Bismarck: 11 of 31**
- Incident Average within Burleigh County: 1 per 19 months (includes Bismarck)
- Incident Average within the City of Bismarck: 1 per 4.5 years

Incident Type Description:

**Derailment: 29 of 31**

Obstruction: 1 of 31

Explosion – Detonation: 1 of 31



<b>Total Derailed Cars Per Incident Report Bismarck/Burleigh 1975-2025</b>					
<b>Derailed Cars +Derailed Loco</b>	<b>Year</b>	<b>Cause</b>	<b>Speed Estimated Recorded</b>	<b>Location (In or Near)</b>	<b>Rail Line</b>
37	2003	T109 Track alignment irregular (buckled/sunkink)	35-R	Bismarck	BNSF
31	2010	T109 Track alignment irregular (buckled/sunkink)	39 - R	Bismarck	BNSF
19+2	1977	T221 Broken Rail - Vertical split head	30 – R	Bismarck	BN
20	2006	T109 Track alignment irregular (buckled/sunkink)	21 - R	McKenize	BNSF
18	1983	E35C Coupler carrier broken or defective	39 - E	Burleigh	BN
14	2011	T199 Other track geometry defects (Provide detailed description in narrative)	24-R	Bismarck	BNSF
13	1976	M501 Interference (other than vandalism) with railroad operations by non-railroad employee	60-E	Driscoll	BN
11	1987	M204 Improperly loaded car	28-E	Bismarck	BN
9	1977	E42C Side bearing(s) broken	25-R	Baldwin	SOO
9	1978	T101 Cross level of track irregular (at joints)	10-E	Bismarck	BN
<b>Bismarck (In or Near) Additional Incidents</b>					
17	2021	Track Failure	Not available in new database	Bismarck	BNSF
7	2002	T109 Track alignment irregular (buckled/sunkink)	5-E	Bismarck	DMVW
3	1981	T110 Wide gage (due to defective or missing crossties)	8-R	Bismarck	SOO
1	1978	H503 Buffing or slack action excessive, train handling	10-E	Bismarck	SOO
1	2001	M203 Overloaded car	7-R	Bismarck	BNSF

## Potential Magnitude

Actual Incidents (at other locations) may be used to understand the potential magnitude of a significant train derailment incident involving fire, explosion, and/or hazardous materials. However, the likelihood of similar incidents within Bismarck is less probable due to speed limits and other existing mitigation capabilities. See Section 3 for hazard-specific mitigation capabilities.

<b>Derailment of Canadian Pacific Railway Freight Train 292-16 and Subsequent Release of Anhydrous Ammonia.</b>	
Minot, North Dakota January 18, 2002	NTSB Number: RAR-04-01 NTIS Number: PB2004-916301.
<p><b>Executive Summary:</b> At approximately 1:37 a.m. on January 18, 2002, eastbound Canadian Pacific Railway freight train 292-16, traveling about 41 mph, derailed 31 of its 112 cars about 1/2 mile west of the city limits of Minot, North Dakota. Five tank cars carrying anhydrous ammonia, a liquefied compressed gas, catastrophically ruptured, and a vapor plume covered the derailment site and surrounding area. The conductor and engineer were taken to the hospital for observation after they complained of breathing difficulties. About 11,600 people occupied the area affected by the vapor plume. One resident was fatally injured, and 60 to 65 residents of the neighborhood nearest the derailment site were rescued. As a result of the accident, 11 people sustained serious injuries, and 322 people, including the 2 train crewmembers, sustained minor injuries. Damages exceeded \$2 million, and more than \$8 million has been spent for environmental remediation.</p> <p><b>Probable Cause</b> The National Transportation Safety Board determines that the probable cause of the derailment of Canadian Pacific Railway train 292-16 was an ineffective Canadian Pacific Railway inspection and maintenance program that did not identify and replace cracked joint bars before they completely fractured and led to the breaking of the rail at the joint. Contributing to the severity of the accident was the catastrophic failure of five tank cars and the instantaneous release of about 146,700 gallons of anhydrous ammonia.</p> <p>The safety issues identified in this accident were as follows:</p> <ul style="list-style-type: none"> <li>• Canadian Pacific Railway's programs and practices for the inspection and maintenance of joint bars in its continuous welded rail;</li> <li>• The Federal Railroad Administration's oversight of continuous welded rail maintenance programs;</li> <li>• Tank car crashworthiness, specifically the adequacy of non-normalized steels to resist tank fracture propagation.</li> </ul> <p>The analysis also addresses the appropriateness of using shelter-in-place to protect the public from the release of hazardous material.</p> <p><a href="http://www.nts.gov/investigations/summary/RAR0401.html">http://www.nts.gov/investigations/summary/RAR0401.html</a></p>	

<b>Casselton Train Derailment - Near Casselton, North Dakota December 30, 2013</b>
<p>On December 30, 2013, a broken axle caused a Burlington Northern Santa Fe (BNSF) train carrying 112 cars of grain to derail 13 cars just a mile west of Casselton in rural Cass County. The first of those cars spilled and leaned over onto adjacent tracks. Less than a minute later, a 104-car BNSF train carrying crude oil failed to hear the emergency alert and struck the derailed grain car, causing 476,000 gallons of crude oil to combust. Explosions could be heard and felt in Casselton as tanker cars exploded. The train carrying Bakken crude oil derailed a total of 21 cars, 20 of them tanker cars. Response exceeded the Casselton Fire Department's (CFD's) capabilities (NTSB, 2017; Springer, 2018). The Cass County Sheriff's Department was called in to assist in setting up a safety perimeter to protect the public during the firefight. With the derailment occurring outside of a heavily populated area, there were no injuries or fatalities, and crew members were able to escape without consequence. Nearby Casselton evacuated 1,400 residents as a precaution. Damages were estimated at \$6.1 million.</p> <p>In reaction to the event industry safety standards, the requirements for tanker cars were raised, requiring stronger double-sided tanks and improved braking and venting systems. Since the 2013 event, pipeline capacity has increased which has reduced the amount of Bakken crude travelling by rail through communities like Casselton, which at the time of the incident had more than 10 oil trains pass through each day, became a case study that helped develop better training for train-derailment response. CFD's response capacity was found to have benefited significantly from its planning for an explosive incident at the nearby Tharaldson Ethanol Plant, using many of the developed protocols and practices in the oil-train derailment (NTSB, 2017; Springer, 2018). Yet they were one of many local agencies that responded.</p> <p>Source: 2024-29 ND Enhanced Mitigation Plan</p>

**Lac-Mégantic runaway train and derailment investigation summary****The accident**

On the evening of July 5, 2013, at about 10:50 p.m., a Montreal, Maine & Atlantic Railway (MMA) train arrived at Nantes, Quebec, carrying 7.7 million liters of petroleum crude oil in 72 Class 111 tank cars. Originating in New Town, North Dakota, these were bound for Saint John, New Brunswick.

In keeping with the railway's practice, after arriving in Nantes, the locomotive engineer (engineer) parked the train on a descending grade on the main track. A replacement engineer was scheduled to continue the trip east in the morning.

The engineer applied hand brakes on all five locomotives and two other cars, and shut down all but the lead locomotive. Railway rules require hand brakes alone be capable of holding a train, and this must be verified by a test. That night, however, the locomotive air brakes were left on during the test, meaning the train was being held by a combination of hand brakes and air brakes. This gave the false impression that the hand brakes alone would hold the train.

The engineer then contacted the rail traffic controller in Farnham, Quebec, to advise that the train was secure. Next, the engineer contacted the rail traffic controller in Bangor, Maine, who controls movements for the crews east of Lac-Mégantic. During this conversation, the engineer indicated that the lead locomotive had experienced mechanical difficulties throughout the trip, and that excessive black and white smoke was coming from its smoke stack. Because they expected the smoke to settle, it was agreed to leave the train as it was and deal with the situation the next morning.

Shortly after the engineer left, the Nantes Fire Department responded to a 911 call reporting a fire on the train. After shutting off the locomotive's fuel supply, the firefighters moved the electrical breakers inside the cab to the off position, in keeping with railway instructions. They then met with an MMA employee, a track foreman who had been dispatched to the scene but who did not have a locomotive operations background.

Once the fire was extinguished, the firefighters and the track foreman discussed the train's condition with the rail traffic controller in Farnham, and departed soon afterward. With all the locomotives shut down, the air compressor no longer supplied air to the air brake system. As air leaked from the brake system, the main air reservoirs were slowly depleted, gradually reducing the effectiveness of the locomotive air brakes. Just before 1 a.m., the air pressure had dropped to a point at which the combination of locomotive air brakes and hand brakes could no longer hold the train, and it began to roll downhill toward Lac-Mégantic, just over seven miles away.

As it moved down the grade, the train picked up speed, reaching a top speed of 65 mph. It derailed near the center of the town at about 1:15 a.m.

**Aftermath and emergency response**

Almost all of the 63 derailed tank cars were damaged, and many had large breaches. About six million liters of petroleum crude oil was quickly released. The fire began almost immediately, and the ensuing blaze and explosions left 47 people dead. Another 2000 people were forced from their homes, and much of the downtown core was destroyed.

The pileup of tank cars, combined with the large volume of burning petroleum crude oil, made the firefighters' job extremely difficult. Despite the challenges of a large emergency, the response was well coordinated, and the fire departments effectively protected the site and ensured public safety after the derailment.

Source: <http://www.tsb.gc.ca/eng/rapports-reports/rail/2013/r13d0054/r13d0054-r-es.asp>

# Wildland Fire – Hazard Profile

## Wildland Urban Interface (WUI)

### Description

A wildland fire is an event dealing with a fire in the wildland; originating from an unplanned ignition, such as lightning, volcanoes, unauthorized and accidental human-caused fires, and prescribed fires that are declared wildfires.

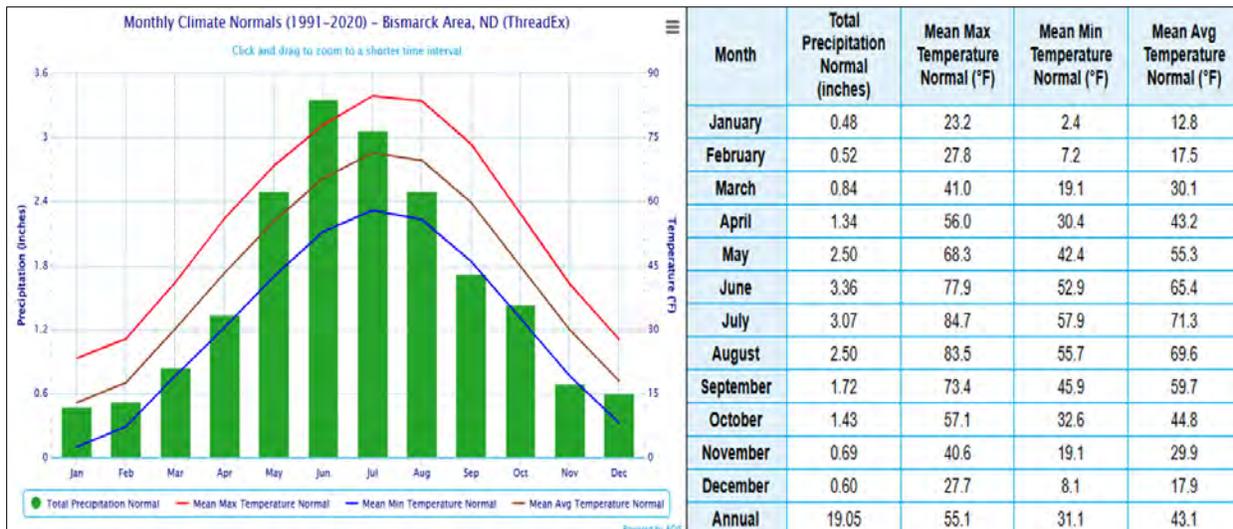
A **wildland/urban interface fire** involves a geographical area where structures and other human development meet or intermingle with wildland or vegetative fuels, resulting in the potential for ignition of the structures within the area from flames or firebrands of a wildland fire.

Source: [National Fire Protection Association Glossary of Terms](#)

The City of Bismarck has a relatively low potential of significant loss due to wildfire. Some areas in the NW part of the city interface with a larger prairie area where, depending on climatological conditions, including past rainfall, relative humidity, and wind, a wildland fire may gain some momentum. These areas are part of a “Wildland Urban Interface” (WUI), defined as areas where homes and other structures are built near or among lands prone to wildland fire. Homes and other structures that are located in these areas should practice wise fire mitigation plans such as those described in [www.firewise.org](http://www.firewise.org).

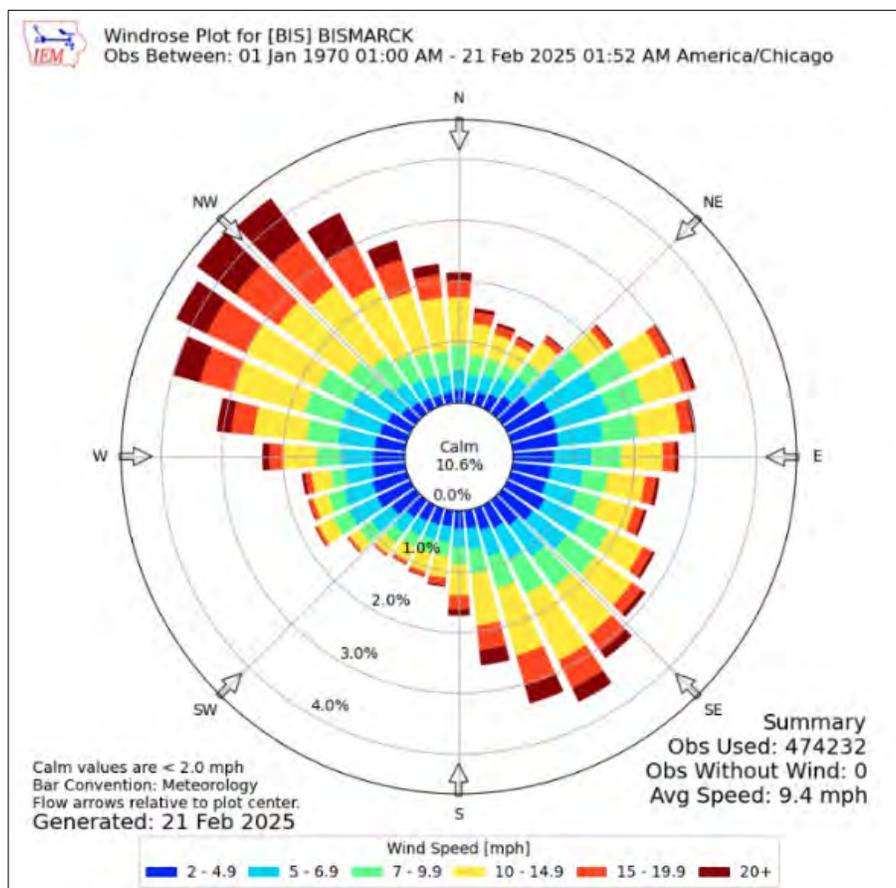
Bismarck has a semi-arid climate with average annual precipitation of 19.05”. Summer monthly rainfalls include; May: 2.5”, June: 3.36”, July: 3.07” and August: 2.50.”

The graph and chart below show the average monthly precipitation and the range of monthly average high and low temperatures for the Bismarck area during the most recent 30-year climate normal period, 1991-2020 ([XM-ACIS](#), 2025; [Climate Toolbox](#), 2024).



The Bismarck Wind Speeds table and Windrose below illustrate the prominent wind directions as well as average wind speeds and 3-second wind gusts. In addition to the effects of wind, there are also some topographical interface areas, mostly in coulees and closer to the Missouri River, where fire may gain momentum as it moves from lower areas to higher areas.

Month	Bismarck Winds		
	Average Wind Speed (mph) 1991-2000	Prevailing Wind Direction (16 pt)	1941-2020 3-Second Wind Gust
January	9	NW	71
February	9	NW	68
March	10.1	NW, E	79
April	10.8	N, E	77
May	10.7	E, SSE	80
June	9.6	E	90
July	8.6	SSE	91
August	8.6	E, SSE	86
September	9.1	NW, SSE	80
October	9.5	WNW	75
November	9	WNW	81
December	8.9	NW	75
Annual	9.4	NW	91



While the City of Bismarck's risk of a wild-land fire in dry years can be relatively high; the damage potential is relatively low as our vegetation and topography do not readily allow a wild-land fire to gain momentum. The concern lessens even more when property owners have a yard that is cared for with short-cut grass creating a buffer between a fire and a home

When compared to mountainous and heavily forested areas similar to those in Colorado, California, and even the Black Hills of South Dakota, we have relatively flat lands, which provide less risk of a high-magnitude event.

Even though our overall vulnerability is low, there are areas that may have more exposure potential than others; those areas would include the northwest portion of the city that is adjacent to undeveloped property and the southwest portion of the city that is adjacent to more heavily forested areas.

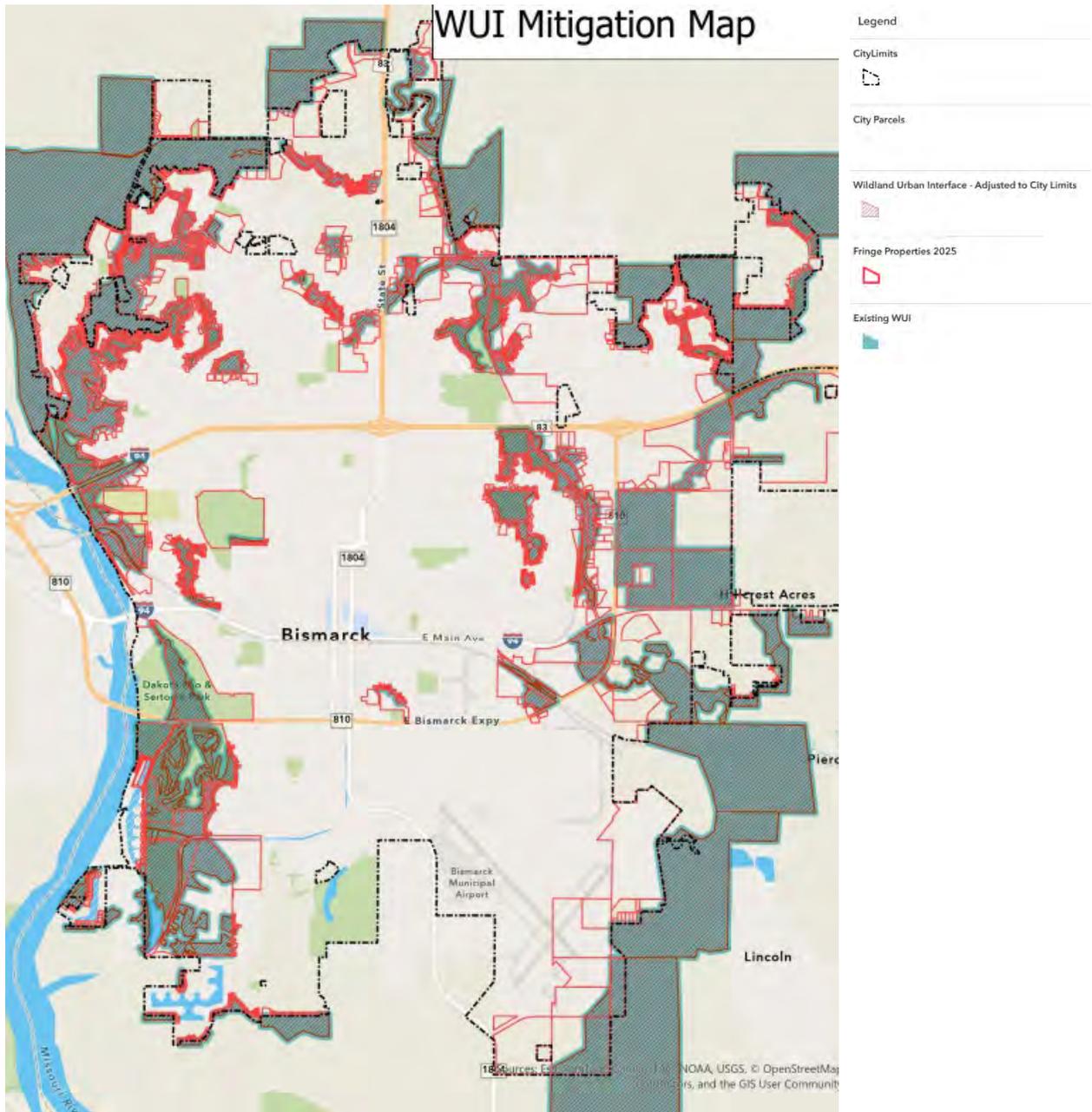
Property owners can make their property safer by practicing wise fire mitigation planning. A great resource is [www.firewise.com](http://www.firewise.com).

Air quality issues arise from Wildland Fire incidents that occur near or far away, such as Canadian Wildfires and fires occurring in the west. The air quality issues pose health risks, especially for those with higher sensitivity.

### Location and Extent

In general, the areas within Bismarck that are at risk are those areas where houses or other properties meet or intermingle with undeveloped wildland vegetation. Wildland Fires are measured in acres burned.

Bismarck Wildland Fire: Wildland Urban Interface Risk Areas



# Vulnerability Assessment

Vulnerability: Characteristics of community assets that make them susceptible to damage from a given hazard.

Scenario	Wildland Fire – Wildland Urban Interface
<b>Probability</b>	Very Likely However, a high magnitude / high impact event is not likely.
<b>Speed of Onset</b>	No Notice Event
<b>Duration</b>	Usually less than 4 hours (WUI). Wildland Fires in rural areas can last several days.
<b>Geographic Area</b>	See map – previous page.
<b>Death / Injury</b>  1. Primary Causes  A. Highest vulnerability	1. Asphyxiation.  A. Those living adjacent to the wildland risk areas that do not evacuate, either by choice or as a result of not receiving notice of the event.
<b>Mass Casualty Incident</b>	Not likely. A high magnitude / high impact event is not likely. <ul style="list-style-type: none"> <li>• Population within Wildland Fire Risk Area: Near Zero. Areas as mapped are open, vacant land or parks.</li> <li>• Population adjacent to wildland risk areas: Approximately 7,500</li> </ul>
<b>Property Losses</b>	A high magnitude / high impact event is not likely. <ol style="list-style-type: none"> <li>1. Properties adjacent to wildland risk areas: Approximately 1,800                             <ul style="list-style-type: none"> <li>○ based on a distance of 100 feet from within the wildfire risk areas</li> </ul> </li> <li>2. Total number of Structures in or adjacent to wildland risk areas: Approximately 2,200</li> <li>3. Total building value adjacent to wildland fire risk area: Approximately 516,000,000.</li> <li>4.</li> </ol>
<b>Environmental</b>	<ol style="list-style-type: none"> <li>1. Temporary air pollution from Wildland Fire itself</li> <li>2. Erosion as a result of temporary loss of vegetation.</li> <li>3. Potential loss of mature trees.</li> </ol>

Scenario	Wildland Fire – Wildland Urban Interface
<b>COG/COOP</b>	1. Waste Water Treatment Plant
<b>Critical Facilities</b>	1. Capital Electric Coop 2. Wastewater Treatment Plant 3. ND Dept of Health Warehouse 4. CHI/St. Alexius Purchasing / Warehouse 5. Fire Station 4 – Northeast 6. American Red Cross
<b>Critical Infrastructure</b> (points of vulnerability – high priority)	1. Wastewater Treatment Plant 2. Sanitary Sewer Pump Station 3. Clear Channel Radio - KFYR/Y93 4. Bis-Man Transit 5. Taxi 9000 6. Central Power 7. Public Works – Landfill
<b>Schools</b>	1. Horizon Middle School 2. Discovery Daycare
<b>High Risk Facilities (chemical)</b>	1. South Port Marina~ 125 feet from building 2. Public Works – Landfill ~ 100 feet to building 3. Wastewater Treatment Plant ~ 100 feet from outbuildings, 300 feet to large buildings 4. Cofells Plumbing and Heating ~ 200 feet to nearest building on property
<b>Specific Populations:</b> Public Assembly, Vulnerable / Special Populations	1. Dakota Boys Ranch 2. Dakota Zoo 3. Non-ambulatory population requiring evacuation assistance. 4. Holiday Inn 5. Door of Hope 6. Edgewood Vista 7. Missouri River Correctional Facility (Burleigh Co – just SW of city limits)
<b>Economy</b> (community wide)	None/Negligible
<b>OTHER:</b>	

<b>Changes in Vulnerability</b> Since the previous plan update in 2020.	
Increase in Vulnerability	Decrease in Vulnerability
No change in vulnerability. Additional properties at risk based on annexations.	No change. See Wildland Fire Hazard Mitigation Capabilities listed in Section 3.

**Risk**

See Section 10 of this plan document for risk assessment and hazard ranking of all hazards addressed in this plan.

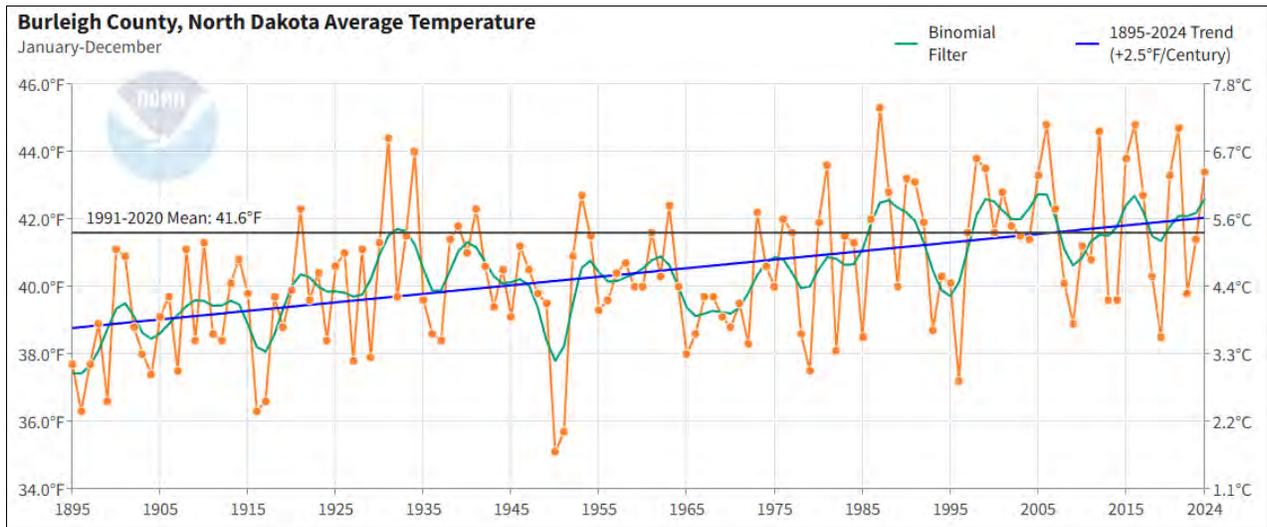
**Relationship to other Hazards:** Drought conditions contribute to the risk of Wildland Fire events. Lightning is another natural hazard that may initiate a fire. Fires may also be started intentionally (Civil Disturbance) or accidentally such as a train derailment (sparks or fire associated with engine or cars). A wildland fire often promotes future geologic hazards due to loss of vegetation.

**Future Conditions**

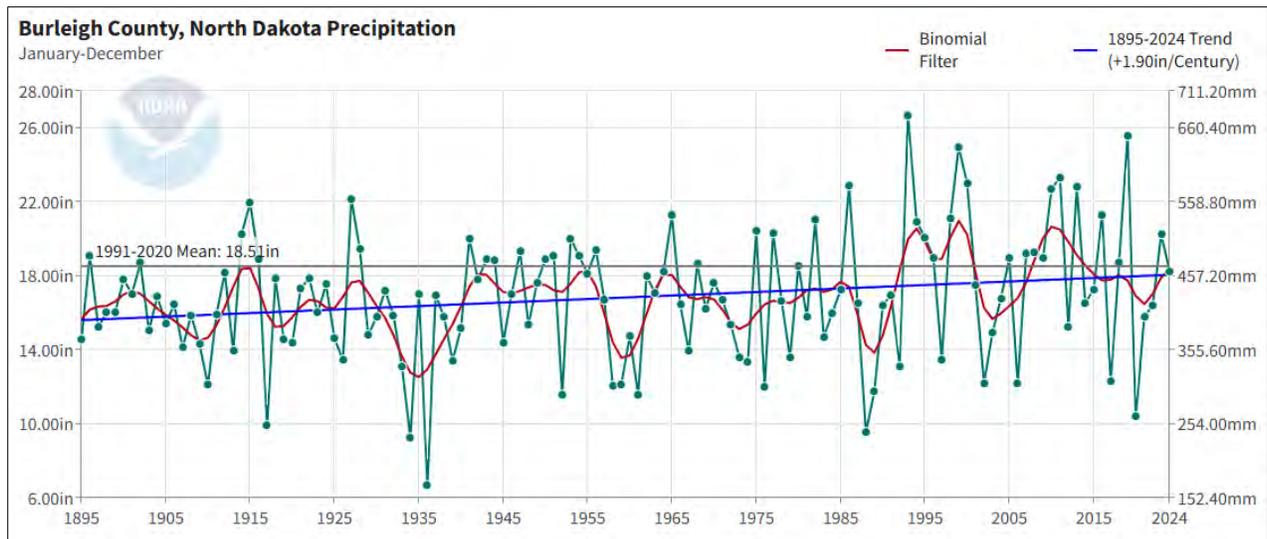
- **Location:** The locations of wildland fire (WUI) in Bismarck will change based on future annexations and changes to adjacent property within the ETA or county.
- **Extent/Intensity:** See “Anticipated Future Climate Impact” below.
- **Frequency:** See “Anticipated Future Climate Impact” below.
- **Duration:** The duration of Wildland Fire hazards is not projected to change.

**Anticipated Future Climate Impact – Wildland Fire (WUI) Hazard**  
Droughts are projected to increase in size, frequency, and duration. The expected increases in temperatures and frequency of droughts translate into an increase in the size, frequency, and intensity of both wildland and urban fires, with an added risk due to increasing development in the Wildland-Urban Interface. Also, water supplies used for fire suppression may become compromised during drought conditions.

