2024 McHenry County, N.D.
Multi-Jurisdictional
Multi-Hazard
Mitigation Plan

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1. Introduction – McHenry Conty, N.D. Multi-Jurisdictional Multi-Hazard Mitigation Plan

Executive Summary

The updating of the McHenry County, N.D. Multi-Jurisdictional Multi-Hazard Mitigation Plan (MHMP) was conducted over a nine-month period. It included the review of natural hazards and man-made threats, risks, vulnerabilities, mitigation capabilities, and resulting mitigation actions for McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire. The review of natural hazard and man-made threat impacts to the county is ongoing by county officials, as are the efforts to reduce and/or eliminate losses.

The planning process and this plan allow the county residents, businesses, stakeholders, and federal and state agencies to have input and to identify actions to assure the safety and protection of people and property. A mitigation survey was conducted during the planning process.

A total of 300 responses were received.

The natural hazards and man-made threats profiled in this mitigation plan include:

- Civil Disturbance
- Criminal, Terrorist, or Nation/State Attack
- Cyberattack
- Dam Failure
- Drought
- Fire (Urban/Structure & Wildland)
- Flood (Overland & Riverine)
- Geologic Hazards
- Hazardous Material Release
- Infectious Disease & Pest Infestations – Animal, Human & Plant
- Severe Summer Weather
- Severe Winter Weather
- Space Weather
- Transportation Incident

Mitigation Projects

To assist in the use, implementation, and updating of this document, the plan includes the federal and state plan approval letters and plan review of this update, and the adoption letters from each of the jurisdictions are included in this document. The chapters and appendices provide a history of the data reviewed and analyzed in the production process of the plan.

The McHenry County, N.D. Multi-Jurisdictional Multi-Hazard Plan develops a mitigation strategy consisting of seven goals and mitigation projects based on an assessment of risks.

A total of 35 projects were identified for McHenry County, North Dakota. Of the 35 projects, four are specific to the city of New Rockford and two are specific to the city of Sheyenne. The remaining projects address the county and all incorporated jurisdictions and unincorporated jurisdictions. The cities of New Rockford and Sheyenne also have five and one specific mitigation projects aside from the county's 35 mitigation projects.

Mitigation Goals

The following are the seven goals that were reviewed, updated, and approved based on the risk assessment conducted and participation at meeting during the planning process:

- **Goal 1: Strengthen and Expand Administrative and Technical Capabilities.**
- **Goal 2: Strengthen and Expand Education and Outreach capabilities.**
- **Goal 3: Strengthen and Expand Financial Capabilities.**
- **Goal 4: Strengthen and Expand Planning and Regulatory Capabilities.**
- **Goal 5: Reduce and/or Eliminate the Impacts of, and Vulnerabilities to, Natural Hazards and Man-Made Threats.**
- **Goal 6: Improve the Resiliency of Critical Facilities and Infrastructure.**
- **Goal 7: Provide Places of Refuge and Early Warning Systems for the Public and Underserved and/or Vulnerable Populations to Take Protective Action During Hazardous Incidents.**

Incorporated Jurisdictions

The impact and other issues from natural hazards and man-made threats vary between incorporated cities. Based on information gathered at each jurisdictional meeting, a problem statement was formed to summarize the needs of the community. The problem statement for McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire, are as follows.

McHenry County, North Dakota

McHenry County, North Dakota, can be impacted by civil disturbance; criminal, terrorist, or nation/state attack; cyberattack; drought; fire (urban and wildland); flood (overland); geology hazards; hazardous material release; infectious disease and pest infestations; severe summer weather; severe winter weather; space weather, and transportation incident. Flooding causes annual damage to property due to the presence of high-water tables, inadequate drainage, closed basins, and the source of the Sheyenne River located in neighboring Wells County. Economic loss to the agriculture and livestock industry occurs on a frequency basis. Critical facilities in the county and incorporated jurisdictions need generators for backup power and upgraded emergency alerting. The county needs to retrofit existing or construct new storm shelters. The county has planning and regulatory, administrative and technical, education and outreach, financial, and planning and regulatory capabilities to accomplish mitigation. However, these capabilities need to be improved and expanded. The county relies on outside sources for funding and to accomplish large-scale mitigation projects.