An increase in temperature promotes drought potential and fire potential.



An increase in precipitation enhances growth of vegetation, an indirect increase in fire risk in the event drought conditions follow.



## Previous Occurrences

The City of Bismarck has not suffered loss of physical property as a result of wild-land fire; none-the-less the city is committed to protect all homes in the city limits from all hazards, including wild-land fires.

**May 30 to June 1, 2025:** Air Quality Index reaches the “Unhealthy” category due to wildland fires in Manitoba, Canada. This level is considered unhealthy for all, including sensitive groups. According to ND Department of Environmental Quality, people should consider taking precautions including limiting or avoiding outdoor activity, staying indoors with windows and doors closed, and setting air conditioners and vehicle vents to recirculate indoor air when the air quality index reaches unhealthy levels.

**May 17, 2023:** Wildland fires in northwestern Canada send smoke across North Dakota. ND DEQ advises people with respiratory conditions, the elderly and young children to avoid prolonged outdoor exposure.

**September 16, 2020:** At approximately 1:00 PM, a fire occurred between Hay Creek and Hamilton Street to the North side of Interstate 94. Approximately 10 acres of wildland (open field) were burned. Wind was blowing from the north at 8 mph. Five fire department apparatus and 9 firefighters were dispatched to the scene. The Bismarck Rural Fire Department provided mutual aid. The Bismarck Police Department assisted with scene control. Metro Area Ambulance was on scene to provide medical support. There were no injuries to first responders. No structures were damaged.

### 2014 through 2019:

The Bismarck Fire Department responded to 56 natural vegetation fires from November 1, 2014 through October 31, 2019.

Type	Number
Natural Vegetation Fire	14
Grass Fire	19
Brush, or brush and grass mixture fire	17
Forest, woods or wildland fire	4
<b>Total</b>	<b>54</b>

**2005:** The most significant wildfire with potential impact to Bismarck occurred on April 2, 2005.

- Incident Name: Wildland Fire
- Date: April 2, 2005
- Time: 1448
- Time Cleared: 1711
- Incident Location: 2800 South Washington (West of Tatley Meadows, north of the Waste Water Treatment Plant, south of drainage ditch and walking path)
- Fire was extinguished by Bismarck Fire and Mutual Aid (Bismarck Rural)

# Winter Storm – Hazard Profile

## Description

Winter storms take many forms and vary significantly in size, strength, intensity, duration, and impact. The composition of a storm varies with the temperature, wind, and amounts of precipitation. Important factors in winter storms include temperature, wind, wind chill, rain, sleet, snow, and blowing snow. Exceptional winter storms can and do cause problems for the communities, residents, and travelers. Examples of these types of storms include blizzards, ice storms, heavy snow events, and extended extreme cold temperatures. The combinations of cold temperatures, wind, snow, wind chills, ice, and reduced visibility can make these storms very deadly and costly.

The winter season can begin as early as September and last into May. The bulk of North Dakota's winter weather is from mid-November until early April. On average, there are around ten winter storms (ice storms, heavy snow events, winter storms, and blizzards) each year in North Dakota. Three to four of these storms reach blizzard intensity. As a result, North Dakota typically leads the nation in blizzard frequency. (National Climatic Data Center, 2010; National Weather Service, 2007)

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

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

### **Blizzards**

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

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

The impact of a severe blizzard with low visibility, heavy snow, and cold temperatures can bring the entire region to a standstill. Utility and communication systems are often interrupted. Road systems are rendered impassable which causes school, workplace, and commercial shutdowns. This in turn magnifies the emergency and medical management needs of the community.

### **Heavy Snow**

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

### **Ice Storms**

An ice storm is a winter event in which damaging accumulations of ice from freezing rain, greater than or equal to one-quarter inch, occur (NWS, 2023). Ice storms develop when a layer of warm (above freezing), moist air aloft coincides with a shallow cold (below freezing) pool of air at the surface. As snow falls into a warm layer of air, it melts to rain, and then freezes on contact when hitting the frozen ground or cold objects at the surface, creating a smooth layer of ice. This phenomenon is called freezing rain. Similarly, sleet occurs when the rain in the warm layer subsequently freezes into pellets while falling through a cold layer of air at or near the Earth's surface. Extended periods of freezing rain can lead to accumulations of ice on roadways, walkways, power lines, trees, and buildings. Almost any accumulation can make driving and walking hazardous. Thick accumulations can bring down trees and power lines.

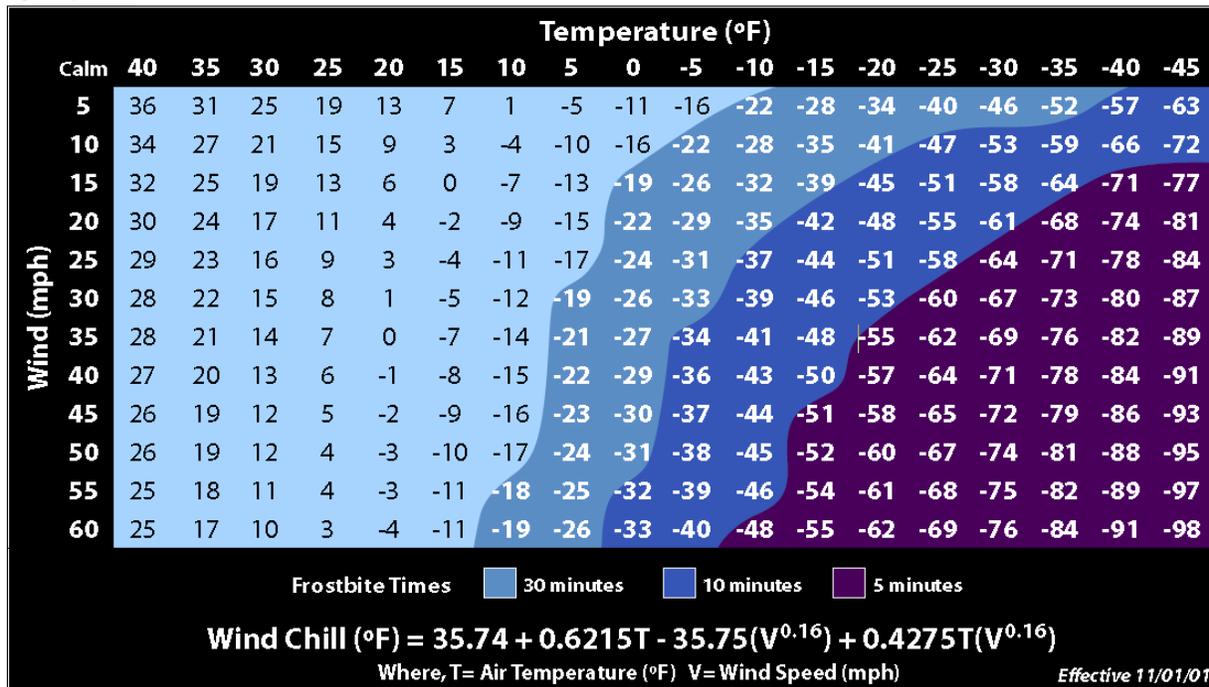
### **Extreme Cold**

Extended periods of cold temperatures frequently occur throughout the winter months in North Dakota. Heating systems generally compensate for the cold outside. Most people limit their time outdoors during extreme cold conditions, but common complaints usually include pipes freezing and cars refusing to start. When cold temperatures and wind combine, dangerous wind chills can develop.

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



# Wind Chill Chart



<http://www.nws.noaa.gov/os/windchill/images/windchillchart3.pdf>

Wind chill conditions become very relevant when human tissue is exposed to the outside air. This can occur when people become stranded in a blizzard and attempt to walk to safety and become lost. Lowering of the body core temperature leads to the condition known as "hypothermia." Hypothermia has often been called "the killer of the unprepared." It also claims the lives of many outdoor sports enthusiasts. This condition occurs when the body or "core temperature" is lowered. The blood is cooled, thereby reducing the amount of oxygen which is carried to the brain, thus dulling the senses. The victim becomes fatigued, delirious, and loses dexterity and control of arms and legs. If the body core temperature continues to drop and nears 85°F, the victim eventually slips into unconsciousness. If treatment is not started immediately, the result is arrest of the circulatory and respiratory systems and death.

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

Strong winds and ice or snow accumulations can take down utility lines. A long-term utility outage becomes more significant during extended cold periods as sheltering and cold weather exposure becomes more challenging. In North Dakota, severe winter seasons often translate to severe flooding potential in the spring.

Large quantities of snow may fall during winter storms. Six inches or more in 12 hours or eight inches or more in 24 hours constitutes conditions that may significantly hamper travel or create hazardous conditions. The National Weather Service issues warnings for such events. Smaller amounts can also make travel hazardous, but in most cases, only results in minor inconveniences. Heavy wet snow before the leaves fall from the trees in autumn or after the trees have leafed out in the spring may cause problems with broken tree branches and power outages. In addition to Winter Storm Watches and Warnings, the National Weather Service issues the following products for heavy snow events:

### Snow Squalls

Snow squalls are intense, but limited duration, periods of moderate to heavy snowfall, accompanied by gusty surface winds resulting in reduced visibilities and often whiteout conditions. They move in and out quickly, and typically last less than an hour (NWS, 2023). Although snow accumulations are generally not significant, the combination of accumulating snow, gusty winds, falling temperatures and quick reductions in visibility can cause extremely dangerous conditions for motorists.

### Location and Extent

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

The location, intensity, and impacts of developing winter storms are depicted by the NWS Weather Prediction Center using the Winter Storm Severity Index (WSSI), shown at right. WSSI is a spatial assessment of the societal impacts of winter storms that highlights areas with the forecasted potential for damaging and life-threatening effects brought on by winter weather (NOAA, 2023). WSSI allows forecasters, emergency management, and the public to make informed and tactical decisions about the potential for significant weather-related impacts. According to NOAA (2023), WSSI is comprised of six components of winter storms:

- Blowing snow,
- Flash freeze,
- Ground blizzard,
- Ice accumulation,
- Snow amount, and
- Snow load.

The WSSI is strictly a gauge of anticipated or forecast storm conditions and potential impacts, with no direct correspondence to any post-storm analysis of actual storm intensity or impacts produced by the storm. Also, the WSSI does not integrate extreme cold or wind chill, a very common North Dakota winter storm ingredient.

Potential Winter Storm Impacts	
	<p><b>Winter Weather Area</b>                      Expect Winter Weather.                      • Winter driving conditions. Drive carefully.</p>
	<p><b>Minor Impacts</b>                      Expect a few inconveniences to daily life.                      • Winter driving conditions. Use caution while driving.</p>
	<p><b>Moderate Impacts</b>                      Expect disruptions to daily life.                      • Hazardous driving conditions. Use extra caution while driving.                      • Closures and disruptions to infrastructure may occur.</p>
	<p><b>Major Impacts</b>                      Expect considerable disruptions to daily life.                      • Dangerous or impossible driving conditions.  <b>Avoid travel if possible.</b>                      • Widespread closures and disruptions to infrastructure may occur.</p>
	<p><b>Extreme Impacts</b>                      Expect substantial disruptions to daily life.                      • Extremely dangerous or impossible driving conditions. <b>Travel is not advised.</b>                      • Extensive and widespread closures and disruptions to infrastructure may occur.                      • Life-saving actions may be needed.</p>

<https://www.wpc.ncep.noaa.gov/wwd/wssi/wssi.php>

# Vulnerability Assessment

Vulnerability: Characteristics of community assets that make them susceptible to damage from a given hazard.

Scenario	Heavy Snow	Blizzard	Extreme Cold & Wind Chill	Ice Storm
<b>Probability</b>	High Probability (and frequency) <i>Refer to Characteristics and History</i>	High Probability (and frequency) <i>Refer to Characteristics and History</i>	High Probability (and frequency) <i>Refer to Characteristics and History</i>	Medium Probability (and frequency) <i>Refer to Characteristics and History</i>
<b>Speed of Onset</b>	12 to 24 hours warning	12 to 24 hours warning	12 to 24 hours warning	12 to 24 hours warning
<b>Duration of impact</b>	1 to 5 days (typically)	1 to 5 days (typically)	1 to 5 days (typically)	1 to 5 days (typically)
<b>Geographic Area</b>	Local to regional	Local to regional	Local to regional	Local to regional
<b>Death / Injury</b> 1. Primary Causes  A. Highest vulnerability	1. Heart Attack (shoveling) 2. Traffic accidents – poor driving conditions 3. Carbon Monoxide – stranded vehicle  A. Elderly or others with heart health issues B. Stranded travelers	1. Traffic accidents – low visibility 2. Snow plow accidents  A. Travelers – high speed travel (highways)	1. Exposure to weather elements 2. Alternate Heat source 3. Carbon Monoxide Poisoning  A. Stranded travelers – attempting to find shelter B. Loss of power / heat C. Mechanical / vent failure – carbon monoxide	1. Traffic accidents 2. Power lines down – coming in contact with live wires 3. Slips/falls  A. Travelers B. Proximity to overhead power lines C. Trees falling – pulling down power lines

Scenario	Heavy Snow	Blizzard	Extreme Cold & Wind Chill	Ice Storm
<b>Mass Casualty Incident</b>	Possible (traffic accidents)	Possible (traffic accidents)	Possible	Possible (traffic accidents)
Comments: No History of mass casualty events within Bismarck as a result of Winter Storms				
<b>Property Losses</b> (points of vulnerability – high priority)	1. Roof collapse <i>(large span roofs)</i>	1. Vehicles – <i>due to accidents</i>	1. Mechanical failures more likely 2. Batteries exposed to cold more likely to fail	1. Trees 2. Power lines and power poles 3. Vehicles <i>(due to accidents)</i>
<b>Environmental</b>			1. Pipeline breaks	
<b>COG/COOP</b>	1. Essential personnel not able to work 2. Transportation 3. Supplies – not able to deliver / receive	1. Ability to provide services is compromised 2. Transportation 3. Supplies – not able to deliver / receive 4. Safety – working outdoors	1. Water main breaks 2. Safety – working outdoors	1. Power outages 2. Safety of workers
<b>Critical Facilities</b>	1. Roof Collapse (large span roofs) 2. Lack of Access to critical facility	1. Access to critical facility compromised	1. Water main break 2. Power outage	1. Power outage 2. Backup generators in place and functional
<b>Critical Infrastructure</b>	1. Transportation <i>(Access)</i>	1. Transportation <i>(visibility)</i>	1. Backup generators – ensure heating capability	1. Power Outages 2. Backup generators – ensure heating capability
<b>Schools</b>	1. School closures <i>(due to closed roads/access)</i> 2. Roof Collapse <i>(large span roofs)</i>	1. Bus Travel 2. Students walking to/from school	1. Exposure to extreme cold <i>(students not prepared)</i>	1. Power outages – school closure. 2. Potential contact with downed power lines <i>(students)</i>

Scenario	Heavy Snow	Blizzard	Extreme Cold & Wind Chill	Ice Storm
<b>High Risk Facilities (chemical)</b>	<ol style="list-style-type: none"> <li>1. Transporting hazardous materials</li> <li>2. Roof Collapse</li> </ol>	<ol style="list-style-type: none"> <li>1. Transporting hazardous materials</li> </ol>		<ol style="list-style-type: none"> <li>1. Transporting hazardous materials</li> <li>2. Power outage at facility</li> <li>3. Backup generators in place and functional</li> </ol>
<b>Specific Populations:</b> Public Assembly, Vulnerable / Special Populations	<ol style="list-style-type: none"> <li>1. Roof collapse (gyms, auditoriums, etc.)</li> <li>2. Medical attention / prescription needs</li> <li>3. Travelers</li> </ol>	<ol style="list-style-type: none"> <li>1. Travelers</li> <li>2. Medical attention / prescription needs</li> <li>3. Homeless Population</li> </ol>	<ol style="list-style-type: none"> <li>1. Travelers</li> <li>2. Outdoor recreation</li> <li>3. Homeless Population</li> </ol>	
<b>Economy</b> (community wide)	Affected – discontinued until storm lifts	Affected – discontinued until storm lifts	Affected - minimal business interaction	Affected – reduced business interaction – possible power outages – unsafe travel conditions
<b>OTHER:</b>	Mobile HazMat (transportation) Emergency Response time	Mobile Hazmat (transportation) Emergency Response time	Mobile Hazmat (transportation) Emergency Response time (outdoor work)	Mobile Hazmat (transportation) Emergency Response (travel / slippery conditions) Additional hazards – tree limbs, power lines, falling ice, slippery conditions

**Snow Removal Costs:**

**October 2022 through April 30, 2023 Winter Season:** Heavy Snowfall for the winter season.

Snow removal costs for Bismarck Public Works for the season was just over **\$5.2 million**.

Senate Bill 2183 of the 68th Legislative Assembly of North Dakota appropriated \$20 million to the North Dakota Department of Emergency Services (NDES) in order to provide snow removal assistance grants to eligible counties/townships, cities and tribal entities. Bismarck Public Works applied and received approximately \$1.57 million in reimbursement.

**April 12-14, 2022:** A significant winter storm brought widespread blizzard conditions to western and central North Dakota from April 12th through April 14th, 2022. Bismarck received 18.3” of snow over the three-day event while Minot received three feet. Peak wind gusts for Bismarck were 51 mph. Bismarck declared a snow emergency and closed city offices on April 13. **Snow removal cost for this single storm incident was \$395,000.**

# Vulnerability Assessment due to power outage caused by Winter Storm Events

Vulnerability: Characteristics of community assets that make them susceptible to damage from a given hazard.

Note: Losses, Impact and Vulnerabilities are assumed to be cumulative from previous columns to the left using winter season as timeframe of occurrence.

Scenario	3-Day Power Outage (ex: winter storm)	1 Week Power Outage & Interstate/Hwy Transportation Closure (ex: winter storm)
<b>Probability</b>	Likely	Possible
<b>Speed of Onset</b>	No warning for power outage. Adequate warning for storm is assumed.	No warning for power outage. Adequate warning for storm is assumed.
<b>Geographic Area</b>	Regional & City-Wide Impact	Regional & City-Wide Impact
<b>Duration</b>	3 days	7 days
<b>Death / Injury</b> 1. Primary Causes  A. Highest vulnerability	<ol style="list-style-type: none"> <li>1. Improper use of alternative heating sources.</li> <li>2. Carbon Monoxide poisoning.</li> <li>3. Injury due to cold temperatures and heavy snow.</li> <li>4. Lack of back-up power for personal life personal supportive equipment.</li> </ol> <p>A. Those more affected by colder temperatures and those with poorly insulated homes. B. Those with medical conditions residing at home.</p>	Same as column to the left.
<b>Mass Casualty Incident</b>	1. No. Some injury and loss of life is possible, but avoidable through sheltering and other response efforts.	1. Possible, but avoidable through sheltering and other response efforts.
<b>Property Losses</b> (points of vulnerability – high priority)	<ol style="list-style-type: none"> <li>1. Frozen and burst water pipes.</li> <li>2. Personal property sensitive to colder temperatures</li> </ol>	<ol style="list-style-type: none"> <li>1. Frozen and burst water pipes (extensive)</li> <li>2. Personal property sensitive to colder temperatures damaged.</li> </ol>

Scenario	3-Day Power Outage (ex: winter storm)	1 Week Power Outage & Interstate/Hwy Transportation Closure (ex: winter storm)
	damaged.	
<b>Environmental</b>		
<b>COG/COOP</b>	<ol style="list-style-type: none"> <li>1. Non-essential services discontinued.</li> <li>2. Staffing challenges due to personal impacts.</li> </ol>	<ol style="list-style-type: none"> <li>1. Critical and essential functions maintained.</li> <li>2. Other functions discontinued.</li> <li>3. Staffing challenges due to personal impacts.</li> </ol>
<b>Critical Facilities</b>	<ol style="list-style-type: none"> <li>1. Grocery Stores closed.</li> <li>2. Gas Stations – not able to pump gas.</li> </ol>	<ol style="list-style-type: none"> <li>1. Grocery Stores closed.</li> <li>2. Gas Stations – not able to pump gas.</li> <li>3. Hospitals, Nursing Homes, Assisted Living Centers</li> <li>4. Prisons, Jails</li> </ol>
<b>Critical Infrastructure</b>	<ol style="list-style-type: none"> <li>2. Heating/Cooling Systems down. Back-up power required.</li> <li>3. Communications (phone / cell) impacted.</li> </ol>	<ol style="list-style-type: none"> <li>2. Transportation – deliveries delayed for one week.</li> <li>3. Reduced inventory of food and medicines due to Interstate and Hwy road closures.</li> </ol>
<b>Schools</b>	<ol style="list-style-type: none"> <li>1. School Closures – some may be used as shelters.</li> </ol>	<ol style="list-style-type: none"> <li>1. School Closures – some may be used as shelters.</li> </ol>
<b>High Risk Facilities (chemical)</b>	<ol style="list-style-type: none"> <li>1. Facilities without back-up power may be impacted. Safety/security may be impacted without power.</li> <li>2. Closed for business – economic impact.</li> </ol>	<ol style="list-style-type: none"> <li>1. Same as left column.</li> </ol>
<b>Specific Populations:</b> Public Assembly, Vulnerable / Special Populations	<ol style="list-style-type: none"> <li>2. Evacuation and sheltering would be necessary for those without back-up power at place of residence.</li> </ol>	<ol style="list-style-type: none"> <li>1. Evacuation and Sheltering would be necessary for those without back-up power at place of residence.</li> </ol>
<b>Economy</b> (community wide)	Minor	Minor
<b>OTHER:</b>		

<b>Changes in Vulnerability</b> Since the previous plan update in 2020.	
Increase in Vulnerability	Decrease in Vulnerability
As the community grows, new areas of development are impacted by snow events and require snow removal services. The growing population, especially those new to the area may not be familiar with the impacts of severe winter weather.	See Winter Storm Hazard Mitigation Capabilities listed in Section 3.

**Risk**

See Section 10 of this plan document for risk assessment and hazard ranking of all hazards addressed in this plan.

**Relationship to other Hazards:** Heavy snowfall followed by rapid snowmelt runoff enhance the risk of spring flooding. The need for heating in the winter months enhances the risk of fire and carbon monoxide poisoning as a result of using alternate heating sources inappropriately or lack of maintenance on furnaces or other heating appliances.

**Future Conditions**

- **Location:** The location of winter hazards will remain the same, with the exception of additional areas as annexed into the city.
- **Extent/Intensity:** See “Anticipated Future Climate Impact” below.
- **Frequency:** See “Anticipated Future Climate Impact” below.
- **Duration:** The duration of winter hazards is not projected to change.

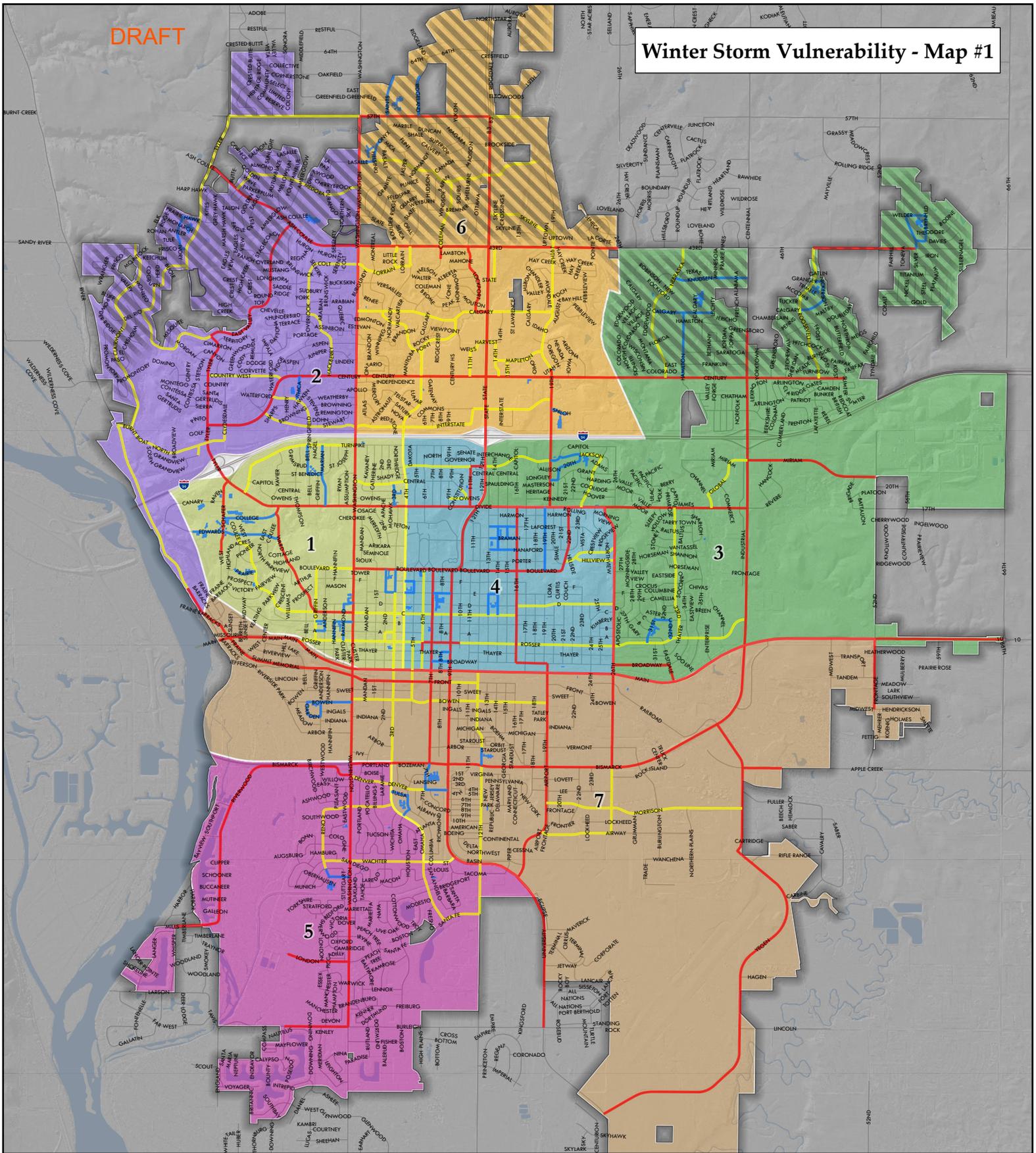
**Anticipated Future Climate Impact – Winter Hazard**

Through the end of this century in North Dakota, expect larger, more frequent, and more intense periods of heavy wet snow, mixed precipitation or ice storms, and freezing drizzle or mist, with somewhat warmer temperatures. Potential Impacts include a likely increase in winter season precipitation, overall, along with more periods of heavy snowfall and/or freezing rain/ice events. Warmer winter season temperatures will support a higher incidence of mixed precipitation (sleet), freezing rain, or ice storms, which will likely impact transportation, power transmission, roof loading, critical facilities, and infrastructure, along with general health and safety. Human health impacts include an increased incidence of heart, back, and/or muscle related injuries from shoveling snow or falling on ice.

Other potential future impact includes a decrease in demand for energy (heating).

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# Winter Storm Vulnerability - Map #1



### Snow Plow Priority

- 1
- 2
- 3
- Streets
- City Limits
- Schools/Daycares
- Areas of New Development (Prone to Heavy Snow Drifting)

### Snow Plowing Zones

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- Waterbodies



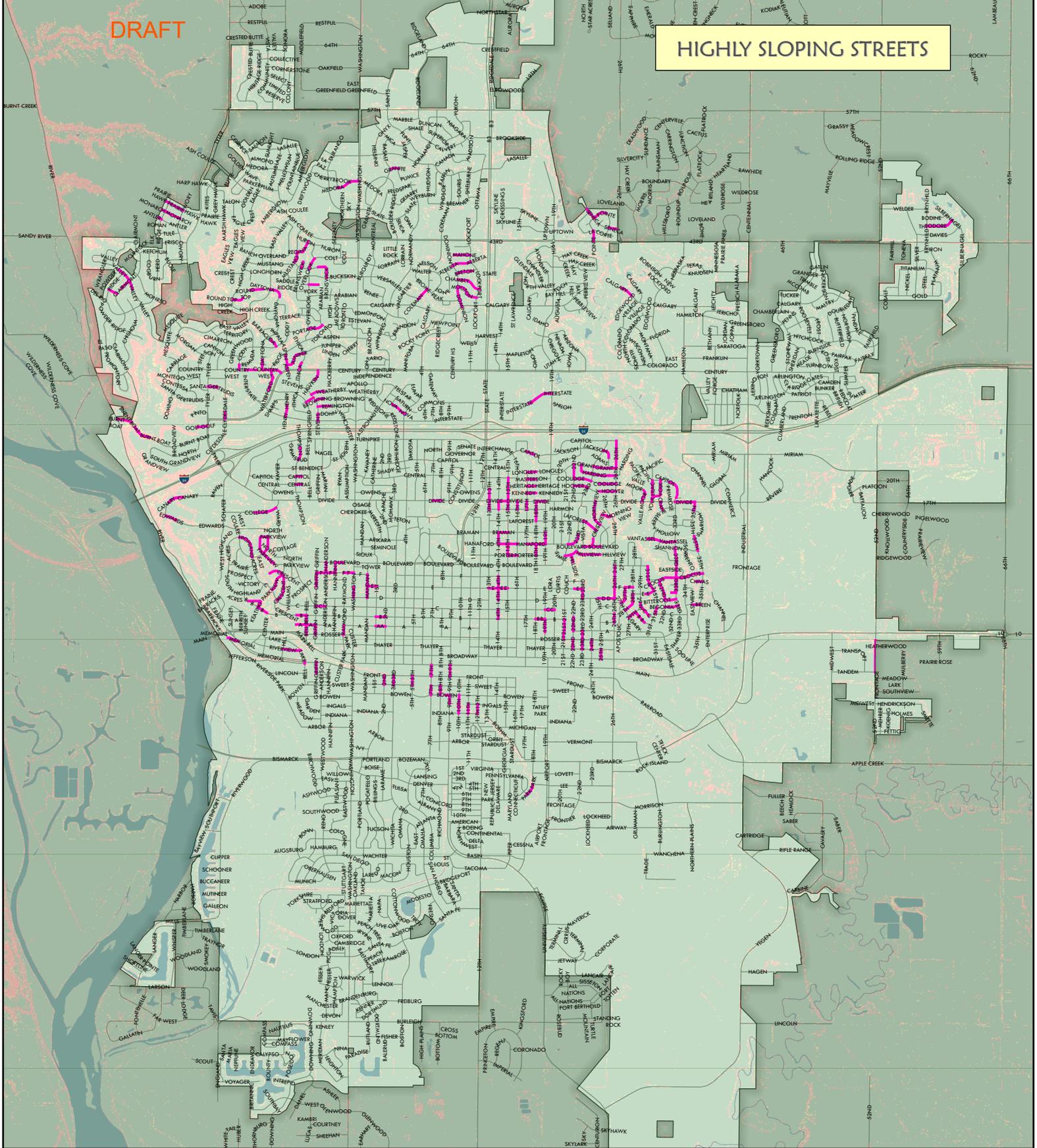
## Snow Plowing Map

Map Created: July 2025  
by GIS Division



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# HIGHLY SLOPING STREETS



- Streets
- City Limits
- Waterbodies
- Slope Percent
- Value
- 100
- 0
- Streets With >10% Slope

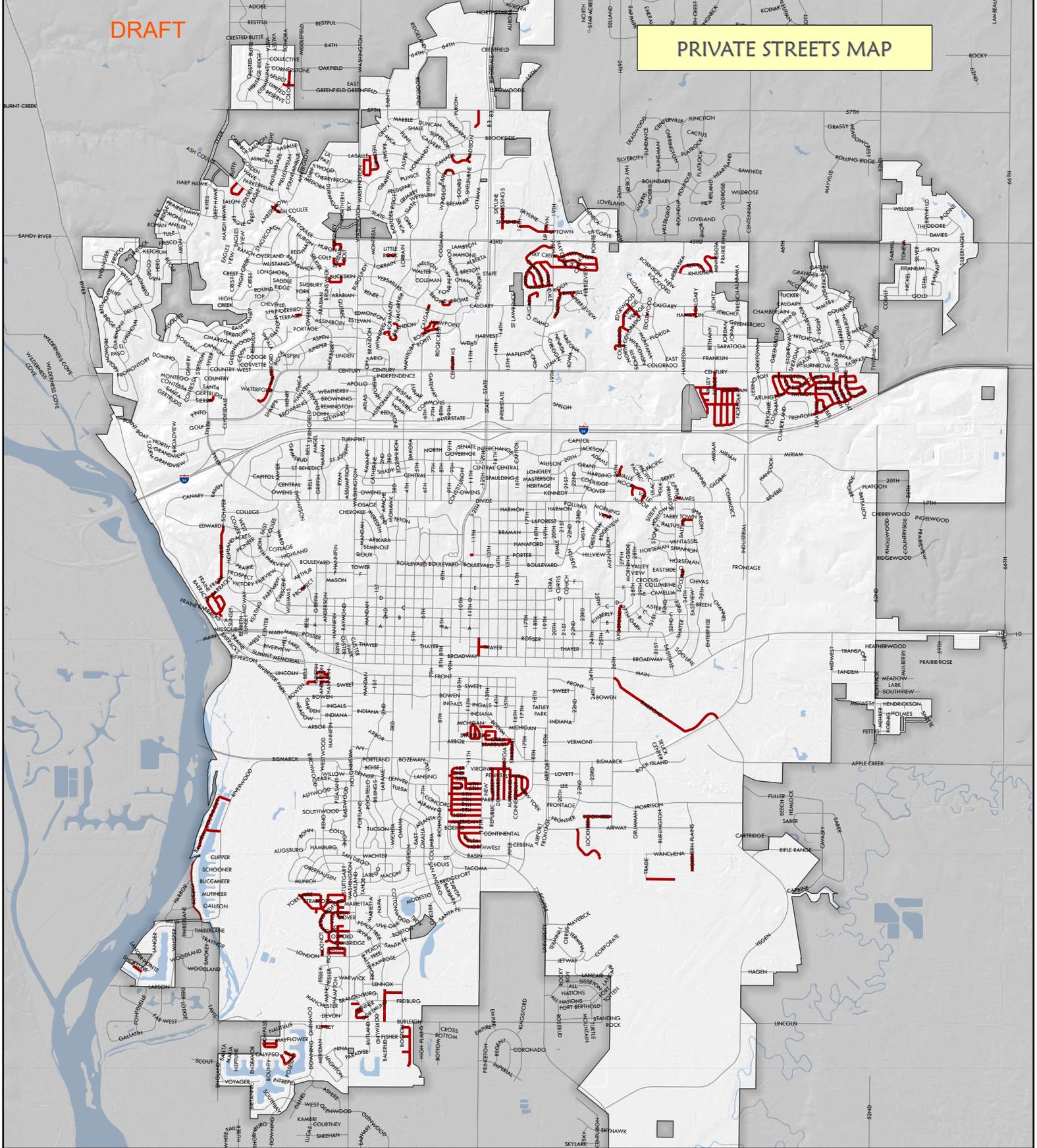


Map Created: July 2025  
by GIS Division



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# PRIVATE STREETS MAP



- Private Streets
- Streets
- Waterbodies
- City Limits

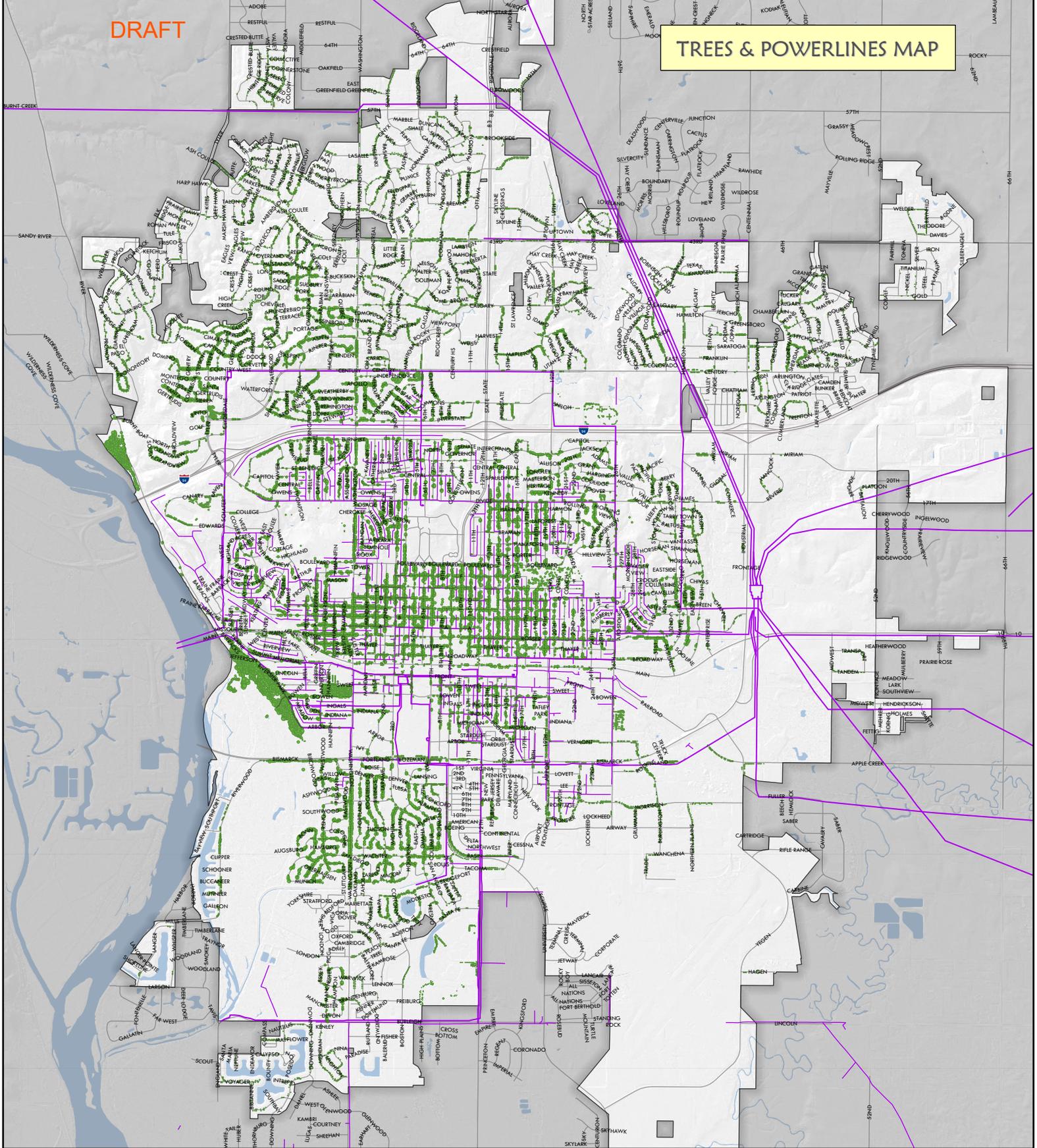


Map Created: July 2025  
by GIS Division



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# TREES & POWERLINES MAP



Map Created: July 2025  
by GIS Division

- Trees
- Size
- 1
  - 5
  - 10
  - 50
  - 100

- Streets
- Waterbodies
- City Limits
- MDU Overhead Lines
- Major Transmission Lines



## Previous Occurrences

Winter Storm Disaster Declarations – Burleigh County Since 1989			
Declaration	Incident	Incident Period	Declaration Date
DR-1901	Severe Winter Storm	April 1, 2010 to April 3, 2010	Major Disaster Declaration declared on April 21, 2010
DR-1157	Severe Winter Storms/Blizzards	January 3, 1997 to January 31, 1997	Major Disaster Declaration declared on January 12, 1997

Source:

[http://www.fema.gov/disasters?field\\_state\\_tid=11&field\\_disaster\\_type\\_term\\_tid=6843&field\\_disaster\\_declaration\\_type\\_value=All&items\\_per\\_page=10&page=1](http://www.fema.gov/disasters?field_state_tid=11&field_disaster_type_term_tid=6843&field_disaster_declaration_type_value=All&items_per_page=10&page=1)

**October 2022 thru April 30, 2023:** Heavy Snowfall for the winter season.

Snow removal costs for Bismarck Public Works for the season was just over \$5.2 million. Senate Bill 2183 of the 68th Legislative Assembly of North Dakota appropriated \$20 million to the North Dakota Department of Emergency Services (NDDDES) in order to provide snow removal assistance grants to eligible counties/townships, cities and tribal entities. Bismarck Public Works applied and received approximately \$1.57 million in reimbursement.

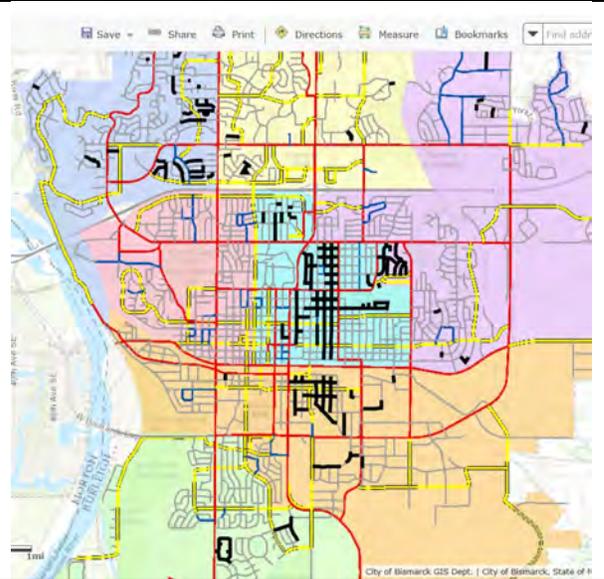
**April 12-14, 2022:** A significant winter storm brought widespread blizzard conditions to western and central North Dakota from April 12th through April 14th, 2022. Bismarck received 18.3" of snow over the three-day event while Minot received three feet. Peak wind gusts for Bismarck were 51 mph. Bismarck declared a snow emergency and closed city offices on April 13. Snow removal cost for this single storm incident was \$395,000.

**October 10-11, 2019:** 11.6 inches of snow fell within a 24 hour period (7am Thursday to 7 am Friday) setting a new record for Bismarck.

**January 2017:** The total accumulation of snow (July 2016 to January 2, 2017) is 53.1 inches. That is the most amount of snowfall ever accumulated to date, according to the National Weather Service in Bismarck. The 1993-94 snowfall season, July 1 through Jan. 2, held the record prior and now takes second place, with 49.3 inches.

**December 25, 2016:** As a result of the winter storm which started on Christmas Day, the volunteer snowmobile club was utilized to provide transportation of critical staff to both hospitals and area nursing homes throughout the Day on December 26. Over 30 personnel were transported by snowmobile. On December 25, plows were pulled from the streets and were utilized for providing access based on 911 calls. Clearing of emergency snow routes was resumed on December 26 during the day. As of Thursday December 29, plows still had not reached many of the residential areas. Snowfall was reported at 12.5 inches.

As of December 29, 2016, extensive snow removal operations continued. Streets shown in black still needed to be cleared (again):



**December 6, 2016:** The City of Bismarck declares Snow Emergency due to accumulation of snowfall and the blowing and drifting snow conditions (blizzard conditions). Bismarck PD issues a no travel advisory as numerous vehicles were stranded and blocking intersections and creating unsafe conditions for law enforcement, emergency vehicles, first responders and snowplows. Bismarck City offices close. Public Works snow removal crews work 24/7 to remove snow.

**April 14-15, 2013:** A total of 17.7 inches of snow fell beginning with a trace on April 13 (.1 inch) with a majority of the snow falling on Sunday April 14, 2013 (17.3 inches) and an additional .3 inches on April 15. The snow had a high moisture content (wet/heavy) and made travel difficult to impossible.

A snow emergency declaration was issued by the city of Bismarck on April 14, 2013. Snow plows focused on clearing emergency routes only (red - priority 1 routes) on April 14<sup>th</sup> until noon on April 15 before snow plows were able to begin clearing second, third, and fourth level priority routes (residential). No travel was advised and the city of Bismarck closed its offices on Monday April 15 along with many other closings including ND State Government, Burleigh County, and Bismarck Public Schools.

NOAA Storm Event Database:

**April 14, 2013 – Blizzard Event:** Very heavy snow combined with winds gusting to 40 miles per hour to create a blizzard for much of the day on the 14th.

**April 14-15, 2013: Winter Storm Event**

Strong low pressure pushed across the Rockies April 13th, slowed down over the Dakotas April 14th, then moved east on April 15th. The peak of the storm occurred on Sunday when much of west and central North Dakota received heavy amounts of snow, with portions of the south central and southeast having a blizzard. A combination of favorable moisture feed and strong surface and mid-level dynamics brought historic snowfall to parts of west and central North Dakota. A moist conveyor belt extended from the eastern portions of Iowa and Illinois back northwest into North Dakota, situated along and north of an inverted surface trough stretched

from southeast to northwest across South Dakota. Combined with strong diffluent flow aloft associated with the upper level low, snowfall rates approached two inches per hour across south central North Dakota on Sunday.

In addition to the heavy snow, strong surface winds developed across south central North Dakota west of the Missouri River and into the James River Valley. Wind gusts to 40 miles per hour combined with the heavy snow resulting in a blizzard. Storm total snowfall amounts ranged from 15 to 22 inches from the James River Valley into the Missouri River Valley. Lesser amounts were reported across the far west and north, with up to eight inches at Watford City, and around an inch near the Canadian border. The highest snowfall amounts were reported at Center and Flasher with 22 inches. A record snowfall for any calendar day of the year was set at Bismarck, with 15.5 inches falling on April 14th. The storm total in Bismarck was 17.7 inches. This also resulted in setting a new record April snowfall of 21.5 inches.

Impacts from this storm were numerous. All roads across the southwest, south central, and southeast were under no travel advisories due to the heavy snow. Interstate 94 was closed from the Montana border to Jamestown, and Highway 83 was closed from Bismarck to Underwood. In addition, multiple school closings occurred on the 15th due to the heavy snow.

**March 22-23, 2011:** A storm total snowfall amount of 10.4 inches was reported near Bismarck.

**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.

Presidential Disaster Declaration for Severe Winter Storm issued in 2010 [DR-1901](#)  
Including Burleigh County  
Incident Period: April 1, 2010 - April 3, 2010  
Declaration declared on: April 21, 2010

**January 22-23, 2010:** A wintry mix of freezing rain, sleet, and snow spread north across the local area. Precipitation eventually changed over to all snow, with up to five inches of accumulations reported by early Saturday morning. Hazardous travel conditions and scattered power outages resulted.

**January 5-6, 2010:** Six to eight inches of snow fell across Burleigh County. The National Weather Service Office in Bismarck reported 7.1 inches of storm total snowfall. Strong northwest winds of 20 to 40 mph created areas of significant blowing and drifting snow, resulting in near blizzard conditions.

**December 25, 2009: Winter Storm / Blizzard Conditions:** Bismarck received 9.2 inches of snowfall on Christmas Day and a total of 13.8 inches from December 23 through 26. Most of North Dakota received heavy snow as a result of this storm. A no travel advisory was issued for the entire state on Christmas Day. Blowing snow caused reduced visibility, drifting, and dangerous driving conditions throughout the state. Road closures included I-29 from S.D. border to Canadian border (and from South Dakota to the Iowa border), I-94 from Montana border to Minnesota border, Hwy 83 from Bismarck to the Canadian border and Hwy 2 from Berthold to Devils Lake. Snow plows in Bismarck focused on clearing emergency routes and major arterials. Duration of the storm and impacts is at least 4 days (starting Dec 23 thru 26).

**2008/2009 Winter Snowfall total:** 100.3 inches (2<sup>nd</sup> place behind 1996-97 with 101.6 inches). Snow removal assistance (Federal Disaster Declaration) was received by Bismarck and many communities throughout the state.

**March 23-24, 2009:** A blizzard began later on the 23<sup>rd</sup> and continued into the 24<sup>th</sup>. Wind gusts to 47 mph on the 24<sup>th</sup> with a snow total of 8.1 inches (.2 on the 23<sup>rd</sup> and 7.9 on the 24<sup>th</sup>). This blizzard exacerbated the flooding/ice jam situation and caused delay in response/recovery efforts.

**March 29 - 30, 2009: Heavy Snow/Blizzard - Strong** northwest winds of 20 to 45 mph accompanied the snow and produced widespread blizzard conditions mainly south of Interstate 94 closer to the North Dakota and South Dakota border. Widespread 14 inch or greater storm total snowfall amounts were common across southwest and south central North Dakota during this event, with a few isolated reports greater than 20 inches. No travel advisories, road closures, including Interstate 94 from Bismarck to the Montana border, and school and business closures were common during this significant spring storm.

**March 23, 2009: Blizzard:** This blizzard occurred at the onset of the Ice Jam Flooding that occurred in Bismarck/Burleigh spring of 2009. A storm total snow amount of 8.1 inches was recorded at the Bismarck National Weather Service Forecast Office. The heavy snow combined with strong northwest winds resulted in widespread blizzard conditions. Storm total snow amounts ranged from 12 to 22.5 inches across southwest North Dakota, to five to 11 inches central. No travel advisories, road closures, power outages, and school and business closures were common during this significant spring storm.

**January 11, 2009: Blizzard:** Strong northwest winds of 25 to 35 mph, with gusts up to 45 mph, combined with falling snow and existing loose snow cover to create widespread and prolonged blizzard conditions across the county. Storm total snowfall accumulations by Monday morning ranged from two to five inches. The blizzard warning encompassed the entire National Weather Service Bismarck County Warning Area, 36 counties, all of which had a blizzard. Periods of light to moderate snow and blizzard conditions, very strong winds creating significant blowing and drifting snow and near zero visibilities, forced numerous road closures and the issuance of no travel advisories by law enforcement officials throughout the event.

**January 8, 2009: Heavy Snow -** A strong winter storm system brought moderate to heavy snow, areas of freezing rain, and considerable blowing and drifting snow to much of west and central North Dakota from early morning Thursday, January 8th, through Friday afternoon, January 9th. This significant storm resulted in numerous no travel advisories being issued by law enforcement throughout the event due to freezing precipitation, heavy snow accumulations, and blowing and drifting snow blocking roadways.

**December 2008:** Snowiest month on record (all months /years) with a total of 33.3 inches.

**December 29, 2008: Heavy Snow -** A fast moving surface low pressure system developed a band of moderate to heavy snow from northwest North Dakota, southeast through much of central North Dakota, Monday night, December 29th, and lasting through the early afternoon of Tuesday, December 30th. Storm total snow amounts ranged from three to four inches around the perimeter of the heavy snow band to around one foot within the center. In addition, occasional winds of 20 to 35v mph a produced considerable blowing and drifting snow and

resulted in the issuance of no travel advisories over several counties Monday night into Tuesday morning.

**December 20, 2008: Extreme Cold / Wind Chill** - Cold Arctic air combined with winds of 15 to 25 mph to create wind chill temperatures of 40 below to near 50 below zero. - from Saturday the 20th, through Sunday morning the 21st.

**December 14, 2008: Extreme Cold / Wind Chill** - After a significant winter storm that brought a blizzard to western and central North Dakota moved out of the Northern Plains, wind chill continued to be a problem. Strong cold air advection combined with gusty northwest winds and resulted in wind chill temperatures of 40 to 55 below zero from Sunday night the 14th, through Monday morning the 15th.

**December 13, 2008: Blizzard** - A significant winter storm impacted all of western and central North Dakota beginning Saturday, December 13th, and lasting through much of Sunday, December 14th. A blizzard warning was posted well in advance of the storm, with the warning lead time more than a full day in advance. The blizzard warning encompassed the entire National Weather Service Bismarck County Warning Area, 36 counties, all of which verified. Heavy snow and blizzard conditions, significant snow combined with very strong winds and near zero visibility, forced numerous road closures and the issuance of no travel advisories throughout Saturday and Saturday night. A statewide no travel advisory was then issued early Sunday morning by the North Dakota Department of Transportation. Total snow amounts by Monday morning the 15th were as much as 13.8 inches at Williston. Bismarck had 12 inches.

**November 6, 2008: Blizzard:** - A significant and complex winter storm impacted much of western and central North Dakota beginning Wednesday, November 5th, and lasting into Friday, November 7th. Winter storm warnings and blizzard warnings were posted well in advance of the storm. Warning lead time averaged nearly 27 hours. The warnings encompassed the entire National Weather Service Bismarck County Warning Area, 36 counties, though not all counties had events or reached warning criteria. Counties in the Williston area and the Jamestown area were basically missed by the storm. Blizzard conditions, or significant snow with near blizzard conditions, forced many schools and businesses to close and stranded travelers. Numerous roads were closed or no travel was advised due to the conditions. Storm total snowfall ranged from one to three inches around Williston and Jamestown, to six to twelve inches southwest through central, to a maximum of twenty inches in McHenry County. The strong wind resulted in blowing and drifting snow and so amounts had to be estimated. Snow drifts were four to six feet deep.

**January 29, 2008: Extreme Cold / Wind Chill** - Wind chills of 40 to 45 below zero with wind speeds of 30 to 45 mph persisted for over 24 hours. The lowest wind chill recorded was 44 below zero at Bismarck.

**March 30, 2007: Ice Storm** - 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 (newspaper). No travel was advised for various county, state, and federal highways as a result.

**March 2, 2007: Blizzard** - Winds of 30 to 45 mph were recorded across central North Dakota for much of Friday. These winds, in combination with recent snowfall of 5 to 12 inches, created widespread areas of significant blowing and drifting snow with near zero visibilities. Conditions

were much worse in the open country than they were within urban areas, as numerous rural roadways became impassable due to large snow drifts. As a result, no travel was advised for much of central North Dakota, along with several highways being closed including Interstate 94 from Bismarck to Fargo.

**February 28, 2007: Winter Storm** - The heaviest snow (9 to 12 inches) fell over far south central and southeastern North Dakota. In addition to the heavy snow, light freezing rain and sleet also fell Wednesday afternoon and night over the central and eastern counties of the Bismarck County Warning Area.

**January 24, 2007: Winter Storm** - Low pressure over the central Rockies intensified into a major winter storm impacting North Dakota on the weekend of January 24th and 25th. A persistent snow event produced 6 to 12 inches of snow over most of western and central North Dakota. The heaviest band of snow fell from the northwest through central North Dakota where snowfall amounts ranged from 9 to 12 inches. The storm began as freezing rain and sleet over north central North Dakota before turning over to all snow. Gusty winds of 15 to 25 mph accompanied the storm resulting in considerable blowing and drifting snow and wind chills to 30 below zero. Travel throughout the region was impacted due to reduced visibilities and blocked roads.

**January 4, 2007: Extreme Cold/ Wind Chill** - Temperatures reached 20 to 30 below zero Sunday night and remained between 10 and 20 below zero on Monday. West winds of 10 to 25 mph combined with the subzero temperatures created wind chills ranging from 45 to 58 below zero over western and central North Dakota. The winds also created low visibilities in blowing snow in many areas of the region. Some roads were closed due to the blowing and drifting snow over parts of northern North Dakota. The frigid temperatures lead to power outages and water line breaks in several areas.

**December 30, 2006: Heavy Snow** - The highest snow totals, in excess of 10 inches, were from Bismarck, to Hazelton, Wishek, and Ashley, and through parts of Stutsman and Foster counties. These were the most significant snow amounts in these areas, from a single storm, in about seven winter seasons. There were many accidents and vehicles in ditches, at least 41 in the Bismarck area and more than 50 in the Jamestown area alone.

**February 16, 2006: Wind Chill** - Temperatures were in the 15 to 25 degree below zero range with wind speeds of 15 to 25 mph resulting in wind chills mainly in the 40s below.

**January 20, 2006: Winter Weather - Around** two inches of snow fell over Morton and Burleigh counties this morning. It was enough to cause slippery roads and traffic induced snow fog. Numerous accidents were reported in the two counties.

**December 29, 2005: Winter Weather** - Snow amounts totaled three to five inches over the area and a snow advisory was in effect. Several accidents were reported in Mandan, Morton County, and about 40 accidents were reported in Bismarck, Burleigh County. Two people were injured (indirect) in one of the Bismarck accidents.

**January 13, 2005: Extreme Cold / Wind Chill** - An arctic high pressure system dropped southeast out of central Canada on the evening of the 13th of January. The system brought bitter cold temperatures to western and central North Dakota the night of the 13th. The air temperatures overnight dropped between 20 to 35 below zero with daytime temperatures ranging 10 to 20 below zero. The subzero temperatures lasted through the morning of the 15th.

Northwest winds up to 20 mph accompanied the cold air producing extreme wind chills of 40 to 60 below zero across the region.

**March 10, 2004: Blizzard** - The high wind event of March 10th brought afternoon and evening snow showers to central North Dakota. The snow combined with the high wind reduced visibilities to less and one quarter mile (1/4 mile) and in some areas visibilities lowered to near zero at times causing blizzard conditions. The North Dakota Highway Patrol and Department of Transportation closed down portions of highway 83 between Minot and Bismarck due to the extremely hazardous conditions caused by the snow and blowing snow. No travel was advised for the secondary roads in central North Dakota due to the snow, blowing snow and reduced visibilities.

**February 10, 2004: Blizzard** - The winter storm warning for western and central North Dakota was upgraded to a blizzard warning in the afternoon of the 10th. Strong winds of 50 mph combined with snow had reduced visibilities to zero at times by the late afternoon hours and remained at or near zero through the night.

**January 27, 2004: Extreme Cold/Wind Chill** - Ambient temperatures ranging 20 to 35 below zero combined with northwest winds to 30 mph resulted in widespread wind chill factors of 40 to 65 below zero.

**December 17, 2002: Winter Storm** - In the far west and far south central North Dakota 3 to 5 inch snowfall was common. After a relatively mild autumn, it was the first major arrival of winter weather to affect the region.

**December 15, 2000: Blizzard** - A strong low pressure system moved rapidly across southern Canada ushering frigid arctic air and strong northwest winds across western and central North Dakota. Wind gust to 60 mph were common throughout the region. The frigid arctic air kept daytime temperatures 5 to 10 below zero. The cold temperatures coupled with the high winds brought dangerous wind chills to 75 below zero. Snowfall was light, around an inch total, however existing snow on the ground created near zero visibilities in blowing and drifting snow for an extended period of time. This prompted the closing of many roads throughout western and central North Dakota.

**November 7, 2000: Winter Storm** – Heavy snow fell across western and central North Dakota with accumulations of 6 to 18 inches reported.

**March 8, 2000: Winter Storm** - Snow amounts ranged between 3 to 6 inches with the heaviest falling over south central North Dakota. Winds during the storm ranged between 40 to 50 mph which created dangerous winter conditions.

**February 26, 2000: Winter Storm** - A wide band of heavy wet snow fell from south central North Dakota through portions of extreme north central North Dakota along the Canadian border. Scattered areas of 8 to 12 inches of wet snow fell over this area with numerous reports of 3 to 6 inches within this band. Winds with this storm generally ranged between 30 to 45 mph which caused some blowing and drifting snow.

**April 3, 1999: Winter Storm** - The storm brought an area of heavy snow over western and central North Dakota. Snowfall ranged from 4 to 8 inches. The heaviest snow fell over the north central area.

**April 1, 1999: Blizzard** - Gusty northwest winds caused low visibilities in blowing and drifting snow over a wide area of western and central North Dakota. Six to fifteen inches of snow fell over the warned area.

**January 1, 1999: Winter Storm** - Heavy snow fell with 6 to 8 inches of snowfall during the day. Northwest winds to 40 mph brought bitter cold wind chills to 65 below zero and low visibilities in blowing snow west of the surface trough. Two fatalities were contributed to the storm. In south-central North Dakota at Bismarck a man (age unknown) died from a heart attack while shoveling snow. In north-central North Dakota near Rolette poor visibility stranded a vehicle which an elderly woman left to seek help and died from exposure to the cold. She came within 75 feet of a farm house but was unable to see it.

**November 18, 1998: Winter Storm** - Snowfall ranged 6 to 15 inches over central and east central North Dakota. The heaviest band of snow of 12 to 14 inches fell over the central and north-central counties.

**November 9, 1998: Heavy Snow** - A band of heavy wet snow extended from the southwest through much of central North Dakota ending early in the afternoon on the 10th. Amounts ranged from 6 to 9 inches in the southwest and south central to 9 to 13 inches north central.