Improvement and expansion of mitigation capabilities; upgrading of sirens, equipment, and installation of generators; construction of flood control measures; and upgrading of critical facilities and infrastructure are a priority for the county.

City of Anamoose, North Dakota

The city of Anamoose, North Dakota, can be impacted by civil disturbance; criminal, terrorist, or nation/state attack; cyberattack; drought; fire (urban and wildland); flood (overland); geologic hazards; hazardous material release; infectious disease and pest infestations; severe summer weather; severe winter weather; space weather, and transportation incident. The city lacks permanent and/or portable backup generators for the lift station but has backup generators at the Anamoose Public School, fire hall, and North Prairie Rural Water District operations building. The city has an outdoor early warning siren. There is inadequate storm shelter capacity, especially for low-income residents. Local emergency services need upgraded equipment and lack adequate volunteers.

The city lacks funding for mitigation projects. With little to no capabilities to accomplish major projects independently, the city is dependent on outside sources for mitigation.

Retrofitting/upgrading of the sanitary sewer wastewater system, installation of backup power sources for the lift station, upgrade and/or expand storm sheltering capabilities, and education and outreach are a priority for the city.

City of Anamoose, North Dakota, Mitigation Priority Expansion/Update

The 2024 McHenry County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan reflects a change in mitigation priority for the city of Anamoose, North Dakota, that includes pursuing grant funding to implementation of necessary sanitary sewer and/or wastewater lagoon system retrofits/upgrades.

City of Velva, North Dakota

The city of Velva, North Dakota, can be impacted by civil disturbance; criminal, terrorist, or nation/state attack; cyberattack; drought; fire (urban and wildland); flood (overland); geologic hazards; hazardous material release; infectious disease and pest infestations; severe summer weather; severe winter weather; space weather, and transportation incident. The city experienced a major flood in 2011 that resulted in a near failure of the temporary diking system. The drinking/potable water and sanitary sewer wastewater system is impacted by severe summer weather (heavy precipitation), which results in geologic hazards causing water mains and sewer pipes to break causing utility outages. The city lacks permanent and/or portable backup generators for the following critical facilities and infrastructure: Velva Ambulance/Fire Hall, Velva Public School, lift stations, and the water treatment plant. There is inadequate storm shelter capacity and an outdated outdoor early warning system consisting of two manually-activated sirens. Local emergency services need upgraded equipment and facilities. The city has a large young population with 30.9 percent being under the age of 20. Approximately 3.4 percent of the population lives below the poverty line. It is estimated by the Velva City Council that 50 percent of the city's workforce commutes to Minot, North Dakota, for employment and has transitioned into a bedroom community.

The city lacks funding for mitigation projects. With little to no capabilities to accomplish major projects independently, the city is dependent on outside sources for mitigation.

Retrofitting/upgrading of existing infrastructure (Velva underpass, drinking/potable water, and sanitary sewer wastewater system), installation of permanent backup power sources, upgrade manually-activated

outdoor emergency sirens and alerting notifications, upgrade and expand storm shelters (specific attention paid to people under the age of 20), expansion of planning and regulatory capabilities, and education and outreach are a priority for the city.

City of Velva, North Dakota, Mitigation Priority Expansion/Update

The 2024 McHenry County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan reflects no change in mitigation priority for the city of Velva, North Dakota.

City of Voltaire, North Dakota

The city of Voltaire, North Dakota, can be impacted by civil disturbance; criminal, terrorist, or nation/state attack; cyberattack; drought; fire (urban and wildland); flood (overland); geologic hazards; hazardous material release; infectious disease and pest infestations; severe summer weather; severe winter weather; space weather, and transportation incident. The city is positioned at an elevation that allows for drainage of runoff without any occurrences of overland flooding. City residents obtain drinking/potable water from individua wells and utilize septic systems for sanitary sewer purposes. The city does not have any critical facilities or infrastructure and does not have any emergency services. The city lacks an outdoor early warning system in city limits but receives early warning for a siren at nearby industries. The Voltaire City Council stated that no businesses are in city limits and that residents commute to Velva, Minot, and other areas for employment.