**April 4, 1997: Blizzard** - Warm weather the first three days of April lead much of North Dakota to believe that spring had arrived with temperatures in the 60s and 70s. Mother Nature had other plans. A very strong area of low pressure moved out of the Colorado area into the northern plains. Warm moist air ahead of the low collided with cold air coming down from Canada. The result was the worst blizzard of the season for North Dakota, bringing much of the state to a complete halt. The precipitation began to fall during the afternoon of the 4th (Friday), as rain in the east and freezing rain or sleet in the west. By Friday evening the freezing rain and sleet had changed over to all snow in the west. By Saturday afternoon the heavy snow moved into the central part of the state, reaching the eastern part of North Dakota later that night. Snow accumulations were on average 1.5 to 2 inches an hour with 50 to 60 mph winds as well. The blizzard ended in the west on the morning of the 6th (Sunday), but continued into the evening across the east. **The additional snow at Bismarck brought the season snowfall total to 101.4 inches, which set an all-time record.** The old record was 91.8 inches. Many power poles fell from the weight of the ice and snow combined with the strong winds. It's estimated that over 300 wooden poles had to be replaced, with one power company reporting about 100 steel towers damaged or destroyed with over 200 miles of transmission line down. An estimated 75,000 homes were without power for some time over the weekend, with a few houses having to wait 4-5 days before power was fully restored. The state's electrical grid was in such patch work condition that the governor requested that people conserve as much energy as possible for fear of overtaxing the system and creating a widespread brownout. National Guard helicopters were used to help power companies assess the damage done to power poles and lines. With the widespread power outages, many people had to resort to burning wood or running gas powered generators to keep their homes warm. This lead to a few reports of carbon monoxide poisoning. Numerous vehicles were stranded in and out of towns, as well as people. I-94, I-29, and all other major highways in the state were closed for the weekend. **On the 7th(Monday), President Clinton declared North Dakota a disaster area for the 2nd time this winter**, freeing up grants and making low interest loans possible.

**March 12, 1997: Winter Storm** - The snow was mainly confined in a band from the northwest part of the state to the south-central (7 inches at Bismarck). I-94 was again closed from Bismarck to Fargo.

**January 9, 1997: Blizzard** - The second blizzard in less than 1 week brought North Dakota to a virtual standstill. This blizzard didn't bring as much snow as the first storm, but the winds gusted from the northwest as high as 40 mph and they lasted for 3 days. Snowfall amounts from this storm varied from 1-2 inches in the southwest to 2-4 inches in the central. But the strong winds combined with this snow as well as the snow from the blizzard a few days earlier created widespread whiteout conditions that lasted for 3 days. There were reports of people getting stranded in vehicles for up to 40 hours. Those that stayed with the vehicle survived, but those that didn't either perished or suffered 2nd and 3rd degree burns over 70-90 percent of their body. As the storm was winding down on the 11th and 12th, bitter cold air moved in, and with the strong northwest winds still blowing, wind chills plummeted to 85-90 below with actual air temperatures 20-30 below. In Elgin (Grant Co), the water tower froze and broke open due to the cold temperatures. With the amount of suffering and hardship going on, Gov. Schafer of North Dakota declared the state a disaster area. This was followed on the 12th with President Clinton approving the 1st ever request to declare a major statewide disaster. The National Guard was called in to help with snow removal as many communities had already spent their snow removal money before this storm.

**January 4, 1997: Blizzard** - The first blizzard of 1997 hit east-central North Dakota on the morning of the 4th. The blizzard was preceded by freezing rain that lasted most of the day before switching over to snow. The snow became so heavy that the highway department pulled the plows off of the roads the evening of the 4th and all day on the 5th. It was during the evening of the 4th that the northwest winds began to blow. Winds of 25 to 35 mph were common. Although the snow was not as heavy in the western part of North Dakota, the freezing rain made travel very hazardous. This would turn out to be the first of 4 major snow events that would hit western and central North Dakota during January.

**December 25, 1996: Extreme Cold** - The blizzard of the 16th-18th left in its wake very cold air. Williston set a new state record low of 32 below the morning of the 25th, and Bismarck set a new record low high temperature for the date, with the mercury struggling to 10 below for a high. Lows across the state that morning varied from 20 to 30 below with highs from 10 to 20 below.

**December 16, 1996: Blizzard** - A strong low pressure center moved southeast out of Canada into the northern plains bringing with it blizzard conditions. The blizzard lasted for 3 days in North Dakota. The blizzard began in the western part of the state the morning of Monday, December 16 and didn't exit the eastern part of the state until the evening of Wednesday, December 18th. This was the first 3 day blizzard since the winter of 1980-81. Snowfall amounts varied from around 2 inches in the Dickinson area...3-4 inches in Williston and Bismarck to 6-8 inches in the Jamestown area. The light snow combined with north winds gusting to 50 mph to produce massive blowing and drifting of snow. Temperatures also plummeted down to 20 below creating wind chills from 40 to 60 below. Visibilities were so poor that the ND Highway dept. pulled the plows off roads the evening of the 16th and didn't allow them to return to the roads until the afternoon of the 18th. Snow drifts as high as 10 feet were common. All of I-29 in North Dakota and I-94 from Bismarck to Fargo were closed, stranding hundreds of travelers.

**November 23, 1996: Winter Storm** - For the 2nd time in less than 1 week, more snow fell on parts of western and central North Dakota. Again, the lack of wind made the storm more bearable than what it could have been. Bismarck received almost 9 inches of snow. Bitter cold air also accompanied the storm system.

**November 19, 1996: Winter Storm** - Another winter storm hit North Dakota bringing more unwanted snow to the state. Although there wasn't enough wind associated with the storm system to qualify the storm as a blizzard, the 10 to 20 mph winds were enough to create some blowing and drifting snow in open areas. Bismarck received from 6-8 inches of snow.

**November 5, 1996: Winter Storm** - Although at first the storm appeared to be warm enough to only produce rain, once snow began to fall on the morning of the 5th, dynamic cooling lead to an all snow event across south-central and east central North Dakota. Snowfall totals include 6 inches at Bismarck.

**March 23, 1996: Winter Storm** - An early spring snow storm 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 include Bismarck with 13 inches. I-94 in Morton county was reported to have 6 foot snow drifts 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 roll-overs were also reported.

**February 26, 1996: Blizzard** - A strong low pressure system moving east out of the central Rockies brought another blizzard to North Dakota. Winds of 20-30 mph combined with the snow to produce white-out conditions. Snowfall totals include 11 inches at Bismarck, 10 inches at Grand Forks, 6.5 inches at Fargo, and 4-5 inches at Dickinson and Jamestown.

**February 1, 1996: Extreme Cold / Wind Chill** - Dangerously cold weather once again hit North Dakota. Many places reported lows from 35 to 45 below. Daytime highs faired no better, as Bismarck reached a high of 26 below. Northwest winds up to 30 mph created wind chills to 100 below. Electric companies reported peak loads, while natural gas companies had trouble keeping gas flowing through pipelines. Numerous schools closed and many water main breaks occurred. There were also shortages of #1 diesel fuel.

**January 29, 1996: Extreme Cold / Wind Chill** - 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.

**January 17, 1996: Blizzard** - A strong low pressure center located over the central plains combined with strong arctic high pressure moving south out of Canada to bring blizzard conditions to North Dakota. Snowfall amounts range from 8 inches at Williston in the northwest to 20 inches at Wahpeton in the southeast. Fargo and Bismarck set new records for 24 hr. snowfall, receiving 18 and 7.9 inches respectively. Winds gusting to 55 mph created 3 to 5 foot drifts in the central, while drifts up to 10 feet were found in the east. Law enforcement officials advised no travel and closed I-29 in North Dakota, I-94 from Bismarck to Fargo, and US Highway 2 from Grand Forks to Devils Lake. Many people who did not heed the travel warnings got stranded for several hours on the interstate and state highways. Fortunately no deaths were reported. With temperatures dropping to 10 to 20 degrees below zero, wind chills varied from 60 to 80 below zero, snow removal was hampered with hydraulic and cooling systems freezing on snow plows.

**February 9, 1995: Blowing Snow** - Strong northerly winds combined with recently fallen snow created near zero visibilities in parts of northwest, central, and eastern North Dakota. Along with the blowing snow were wind chills 40 to 60 below zero. Several counties advised no travel, many schools were cancelled; parts of Interstate 29 and parts of Interstate 94 were closed for the second time in as many days. Among the many problems caused by the weather was a serious accident at 1730 CST on the 10th, 15 miles west of Mandan on Interstate 94. Zero visibility caused several vehicles to slow or stop on the interstate. Other cars, 23 in all, continued travel causing a chain reaction of accidents resulting in 1 death and 13 injuries. In addition to the injuries from the accident, several rescue workers suffered frostbite in their rescue efforts.

**November 26, 1994: Heavy Snow** - Six to ten inches of snow fell in central North Dakota. In addition to the snow, freezing drizzle fell in the south central. The North Dakota Highway Patrol advised no travel in much of the central part of the state.

**April 25, 1994: Heavy Snow / Blizzard** - 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.

**March 22, 1994: Heavy Snow** - 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, then ended that evening. In southeast North Dakota, the snow began later 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: Heavy Snow** - A slow moving and enormous storm over North America brought record single-storm snowfall to much of North Dakota. Over two feet of snow fell over a large part of central and southeast 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 southeast 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 26th, the snow was continuous through this period. The snowfall was intermittent over most of North Dakota during this lengthy event. Fortunately, the wind was only 10 to 25 MPH during this storm, so it was well below blizzard conditions and blowing and drifting of 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.

**October 27, 1991** – Snow and ice storm

**October 23, 1991** – Snow storm

**December 19, 1990** – Extreme cold

**November 7, 1986** – Blizzard, heavy snow, and ice storm

**April 13, 1986** – Blizzard, heavy snow, ice storm

- February 1, 1986** – Fog and freezing drizzle
- December 23, 1983** – Extreme cold
- March 4, 1983** – Severe storm with snow
- January 5, 1980** – Blizzard
- April 11, 1979** – Heavy snow
- March 18, 1979** – Winter storm
- February 22, 1979** – Winter storm
- February 14, 1979** – Winter storm
- January 24, 1978** – Blizzard
- December 16, 1977** – Ice storm and wind
- December 6, 1977** – Winter storm with one fatality
- November 18, 1977** – Blizzard, wind, and snow
- January 1, 1976** – Snow and blizzard
- December 30, 1975** – Snowstorm
- March 26, 1975** – Blizzard
- January 10, 1975** – Blizzard
- July 4, 1972** – Frost
- June 20, 1972** – Frost
- February 23, 1969** – Severe snow and ice storm
- January 22, 1969** – Blizzard
- December 22, 1968** – Snow and blizzard
- April 29, 1967** – Ice storm
- April 16, 1967** – Ice storm and blizzard
- February 23, 1967** – Blizzard
- April 25, 1966** – Rain, freezing rain, and heavy snow

**March 2, 1966** – Blizzard  
Worst Blizzard in state history happened in 1966: KFVR TV Article:  
<https://www.kfyrtv.com/content/news/Worst-blizzard-in-state-history-happened-in-1966-475786173.html>

**Worst blizzard in state history happened in 1966**



(KFVR)  
By Cynthia McLaughlin  
Published: Mar. 4, 2018 at 8:44 PM CST

- December 15, 1964** – Blizzard
- December 6, 1963** – Blizzard
- April 23, 1961** – Blizzard
- March 28, 1960** – Blizzard with heavy snow
- March 16, 1960** – Glaze with 3 injuries
- January 1, 1960** – Cold wave and blizzard

Blank Page - Intentional

# Risk Assessment

**Risk:** the potential for damage, loss, or other impacts created by the interaction of hazards with community assets.

**Risk Assessment:** product or process that collects information and assigns values to risks for the purpose of informing priorities, developing or comparing courses of action, and informing decision making.

## Hazard Identification

Many hazards have the potential to affect Bismarck, from regional or global events to isolated, localized events. To provide a framework for the risk assessment, hazards were identified for inclusion in this plan based on previous occurrences as well as hazards addressed in the Bismarck Emergency Operations Plan, the previous 2020 Bismarck Multi-Hazard Mitigation Plan, and review of the 2024-29 State of North Dakota Enhanced Mitigation Plan. As an outcome of the plan update kick-off meeting, three additional hazards are addressed in the plan update: Space Weather, Cyberattack, and Terrorism or Nation-State Attack. One hazard, “Shortage or Outage of Critical Infrastructure or Materials” was removed. The rationale for removing this hazard is explained on page 6 of this section.

Hazards excluded from the plan are noted on page 6.

Hazards were ranked as “**High**,” “**Moderate**,” or “**Low**” as part of the plan update process throughout 2025. Considerations for hazard ranking include the status of existing hazard mitigation, opportunities and capability to mitigate, as well as emergency response capabilities related to each hazard.

The results of the hazard-specific mitigation planning team meetings are reviewed by the MHMP Steering Committee for final evaluation and consensus prior to submitting to ND Department of Emergency Services and the Federal Emergency Management Agency for approval.

## **Integration of Threat/Hazard Identification and Risk Assessment (THIRA) methodologies:**

The THIRA risk assessment methodology is applied to each of the hazards within this section. THIRA ratings were based on consensus of each hazard-specific planning teams as a result of initial plan development and plan updates. THIRA was applied to various scenarios within each hazard to better illustrate the full range of likelihood and impact per hazard. The THIRA ratings support the decision-making process, but do NOT dictate the hazard ranking of “High, Moderate, or Low.”

**\*Hazard Ranking**

	Natural Hazards	Technological or Human Caused
High	Winter Storm Tornado	Cyberattack
Moderate	Severe Summer Weather Flood Infectious Disease	Hazardous Materials Release Train Derailment Active Threat Civil Disturbance
Low	Pest Infestation Drought Geologic Hazard Wildland Fire Space Weather	Fire Dam Failure Aircraft Accident Terrorist or Nation State Attack

\*The purpose of ranking hazards, per planning requirements established by the Federal Emergency Management Agency, is to aid in prioritizing mitigation efforts and funding. However, it's understood that all approved mitigation action items are important, and may be addressed based on opportunities and required resources as available.

The following factors were considered while ranking hazards:

- Likelihood of Occurrence (Risk/Probability).
- Potential Impact
  - to Life, Property, Environment, Economy, Psychological, and Continuity of Essential Functions.
- Mitigation Status: Existing Mitigation Capabilities and completed mitigation projects
  - If already mitigated, a hazard may be of lower priority or lower concern.
- New Mitigation Actions
  - A hazard may rank higher if it's NOT mitigated, and there's a high need and/or good opportunity to mitigate.
- Response Capabilities
  - Mitigating a hazard may be more important if response capabilities are lower compared to other hazards.

### Threat/Hazard Identification and Risk Assessment (THIRA)

Each hazard profile within Section 9 directs the reader to reference this section, Section 10, for the Risk Assessment. This section includes Threat and Hazard Identification and Risk Assessment (THIRA) ratings which are summarized in the chart below. The THIRA ratings for each hazard are based on consensus of each hazard-specific planning team in 2020 and updated in 2025. The THIRA ratings/scores facilitate the decision-making process regarding the hazard ranking, but do not dictate the hazard ranking of “High, Moderate, or Low.” Additional considerations for hazard ranking include the status of existing hazard mitigation capabilities as well as response capabilities related to each hazard. The next two pages include THIRA terms and definitions as well as the scoring of the hazards as noted within the table.

		Very Likely	Likely	Possible	Unlikely	Improbable
Score		5	4	3	2	1
Catastrophic	5			Infectious Disease (Pandemic)	Dam Failure (Garrison Dam) Tornado (EF4-EF5) Terrorism or Nation-State Attack	
Significant	4		Cyberattack	Train Derailment (involving hazmat/fire) Aircraft as Weapon Aircraft Accident		
Moderate	3	Winter Storm	Hazmat Release: Transportation	Tornado (EF2-EF3) Hazmat Release: Pipeline or Fixed Facility	Fire: Conflagration Flood: 500-Year	
Minor	2	Severe Summer WX Fire: Residential Flood: Urban Flooding	Pest Infestation (ie: DED or EAB)  Infectious Disease (Foodborne Illness)	Space Weather Tornado (EF0-EF1) Drought (D4 rating) Flood: Ice Jam Active Threat Geologic Hazard		
None / Negligible	1	Wildland Fire (WUI)				

**Threat and Hazard Identification and Risk Assessment (THIRA) Terminology and Definitions**

<b>Frequency</b>				
<b>Very Likely (5)</b>	<b>Likely (4)</b>	<b>Possible (3)</b>	<b>Unlikely (2)</b>	<b>Improbable (1)</b>
The potential for impact is very probable (near 100%) in the next year.	The potential for impact is between 10% and 100% within the next year, or there is at least one chance of occurrence within the next 10 years.	The potential for impact is between 1% and 10% within the next year, or there is at least one chance of occurrence within the next 100 years.	The potential for impact is less than 1% in the next 100 years.	The potential for impact can safely be ruled out because it either does not exist (e.g. hurricane) and/or the potential for it to occur in the next 100 years is so low it can safely be called 0%.
<b>Human Consequence</b>				
<b>None/Negligible (1)</b>	<b>Minor (2)</b>	<b>Moderate (3)</b>	<b>Significant (4)</b>	<b>Catastrophic (5)</b>
0 fatalities < 10 injuries is most likely	< 10 fatalities and/or < 50 injuries is most likely	10-25 fatalities and/or < 100 injuries is most likely	25-100 fatalities and/or 100 – 500 injuries is most likely	> 100 fatalities and/or > 500 injuries is most likely
<b>Economic Consequence</b>				
<b>None/Negligible (1)</b>	<b>Minor (2)</b>	<b>Moderate (3)</b>	<b>Significant (4)</b>	<b>Catastrophic (5)</b>
< \$500K losses or damages is most likely	> \$500K to <\$1 Million losses or damages is most likely	>\$1 Million to \$50 Million losses or damages is most likely	>\$50 Million to <\$100 Million losses or damages is most likely	>\$100 Million losses or damages is most likely
<b>Psychological Consequence</b>				
<b>None/Negligible (1)</b>	<b>Minor (2)</b>	<b>Moderate (3)</b>	<b>Significant (4)</b>	<b>Catastrophic (5)</b>
Event most likely creates minimal population behavior change or effects on social functioning	Event most likely creates occasional or minor loss of nonessential social functions	Event most likely creates a loss of many nonessential social functions	Event most likely creates dysfunctional behavior and disruption of important social functions	Event most likely creates a loss in belief of government and some institutions
<b>Government Consequence</b>				
<b>None/Negligible (1)</b>	<b>Minor (2)</b>	<b>Moderate (3)</b>	<b>Significant (4)</b>	<b>Catastrophic (5)</b>
Event most likely creates no measureable change in the accomplishment of government functions/missions	Event most likely creates only minor changes in the accomplishment of government functions/missions	Event most likely creates a moderate interruption or change in the ability to sustain government functions/missions	Event most likely creates a widespread and significant change in ability to sustain government functions/missions	Event most likely creates a widespread and sustained loss of ability to sustain government functions/missions

## Threat and Hazard Risk Assessment

<u>Hazard Name and Scenario</u>	<u>Frequency</u>	<u>IMPACT</u>				<u>*THIRA Score</u>
		<u>Human</u>	<u>Economic</u>	<u>Psychological</u>	<u>Government</u>	
<b>Winter Storm</b>	Very Likely 5	Minor 2	Moderate 3	Significant 4	Minor 2	<b>7.75</b>
<b>Infectious Disease: Pandemic</b>	Possible 3	Catastrophic 5	Catastrophic 5	Significant 4	Significant 4	<b>7.50</b>
<b>Aircraft as Weapon</b>	Possible 3	Catastrophic 5	Catastrophic 5	Significant 4	Moderate 3	<b>7.25</b>
<b>Severe Summer Weather</b>	Very Likely 5	Minor 2	Moderate 3	Minor 2	Minor 2	<b>7.25</b>
<b>Fire: Residential</b>	Very Likely 5	Minor 2	Moderate 3	Minor 2	None/Negligible 1	<b>7.00</b>
<b>Dam Failure – Catastrophic (Adversarial)</b>	Unlikely 2	Catastrophic 5	Catastrophic 5	Significant 4	Catastrophic 5	<b>6.75</b>
<b>Train Derailment (ie: hazmat/fire)</b>	Possible 3	Significant 4	Significant 4	Significant 4	Moderate 3	<b>6.75</b>
<b>Hazmat Release: Transportation</b>	Likely 4	Moderate 3	Moderate 3	Minor 2	Moderate 3	<b>6.75</b>
<b>Aircraft Accident</b>	Possible 3	Catastrophic 5	Catastrophic 5	Moderate 3	Minor 2	<b>6.75</b>
<b>Flood: Urban Flooding</b>	Very Likely 5	None/Negligible 1	Minor 2	Minor 2	Minor 2	<b>6.75</b>
<b>Tornado EF4/5</b>	Unlikely 2	Catastrophic 5	Catastrophic 5	Significant 4	Significant 4	<b>6.50</b>
<b>Wildland Fire</b>	Very Likely 5	Minor 2	None/Negligible 1	None/Negligible 1	None/Negligible 1	<b>6.25</b>
<b>Hazmat Release: Pipeline</b>	Possible 3	Significant 4	Significant 4	Minor 2	Minor 2	<b>6.00</b>
<b>Tornado EF2/3</b>	Possible 3	Significant 4	Moderate 3	Minor 2	Moderate 3	<b>6.00</b>
<b>Cyber Attack</b>	Very Likely 4	Minor 1	Moderate 3	Minor 2	Minor 2	<b>6.00</b>
<b>Infectious Disease: Foodborne Illness</b>	Likely 4	Minor 2	Minor 2	Minor 2	None/Negligible 1	<b>5.75</b>
<b>Hazmat Release - Fixed Facility</b>	Possible 3	Moderate 3	Moderate 3	Minor 2	Minor 2	<b>5.50</b>
<b>Pest Infestation</b>	Likely 4	None/Negligible 1	Moderate 3	None/Negligible 1	None/Negligible 1	<b>5.50</b>
<b>Fire: Conflagration</b>	Unlikely 2	Moderate 3	Catastrophic 5	Moderate 3	Minor 2	<b>5.25</b>
<b>Flood: Ice Jam</b>	Possible 3	Minor 2	Minor 2	Minor 2	Moderate 3	<b>5.25</b>
<b>Space Weather</b>	Possible 3	Catastrophic 2	Catastrophic 2	Significant 2	Significant 3	<b>5.25</b>
<b>Terrorism or Nation-State Attack</b>	Possible 3	Catastrophic 3	Catastrophic 2	Significant 2	Moderate 2	<b>5.25</b>
<b>Flood: 500-Year</b>	Unlikely 2	Moderate 3	Moderate 3	Moderate 3	Moderate 3	<b>5.00</b>
<b>Active Threat</b>	Possible 3	Minor 2	None/Negligible 1	Moderate 3	Minor 2	<b>5.00</b>
<b>Drought - D4</b>	Possible 3	None/Negligible 1	Moderate 3	Minor 2	None/Negligible 1	<b>4.75</b>
<b>Tornado EF0/1</b>	Possible 3	Minor 2	Minor 2	None/Negligible 1	Minor 2	<b>4.75</b>
<b>Geologic Hazard</b>	Possible 3	None/Negligible 1	Minor 2	Minor 2	Minor 2	<b>4.75</b>

\*THIRA Score = Frequency + Average of Impact Ratings

<b>Hazards Excluded from this Plan</b>	
Natural Hazards Excluded from this Bismarck Multi-Hazard Mitigation Plan are consistent with natural hazards excluded from the ND Department of Emergency Services Multi-Hazard Mitigation Plan.	
<b>Hazard</b>	<b>Why Excluded/Where Addressed</b>
Avalanche	Avalanches generally require long stretches of slopes of 25-55 degrees; North Dakota has few 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	North Dakota does not have an ocean coastline.
Coastal Storm	North Dakota does not have an ocean coastline.
Hurricane	North Dakota does not have an ocean coastline, nor is it located in a potential hurricane impact area.
Transportation Incidents	However, Train Derailment, Aircraft Accident, and Hazardous Materials are each addressed in the plan specifically. General transportation accidents are not addressed in this plan, but are addressed by law enforcement entities at the local and state level.
Tsunami	North Dakota does not have an ocean coastline.
Volcano	Volcanic ashfall can occur over North Dakota, 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.

The previous plan included “Shortage or Outage of Critical Infrastructure or Materials” as a hazard. This hazard was removed from this updated plan and the relevant content such as vulnerabilities and mitigation action items were integrated into the Winter Storm, Terrorism or Nation-State Attack, and Space Weather hazards. Rather than identifying Shortage or Outage of Critical Infrastructure or Materials” as a hazard, the outage was considered an impact or effect of other hazards. The primary issues and related mitigation action items were associated with power outages.

# Plan Maintenance

Hazard mitigation planning is an on-going process. Bismarck Emergency Management coordinates with stakeholders to ensure this plan remains effective and relevant for the city of Bismarck.

This plan section establishes the method and schedule for monitoring, evaluating, and updating the Hazard Mitigation Plan during a five-year plan-update cycle. This section also identifies how Bismarck will maintain community involvement in the plan.

## **Plan Monitoring**

The plan will be jointly monitored by Bismarck Emergency Management and all city departments assigned to complete mitigation actions or conduct ongoing mitigation projects. At a minimum, the plan is reviewed after each disaster or annually. Emergency Management and all departments will monitor the progress of their assigned mitigation projects and maintain their own list of projects completed to be noted in plan updates.

The plan will be reviewed annually throughout the 5-year planning cycle for updates based on any actual incidents or additional mitigation planning needs identified as a result of ongoing input from the public, city departments, or stakeholders.

## **Plan Evaluation and Updating**

Evaluation and updating of the plan are coordinated by Bismarck Emergency Management in cooperation with the city departments and applicable stakeholders. Significant disaster or emergency incidents will be evaluated for mitigation recommendations that should be added to the plan. New stakeholders and interested parties are identified and invited to participate in the implementation and update process.

## **Public Participation**

The Bismarck Multi-Hazard Mitigation Plan is posted to the Bismarck Emergency Management website. The website will invite and provide opportunity for ongoing public input regarding the mitigation plan. Bismarck Emergency Management will also promote awareness of the mitigation plan and make it available for public review during various public forums including public education emergency preparedness presentations and on-site or community group-specific settings.

## **Annual Reporting**

The City of Bismarck participates in the Community Rating System (CRS) program. To comply with the requirements of CRS participation, a flood mitigation action item progress report is communicated to the city commission and city residents via the city website and/or a scheduled city commission meeting. This activity supports updating and maintaining the Multi-Hazard Mitigation Plan.

**Plan Update Process**

When updating this Multi-Hazard Mitigation Plan within the 5-year cycle, Bismarck Emergency Management will serve as the lead coordinator for the planning activities and must document the planning process for inclusion within the plan (See Section 12). The planning process requires participation by city departments, especially those designated with mitigation responsibilities, as well as any departments that provide subject matter expertise, experience, or other capabilities to contribute to identification of hazards, potential impacts, vulnerabilities, mitigation ideas, or other components of the plan. Providing opportunity for public input and involving community partners and stakeholders is also necessary.

An approved mitigation plan ensures the City of Bismarck remains eligible for applicable mitigation grant funding. Both the ND Department of Emergency Services and the Federal Emergency Management Agency review local mitigation plans for plan approval. Plan approval is contingent upon meeting planning process and other requirements outlined by FEMA's Local Mitigation Planning Policy Guide. The Bismarck City Commission adopts the Multi-Hazard Mitigation Plan after the plan is approved at both the state and federal levels.

The plan update process should begin about one year prior to the plan expiration date to allow adequate time to accomplish the various plan review and update needs and planning process requirements.

<b>Schedule of Plan Review and Updates</b>			
<b>Plan Section/Content</b>	<b>Post-Disaster</b>	<b>Annually</b>	<b>Every 5 Years</b>
Adoption Documentation			X
Executive Summary and Introduction Sections			X
Mitigation Strategy	X		X
Hazard Vulnerability & Mitigation Actions Summary	X		X
Mitigation Implementation Action Plan	X	X	X
Mitigation Actions – Prioritizing	X		X
Integration of Plans/Programs & Mitigation Capabilities Inventory			X
Community Profile			X
Community Assets		X	X
Risk Assessment Summary			X
Hazard Identification	X		X
Hazard Profiles	X	Update per incidents	X
Planning Process	X	X	X
Plan Maintenance		X	X

# Planning Process & Public Input

The City of Bismarck recognizes that the planning process is as important as the plan document. Involvement in the planning process enhances understanding and awareness of the hazards, the associated risks and vulnerabilities, as well as mitigation opportunities to minimize potential impact.

The Bismarck Multi-Hazard Mitigation Plan is a combined effort among city departments and various stakeholders including the public and private sectors, volunteer organizations, private citizens, and local, state and federal agencies. Bismarck Emergency Management coordinated the plan update efforts and facilitated the plan update meetings.