The city lacks funding for mitigation projects. With little to no capabilities to accomplish major projects independently, the city is dependent on outside sources for mitigation.

Education and outreach are a priority for the city.

City of Voltaire, North Dakota, Mitigation Priority Expansion/Update

The 2024 McHenry County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan reflects no change in mitigation priority for the city of Voltaire, North Dakota.

Background

The first McHenry County, N.D. Multi-Jurisdictional Multi-Hazard Mitigation Plan (MHMP) was developed and received approval from the Federal Management Agency (FEMA) in 2010. This plan update is the third update to the mitigation plan for McHenry County, North Dakota.

The MHMP Steering Committee understands that the plan must be dynamic and detailed to include the specific risks of threats and hazards to the county and its jurisdictions. Improvements, updates, and revisions will be made constantly to assure this plan continues to mitigate the potential losses and damages that can impact people and property in McHenry County, North Dakota.

Purpose

As defined by the Disaster Mitigation Act of 2000, hazard mitigation is any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards. The Act of 2000 was an amendment to the Robert T. Stafford Disaster Relief and Emergency Assistance to authorize a program

for pre-disaster mitigation, to streamline the administration of disaster relief, to control the Federal costs of disaster assistance, and for other purposes.

According to a study by the National Institute for Building Standards, pre-disaster mitigation saves an average of $6.54 for every $1.00 spent. Additionally, the Pew Research Center recently identified that North Dakota saves an average of $6.55 for every $1.00 spent on mitigation projects. Mitigation can range from infrastructure projects such as raising of roads, burying of power lines, or installation of generators for critical facilities and infrastructure, to public education and outreach programs.

The purpose of this plan is to fulfill federal, state, and local hazard mitigation planning responsibilities; to promote pre- and post-disaster mitigation measures, short and/or long range strategies that minimize suffering, loss of life, and damage to property resulting from hazardous or potentially hazardous conditions to which citizens and institutions within the county are exposed; to improve quality of life; and to eliminate or minimize conditions which would have an undesirable impact on our citizens, the economy, environment, and well-being of the counties.

Objective

The objective of this plan is to establish a methodical process to assist in hazard and threat identification, impact evaluation, and action plan development to decrease the impacts from natural hazards and man-made threats where possible and to protect lives and property. Additionally, impacts from natural hazard and man-made threats may be exacerbated by the extreme climate variability and expected increase in temperatures or likely increases in precipitation through this century.

Scope

The scope of the McHenry County, N.D. Multi-Jurisdictional Multi-Hazard Mitigation Plan is countywide. The plan is not necessarily limited to federal, state, or locally declared disasters or emergencies. Any time situations or incidents occur that produce a requirement for mitigation actions, activities, and strategies, etc.; they will be developed and incorporated into the McHenry County, N.D. Multi-Jurisdictional Multi-Hazard Mitigation Plan.

2. Planning Process

The planning process chapter outlines how the plan was updated to meet mitigation planning requirements. The chapter summarizes all steering committee, and hazard/threat meetings, and jurisdictional workshops.

No need for anyone to worry about this chapter other than the plan contractor.

I got this.

Carry on.