The initial community specific Multi-Hazard Mitigation was developed and approved in 2015, and subsequently updated in 2020 and approved in January of 2021. This plan update was conducted throughout 2025, and approved by FEMA and the ND Department of Emergency Services as of **DATE, 2026.**

This section illustrates the extensive involvement in the planning process and outlines the opportunities provided for participation in the plan update process. The overall planning process for the update of the Bismarck Multi-Hazard Mitigation Plan (MHMP) included the following activities:

<b>Event</b>	<b>Timeframe</b>	<b>Activity</b>	<b>Participants</b>
MHMP Kick-Off Meeting	February 19, 2025	Hazard Identification, Identify MHMP Goals and Priorities, Identify Lead Planners per Hazard, Review Planning Process.	MHMP Steering Committee made up of City Administration, Emergency Management, and City Department Representatives
Public Input Survey (online)	March 20 through April 10, 2025	Invite Public Input to identify hazards of concern and provide input regarding community vulnerabilities and mitigation ideas.	Bismarck and Burleigh Residents and neighboring jurisdictions
Public Input Survey targeted invites	March 20 through April 10, 2025	Same As above.	Distributed the public input survey invite directly (via email) to representatives of underserved and other vulnerable populations.
Hazard Profiles Updating	March through October, 2025	Coordinate efforts with Lead Planners and subject matter experts to create draft updates of all hazard profile content (section 9), and develop hazard profiles for additional hazards to be included.	Lead Planners, Emergency Management, Subject Matter Experts
Hazard Profiles developed for additional hazards identified to be included in the plan.	March through October, 2025	Coordinate efforts with Lead Planners to establish new hazard profiles for additional hazards including Space Weather, Cyberattack, and Terrorism or Nation-State Attack.	Lead Planners, Emergency Management, Subject Matter experts

<b>Event</b>	<b>Timeframe</b>	<b>Activity</b>	<b>Participants</b>
Community Partners Stakeholder Survey	July 31 through August 15, 2025	Provide Opportunity for Participation in the Bismarck MHMP Plan Update Process. Invite input regarding preferred methods of involvement in the plan update process such as plan review, meeting participation, or individualized input relating to specific elements of the plan.	Neighboring Jurisdictions invited. Community Partners/Stakeholders such as public, private, and volunteer organizations, as well as state and federal level agencies.
Community Profile Updating (Section 7)	May 2025 through October 2025.	Identify overall Community Changes (since 2020) and updates to community characteristics.	City Department and Divisions Staff including Planning, Building Inspections, Engineering Dept, GIS
Hazard-Specific Meeting Invitations	September & October 2025	Send meeting invitations to the Hazard-Specific Plan update meetings to be held at the Emergency Operations Center.	Lead Planners, and community partners based on Stakeholder Survey responses, and required or suggested participants based on expertise.
Provide Draft Hazard Profile and Mitigation Strategy content Materials for each of the 5 Hazard-Specific Plan Update meetings.	September & October 2025	Share the Draft Hazard Profiles and Section 3 Content with required and interested meeting participants.  Provided one week prior to each meeting to allow time for review.	Lead Planners, and community partners based on Stakeholder Survey responses, and required or suggested participants based on expertise.
Hazard-Specific Planning Team Meeting: Geologic Hazard, Space Weather, Hazardous Materials and Train Derailment Hazards	October 6, 2025	Identify vulnerabilities or other areas of concern as well as identification or revision of suggested mitigation ideas. Evaluate public input per hazard for inclusion where applicable. Obtain feedback from the team for further revision.	Lead Planners per Hazard (City Staff), Community Partner/Stakeholder participants (non-city staff including private, public, volunteer, state and federal level agencies).
Hazard-Specific Planning Team Meeting: Wildland Fire, Fire, Drought, Flood	October 8, 2025		
Hazard-Specific Planning Team Meeting: Active Threat, Civil Disturbance, Terrorism or Nation-State Attack, Cyberattack	October 13, 2025		
Hazard-Specific Planning Team Meeting: Winter Storm, Severe Summer Weather &	October 16, 2025		

Event	Timeframe	Activity	Participants
Tornado, and Pest Infestation			
Hazard-Specific Planning Team Meeting: Dam Failure, Infectious Disease, Aircraft Accident	October 23, 2025		
Strategic Plan Updated	2025 Approved in November.	Align MHMP goals and priorities with the updated Strategic Plan. Identify additional mitigation action items based on Strategic Plan.	City Administration Emergency Management
Steering Committee MHMP plan review for preliminary approval	Date of meeting through Date	Emergency Management provided for an overview of the plan updates including updates to goals, risk and vulnerability assessments, as well mitigation action items and assignments. The Steering Committee was provided opportunity to review the plan in its entirety for any recommended changes.	The invite includes the same city department representation as the original Kick-Off Meeting.
Public Comment Period	DATEs	Notes	Notes

The City of Bismarck **Multi-Hazard Mitigation Plan Update Kick-Off Meeting** was held on February 19, 2025. Below is the agenda and summary. The hazard-specific planning teams identified on pages 6-7 were discussed as one of the kick-off meeting agenda items and finalized in follow-up communications with City Administration.

### **Bismarck Mitigation Plan Update Kick-Off Meeting**

February 19, 2025: Emergency Operations Center

#### **Agenda**

- Overview
  - Mitigation Defined, Purpose of the Mitigation Plan, Planning Process and Requirements
- Hazard Identification – Review and Update
- Mitigation Goals – Review and Update
- Overview of Mitigation Plan Sections
- Deliverables:
  - Hazard Identification, Goals of the Mitigation Plan, Identify Lead Planners specific to each hazard, Identifying Planning Team Members
  - Establish planning process and plan requirements awareness
  - Provide Awareness of plan update informational needs

#### **Meeting Summary**

### **Bismarck Mitigation Plan Update Kick-Off Meeting**

February 19, 2025: Emergency Operations Center

Gary Stockert, Emergency Manager, provided an overview of planning requirements, including public input opportunity and participation requirements, as it relates to plan approval by ND Department of Emergency Services and the Federal Emergency Management Agency. Participants were informed of the current plan's expiration date as well as a general timeline for plan completion and submittal. The intent is to submit the plan for approval by mid November.

As a result of reviewing the hazards identified within the existing plan, three additional hazards were discussed for potential inclusion in the plan: Cyber Attack, Space Weather, and Terrorist or Nation-State Attack. It was decided to include Cyber Attack and Space Weather during the kick-off meeting, and tentatively include Terrorist or Nation-State attack pending further review by the Assistant City Administrator and the Emergency Manager. (The subsequent decision was to add Terrorist or Nation-State Attack). Lead Planners for both Space Weather hazard, and IT would serve as lead planner for the Cyber Attack hazard. Emergency Management will coordinate to identify the Lead Planner for the Terrorist or Nation State Attack hazard. Cyber Attack was noted as "high" for hazard priority. Space Weather as "low." The biological attack (intentional) hazard was discussed, including a mitigation capability at the postal sorting facility. Participants were informed that additional planning team members may be added from various community stakeholder agencies or even individuals who may express interest though public input opportunities.

The existing mitigation goals (strategy) and purpose of the plan were reviewed – no changes were made. Lead planners (per hazard) and planning team participants were discussed and tentatively identified noting the Emergency Manager would follow up with city departments to identify specific participants. Participants were informed that additional planning team members may be added from various community stakeholder agencies or even individuals who may express interest in specific elements of the mitigation plan.

Emergency Management reviewed each of the sections of the existing plan to provide for awareness (refresher training) regarding the purpose of each plan section, along with an overview of the updates needed per plan section in order to meet planning requirements, and to establish a quality plan document.

**Bismarck Mitigation Plan Update Kick-Off Meeting  
February 19, 2025**

<b>Bismarck Mitigation Plan Update Kick-Off Meeting Invite List (City Departments)</b>			
<b>Name</b>	<b>Department or Division</b>	<b>Name</b>	<b>Department or Division</b>
Jason Tomanek	Administration	Tory Otto	Public Works
Doug Wiles	Administration	Kurt Ohnell	Public Works
Kalen Ost	Administration	Mike Dannenfelzer	CenCom
Ben Ehreth	Community Development	Joel Boespflug	Fire
Brady Blaskowski	Community Development	Chad Gee	Fire
Gabe Schell	Engineering	Brooks Martin	Fire
Michelle Klose	Public Works	Dave Draovitch	Police
Michael Mart	Public Works	Randy Ziegler	Police
Terry Halstengard	Public Works	Jason Stugelmeyer	Police
Steve Salwei	Public Works	Gregory Haug	Airport
Jim Kershaw	Public Works	Matthew Remynse	Airport
Christy Ames-Davis	Forestry	Tandra Kraft	Information Technology
Renaë Moch	Public Health	Dmitriy Chernyak	Finance
Theresa Schmidt	Public Health	Leanne Schmidt	Human Resources
Crystallynn Kuntz	Public Health	Jami Wangler	GIS
Daniel Emery	GIS	Jared Auch	GIS

<b>Kick-Off Meeting Participant Roster</b>																																									
<b>On Site (left) / MS Teams (Right)</b>																																									
<b>SIGN IN</b> Bismarck Multi-Hazard Mitigation Plan Update Kick-Off Meeting February 19, 2025 – Emergency Operations Center																																									
<table border="1"> <thead> <tr> <th>Name</th> <th>Position Title</th> <th>Department - Bismarck</th> </tr> </thead> <tbody> <tr> <td>Doug Wiles</td> <td>Assistant City Administrator</td> <td>Admin</td> </tr> <tr> <td>Kalen Ost</td> <td>Comms Strategist</td> <td>Admin</td> </tr> <tr> <td>Steve Salwei</td> <td>Service Operations Director</td> <td>PW</td> </tr> <tr> <td>Keith Glass</td> <td>Public Works Superintendent</td> <td>P Works</td> </tr> <tr> <td>Chad Schickmiller</td> <td>Roads &amp; Streets Supervisor</td> <td>P Works</td> </tr> <tr> <td>CHRISTY AMES-DAVIS</td> <td>CITY FORESTER</td> <td>P WORKS</td> </tr> <tr> <td>Mike Dannenfelzer</td> <td>Comms Director</td> <td>CenCom</td> </tr> <tr> <td>Michael Mart</td> <td>Utility Ops Director</td> <td>PW</td> </tr> <tr> <td>David Gee</td> <td>B.S. Fire Deputy Chief</td> <td>Fire</td> </tr> <tr> <td>Gregory Haug</td> <td>Building Maint Mgr</td> <td>Building Maint</td> </tr> <tr> <td>Dave Draovitch</td> <td>BPD Chief</td> <td>BPD</td> </tr> <tr> <td>Gary Schubert</td> <td>Emergency Manager</td> <td>Admin / EM</td> </tr> </tbody> </table>	Name	Position Title	Department - Bismarck	Doug Wiles	Assistant City Administrator	Admin	Kalen Ost	Comms Strategist	Admin	Steve Salwei	Service Operations Director	PW	Keith Glass	Public Works Superintendent	P Works	Chad Schickmiller	Roads & Streets Supervisor	P Works	CHRISTY AMES-DAVIS	CITY FORESTER	P WORKS	Mike Dannenfelzer	Comms Director	CenCom	Michael Mart	Utility Ops Director	PW	David Gee	B.S. Fire Deputy Chief	Fire	Gregory Haug	Building Maint Mgr	Building Maint	Dave Draovitch	BPD Chief	BPD	Gary Schubert	Emergency Manager	Admin / EM	Tandra Kraft, IT Daniel Emery, GIS Jared Auch, GIS Jami Wangler, GIS Renaë Moch, Public Health Crystallynn Kuntz, Public Health Theresa Schmidt, Public Health Leanne Schmidt, Human Resources Jim Kershaw, Public Works Matthew Remynse, Airport Dmitriy Chernyak, Finance	
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Gary Schubert	Emergency Manager	Admin / EM																																							

### Hazard-Specific Mitigation Plan Update Teams

Hazard Planning Teams were established to support the update or development of the hazards as noted within the tables shown below. Bold letters within the second table below indicate the **Lead Planner** for plan updates specific to each hazard. Lead Planners are identified on page 7.

Team A	Team B	Team C	Team D	Team E
Fire	HazMat Release	Tornado	Active Threat	Dam Failure
Wildland Fire	Train Derail	Severe Summer Weather	Civil Disturbance	Aircraft Accident
Flood	Geological Hazard	**Biological Infestation	Terrorist- Nation State Attack	*Outage of Critical Material
Drought	Space Weather	Winter Storm	Cyberattack	**Communicable Disease

\* Outage of Critical Material was ultimately discontinued as a result of input provided at subsequent planning meetings. The relevant content was integrated into other hazards.

\*\* These hazards were ultimately renamed as a result of input provided at subsequent planning meetings. Biological Infestation was changed to Pest Infestation and Communicable Disease was changed to Infectious Disease.

City Departments <i>Hazard Planning Teams Participation</i>	Active Threat	Aircraft Accident	Pest Infestation	Civil Disturbance	Infectious Disease	Cyberattack	Dam Failure	Drought	Fire	Flood	Geological Hazard	HazMat Release	Severe Summer Wx	Tornado	Space Weather	Terrorist - NS Attack	Train Derailment	Wildland Fire (WUI)	Winter Storm
Administration		<b>F</b>			<b>F</b>		<b>F</b>												
Airport		<b>F</b>			<b>F</b>		<b>F</b>												
Building Inspections								A	A	A								A	
CenCom	D			D		D										D			
Emerg Mgmt	All teams: facilitate and/or participate. Lead on Tornado and Severe Summer Wx.																		
Engineering										<b>A</b>	<b>B</b>	<b>B</b>			<b>B</b>		<b>B</b>		
GIS	Provided mapping support for all hazard teams upon request.																		
IT	D			D		<b>D</b>										D			
Fire			C					A	<b>A</b>	A	B	<b>B</b>	C	C	B		<b>B</b>	<b>A</b>	C
Police	<b>D</b>			<b>D</b>		D										<b>D</b>			
Public Health		E			<b>E</b>		E												
Env Health		E	C		E		E						C	C					C
Planning								A	A	A								A	
Public Works Service Ops			C		E			A	A	A			C	C	<b>B</b>			A	<b>C</b>
Forestry			<b>C</b>										C	C					C
Public Works Utility Ops		E					E	<b>A</b>	A	A					A			A	

## Lead Planners Identified Per Hazard

<b>Hazard</b>	<b>Lead Planner</b>	<b>Department or Division</b>
Active Threat	Noah Lindelow	Police Department
Aircraft Accident	Matthew Remynse	Airport Administration
Civil Disturbance	Noah Lindelow	Police Department
Cyberattack	Drew Sagsveen	Information Technology
Dam Failure	Gary Stockert	Administration/Emergency Management
Drought	Michael Mart Jim Kershaw	Public Works – Utility Operations
Fire (Urban Fire)	Brooks Martin Dale Hurt	Fire
Flood	Waylon Erdman	Engineering
Geologic Hazard	Michael Greer	Engineering
Hazardous Materials Release	Brooks Martin Donavan Voeller	Fire
Pest Infestation	Christy Ames-Davis	Forestry
Severe Summer Weather	Gary Stockert	Administration/Emergency Management
Space Weather	Tory Otto	Public Works – Facilities Management
Terrorism or Nation-State Attack	Noah Lindelow	Police Department
Tornado	Gary Stockert  <i>Co-Lead</i>	Administration/Emergency Management Fire Staff
Train Derailment	Brooks Martin Donavan Voeller	Fire
Wildland Fire (Wildland Urban Interface)	Brooks Martin Dale Hurt	Fire
Winter Storm	Steve Salwei, Keith Glass, and Chad Schiermeister	Public Works Service Operations

## Role of the Lead Planner

Lead Planners coordinated with Bismarck Emergency Management to review and update the existing hazard profile data by conducting research and reaching out to other organizations for input as necessary. The updates to the hazard profiles as well as summaries of vulnerabilities, mitigation capabilities, and mitigation action items served as drafts for review during the hazard-specific meetings held in October. Lead planners were also key participants in the hazard-specific planning meetings conducted in October.

The agenda below applies to each of the five hazard-specific plan update meetings.

### **Multi-Hazard Mitigation Plan Update Meeting**

- October 6, 2025
  - Hazards: Space Weather, Geologic Hazard, Train Derailment, Hazardous Materials Release
- October 8, 2025
  - Hazards: Active Threat, Civil Disturbance, Terrorism or Nation-State Attack, Cyberattack
- October 13, 2025
  - Hazards: Wildland Fire, Fire, Drought, Flood
- October 16, 2025
  - Hazards: Winter Storm, Severe Summer Weather, Tornado, and Biological Infestation
- October 23, 2025
  - Hazards: Dam Failure, Communicable Disease, Aircraft Accident, Outage/Shortage of Critical Material

#### **Agenda:**

1. Introductions
2. Overview of the Bismarck Multi-Hazard Mitigation Plan
3. Defining “Mitigation”
4. Review of Existing Mitigation Measures
5. Vulnerabilities of people, built environment, or natural environment
  - a. Community-wide or specific area or population
  - b. Review vulnerabilities currently identified and Community Changes
6. Hazard Profiles Review: Description of the Hazard and applicable hazard-specific data
7. Identify Additional Mitigation Opportunities for consideration:
  - a. Brainstorm/discuss
  - b. Review ideas per public input survey
  - c. Recommend mitigation measures (for further evaluation and approval)
  - d. Determine potential assignments (lead department or other entity) for any new mitigation measures
  - e. Estimated Cost to Implement

#### **Meetings Summary Overview** (all Hazard Specific Meetings):

As a result of the planning meeting and follow-up input including additional data and guidance, Bismarck Emergency Management updated each Hazard Profile as well as vulnerability statements and mitigation action items for further review. Based on meeting participant input, a brief summary of increase and/or decrease in vulnerability was added to all hazard profiles. It was determined that completed mitigation action items be identified as mitigation capabilities within Section 3 of the plan document. The public input received via the public input survey was shared with each planning team to inform discussion on Agenda Item #7. Each of the agenda items above were discussed at each meeting.

*Additional notes specific to each meeting are included within the next five pages.*

Multi-Hazard Mitigation Plan Update Meeting #1.  
Team B Participation

**City of Bismarck – Mitigation Planning Meeting**  
**Hazards: Geologic Hazard, Space Weather, Hazardous Materials & Train Derailment**  
**Emergency Operations Center**  
**October 6, 2025**

Name	Agency	Position Title
Brooksmartin	BFD	DC
Dorain Voller	BFD	BC
Hope Brighton	NODES-HSEM	Lead Mitigation & Recovery Planner
Jeff Savabel	NOAA-NWS	Meteorologist in Charge
Chris Maike	DMR - NDGS	Geologist
Mike Wald	Bismarck Parks	Facilities & Programs Director
Hatie Leitch	NODES-HSEM	Planning Specialist
Mike Greer	Engineering	Design & Const. Engineer
Tony Otto	Facilities Maint	Facilities Manager

MS Teams Participants:  
 Paul Hester, Manager of Hazmat Field Operations & Response: BNSF  
 J. Daniel Schwartz, President/CEO: Nexus Planning & Consulting

Additional Meeting Summary Notes:

- No public input comments were received via the public input survey regarding Space Weather, Train Derailment, or Geologic Hazard.
- Chris Maike discussed new technology to identify or detect changes in slopes or contours (identify Geologic Hazard events).
- Shelter In Place was discussed as an important mitigation action item for public education.
- Regarding Space Weather, discussion revolved around the need to identify trigger points for informing the public of potential impacts. Mitigation action items ideas included EMP shielding for generators and surge protection. Eastern ND is at more risk to Space Weather due geology.
- Some concern was expressed about the being downwind of the refinery (winter months – depends on wind direction). Future, possible, hazmat concerns for ND include nuclear power and AI data centers.
- It was clarified that BNSF owns the bridges (rail-lines) within Bismarck. Inspections are completed by DOT in concert with FRA, and BNSF also does its own inspections.
- It was noted that Train Derailment and Hazardous Materials are closely related and could be combined. However, the Train Derailment hazard profile is extensive and it works well to keep the hazard profiles separate.
- As a result of the planning meeting and follow-up input including additional data, and guidance, Bismarck Emergency Management updated each Hazard Profile as well as vulnerability statements and mitigation action items for further review.

Multi-Hazard Mitigation Plan Update Meeting #2.  
Team D Participation

City of Bismarck – Mitigation Planning Meeting  
Hazards: Active Threat, Civil Disturbance, Terrorism or Nation-State Attack, Cyberattack  
Emergency Operations Center  
October 8, 2025

Name	Agency	Position Title
North Lindelow	BPD	LT.
Julie Tommske	BPRD	Adm. Serv. Mgr.
Hope Brighton	NDDDES - HSEM	Lead Mitigation & Recovery Planner
Mike Dannefer	Com. Com	Comms. Director

MS Teams Participants:

Kirk Hagel, Chief of Operations, ND State and Local Intelligence Center  
Katie Leitch, Planning Specialist, ND Department of Emergency Services.

Additional Meeting Summary Notes:

- Public input was received relating to all of the hazards discussed.
- The public input received validates the decision to include Cyberattack as a hazard as well as providing for continued mitigation efforts relating to Active Threat, Civil Disturbance, and Terrorism or Nation-State Attack.
- One of the mitigation ideas suggested was intended to be implemented immediately, to communicate the need for state funding to enhance local capability to respond to Civil Disturbance events.
- Mitigation ideas discussed included CRASE (Civilian Response to Active Shooter Events) as well as an opportunity for facility assessments (available by Bismarck PD and/or NDDDES).
- As a result of the planning meeting and follow-up input including additional data and guidance, Bismarck Emergency Management updated each Hazard Profile as well as vulnerability statements and mitigation action items for further review. Also, based on follow-up input, a brief summary of increase and/or decrease in vulnerability was added to all hazard profiles.
- Subsequent to this meeting and upon completion of the updated Strategic Plan for Bismarck, additional mitigation action items were added for Cyberattack as well as one goal relating to cyber security included within the Mitigation Strategy Section of this plan.

Multi-Hazard Mitigation Plan Update Meeting #3.  
Team A Participation

City of Bismarck – Mitigation Planning Meeting  
Hazards: Wildland Fire, Fire, Drought, Flood  
Emergency Operations Center  
October 13, 2025

Name	Agency	Position Title
Jim Kershaw	Bismarck Water Plant	Superintendent
Brian Huber	Bismarck Fire	Battalion Chief
BRADY BLASZKOWSKI	Community Dev	Building Official
TERRY HALSTENGARD	Public Works	Storm Water
Michael Mart	Public Works	Director of Utility Ops
Brooks Martin	Bismarck Fire	Deputy Chief
Mike Wald	Bismarck Parks	Facilities + Programs Director
Waylon Erdmann	City of Bismarck Engineering Dept	Project Eng.

MS Teams Participants:

Eric Upton, Planning Section Chief, ND Department of Emergency Services  
Katie Leitch, Planning Specialist, ND Department of Emergency Services  
Jeff Schild, Senior Forecaster, National Weather Service – Bismarck Office

Additional Meeting Summary Notes:

- Meeting participants discussed anticipated changes to the ETA, which will impact the CRS program for both Bismarck and Burleigh County at some point in 2026.
- A south Bismarck flood mitigation project was discussed, noting that City Engineering would be communicating an alternate project for consideration at an upcoming city commission meeting in November. This mitigation action items to be included was identified as a result of the updated floodplain and flood insurance rate map which became effective June of 2024.
- Air Quality monitoring and public education and communications were discussed as a mitigation action item to be added as it relates to Wildland Fire.
- Shelter and Shelter In place were discussed as a mitigation action item, already identified, that would also be relevant for Wildland Fire.
- It was identified that the Fire Departments ISO rating 1 should be added as an existing capability relating to the Fire Hazard.
- Completed mitigation action items relating to flood were noted, to be moved to “capabilities.” A few corrections were made including moving a vulnerability (relating to Jackman Coulee Dam #2) from the flood hazard to the dam failure hazard. Updates to the diagrams illustrating flood mitigation (as existing capability) with the flood hazard profile were identified and source information was shared for the update.
- The public input provided via the public input survey was reviewed. The mitigation action items relating to shelter in place and air quality recommendations relating to the Wildland Fire were both incorporated into the mitigation strategy.

Multi-Hazard Mitigation Plan Update Meeting #4.  
Team C Participation

City of Bismarck – Mitigation Planning Meeting  
Hazards: Winter Storm, Severe Summer Weather, Tornado, and Biological Infestation  
Emergency Operations Center  
October 16, 2025

Name	Agency	Position Title
Steve Salwei	Bismarck Public Works	Director SO
Eric Upton	NDDIS - HSEM	Planning section Chief
Christy Ames-Davis	Public Works	City Forester
Hoke Teagle	Fire	Battalion Chief
Katie Leitch	NDDIS - HSEM	Planning Specialist
Chad Schirmerster	Roads & Streets Division	Supervisor
Keith Glass	Roads & Streets	Supervisor
Chauncy Schultz	National Weather Service	Science & Operation Officer
Julie Tomshels	BPRD	Admin & Bus Mng.
Mike Wald	BPRD	Facilities & Programs Director

MS Teams Participants:

Hope Brighton, Lead Mitigation and Recovery Planner, ND Department of Emergency Services

Additional Meeting Summary Notes:

- For consistency with the state’s mitigation plan, it was decided to change “Biological Infestation” to “Pest Infestation.” Otherwise, the mitigation action items and hazard profile for Pest Infestation remain relevant.
- A mitigation action item relating to individualized storm/tornado shelters were discussed, including available funding. A recommendation was made to reach out to Fargo to learn about a project that funded by FEMA (for an individual homeowner).
- The mitigation action item relating to downed-power line safety was clarified to apply to Forestry staff. Decision support services provided by the National Weather Service were added to capabilities for the Winter Storm hazard.
- Tornado sheltering (pre-event sheltering) was discussed, including the logistics, safety, and security issues that serve as significant community-wide challenges for establishing the shelters. The need for on-going public education to promote emergency preparedness planning at the individual homeowner level, as well as awareness of the purpose of the outdoor warning sirens was discussed. Also, promoting the NOAA All Hazards Weather radio as an important indoor warning system option was identified as an important public education mitigation action item.
- It was suggested to combine Tornado and Severe Summer Weather hazard profiles. However, due to the significant differences in potential impact, and in discussion with a subject matter expert regarding separate hazard profiles, Tornado will remain its own hazard at this time.
- For public education, it was recommended to reach out to various entities (such as Global Neighbors) that may support getting the message out to underserved or other vulnerable populations.

Multi-Hazard Mitigation Plan Update Meeting #5.  
Team E Participation

City of Bismarck – Mitigation Planning Meeting  
Hazards: Dam Failure, Communicable Disease, Aircraft Accident, Outage/Shortage of Critical Material  
Emergency Operations Center  
October 23, 2025

Name	Agency	Position Title
Eric Upton	NDDIS	Planning Section Chief
Doug Miles	COB	Assistant City Administrator
Daniel Schwartz	Nexus	Planner
Steven Featherston	ARFF	Chief-
Scott Milderhuth	Airport	Ops Manager
Matthew Reynolds	Airport	Assistant Airport Dir.
Julie Hornshell	BPRD	Admin Swo Mgr.
Allen Schlag	NWS	Hydrologist
Halstengard	COB	Storm - Public Works
Cayshyan Kunte	BBPH	EPR Coordinator
Aaron Sattler	BBPH	Env Health Admin
David Non	Bismarck	Planning Director

MS Teams Participants:

Noelle Kroll, Emergency Manager, McLean County

Hope Brighton, Lead Mitigation and Recovery Planner, ND Department of Emergency Services

Katie Leitch, Planning Specialist, ND Department of Emergency Services

Additional Meeting Summary Notes:

- There were no public input comments provided via the public input survey regarding these hazards.
- For consistency with the state’s plan, it was decided to change “Communicable Disease” to “Infectious Disease.”
- The majority of previous mitigation action items for Infectious Disease were moved to “capabilities” since they are routine practice.
- Discussion regarding the Dam Failure hazard focused on the addition of Heart Butte Dam to the hazard profile as well as future repairs planned for both the Heart Butte Dam and the Garrison Dam over the next few years. Although these planned projects do not suggest new mitigation action items for Bismarck, the importance of flood insurance was discussed as an important public awareness mitigation action item.
- The use of a different siren tone in the event of a dam failure was discussed. However, the use of differing siren tones had been discussed extensively in the past, and determined it would not be practical or effective to spend resources educating the public about how to interpret or remember the meaning of various siren tones.
- It was recommended to remove “Shortage or Outage of Critical Infrastructure or Materials” and incorporate into other hazard profiles, such as Winter Storm, since the impacts occur as the result of other hazards. As follow up to the meeting, the hazard profile content as well as the mitigation action items were transferred to Winter Storm and the Terrorism or Nation-State Attack hazards.

## Community Stakeholders – Opportunity to Participate

Prior to conducting hazard-specific planning meetings in October, Bismarck Emergency Management reached out to community partners to determine their level of interest and preferred method of involvement as it relates to the Bismarck Multi-Hazard Mitigation Plan update.

The survey allowed for opportunity to express which hazards were of most interest or concern, as well as preferred method/s and extent of involvement. The survey also provided for opportunity to provide narrative regarding hazard-related concerns or mitigation ideas if the entity or individual preferred to limit their participation to feedback via the survey itself. Of those who responded (9 total), participation in the hazard-specific meetings was the primary method of plan update participation, as well as individualized communications via email with Bismarck Emergency Management.

The intent of the survey was to ensure public and private partners were given an opportunity to have a voice in the development of the city's mitigation plan, including the mitigation strategy.

The following email was sent on July 31, 2025 allowing two weeks to respond to the survey.

Greetings City of Bismarck Multi-Hazard Mitigation Plan community stakeholders:

Bismarck Emergency Management is in the process of coordinating the update of the 2020 City Bismarck Multi-Hazard Mitigation Plan. The plan must identify the natural hazards of concern, identify the local risk and vulnerability applicable to each hazard, and ultimately, identify and evaluate options to mitigate the hazards (minimize risk or vulnerability). The Bismarck Multi-Hazard Mitigation Plan also addresses human-caused and technological hazards.

Throughout the process of plan development, it's important to provide opportunity for the public, including community partners and stakeholders to participate in the planning process. The plan must be updated every five years and must be approved by both the ND Department of Emergency Services and the Federal Emergency Management Agency to ensure the City of Bismarck remains eligible for various hazard mitigation grant opportunities in the future. The current plan expires January 2026. Bismarck and Burleigh have already provided public input opportunity through a community survey conducted in the spring of 2025, and received 90 responses from area residents.

The intent of this outreach is to invite you and other stakeholders to participate in the planning process. Your level of involvement can be as minimal or extensive as you wish, and may be focused on specific elements of the plan depending on your areas of interest (such as hazards of interest or concern).

If you would have interest in participating in the plan update, please take a few minutes to respond to the brief [survey by August 15](#). Your responses will inform me as to how you would prefer to participate (areas of interest).

Link to the Survey: [Bismarck Multi-Hazard Mitigation Plan Community Stakeholder Survey](#).

Thank you!

**Gary Stockert**  
City Emergency Manager

The Community Stakeholder Survey was sent to the following points of contact to provide an opportunity to participate in the plan update process, and to communicate their preferred methods and/or level of involvement.

Entity	Point of Contact	Email
ND Department of Emergency Services	Darin Hanson Justin Messner Hope Brighton Katie Leitch Eric Upton	<a href="mailto:dthanson@nd.gov">dthanson@nd.gov</a> <a href="mailto:jmessner@nd.gov">jmessner@nd.gov</a> <a href="mailto:hopebrighton@nd.gov">hopebrighton@nd.gov</a> <a href="mailto:katieleitch@nd.gov">katieleitch@nd.gov</a> <a href="mailto:eupton@nd.gov">eupton@nd.gov</a>
Burleigh County	Mary Senger	<a href="mailto:msenger@nd.gov">msenger@nd.gov</a>
Mandan/Morton	Patrick Martin Joel Rostberg Daniel Schwartz, Nexus	<a href="mailto:patrick.martin@mortonnd.org">patrick.martin@mortonnd.org</a> <a href="mailto:joel.rostberg@mortonnd.org">joel.rostberg@mortonnd.org</a> <a href="mailto:Dschwartz@nexusplanco.com">Dschwartz@nexusplanco.com</a>
City of Lincoln	Admin general email Tonya Wilson, Auditor	<a href="mailto:lincoln@cityoflincolnnd.com">lincoln@cityoflincolnnd.com</a> <a href="mailto:Auditor@cityoflincolnnd.com">Auditor@cityoflincolnnd.com</a>
Bismarck Parks and Recreation District	Kevin Klipfel Mike Wald Julie Fornshell	Kevin Klipfel < <a href="mailto:kklipfel@bisparks.org">kklipfel@bisparks.org</a> > <a href="mailto:mwald@bisparks.org">mwald@bisparks.org</a> <a href="mailto:jfornshell@bisparks.org">jfornshell@bisparks.org</a>
Bismarck Public Schools	Becky LaBella	<a href="mailto:Becky_Labella@bismarckschools.org">Becky_Labella@bismarckschools.org</a>
Light of Christ Schools	Daniel Neff, Vice President of Operations and Finance	<a href="https://lightofchristschools.org/contact-us">https://lightofchristschools.org/contact-us</a> <a href="mailto:dneff@lightofchristschools.org">dneff@lightofchristschools.org</a> Vice President of Operations and Finance
Metro Area Ambulance	Dan Schafer Joshua Davis	<a href="mailto:dschaefer@maas-nd.com">dschaefer@maas-nd.com</a> <a href="mailto:JDavis@maas-nd.com">JDavis@maas-nd.com</a>
Salvation Army	Major Nelson De La Vergne	<a href="mailto:Nelson.DeLaVergne@USC.salvationarmy.org">Nelson.DeLaVergne@USC.salvationarmy.org</a>
Red Cross	Nita Ritzke	<a href="mailto:Ritzke,Nita&lt;nita.ritzke2@redcross.org&gt;">Ritzke, Nita &lt;nita.ritzke2@redcross.org&gt;</a>
National Weather Service	Jeffrey Savadel, Meterologist in Charge	<a href="mailto:Jeffrey.Savadel@noaa.gov">Jeffrey.Savadel@noaa.gov</a>
Metro Fire (Airport Fire)	Steven Featherston	<a href="mailto:steven.featherston@ruralmetrofire.net">steven.featherston@ruralmetrofire.net</a>
Chaplaincy	Greg Carr Paul Herr	<a href="mailto:crisis.care.chaplaincy@gmail.com">crisis.care.chaplaincy@gmail.com</a> <a href="mailto:pherr@centurybaptist.org">pherr@centurybaptist.org</a>
Capital Electric Cooperative	Greg Owen	<a href="mailto:grego@capitalelec.com">grego@capitalelec.com</a>
Montana Dakota Utilities	Toby Gross	<a href="mailto:toby.gross@mdu.com">toby.gross@mdu.com</a>
BNSF	Paul Hester	<a href="mailto:Paul.Hester@BNSF.com">Paul.Hester@BNSF.com</a>
DMV/WW	Jay Bachmeier	<a href="mailto:jbachmeier@dmvwr.com">jbachmeier@dmvwr.com</a>
BisMan Transit	Diedre Hughs	<a href="mailto:DHughes@bismantransit.com">DHughes@bismantransit.com</a>
Bismarck Mandan Chamber EDC	Brenda Nagel, President/CEO	<a href="mailto:info@bmcedc.com">info@bmcedc.com</a> <a href="mailto:bnagel@bmcedc.com">bnagel@bmcedc.com</a>
MPO	City Staff	<a href="mailto:mpo@bismarcknd.gov">mpo@bismarcknd.gov</a>
Ministry on the Margins	Sister Kathleen Atkinson	<a href="mailto:ministryonthemargins@gmail.com">ministryonthemargins@gmail.com</a> <a href="mailto:kathleen@ministryonthemargins.org">kathleen@ministryonthemargins.org</a>
United Way	Jenna Gullo	<a href="mailto:jgullo@msaunitedway.org">jgullo@msaunitedway.org</a>
MVCHP Missouri Valley Coalition for Homeless People	Jeannie Messal, MVCH Director	<a href="mailto:mvchp@ndhomelesscoalition.org">mvchp@ndhomelesscoalition.org</a> <a href="mailto:mvchphomeless101@gmail.com">mvchphomeless101@gmail.com</a>
Abused Adult Resource Center	Lane Hoffer	<a href="mailto:LaneH@aarncnd.com">LaneH@aarncnd.com</a>
CHI / St. Alexius	Jordan Freitag	<a href="mailto:jordan.freitag@commonspirit.org">jordan.freitag@commonspirit.org</a>
Sanford Health	Brad Erickson	<a href="mailto:Bradley.Erickson@SanfordHealth.org">Bradley.Erickson@SanfordHealth.org</a>
University of Mary	Paul Podhrasdsy	<a href="http://Umary.edu">Umary.edu</a>
Bismarck State College	Michael McMerty	<a href="mailto:michael.mcmerty@bismarckstate.edu">michael.mcmerty@bismarckstate.edu</a>

## Community Stakeholder Survey – Providing Opportunity to Participate in the Multi-Hazard Mitigation Plan Update Process

### Bismarck MHMP Update - Community Stakeholder Survey

Completing this brief survey will inform Bismarck Emergency Management of how you might prefer to participate in the efforts to update the Bismarck Multi-Hazard Mitigation Plan in the coming months.

The survey should only take a couple minutes to complete. You're welcome to complete the survey more than once if you have additional thoughts after the completing the survey. **Please complete the survey by August 15.**

If you would like to review the existing Bismarck [Multi-Hazard Mitigation Plan](#) prior to completing this survey, the mitigation plan is available as a pdf.

*If you are not familiar with the purpose and content of a local mitigation plan, it would be helpful to download the plan and review Sections 1, 2, and 3 of the existing mitigation plan. The plan update will include three additional hazard profiles which are noted within the survey below with (new) following the hazard name.*

1 **Name\***

2 **Email\***

3 **Phone (optional)**

4 **Please select one, two, or three hazards that interest you most based on your knowledge of the hazard, professional or personal concerns about the hazard, or other factors. Selection is limited to three hazards.**

Consider selecting hazards where you would be most interested in reviewing or identifying areas of vulnerability within the city of Bismarck, or may have ideas to share on how to mitigate the hazard prior to incident occurrence. Mitigation includes actions taken *prior to an event* that would reduce the impact of the hazard event, should it occur.

<input type="checkbox"/> Flood	<input type="checkbox"/> Geologic Hazards	<input type="checkbox"/> Tornado / Severe Summer Weather
<input type="checkbox"/> Winter Storm	<input type="checkbox"/> Wildland Fire (Wildland Urban Interface)	<input type="checkbox"/> Biological Infestation (Urban Forest)
<input type="checkbox"/> Communicable Disease	<input type="checkbox"/> Drought	<input type="checkbox"/> Space Weather (new)
<input type="checkbox"/> Fire (Urban Fire)	<input type="checkbox"/> Hazardous Materials Release	<input type="checkbox"/> Cyberattack (new)
<input type="checkbox"/> Train Derailment	<input type="checkbox"/> Active Threat (Active Shooter)	<input type="checkbox"/> Civil Disturbance

<input type="checkbox"/> Terrorist or Nation State Attack (new)	<input type="checkbox"/> Dam Failure	<input type="checkbox"/> Shortage/Outage of Critical Materials
<input type="checkbox"/> Aircraft Accident		
<input type="checkbox"/> Other		

5

**Check any or all statements below if "yes" - the statement is applicable to you.**

You may check as many boxes as applicable. Selecting "other" will allow you to comment if you wish to provide any clarification.

About future Hazard Specific Meetings

*Estimated Meeting time: 90 minutes. (dates to be determined).*

*Format: in person with MS Teams invites as necessary.*

*Meeting discussion will focus on identification of the more significant vulnerabilities and recommended mitigation actions for consideration.*

<input type="checkbox"/> I would like to be invited to participate in hazard specific planning meeting(s) which address those hazards I selected above.
<input type="checkbox"/> I have comments, ideas, or recommendations regarding community vulnerabilities for the hazards I selected above. (Bismarck EM will contact you prior to hazard specific planning meetings - in case you can't make it when scheduled).
<input type="checkbox"/> I have comments, ideas, or recommendations regarding opportunities to mitigate one or more of the hazards I selected above. (Bismarck EM will contact you prior to hazard specific meetings - in case you can't make it when scheduled).
<input type="checkbox"/> Other

6

**If you are aware of community vulnerabilities associated with the hazards you selected above, and prefer to share input now, you may provide narrative below.**

If you wish to review vulnerabilities already identified, you may review the existing [mitigation plan](#) (Refer to Sections 3 and 10 of the existing plan.

7

**If you have suggestions regarding opportunities to mitigate the hazards you selected above, and prefer to share those ideas now, you may provide narrative below.**

Mitigation is defined as any action that can reduce the likelihood of impact, or reduce the impact, should the hazard occur. If you wish to review existing mitigation action items, review Section 3 of the existing [mitigation plan](#).

8

**Please provide any narrative (optional) to explain your preferred method of participation in the update of the Bismarck Multi-Hazard Mitigation Plan.**

In case the survey questions and response options don't seem to apply to you, feel free to provide narrative.

9

**If you have questions, comments, or suggestions regarding any portion of the mitigation plan or the plan update process, please provide narrative.**

Submit

## Additional Plan Update Contributions

Throughout the planning process, many individuals provided valuable data, insights, or other support. Some of the plan update involves efforts that occurred outside of the plan update activities discussed previously. The table below identifies specific contributions and participation in the plan update process.

<b>Name</b>	<b>Entity</b>	<b>Participation</b>
Greg Gust, Meteorologist, Weather/Climate Lead	ND Department of Emergency Services	Climate Data including specific anticipated future impact relevant to each hazard.
Christopher Maike, Senior Surface Geologist, Landslide Lead	ND Geologic Survey	Provided support in updating the Geologic Hazard data and participated in the hazard-specific planning meeting to support identification of key vulnerabilities and mitigation action items.
Hope Brighton, Lead Mitigation and Recovery Planner	ND Department of Emergency Services	Provided technical assistance and guidance in addition to extensive participation in the hazard-specific mitigation plan update meetings.
Jeff Savadel, Meteorologist in Charge Megan Jones, Meteorologist, Climate Program Leader Jeff Schild, Senior Forecaster, Chauncy Shultz, Science and Operations Officer Allen Schlag, NWS Hydrologist	National Weather Service – Bismarck Office	The NWS staff provided extensive participation in the hazard-specific mitigation plan update meetings and additional support in updating natural hazard data.
Daniel Nairn, Planning Director Sarah Fricke, Senior Administrative Assistant	Planning Department	Review and Updates to Section 6, Community Capabilities and updates to Section 7, Community Profile.
Darrel Nucech, GIS Developer Jared Auch, GIS Developer Jami Wangler, GIS Analyst	GIS	Provided updated maps, contributing to updated hazard profiles and accurate identification of risk or vulnerability.
Doug Wiles, Assistant City Administrator	City Administration	On-going review of the MHMP progress as well as updates to the goals based on the city's updated Strategic Plan.
Paul Hester, Manager of Hazmat Field Operations & Response	BNSF	Review of mitigation plan data relating to train derailment hazard.
Kirk Hagel, Chief of Operations	ND State and Local Intelligence Center	Review of hazard profiles relating to Civil Disturbance, Active Threat, and Terrorism or Nation-State Attack prior to meetings.
J Daniel Schwartz, J. Daniel Schwartz, President/CEO	Nexus Planning & Consulting	Provided for extensive participation in the hazard-specific mitigation plan update meetings.
Shawn Dahl, SWPC Service Coordinator	Space Weather Prediction Center (NOAA / NWS / SWPC), Boulder CO	Provided assistance with Space Weather hazard data and serves as resource for future communication strategy.
John P Martin, retired	National Weather Service – Bismarck Office	Statistics regarding weather-related events.
Tyler Spomer, National Flood Insurance Program Coordinator	ND Department of Water Resources	Provided updated statistics regarding repetitive loss properties and other flood insurance statistics.
Angie Gray	Angie Gray Photography	Provide permission to use the June 27, 2025 tornado photo for the plan cover and title page.

Place Holder

MHMP Steering Committee  
Final Mitigation Planning Meeting  
Agenda & Date (TBD)

Meeting Summary (TBD)

## Public Input Opportunity

Public Input opportunity remains available 24/7/365 relating to the Bismarck Multi-Hazard Mitigation Plan. This notice of opportunity remains available on the city’s website before, during, and after the formal mitigation plan update process.



## Annual reminder regarding availability of the Mitigation Plan

As part of the city’s participation in the Community Rating System program, Bismarck Emergency Management provides the city commission and the general public with an update regarding progress made relating to flood mitigation action items on an annual basis since becoming a Community Rating System program community in 2017. As part of the presentation, Bismarck Emergency Management invites the public to review the mitigation plan document and provide input relating to the flood hazard or any other hazard, as desired, at any time. The flood mitigation progress report and information regarding the status of Bismarck’s participation in the CRS program are shared via the city’s website and promoted through local media and social media channels.

## Public Input – Plan Influence

Notable mitigation action item ideas expressed by local citizens are integrated into this plan update, although the language to describe the mitigation action item is not identical. Primary examples include the following:

- Collaborate with the state and other community partners to provide necessary resources for the homeless population, especially during extreme weather events.
- Develop a communications strategy for Space Weather events based on trigger points.
- Support the south Bismarck flood protection mitigation project(s) due to recent update to the 100-year floodplain.
- Support the dissemination of Air Quality status and recommended actions provided by ND Department of Environmental Quality.
- Explore partnership/opportunities to share public education with underserved and other vulnerable populations.

In general, the public input provided via the public input survey reinforces or supports the mitigation goals and mitigation strategy identified in this Multi-Hazard Mitigation Plan update.

The public input opportunity communicated at the start of the plan update effort was distributed via local (traditional) media and was also promoted via both the city website and Burleigh County's website, as well as via social media disseminated by both the City of Bismarck and Burleigh County.



**Emergency Management**  
4200 Coleman St  
Bismarck, ND 58503  
701.222.6727



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**NEWS RELEASE**  
**FOR IMMEDIATE RELEASE**

Contact: Mary Senger, Burleigh County Emergency Manager, 701-222-6727  
Gary Stockert, City of Bismarck Emergency Manager, 701-222-6727

March 20, 2025

**Burleigh County and City of Bismarck Seek Community Input on Mitigation Plan Update**

Bismarck, ND—Burleigh County and the City of Bismarck want your input regarding how to make our community safer from potential hazards/disasters. We're examining the hazards facing our community as well as strategies to mitigate (reduce or eliminate) their impact. Our current plans have been approved by the Federal Emergency Management Agency and require an update every five years.

Citizens are invited to complete a brief survey by April 10<sup>th</sup>. The survey is available online at [www.burleigh.gov](http://www.burleigh.gov) and [www.bismarcknd.gov](http://www.bismarcknd.gov)

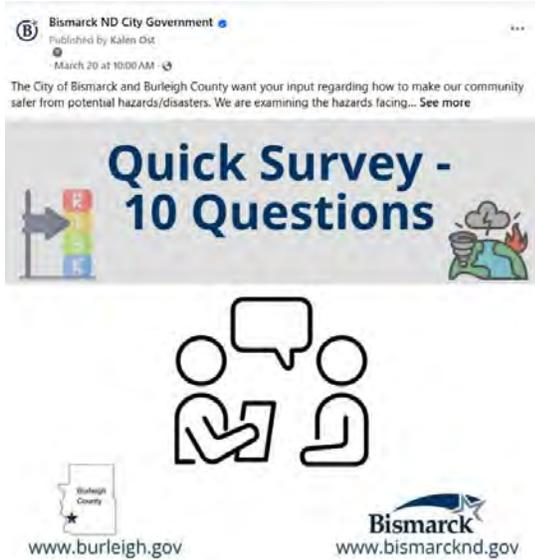
Mitigation is defined by any action taken **before** an incident occurs to reduce loss of life and property.

Mitigation's value to society includes:

- Creating safer communities by reducing losses of life and property.
- Enabling individuals and communities to recover more rapidly from disasters.
- Lessening the financial impact of disasters on individuals and communities.

###

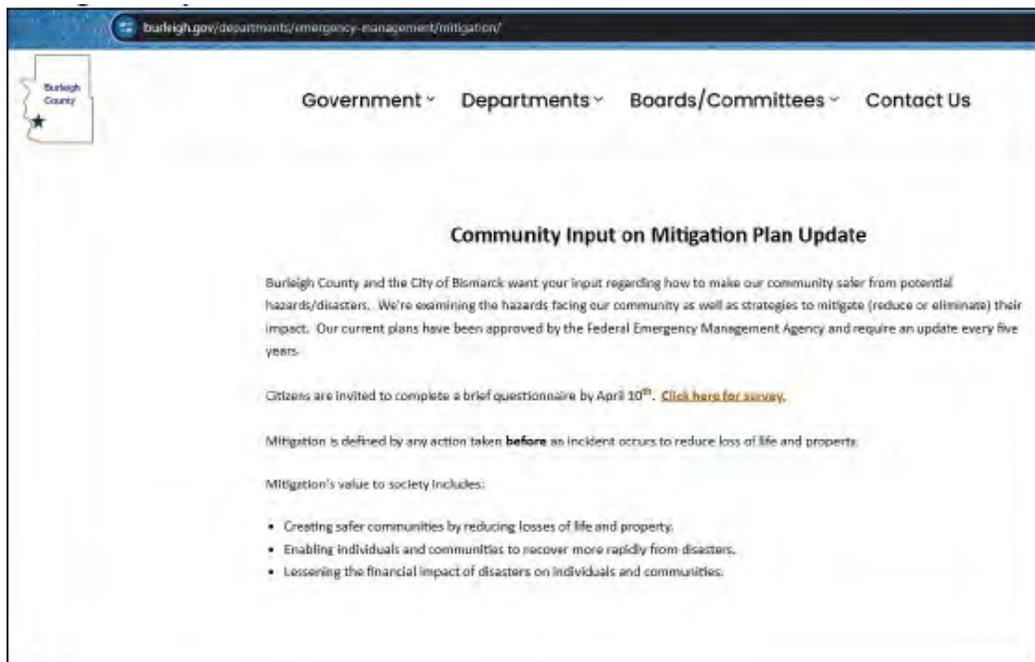
Bismarck and Burleigh County Facebook:



Burleigh County Website:

News

**Burleigh County and City of Bismarck Seek Community Input on Mitigation Plan Update**  
By Burleigh County - Mar 20, 2025  
Emergency Management



Bismarck Website:



DAKOTA BRIEFS

**Burleigh hosting 3 special meetings**

Burleigh County residents will have several opportunities outside of regularly scheduled County Commission meetings to weigh in on a proposal to change the auditor/treasurer position from elected to appointed.

The Commission will host two special public comment meetings in rural communities on Saturday. The first will be at 10 a.m. at Wilton Memorial Hall, 105 Dakota Ave., in Wilton. The second will be at 2 p.m. at the Sterling School, 118 McKenzie St., in Sterling.

Additionally, the Commission will host a special public comment meeting at 10 a.m. Saturday, March 29,

in Bismarck. That meeting will be in the Tom Baker Meeting Room in the City/County Building, 221 N. Fifth St., in downtown Bismarck.

The Commission has already hosted public hearings during both regular meetings in March. An additional public hearing will be held during the April 7 regular meeting.

County residents who are unable to attend the public comment meetings can submit written comments on the Burleigh County website at <https://bit.ly/4iZmeGD>.

**Fedorchak to hold telephone town hall**

North Dakota's sole member in the U.S. House

of Representatives will host a call-in town hall on Tuesday.

Republican U.S. Rep. Julie Fedorchak's office said the call will provide "thousands of North Dakotans the opportunity to engage in a productive discussion about the issues that matter most to them."

Fedorchak is a freshman member of Congress who ran last year for the spot after now-Gov. Kelly Armstrong opted to seek the governorship.

The call will take place at 6:30 p.m. on Tuesday. Residents who want to participate must sign up by 5 p.m. on Monday on Fedorchak's website. To register, go to <https://bit.ly/4hpjGt6>.

The event will be livestreamed on her official

website and Facebook page.

**Bismarck, Burleigh residents asked for mitigation plan input**

Burleigh County and Bismarck are seeking community input regarding how to make the area safer from potential hazards and disasters.

Plans to mitigate potential hazards are approved by the Federal Emergency Management Agency and require an update every five years.

Area residents are asked to complete a questionnaire by April 10. It is available at <https://bit.ly/4kWCht7>.

—Bismarck Tribune staff reports

Central ND News

# Bismarck seeks public feedback for hazard mitigation plan update

GOVERNMENT

By Central ND News

Mar 26, 2025



The City of Bismarck, in collaboration with Burleigh County, is seeking community input to enhance safety measures against potential hazards and disasters. The current mitigation plans, approved by the Federal Emergency Management Agency, require updates every five years.

Residents are encouraged to participate by completing a short questionnaire available online at [burleigh.gov](http://burleigh.gov) and Bismarck Emergency Management. The deadline for submission is April 10th.

The initiative aims to create safer communities by reducing loss of life and property, enabling quicker recovery from disasters, and lessening the financial impact on individuals and communities.

Public Input Survey

## Burleigh County and City of Bismarck Seek Community Input on Mitigation Plan Update

Public Input is requested to assist in the update of both the Burleigh County and City of Bismarck Mitigation Plans. Mitigation is defined as an action that reduces or eliminates potential impact from hazards identified within the mitigation plans.

2020 Burleigh County Multi-Hazard Mitigation Plan: <https://www.burleigh.gov/mitigation>

2020 City of Bismarck Multi-Hazard Mitigation Plan: <https://www.bismarcknd.gov/2218/Bismarck-Multi-Hazard-Mitigation-Plan>

The plans are updated every 5 years and are required to sustain eligibility for various mitigation grant programs.

Questions regarding the survey, or if you would like to discuss more ways you can participate in the update:

Mary Senger, Burleigh County Emergency Manager, [msenger@nd.gov](mailto:msenger@nd.gov), 701-222-6727 or Gary Stockert, City of Bismarck Emergency Manager, [gstockert@bismarcknd.gov](mailto:gstockert@bismarcknd.gov), 701-222-6767

\* Required

### 1. Where do you live? \*

- City of Bismarck
- City of Lincoln
- City of Regan
- City of Wilton
- City of Wing
- Unincorporated Burleigh County
- Other

### 2. Select three hazards you feel are the highest threat to your area. \*

Please select at most 3 options.

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

3. What potential impacts concern you most relating to the hazards you selected above?

Enter your answer

4. What preventative measure(s) would you recommend for any of the hazards you selected above to minimize or eliminate the potential impacts?

Enter your answer

5. If you or a family member are considered an at-risk population (such as a senior citizen, individual with disabilities), what are your concerns during an incident?

Enter your answer

6. Is your home located in a floodplain? \*

- Yes
- No
- I don't know

7. Do you have flood insurance? \*

- Yes
- No
- I don't know

8. If "No," why not?

- Not located in floodplain
- Too expensive
- Other

9. What is the most effective way for you to receive information about how to make your home and area more resistant to hazards? \*

Newspaper

Television

Radio

Email

Social Media

Regular Mail

Websites

Other

10. This survey may be submitted anonymously; however, if you provide us with your contact information (name, phone number, email), we will have the ability to follow up with you to learn more about your ideas or concerns (optional):

Enter your answer

Submit

The Public Input Survey was specifically sent to those who serve populations that may be disproportionately impacted by disaster events. The public input survey was distributed via email on March 28, 2025 to the entities listed below.	
<b>Organization</b>	<b>Description of Vulnerable or underserved population - description</b>
BSC Embracing Diversity Committee	General – diverse populations
Burleigh County Housing Authority	Houselessness, Low socioeconomic status, New Americans Renters
CATCH ND	Refugees, New Americans, Immigrants
Dakota Center for Independent Living (DCIL)	Disabilities, Limited mobility, limited transportation, seniors
Dakota Outright	LGBTQ+
DD Council (North Dakota State Council on Developmental Disabilities)	Disabilities, Limited mobility, limited transportation
Designer Genes	Disabilities, Limited mobility, limited transportation
Dream Center	Houselessness, Low socioeconomic status
Global Neighbors	Refugees, New Americans, Translation Services, Immigrants potentially undocumented individuals
Heavens Helpers Soup Café	Houselessness, Low socioeconomic status
Ministry on the Margins	Houselessness, Low socioeconomic status, previously incarcerated
Missouri Valley Coalition for Homeless People	Houselessness, Low socioeconomic status
Native Inc	Tribal Nations
North Dakota Department of Human Services (refugee resettlement)	Refugees, New Americans, Immigrants, possibly undocumented
North Dakota Office of Legal Immigration	Refugees, New Americans, Immigrants,
Protection and Advocacy	Disabilities, Limited mobility, limited transportation
United Way	Houselessness, Low socioeconomic status
Welcome House	Houselessness, Low socioeconomic status
Youth Empowering Social Status (YESS)	Disabilities, Limited mobility, limited transportation
Youthworks	Houselessness, Mental Health Disorders

The survey was also sent directly to the City of Bismarck’s Integration Facilitator for direct distribution to populations new to the community.

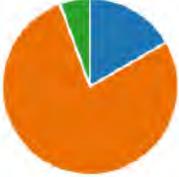
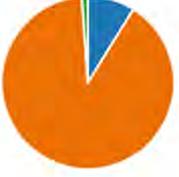
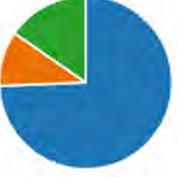
Burleigh County Emergency Management also sent the same survey to the American Red Cross and The Salvation Army as a direct target audience for public input. Bismarck and Burleigh County shared the same public input survey and survey results.

# Public Input Received - March/April 2025

## Survey Results

90 Responses

<p><b>1. Where do you live?</b></p> <table border="1"> <thead> <tr> <th>Location</th> <th>Count</th> </tr> </thead> <tbody> <tr> <td>City of Bismarck</td> <td>57</td> </tr> <tr> <td>City of Lincoln</td> <td>2</td> </tr> <tr> <td>City of Regan</td> <td>0</td> </tr> <tr> <td>City of Wilton</td> <td>2</td> </tr> <tr> <td>City of Wing</td> <td>2</td> </tr> <tr> <td>Unincorporated Burleigh Cou...</td> <td>22</td> </tr> <tr> <td>Other</td> <td>5</td> </tr> </tbody> </table>	Location	Count	City of Bismarck	57	City of Lincoln	2	City of Regan	0	City of Wilton	2	City of Wing	2	Unincorporated Burleigh Cou...	22	Other	5	<p>The majority (57 of 90) of those responding were Bismarck residents.</p>														
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<p><b>3. What potential impacts concern you most relating to the hazards you selected above?</b></p> <p>74 Responses</p> <p>Latest Responses</p> <ul style="list-style-type: none"> <li>"Climate change makes weather more severe. We have lot..."</li> <li>"Grassfires and identity theft"</li> <li>"Property damage"</li> </ul>	<p>See Public Input Comments Summary on pages 32-36.</p> <p>Applicable Public Input was shared with Lead Planners and meeting participants during the Hazard-Specific Plan update meetings held in October.</p>																														
<p><b>4. What preventative measure(s) would you recommend for any of the hazards you selected above to minimize or eliminate the potential impacts?</b></p> <p>69 Responses</p> <p>Latest Responses</p> <ul style="list-style-type: none"> <li>"The army corps the act cautiously."</li> <li>"Not sure, quick response to fires."</li> <li>"Flood mitigation"</li> </ul>	<p>See Public Input Comments Summary on pages 32-36.</p> <p>Applicable Public Input was shared with Lead Planners and meeting participants during the Hazard-Specific Plan update meetings held in October.</p>																														

<p>5. If you or a family member are considered an at-risk population (such as a senior citizen, individual with disabilities), what are your concerns during an incident?</p> <p>56 Responses</p> <p>Latest Responses  <i>"We don't have any concerns"</i>  <i>"Emergency response teams arrival time"</i></p>	<p>See Public Input Comments Summary on pages 32-36.</p> <p>Applicable Public Input was shared with Lead Planners and meeting participants during the Hazard-Specific Plan update meetings held in October.</p>																
<p>6. Is your home located in a floodplain?</p> <table border="0"> <tr> <td>Yes</td> <td>15</td> </tr> <tr> <td>No</td> <td>70</td> </tr> <tr> <td>I don't know</td> <td>5</td> </tr> </table> 	Yes	15	No	70	I don't know	5	<p>Promoting flood insurance is identified as a mitigation action item for the Flood and Dam Failure hazards.</p>										
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<p>10. This survey may be submitted anonymously; however, if you provide us with your contact information (name, phone number, email), we will have the ability to follow up with you to learn more about your ideas or concerns (optional):</p>	<p>There were 22 responses to this optional survey question.</p>																

The public comments provided via the public input survey were reviewed by Bismarck Emergency Management, the Lead Planners and meeting participants as part of the hazard-specific Multi-Hazard Mitigation Plan update meetings held in October, to aid in the identification of individual mitigation action items supporting the overall goals of the plan.

## Public Input Comments

*Formatting Note: Comments are applicable to the left-most column.*

Hazard	Vulnerability identified	Mitigation Actions Suggested	At risk population comments
Civil Disturbance	Enforcement of property rights	Convenances for all areas of town	
Civil Disturbance	I feel civil disturbances are most likely, given short tempers, lacking security measures and easy access to guns here.	Increased security at schools and public places.	Not an at-risk population ... unless you consider being a government employee when rhetoric is raised against them.
Civil Disturbance	Civil Unrest: Past protests and how they disrupted our city peace	Civil Unrest: Citizen education how to handle harassments, citizens arrest and conceal carry rights/responsibility	
Civil Disturbance	Trump followers attacking those of us who don't wear the red caps. The rule of law is rapidly breaking down. I know people who are eager to start "shooting the libs".	Leaders must emphasize that violence is unacceptable and that if it occurs, it will be dealt with immediately. Law enforcement especially needs to be trained and reminded that they are to enforce the law, not follow the whims of an evil president. Note: I have NEVER worried about our local law enforcement officers but I am worried about the very near future.	
Criminal behavior	Folks intoxicated on drugs breaking in to our houses, vehicles, yards	More city cameras in neighborhoods, more severe penalties	Yrs, I cannot run from them. Also when I called the police a couple years ago when a clearly intoxicated man was trying to break in my back door, repeatedly, he told them a fabricated storg-that I knew him, invited him in, then changed my mind! Good lord, he was clearly high on drugs, I have never called 9q2 before, I sm elderly and he was maybe 24! They said they couldn't take him in!! Bogus!
Criminal, Terrorist or Nation-State Attack	Law enforcement does not have adequate resources to be able to respond and confront any type of coordinated attacks by criminal or terrorist organizations. They may be able to handle single small events but in the case of any type of coordinated multiple dynamic events, they are under staffed, poorly equipped and trained to be able to respond and control these types of issues.	Develop at the state level regional response teams that can be called on short notice to acts of terrorism and or high impact criminal activity. The teams would be trained and equipped for swat and explosive responses. The training requirements on these two disciplines are demanding and cannot be maintained at the "additional duty" status that all departments have. These are perishable skills and are difficult to maintain on the one day a month "maybe" training time allotted by most departments.	
Criminal, Hate Crimes	Attacks against racial, national, gender, sexual preference, protected groups	Declare attacks against protected a hate crime	I identify as transgender , yes I feel threatened here
Cyberattack Severe Weather Events	CYBERATTACK: can reek havoc on ALL systems if power or internet is down; like I'd have to dig to find a radio in our house, we use the internet, phones, computer to get news. I do have a battery operated weather radio, but the current president is laying off all the National Weather Service people that manage the satellites that allow us to have excellent weather forecasting, so how's that gonna help us?		
Cyberattack	Long term loss of power via a cyberattack	education	
Cyberattack	Seem to have highest probability all things considered. I think are city/county have prepared for and have experience with the other options.	Not sure. AI is growing exponentially and it would seem cybersecurity should be paramount.	I am not but know seniors that live alone. Access to food, water, power (electricity or other) and communication (phone or computer).
Cyberattack	Economy and families unable to function	Community education	

Hazard	Vulnerability identified	Mitigation Actions Suggested	At risk population comments
Cyberattack	loss of life, loss of financial, loss of everyday amenities.	Two-factor authentication.	power loss
Cyberattack	Cyberattack which affects the life lines (Safety and Security; Health and Medical; Communications; Hazardous Materials; Food, Water, Shelter; Energy (Power & Fuel); and Transportation) for an extended period of time or during the middle of winter.	increased / enhanced cyber protections, back up power sources, food, medical supplies, and water reserves.	access to medical care
Cyberattack	Shutdown of critical infrastructure for an extended period of time	Investments in cybersecurity tools city/county owned infrastructure.	
Evacuation concern – transportation planning	There are only a handful of roads that go the entire length of town north to south and east to west. If there was ever an event that required a complete evacuation, it would be complete gridlock.		
Fire	we're on the prairie and a ways away from firestation that is staffed by volunteers - so a lightening strike, casual campfire, backyard bonfire or controlled burn can easily get out of hand and cause damage. Esp. of there's high winds or draught and the fuel (ie. grass and fields) is dry.	more PSAs about county burn bans, fireworks, etc (I see my neighbors burning brush when I know there's a county burn ban in effect... grrrr...)  Free access to landfill for people in the ETA. Would prevent people from feeling that they have to burn their extra brush and grass clippings because they don't want to pay to take it to the compost site; or that they can throw their old printer or electronics in the dumpster.	
Fire	The WUI presents a danger to the borders of our communities; wildland fires could result in property damage and human and livestock losses.	Firewise Programs and Community Wildfire protection plans.	
Fire	long-term infrastructure damage and residential damage with the need for sheltering.	fuel reduction projects near infrastructure and home (wildland/urban interface areas)	
Flood	Lack of readily response time for emergency services. As an ETA residents I feel city leadership doesn't include us or try to provide adequate services .	Better response times and available resources	I have elderly neighbors, we try to keep roads open in the winter and such in case of an emergency but it's most citizen led efforts. As an ETA residents we are kind of stuck between the city and the county, neither want to except full responsibility of the ETA and the citizens suffer.
Flood	lack of access to/from neighborhood. A flood will close/cover roads leading to our neighborhood, and damage our house due to groundwater seepage (has happened in the past, totally expect it to happen again).		
Flood	Past flood events and how the city responded and assisted communities	Community organization and response plans that dont rely on City only	
Flood	While I don't live in an area that floods, I am hoping mitigation measures planned for south Bismarck will reduce the risk.	Implement flood control measures planned for south Bismarck.	
Flood		Monitor river water levels, Garrison water output.	Senior citizens, as well as adult child with disabilities.
Flood	Concern about overland flooding	Education about special flood zone areas	
Flood	long-term infrastructure damage and residential damage with the need for sheltering.	Flood mitigation projects (like south Bismarck)	
Flood Ice Jam	Missouri River flooding, especially rapid backup due to ice jams.	Monitoring for ice jams and having a plan for breaking them in emergency situations.	We have elderly neighbors. I don't know if they are on any kind of reverse 911 or anything, if we even have that.
Geologic	Concern about expansive soils	Education about expansive soil prevalence in North Bismarck.	
Hazardous Materials		no CO2 pipeline.	Senior citizens, as well as adult child with disabilities.
Hazardous Materials	CO2 release from pipeline	Do not allow CO2 pipeline in Burleigh County	no ability to avoid CO2 leak

Hazard	Vulnerability identified	Mitigation Actions Suggested	At risk population comments
Hazardous Materials	The CO2 pipe line is super hazardous	Do not allow CO2 pipeline.	
Hazardous Materials	CO2 or Natural Gas pipelines, wildfires	Tighter regulations, maintenance checks	
Hazardous Materials	CO2 release from pipeline	Do not allow CO2 pipeline in Burleigh County	no ability to avoid CO2 leak
Hazardous Materials	I don't think our community is prepared for an emergency involving hazardous materials whether it involves a railroad accident, truck accident, a terror attack, or accident at a local business. I know we don't have anyway to protect ourselves if we were exposed.	A plan for hazardous material emergencies. Help for senior citizens who don't have family.	We are senior citizens and we don't have family that could help us in an emergency.
Hazmat	High volume of truck hazmat tanker traffic in populated areas and the ability of local responders to be able to contain/control releases and coordinate mitigation responses. There are no full time hazmat response teams in the state.	State supported full time Hazmat response team.	
Infectious Disease	There is an area across the street that is an empty lot/pasture full of mice, gophers, rabbits and who knows what else. They are planning building something there after years of being empty and the neighborhood has complained about the critters to the city and nothing has ever been done by the landowner. We fear that once construction begins, this will become more of a problem with the animals running across the street and becoming more of a nuisance than they are now. We hope that traps, poison or SOMETHING will be done before the dirt is dug up as the mice situation is bad now when they come across the street and get in the garages and try to get in the condos.		
Infectious Disease		No clue since public will not accept health measures if there is another pandemic	My mother is elderly, and i worry about her health
Infectious Disease	Infectious disease	Our city to let public health do their job to mitigate	
Infectious Disease – and homeless populations	Increased risk for these hazards which requires increased preparedness to mitigate impacts.	Increased funding for HHS, refinement of homeless operations, collaboration with state environmental agencies for improved environmental health processes.	Lack of information shared readily with at risk populations
Severe Summer Weather	personal safety during tornado season (what if you dont have a basement?)	Better education about personal safety during tornado season (what if you dont have a basement?)	
Severe Summer Weather	Severe Summer Weather -- We are seeing more impactful storms these days.  It's startling to see how many tennis players disregard sirens when severe weather comes into our area.	I would encourage City Parks and Recreation to issue guidance to heed warnings. Perhaps they could have signs on city tennis courts asking players to seek shelter, if those signs do not already exist.	My husband and I are seniors and worry about moving to a lower level quickly enough.
Severe Summer Weather	Home damage	Insurance--I'm not sure	Not at risk population, but not having a residence
Severe Summer Weather	Severe weather.	More warning and preparedness.	
Severe Summer Weather	Disruption of services	Situation awareness, individual preparedness responsibility	
Severe Winter Weather	Disruption of services	Situation awareness, individual preparedness responsibility	
Severe Winter Weather	Not being able to get to an emergency route	Just put the plows out before the storm is done	The road not being plowed open for at least 2 days
Severe Winter Weather	People injured / dead. Property destroyed	Warming stations / places designed during extreme cold	
Severe Winter Weather	Power failure.	Free power generators for homes	

Hazard	Vulnerability identified	Mitigation Actions Suggested	At risk population comments
Severe Winter Weather	Severe weather.	More warning and preparedness.	
Severe Winter Weather		Do away with that liquid vehicle rusting agent and go back to sanding roads.	
Severe Winter Weather	secondary impacts that occur from severe winter weather such as a lack of ability to travel and loss of power.	an education campaign or potential pre-warning of the public to gather essential items before the winter storm hits could be beneficially. Ice is more of a concern than snow.	Yes. We have concerns about the ability to fill medications before expiration or running out of supplies. As for family members with disabilities, we rely on social support programs such as PRIDE Inc., and when the weather is bad these services are unable to be accessed creating daily challenges.
Severe Winter Weather		Help for senior citizens who don't have family.	We are senior citizens and we don't have family that could help us in an emergency.
Space Weather	Power failure.	Free power generators for homes	
Space Weather	Worst Case Scenario when all communications/electrical go down	Where and how to gather information and actions	
Criminal, Terrorist or Nation-State Attack	Disruption of services	Situation awareness, individual preparedness responsibility	
Train Accident		Routing trains outside or populated areas may be smart but cost prohibitive.	
Tornado	I don't think our community is prepared for an emergency involving hazardous materials whether it involves a railroad accident, truck accident, a terror attack, or accident at a local business. I know we don't have anyway to protect ourselves if we were exposed.	Public storm shelters. Help for senior citizens who don't have family.	We are senior citizens and we don't have family that could help us in an emergency.
Summer Weather / Sirens – Winter Weather			I live alone and fear what will happen when the sirens go off for bad weather or when a blizzard is forecasted as I have no where else to go in case of an emergency. Will someone come looking for me when there are no family members near me? I have anxiety and PTSD and this gets really bad when I know bad weather (blizzards/thunderstorms/tornados) is here and I have no where to go so that I won't be alone or by myself if there is no electricity.
Wildland Fire	The quickness in which wildfires can start and spread with our property so close to the north boundary of Bismarck.	Clear overgrown undeveloped property of fire fuel(tall dry grass) and possibly controlled burns of areas where that is available.	
Wildland Fire	Area of south bismarck between archery range and waste treatment plant has extreme levels of deadfall and undergrowth that need to be dealt with before it catches fire and threatens the homes in area.	Controlled burns	
Wildland Fire		Monitor tall grasses, deadfalls, open fires.	Senior citizens, as well as adult child with disabilities.
Wildland Fire	Tyler coulee and the Nature Park in northwest Bismarck has potential to create a disaster with a dry fall and decreased snowfall and drought, high winds and a fire.	Simple, control the fuel load created by native grasses. Mowing the area that can be mowed is easy to do and would be very effective in aiding to reduce the fire potential.	
Wildland Fire	The Dry area we live in. Need to keep "the No fires"on until we get about 3" of rain.	Water and Fire Prevention in every home, garage and car.	
Wildland Fire	Many of these hazards are expected to get worse and droughts lead to fires.	I am located within the city and the hazards are a little diminished there as opposed to being out in the county where there are less	Air quality and water quality are the overall concerns for everyone but for those with other physical disabilities, I am concerned about their ability to get to safety in the event of an emergency.

Hazard	Vulnerability identified	Mitigation Actions Suggested	At risk population comments
		structures to block winds while also less access to resources like water and emergency services.	
Winter	High impact winter events-blizzards or extended periods of heavy winter weather is especially obvious in the grocery stores. Supplies run out quickly during these events. The ability to keep routes open and ensure the ability for freight to get in is a concern. Limited numbers of large snow removal equipment make it a challenge to keep vital supply lines open.	Investments in snow removal equipment as well as vehicles able to traverse extremely challenging terrain should be looked at.	
Winter	loss of utilities, access to roads, downed and falling trees	identifying trees that look susceptible to falling	
Winter	Loss of life for homeless people in the Summer because of heat and in the winter because of cold and the loss of jobs and homes by Donald Trump's cancelling of humanitarian parole status.	A low barrier shelter for homeless and a guest worker program for humanitarian parolees in Bismarck, there are more than 100 individuals in that status	
Winter	travel impact (not being able to travel at all or dangerous travel), property damage	NA	getting to elderly family members who live in a trailer court (less sturdy structure)
Driving Safety	Speeding traffic , red light runners , not enough time for turns in Turning signal on century and state street	Reduce speed limits in residential areas, 19th street is a road race track, add more time for traffic to turn from Century onto state street- lots of red light violations, make curch plant bushes to hide parking lot on east auditorium- this would also help stop some wind, fix the massive potholes and also tar the cracks	Speeding has to stop- I can't even cross my street to get my mail from our cluster box. We have tried to move the box but no prevail.
Driving Safety	People always running red lights	Cameras on stoplights to catch these people.	
Driving Safety	I feel that the drivers in this town/state DO NOT pay enough attention to what they are doing. I'm tired of having people run stop lights and stop signs, talking on the phone or putting on makeup while driving and being in the wrong lane when there are CLEAR signs stating what the lane is for.		

# Appendix A: Acronyms

BCA: Benefit Cost Analysis  
BCR: Benefit Cost Ratio  
BFE: Base Flood Elevation  
CDBG: Community Development Block Grant  
CDC: US Centers for Disease Control  
CenCom: Central Dakota Communications Center  
CFS: Cubic Feet per Second  
CPC: Climate Prediction Center  
COG: Continuum of Government  
COOP: Continuity of Operations Plan  
CRS: Community Rating System  
DES: ND Department of Emergency Services  
DFIRM: Digital Flood Insurance Rate Map  
DHS: Department of Homeland Security  
DR: Disaster  
DWR: North Dakota Department of Water Resources  
EOC: Emergency Operations Center  
EOP: Emergency Operations Plan  
ETA: Extraterritorial Area boundary  
FEMA: Federal Emergency Management Agency  
FIRM: Flood Insurance Rate Map  
FIS: Flood Insurance Study  
GIS: Geographic Information System  
HazMat: Hazardous Materials  
HHS: North Dakota Health and Human Services  
HMGP: Hazard Mitigation Grant Program  
HUD: Housing and Urban Development  
IBC: International Building Code  
ISO: Insurance Services Office  
LEPC: Local Emergency Planning Committee  
MHMP: Multi-Hazard Mitigation Plan  
MPO: Metropolitan Planning Organization  
NCDC: National Climatic Data Center  
NDCC: North Dakota Century Code  
NFIP: National Flood Insurance Program  
NOAA: National Oceanic and Atmospheric Administration  
NTSB: National Transportation & Safety Board  
NWS: National Weather Service  
PMP: Probable Maximum Precipitation  
SLIC: State and Local Intelligence Center  
STAPLEE: Social, Technical, Administrative, Political, Legal, Economic, and Environmental

SWPC: Space Weather Prediction Center

THIRA: Threat and Hazard Identification Risk Assessment

USACE: United States Army Corps of Engineers

USGS: United States Geological Survey

WRD: Water Resource District

WUI: Wildland Urban Interface

# Appendix B: Climate

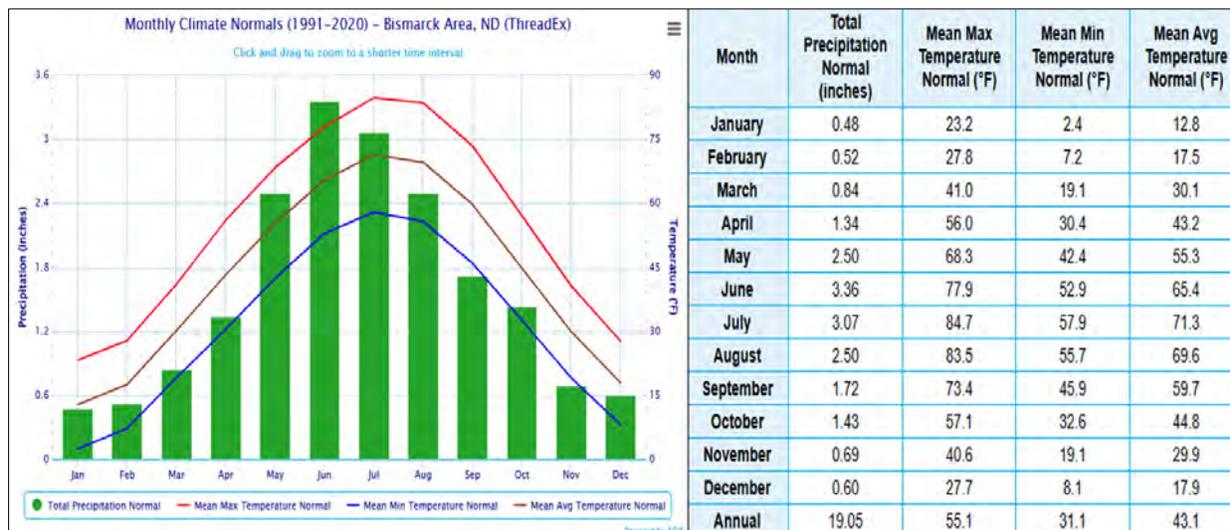
[Basic: Historical, Current Variability, Trends, and Projections]

**1. Historical.** Historical Climate is derived from documented weather and climate observational data and is usually discussed in terms of its Long-Term mean, or average, and its extremes. Long-Term can refer to the entire Period of Record (POR) or its most current 30-year Climate Normal, a sliding scale that is updated every decade. Short-Term refers to variations in climate that occur over periods of a few years to a decade or more ([SUNY/OER, 2025](#)). The most common of these is the oscillation between El Nino and La Nina conditions in the equatorial Pacific Ocean, which often affect the Northern Plains states.

**1.1. General Climate Type - Continental.** Temperature and precipitation are the two parameters traditionally used to describe general, large-scale climate types.

**Temperature.** The Northern Great Plains (NGP) region in general and South-central North Dakota (Bismarck area) in particular, has an extreme [continental climate](#) characterized by a very high annual variation in temperature (warm summers and cold winters) and a high daily range in temperatures, as compared to maritime climates. These high ranges in temperature are mainly due to the area’s location: in the mid-north latitudes (between 45.935° and 49.00° N), along the north border of the continental United States, centered in the North American Continent, and far from the modifying effect of oceans.

**Precipitation.** Moisture is a second key component of climate, with North Dakota effectively straddling “the transition from the moist eastern United States and the semiarid West” ([Frankson, 2022](#)). A high daily range in temperature is primarily due to the lower [heat capacity](#) of dry air and dry soils as compared to humid air and either moist soils or large bodies of water, so that dryer air and dryer soil will both warm and cool at a faster rate than wetter air or soil ([Wikipedia: Climate of ND, 2023](#)).

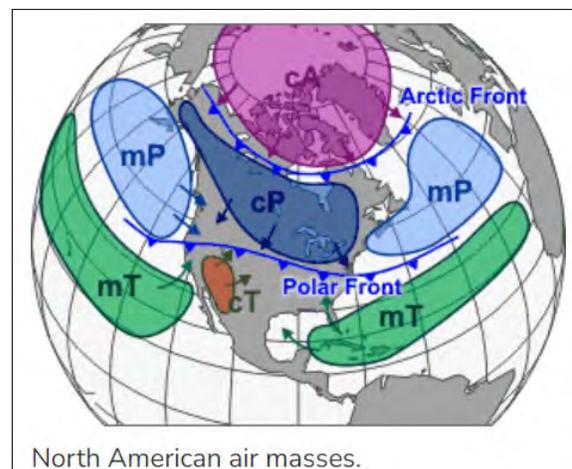


**Figure 1.1**, above, shows the average monthly precipitation and the range of monthly average high and low temperatures for the Bismarck area during the most recent 30-year climate normal period, 1991-2020 ([XM-ACIS, 2025](#); [Climate Toolbox, 2024](#)).

North Dakota's longest running record of daily maximum and minimum temperature and daily precipitation reports are for the Bismarck area, dating from October 1, 1874, through the present ([XM-ACIS](#), 2025). As the city has grown, the official location of these weather observations has varied from the downtown area to the present location at the Bismarck Municipal Airport while their representativeness has remained consistent. The average annual precipitation for Bismarck during the current 30-year climate normal period is around 19.05 inches, about 0.33 inches higher than the statewide average, while the average annual temperatures is around 43.1°F, about 2.1°F warmer than the statewide average.

A composite record of daily temperature and precipitation reports covering most areas of the state dates from 1895 to the present and is used for comparisons throughout this section ([NOAA-CAG](#), 2025).

**Figure 1.2. Common Air Mass Types.** The dominant airmass types which affect all areas of North Dakota are **Continental Polar (cP)**, which originates over the high latitudes of central Canada, and **Continental Tropical (cT)**, which originates over the upland areas of the western United States. A third common airmass type is **Maritime Polar (mP)**, which originates over the Gulf of Alaska and far-north Pacific Ocean. Note that maritime air from the Pacific Ocean loses most of its moisture in transiting the western mountain ranges. Two other and more extreme airmass types also affect North Dakota, generally over shorter and more variable periods of time. Midwinter will often be impacted by the extreme cold of **Continental Arctic (cA)** air, originating near the North Pole, while the midsummer will often be impacted by very humid **Maritime Tropical (mT)** air, originating over the Gulf of Mexico. Image courtesy of NOAA ([NOAA: Airmasses](#), 2023).



*Continental Arctic air* is characterized by very cold and dry air, typically well below zero (F), and is responsible for ND's coldest wintertime temperatures. *Continental Tropical air* is typically warm (or hot) and dry and results in ND's highest summertime air temperatures. *Maritime Tropical air* is typically hot and humid, and though the air temperature can be less extreme than with **cT** air, the increased humidity often results in ND's highest [Heat Index](#) days. Local, near-surface humidity levels may be reported in terms of either *Relative Humidity* or *Dewpoint Temperature* readings.

**Relative Humidity**, is the ratio of how much water vapor is in the air compared to how much the air can hold at a given temperature and pressure ([AMS Glossary](#), 2013), and is often referred to as a comfort index. The ideal relative humidity level for humans ranges from 30 to 50 percent, according to a [Mayo Clinic report](#). Where lower levels can result in dry skin, respiratory issues, etc., and higher levels can make it difficult for the human body to cool itself through the evaporation of sweat.

**Dewpoint Temperature** is a measure of the quantity of moisture in the air. When the Dewpoint equals the Air Temperature, Relative Humidity is maximized at 100 percent, and either dew,

frost, or fog forms ([AMS Glossary](#), 2013). Heat Index is [calculated](#) using Air Temperature and either Dewpoint or Relative Humidity.

The record maximum dewpoint for ND was set at 89F near Wahpeton ND, on 19 July 2011. And with a concurrent air temperature of 91F, the maximum Heat Index was 131F. On that same day, the record dewpoints for Minnesota (Moorhead MN: 88F) and for Manitoba (Brandon MB: 82F) were also set. That day, **dewpoint temperatures reaching more than 80F overspread most all of North Dakota along and east-northeast of the Missouri River**, western MN, much of eastern South Dakota, and well into southwestern Manitoba past Canada Hwy 1 (Gust, 2018). The Bismarck Airport (KBIS), southwest of downtown, measured a peak dewpoint that afternoon of 82.0F ([Mesowest](#), 2025), while the Mandan NDAWN station recorded a peak dewpoint of 82.4F ([NDAWN](#), 2025). And with high temperatures that afternoon ranging from 93 to 96.1F, the peak Heat Index (Apparent Temperature) across the Bismarck-Mandan Metro area, ranged from 115 to 124F.

**1.2. Sub-climate** differences across the NGP region are primarily driven by the range of temperature and precipitation extremes experienced in any given year or over a series of years. Average temperatures are generally cooler across northern ND and points north of the state, and generally warmer in southern ND and points south.

In contrast, conditions are generally wetter and more humid in the somewhat lower elevations of eastern ND and points further eastward towards the Great Lakes. The somewhat higher elevations of far western ND, and the high plains region stretching westward to the Rocky Mountain Front Range, are drier and less humid.

Figure 1.3. Köppen-Geiger Climate Classification

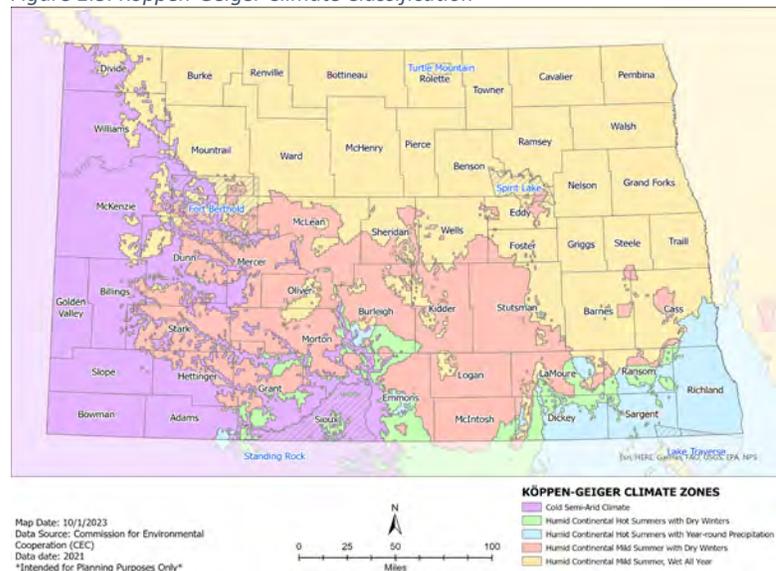


Figure 1.3. ([CEC](#), 2021: at right) shows that most of North Dakota, including all of Burleigh County, falls under a [Köppen-Geiger](#) climate classification, **Dfb** (continental: cold/snowy winters, humid, with warm to hot summers). While extreme western North Dakota, including portions of the Missouri River breaks and points westward, resembles more of a [Steppe](#) type climate, **Bsk** (continental: arid/[semi-arid](#), steppe, cold).

For Bismarck, Burleigh County, and North Dakota in general, the *average climate* can be best described as a statistical position between climate extremes ([Wikipedia: Köppen](#), Steppe, Semi-Arid, 2013).

**1.3. Micro-Climates** in any county, tribal land or community depend on a variety of factors such as soil type, land-use/land-cover, slope, elevation, drainage, and wind/exposure.

**Soil Type.** Burleigh County is in the glaciated Missouri Plateau Section, with the northeast corner of the county in the Missouri Coteau District and the remainder in the Coteau Slope District ([Kume and Hansen](#), 1965; [Stout](#), 1974). According to Omodt et al. (1961), Bismarck center city and points to the north, northwest, and west are primarily the gently rolling, fertile, chestnut brown Williams Series soils of a semiarid grassland, common to the well-drained glacial till of the Missouri Coteau District. South central Bismarck into the middle and upper Apple Creek drainage is the slightly different Savage-Wade-Farland Series soils, which more of a dark greyish brown, silty clay loam, with medium permeability and fertility. The steeper slopes west of downtown into the River Road, and northwest to far north of the city are the steeply rolling and/or sloping chestnut brown soils of the Williams-Zahl Series, which extend through much of the lower Burdt Creek drainage. The lower elevations southeast of downtown and along the Missouri River bottomlands are alluvial loams and sandy loams of the Havre-Banks Series.

**Land-Use.** The primary landscape of Burleigh County, 73%, is equally split between rolling pasturelands and croplands, with less than 7 percent developed as residential or commercial property. The remaining 20% is composed of rolling prairie, wetlands, small lakes, and federal or state wildlife management areas ([USDA](#), 2022; [Stout](#), 1974). Woodlands make up less than 1 percent of the landscape in the county, primarily as homestead shelterbelts or urban plantings ([Claeys](#), 2020).

**Slope and Drainage.** Central and southern Burleigh County have a primary but subtle slope gradient from east to west and a secondary slope gradient from north to south, with a general west-southwest drainage towards Apple Creek and the Missouri River ([Stout](#), 1974). Northeast Burleigh County is replete with sloughs and prairie potholes ([NDDWR](#), 2011), and the northern third, roughly along and north of SR36 has a subtle slope and drainage towards the west along the Painted Woods Creek, and to the Missouri River. Part of east-central Burleigh County is drained by Burnt Creek, then into the Missouri River north of Bismarck. The Bismarck area drains from its highland areas in the north-northwest, either directly westward towards the Missouri River, to the northwest and the Burnt Creek drainage, or towards the south-southwest into the Apple Creek ([Google Earth](#), 2024). In general, far western Burleigh County has a general westward and sharp drainage towards the Missouri River.

**Elevation.** The highest elevations in Burleigh County range up to 2250 ft MSL, across the northwest corner of the county in central Ecklund Township, about 4 miles WSW of Winton ([Peakbagger](#), 2004). Lowest elevations of around 1615 ft MSL are located along the Missouri River at the Oahe Wildlife Management Area, in the southwest corner of Burleigh County, north and east from Huff. ([Google Earth](#), 2024; [Stout](#), 1974). Elevations in the Bismarck-Mandan area range from a low of around 1625 ft MSL along the Missouri River near the Apple Creek outlet, to high points of around 1950 ft MSL in the hills/bluffs of north-northwest Bismarck and northwest Mandan.

**Short-term micro-climates** can form within a county or community under a variety of conditions. For example, areas which receive significantly more rainfall or snowfall than other areas, typically through spotty convective rain or snow showers, can develop temporary warm or cool zones. In the winter season, areas with heavier and/or fresher snowfall may cool more sharply overnight due to increased insulation from any lingering soil heat, or warm less quickly the following day due to increased reflection of solar energy off the fresh snow surface. A township sized area that is largely snow-free may warm by 10-20F over a similar sized areas covered with fresh snow, with greater temperature differences occurring when winds speeds and mixing are low.

During the summer months, a township sized area with recently wetted soils will generally remain a bit cooler than surrounding dry areas during the day, due to the solar energy used to evaporate moisture from the soil, and stay a bit warmer during the night, due to the higher retained heat in the near surface moist air and the moist soil (Trenberth, 2003, p.1212). These small-scale temperature differentials often persist during periods of calm or light winds and dissipate quite quickly under high wind conditions.

**1.4. Importance of Wind Direction and Speed.** Changes in windspeed and/or direction often indicate the passage of airmass boundaries, cold fronts or warm fronts, and related changes in weather. Winds vary significantly with height above the terrain and are often much stronger some tens to hundreds of feet above the terrain where the frictional forces of surface roughness, structures, and trees diminish.

In current weather observation practice, windspeed and direction are measured at most automated and manual weather stations, but not necessarily at climate reporting stations. An “instantaneous windspeed” is measured at 3-second intervals. **Sustained winds** reflect the highest windspeed average over any 2-minute period within the 10 minutes preceding the observation time. **Wind gusts** are the highest 3-second measurement during that same 10-minute period. **Peak wind** is the maximum 3-second gust measured *at any time* during the hour (FCM-H1, 2019, pp.28-30).

**Gradient winds** are those sustained winds at various atmospheric levels and produced by larger scale pressure differences in the atmosphere. Daytime warming of the terrain by sunshine gives rise to convective mixing of the lower atmosphere, which can then mix higher gradient windspeeds down to the surface, often in the form of buffeting wind gusts.

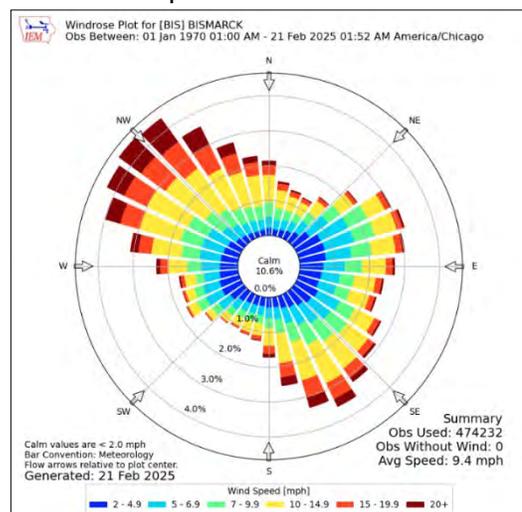
According to Gust (2022), the standard height for measuring surface winds for aviation purposes is at 10 meters (32.8 ft.) Above Ground Level (AGL), with wind speed measurements available at most airports around the state. Wind measurements for agricultural purposes (example NDAWN: North Dakota Agricultural Weather Network) are often as low as 3 meters (9.8 ft.) and for fire-weather monitoring purposes (example RAWS: Remote Automated Weather Stations) at around 6 meters (19.7 ft.) AGL.

Multi-source/composite wind energy estimates indicate that derived winds across Burleigh County average near 11.7 mph, at 10 meters AGL, and near 18.6 mph at 100 meters AGL

(Global Wind Atlas, 2023), with strongest winds most often from the northwest, with winds from the south-southeast coming in at second place, and winds from the east-northeast coming in at third.

These estimates are consistent with a wind rose from the **Bismarck Airport (KBIS)**, shown in *Figure 1.4* at right. The airport is located roughly 2 miles southeast of downtown Bismarck, and slightly lower in elevation than the surrounding terrain. Seasonal wind roses for the KBIS location show that during the winter months (DJF), winds are predominately from the northwest.

During the summer months (JJA), winds are balanced between the northwest and south-



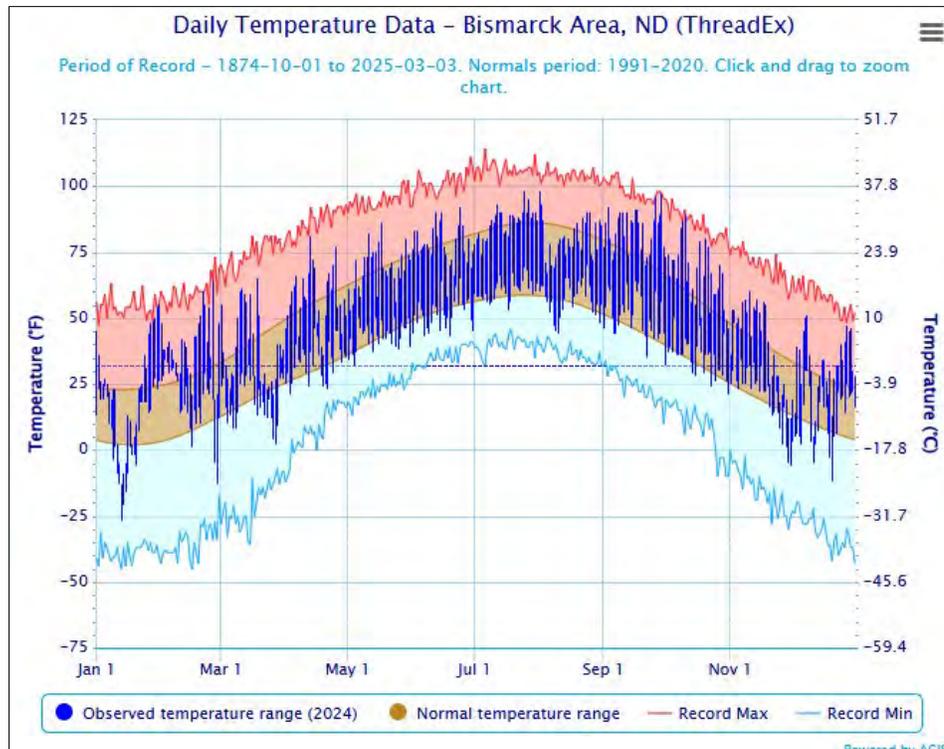
southeast. Easterly winds are somewhat common in the spring (MAM) and fall (SON) months ([IEM](#), 2023).

The **highest non-tornadic wind record of 100 mph for Burleigh County** was estimated based on wind damage produced along a line from southwest of Sterling to south-southeast of Sterling in the early evening hours of August 28, 2024 ([NWS BIS](#), 2025). Reports show that sunflower fields were flattened, trees were uprooted, railcars were tipped, a large grain bin was dislodged, and power poles were broken on both sides of US Highway 83 ([NOAA/StormData](#), 2025). These extreme downburst wind damage events occurred as part of a larger thunderstorm squall line which produced widespread hail and wind damage across much of the southcentral and central portions of the state, and at least one or more tornado or funnel cloud sighting among the several counties involved.

Of the **8 tornadoes** which have struck **within 8 miles of downtown Bismarck**, from 1950 through 2024, and affecting part of the current Bismarck-Mandan Metro area, **the 25 May 1978 event was rated EF3** ([NOAA Tornado Tracks](#), 2025; [StormData](#), 2025). This tornado mainly affected Mandan, with property damages their estimated at \$250k in 1978, which is over \$1.2M in 2025 dollars ([Alioth Finance](#), 2025). Likewise, the Fort Rice F5 Tornado of 29 May 1953, which tracked from far southeast Morton County into far northwest Emmons County, ending just shy of the Burleigh County line, or 20 miles southeast of downtown Bismarck, produced an estimated \$500k in 1953 dollars, which is over \$5.9M in 2025 dollars.

**2. North Dakota Extreme Climate Variability.** Located at the geographical center of the North American Continent and furthest from the modifying effects of oceans or seas, Bismarck, North Dakota, epitomizes the concept of extreme [continentality](#). It has some of the highest degree in day-to-day, week-to-week, month-to-month, year-to-year, and multi-decadal variability in both temperature and precipitation of anywhere on the continent ([Franksen et al.](#), 2023).

Figure 2.1 below. **Bismarck ND, Extreme Daily through Annual Variability.** The graph below contrasts the range in daily temperatures with their recent 30-year climate normal period, and the extreme range in temperature that's occurred over the entire Period of Record for the Bismarck area ([XM-ACIS](#), 2025).



The dark blue line indicates the daily maximum and minimum temperatures from January 1 through December 31, 2024. Note that day-to-day and week-to-week temperatures are highly variable.

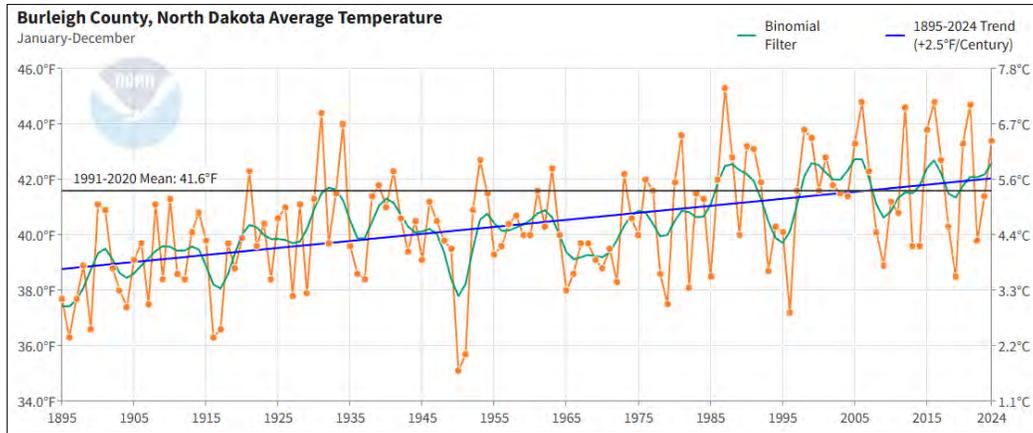
The golden band represents the range of daily average maximum and minimum temperatures, based on the recent 1991-2020 period. The red line indicates the daily record high temperatures for the entire Period-of-Record while the light blue line indicates the daily record low temperature ([XM-ACIS](#), 2025). Note that at Bismarck, the *all-time* record high temperature was 114F, set on 6 July 1936, while the *all-time* record low temperature was -45F, set on 16 February 1936 (also 13 Jan 1916).

The statewide extremes of 121F (Steele ND) and -60F (Parshall ND) were set during those same time periods, on 6 July 1936 and 15 February 1936, respectively. No doubt, the protracted dry conditions of the Great Plains Dust Bowl era led to the dramatically cold winter and dramatically hot summer conditions experienced statewide, and throughout that period.

ND's range of extremes in heat and cold are only exceeded by two other states, those being the intermountain states of Montana and Utah ([Statewide Extremes](#), 2023). These two states have markedly larger variations in elevation which likely led to the markedly colder minimum temperatures recorded at locations several thousand feet higher in elevation than that of the record cold ND location.

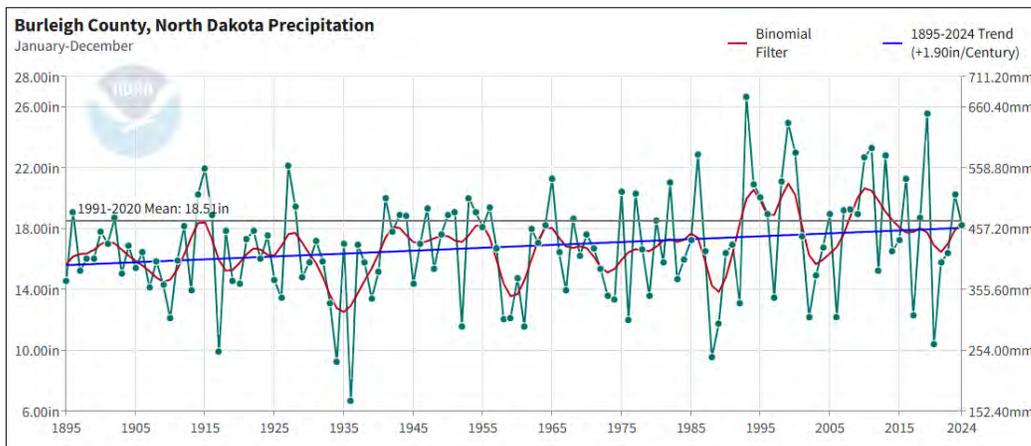
Figure 2.2 below. **Burleigh Co. ND Extreme Interannual to Multi-Decadal Variability in Temperature.**

The graph below shows the **annual temperature** pattern for Burleigh County, and covers the long-term Period-of-Record, which extends back through 1885 and includes all available climate data from stations located within or near the county ([NOAA/CAG, 2025](#)).



Note the frequent changes from warmer to colder years, with patterns of changes that occur over a period of a few years to decades, and the subtle but steady warming trend of around 2.5F per century. The average temperature of 41.6F for Burleigh County ND is about 0.6F warmer than the statewide average, while the rate of increase (trend) is a tenth of a degree Fahrenheit per century slower than the statewide average. As noted in Figure 1.1, Bismarck’s average temperature is roughly 1.5F warmer than the Burleigh County average, in part due to its more sheltered, treed, and populated exposure.

Figure 2.3 below. **Burleigh Co. ND Extreme Interannual to Multi-Decadal Variability in Precipitation.** The graph below shows the **annual precipitation** pattern for Burleigh County, and covers the long-term Period-of-Record, which extends back through 1885 and includes all available climate data from stations located within or near the county ([NOAA/CAG, 2025](#)).



Again, one can see the frequent changes from much drier to much wetter years, the patterns of changes that occur over a period of a few years to decades, and the subtle but steady trend for increasing precipitation at around 1.90 inches per century. The current 30-year average precipitation of 18.44 inches for Burleigh County is about 0.27 inches lower than the statewide average, while the rate of increase (trend) is about 0.74 inches per century faster than the statewide average. As noted in Figure 1.1, Bismarck's average annual precipitation is roughly 0.6 inches above the Burleigh County average.

### **3. Future Conditions in North Dakota** (Climate Variability, Trends, and Projections).

As of April 2023, the Federal Emergency Management Agency (FEMA) requires the inclusion of information regarding the effects of short-term climate variability, long-term climate trends, and future climate projections on identified hazards and their potential impacts in both state and local hazard mitigation plans. The 2025 Bismarck, ND, Multi-Hazard Mitigation Plan incorporates this information in coordination with state and federal guidance.

**3.1. Primary Sources.** Information for this section was extracted from the 2022 North Dakota State Climate Summary, the Fifth National Climate Assessment (2023), the 2024-2029 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP), related research as identified by these sources, and by various regional and local experts identified and contacted throughout the plan development process.

#### **- 2022 North Dakota State Climate Summary.**

Prepared and updated by the NOAA National Centers for Environmental Information (NCEI) and select regional and state climate experts, the 2022 ND State Climate Summary contains detailed information regarding the state's extremely variable climate and recent climate trends, as evidenced by the historical climate record, along with a summary of computer model-based projections of its potential future climate ([Frankson, 2022](#)).

#### **- Fifth National Climate Assessment (NCA5).**

Developed by the U.S. Global Change Research Program (USGCRP), NCA5 is a synthesis of climate knowledge, impacts, and trends across regions and sectors of the United States to help inform decision-making concerning a changing climate.

Chapter 25 of the NCA5 focuses on the Northern Great Plains, and explores specific trends and impacts in more detail, while discussing uncertainties that exist in the underlying science, the modelling process, the analysis of climate model results, and their potential impacts. This synthesis helps planners to ascribe levels of confidence and likelihood to potential impacts and to identify resilience-building activities that can be incorporated locally through mitigation planning ([Knapp, 2023](#)).

#### **- 2024-2029 North Dakota Enhanced Mitigation Mission Area Operations Plan (MAOP).**

Developed by the ND State Hazard Mitigation Team, the 2024 MAOP builds on the 2018 Enhanced MAOP and incorporates updated information as provided by team members, analysts and consultants, and guidance as provided by federal law; FEMA's state, tribal, and local mitigation planning policy guides; and mitigation planning experts at local, state, and federal levels ([ND eMAOP, 2024](#)).

**3.2. Current belief regarding ND climate variability, trend, and potential change.** North Dakota has the highest degree of day-to-day, week-to-week, month-to-month, and year-to-year variability in both temperature and precipitation in the nation. This **variability has increased in either frequency or magnitude over the past century and is likely to continue increasing over time**. According to Frankson et al. (2022), through the end of this century: North Dakota's extreme climate variability will likely continue to be the primary influencer or signal within each of the natural hazards which directly or indirectly impact jurisdictions and peoples across the state, over days to decades long timescales, *and* the much more subtle and gradual trends of climate change over the rest of this century may act to further extend the range of such variability beyond that which has previously been documented in the historical record. As discussed in section B.2., temperatures across North Dakota, the Northern Great Plains Region, and across much of the globe have been increasing at a slow but quite variable rate throughout the 20<sup>th</sup> century and the beginning of the 21<sup>st</sup> century. National and global rates of increase are similar at roughly 1.60F (0.89C) per century. However, northern latitudes in general, and particularly North Dakota and the Northern Great Plains are seeing markedly higher rates of change.

At 2.6F (1.44C) per century, North Dakota's statewide average *rate of* annual temperature increase is *one of the fastest (tied for 6<sup>th</sup> highest)* in the contiguous United States and is driven primarily by warming winter temperatures - *especially by warming wintertime low temperatures*. And the Bismarck/Burleigh County area has a similarly rapid rate of increase, while all of the state is prone to such extremes. Given the relatively flat, low-relief nature of the terrain in North Dakota, most areas in the state have a similar high degree of variability in temperature and precipitation, with only a slight difference in average value from one climate division, county, and/or community to the next.

**Figure 3.1. Observed and Projected Temperature Change Across North Dakota.** According to the 2022 North Dakota State Climate Summary, the statewide average annual temperature has increased by over 2.6F in the past 122 years (since 1901), and projections indicate the potential for an additional 1 to 9F (0.6-5.0C) increase above the current 1991-2020 average through mid-century. This amounts to a projected 2.5 to 10.5F (1.4 to 5.8C) increase above the 1901-1960 average, as indicated in the image below. Source at <https://statesummaries.ncics.org/chapter/nd/>.

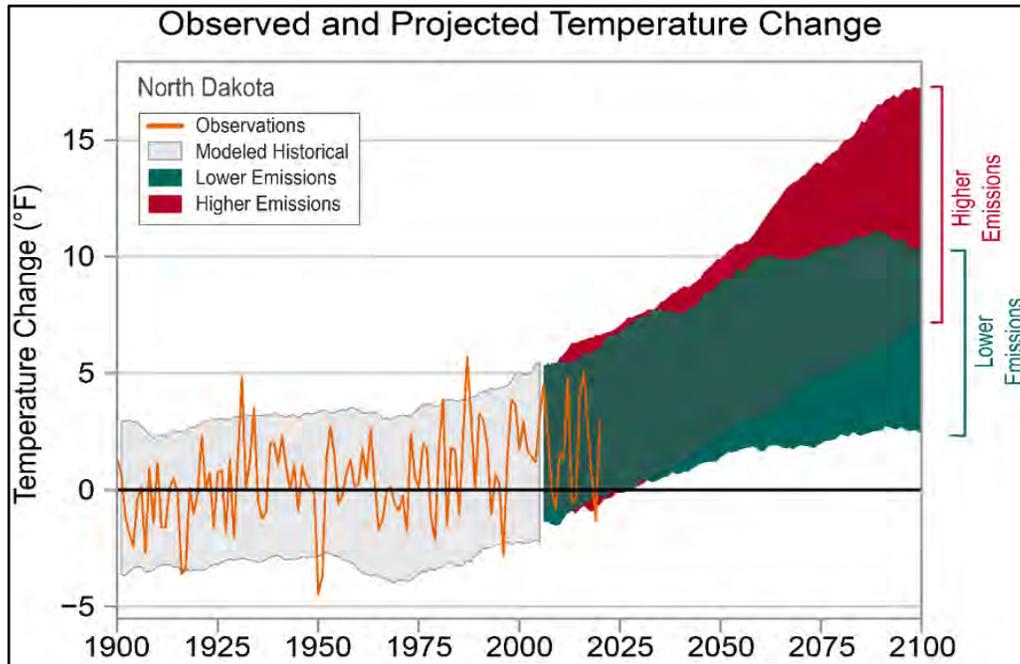


Figure 3.1: Observed and projected changes (compared to the 1901–1960 average) in near-surface air temperature for North Dakota. Observed data are for 1900–2020. Projected changes for 2006–2100 are from global climate models for two possible futures, one with emissions increasing at a higher rate (RCP8.5) and one with emissions increasing at a slower rate (RCP4.5). As of 2022, temperatures in North Dakota (orange line) have risen more than 2.6°F since the beginning of the 20th century. Shading indicates the range of annual temperatures from the set of climate models (CMIP5). Observed temperatures are generally within the envelope of model simulations of the historical period (gray shading). Sources: CISS and NOAA NCEI.

**3.3. General Climate Pattern Changes.** Recent climate change trends have shown, and future projections suggest that the state can expect continued gradual warming in all seasons, with greatest warming in the winter season. Overall precipitation is likely to increase, but with a high degree of inter-seasonal and interannual variability, which could lead to longer and stronger droughts interspersed with more frequent and more intense flooding. Severe summer and winter season storms will likely continue to occur in both drier, drought-prone periods, and wetter, flood-prone periods within the state’s overall high climate variability.

According to the NCA5 and information included in the 2024-2029 ND Enhanced Mitigation Mission Area Operations Plan (eMAOP) chapter on *ND Extreme Climate Variability and Potential Climate Change*, the state of North Dakota will *likely* experience the following changes in climate patterns across the state:

- More days with precipitation over a half inch.
- Longer dry spells (consecutive days without precipitation).

- Summer days with maximum temperatures over 95 degrees Fahrenheit will increase, as well as summer nights with minimum temperatures over 65 degrees Fahrenheit.
- Increase in cool season precipitation - late fall, winter, and early spring.
- Warming winters.

### 3.4. Anticipated Future Climate Impacts on Natural Hazards and Man-Made Threats.

A highly variable and/or changing climate will affect more than just temperatures and precipitation levels. An increase in the frequency and severity of extreme heat events and severe summer weather will adversely affect public health, water resources, and the production of agriculture (crops and livestock). A changing climate will increase the incidence of warm wintertime temperatures while simultaneously increasing the frequency and severity of extreme cold and severe winter weather episodes, adversely impacting public health, water resources, and essential services. The average length of the growing season could increase by up to 12 days per century in North Dakota.

According to the 2024-2029 ND Enhanced Mitigation Mission Area Operations Plan (MAOP), the expected impact of climate change on the 15 natural hazards and man-made threats detailed in this plan are outlined below.

- 1. Flood Hazard.** Future climate conditions are expected to produce increased precipitation across North Dakota, with winter and early spring precipitation expected to see the greatest increase, along with an increased risk of rainfall occurring during the traditional spring snowmelt period. In addition to increased precipitation during the cool/cold season, the number of days with strong thunderstorms and heavy rainfall is expected to increase by mid-century, especially in the eastern half of the state. Increased rainfall rates typically result in increased runoff rates and an increase in flash flooding, overland flooding, and/or riverine flooding in any season. However, rain occurring when the ground is frozen produces even more and faster runoff and is most likely to exacerbate the flood threat.
- 2. Fire (Wildland/Urban) Hazard.** Droughts are projected to increase in size, frequency, and duration. The expected increases in temperatures and frequency of droughts translate into an increase in the size, frequency, and intensity of both wildland and urban fires, with an added risk due to increasing development in the Wildland-Urban Interface. Also, water supplies used for fire suppression may become compromised during drought conditions. Total acres burned have markedly increased over the past 10-15 years, while rural fire departments across ND are largely staffed by volunteers. As the frequency and intensity of wildfires are projected to increase, volunteer fire departments are projected to lose personnel strength due to general rural population declines and/or staff retirements. These trends will likely stress unit resources and increase fire response times.
- 3. Drought Hazard.** Through the end of this century, expect larger and more intense droughts, with increasing frequency and/or longer duration of drought periods in North Dakota. Potential impacts include more episodes of extreme heat/heat index with increased human, animal, and crop stress; more rapid onset of drought conditions or flash drought; more drought related (both wind and rapid rainfall runoff) erosion, riverbank destabilization, etc.; reductions in overall agricultural economy. Drought impacts on vulnerable water users, such as the agriculture industry and municipal systems, will likely be exacerbated.

4. **Cyberattack Hazard.** There is no known direct connection between cyberattacks and future climate conditions, though attackers may take advantage of inclement weather periods and other social, infrastructure, or economic stressors to mask or otherwise facilitate their attacks.
5. **Severe Winter Weather.** Through the end of this century in North Dakota, expect larger, more frequent, and more intense periods of heavy wet snow, mixed precipitation or ice storms, and freezing drizzle or mist, with somewhat warmer temperatures. Potential Impacts include a likely increase in winter season precipitation, overall, along with more periods of heavy snowfall and/or freezing rain/ice events. Warmer winter season temperatures will support a higher incidence of mixed precipitation (sleet), freezing rain, or ice storms, which will likely impact transportation, power transmission, roof loading, critical facilities, and infrastructure, along with general health and safety. Human health impacts include an increased incidence of heart, back, and/or muscle related injuries from shoveling snow or falling on ice.
6. **Severe Summer Weather.** Through the end of this century in North Dakota, expect more frequent, larger, and longer duration storms with an increase in intense rain and flooding, and an increase in large hail. Potential Impacts include an expected increase (high confidence) in heavy precipitation events overall, higher in NC and NE ND and somewhat lesser in SW ND, with a likely increase in areal and/or flash flooding but less certain impacts on summertime riverine flooding. Hail size, frequency of large hail, and length of the hail season should increase (medium confidence) with a commensurate increase in the frequency and intensity of lightning and damaging downburst winds which are tied to hail production. Expected increases in temperature are likely to lead to an increase in days with a high Heat Index and the potential for lost workhours during such periods.
7. **Tornadoes.** Through the end of this century in North Dakota, expect more frequent, larger, and longer duration thunderstorms with an increase in intense rain and flooding, and an increase in relative size (areal coverage) of the impact areas of any corresponding tornadoes. Not necessarily more intense tornadoes, but tornadoes with a larger damage footprint.
8. **Infectious Disease and Pest Infestation.** North Dakota should expect larger, more frequent, and more intense outbreaks of certain infectious diseases and pests, though some human and animal diseases may also decrease in occurrence. As a result of slightly warmer and longer summers, more pests and invasive weeds will be able to thrive and spread, contributing to increases in insect populations such as *Emerald Ash Borers* and *Elm Bark Beetles*, or certain vector-borne diseases such as *Dutch Elm Disease Spores* or *West Nile Disease*. Somewhat shorter and less cold winter seasons could also lead to decreased incidents of certain infectious diseases among both human and animal populations during this period, depending on how and where population growth (or withdrawal) and development occur.
9. **Dam Failure Hazard.** The expected increase in size, intensity, and frequency of both drought and heavy precipitation episodes, or an increased frequency in change between drought and flood intervals may put more dams at risk of scenarios that exceed the original design criteria of each respective dam. Aging dams are most at risk for this expected impact.

- 10. Space Weather.** Through the end of this century in North Dakota, future climate conditions are not expected to directly impact the occurrence of space weather events, though indirectly the Extent, Intensity, and Frequency of hazard related impacts could potentially be increased. Indirectly, if extreme climate variability and/or climate change begin to stress area power grids, satellite and terrestrial communications infrastructure, and other critical facilities then there is a potential for increased (compounding) impacts from any concurrent Space Weather Hazard phenomena in these and related areas.
- 11. Hazardous Material Release.** Although this hazard is largely human-caused, future climate conditions may cause both direct and indirect impacts. Warmer temperatures may directly result in the expansion of gases, increases in biologic agents, or other such actions that could put hazardous material storage containers, transporters, applicators (i.e., anhydrous), or facilities at an increased risk. Increased summer and winter storms, wildfires, floods, transportation incidents, etc. could indirectly put hazardous material containers, transports, applicators (i.e., anhydrous), or facilities at an increased risk.
- 12. Geologic Hazard.** Through the end of this century in North Dakota, expect more frequent, larger, and more intense geologic hazards, such as landslides, riverbank collapse, sink holes, and expansive (clay) soils. Both Drought and Heavy Precipitation events are projected to occur more frequently, which is expected to contribute to an increased frequency of expansive soils alternately cracking and swelling, landslides where steep slopes are present, or to riverbank collapse where undercutting due to subsoil flow and/or antecedent flooding is possible. Both extremes also increase the potential for wind and water erosion. Increased development pressure and the impacts of future climate conditions may increase the risk to a variety of state infrastructure and assets if constructed or situated in areas prone to geologic hazards.
- 13. Criminal, Terrorist or Nation-State Attack Hazard (Active Threat).** There is no known direct connection between future climate conditions and the location, extent, intensity, or duration of specific adversarial threats, though indirect connections are possible. For instance, future climate would not necessarily promote or prevent a specific threat, while a specific weather episode may help to delay or advance such actions. And Increased heat stress, along with increased summer and winter storms, wildfires, floods, transportation incidents, etc. could increase social unrest, which could encourage increased criminal and/or adversarial threats.
- 14. Civil Disturbance.** There is no known direct connection between future climate conditions and civil disturbance, though some research links the effects of climate change anxiety to an increasing intensity of civil disturbance in a variety of developing and developed countries. And research shows that increased heat stress, along with increased summer and winter storms, wildfires, floods, transportation incidents, etc. could increase social unrest, which could encourage general civil unrest. Likewise, there is an increased risk of civil disturbances targeted toward the oil and gas industry in North Dakota from growing public concern over potential impacts of climate change.

### B.3.3. Other Potential Impacts

In addition to the above identified direct and indirect impacts of future climate conditions on the identified major hazards areas, there are other potential societal impacts which include:

- Increase in demand for energy during the summer (air conditioning).
- Decrease in demand for energy during the winter (heating).
- Decrease in culturally significant animal and plant life in tribal communities.

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