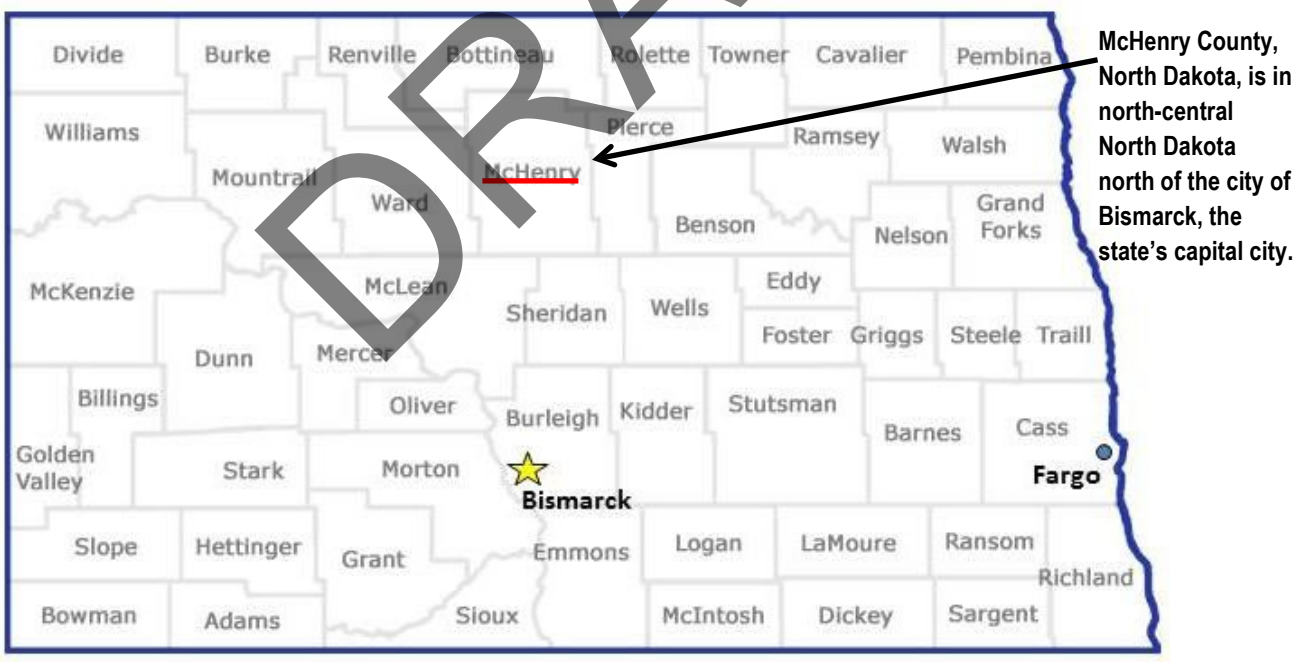
3. County and Jurisdictions Profile and Inventory

McHenry County, North Dakota, and Incorporated Jurisdictions Overview

McHenry County, North Dakota, is in north-central North Dakota and is the 9th largest county in total land area of the 53 counties in the state encompassing 1,912 square miles. Of the 1,912 square miles, approximately 1,864.2 square miles of it is land areas (96.22 percent) and 47.8 square miles (2.5 percent) is water surface area. The 2020 population of the county is 5,345people and has a population density of 1.3 people per square mile. A general map of the county showing jurisdiction locations, transportation routes, airports and bodies of water can be found in Chapter 9, Maps.

McHenry County, North Dakota, is bordered on the north by Bottineau County, on the east by Pierce County, on the south by Sheridan County, on the southwest by McLean County, on the west by Ward County and on the northwest by Renville County. U.S. Highways 2 and 52 are major trade routes traversing the county. U.S. Highway 2 consists of two segments connections by carious roadways in southern Canada. The western segment of U.S. Highway 2 begins at its interchange with Interstate 5 in and State Route 529 in Everett Washington, and terminates at Interstate 75 in St. Ignace, Michigan. The eastern segment of U.S. Highway 2 begins at U.S. Highway 11 in Rouses Point, New York and terminates at Interstate 95 in Houlton, Maine. U.S. Highway 52 extends from a northwestern terminus in Portal, North Dakota to a southeast terminus in Charleston, South Carolina. N.D. Highways traversing McHenry County, North Dakota 14, 19, 41, 53, and 97.

Figure 3.1 – Location of McHenry County, North Dakota, in the State of North Dakota



There are forty-five (45) townships in McHenry County, North Dakota. The townships, listed in alphabetical order, include: Anamoose, Balfour, Bantry, Bantry, Berwick, Bjornson, Brown, Cottonwood Lake, Deep River, Deering, Denbigh, Egg Creek, Falsen, Gilmore, Granville, Grilley, Hendrickson, Karlsruhe, Kottke Valley, Lake George, Lake Hester, Land, Layton, Lebanon, Little Deep, Meadow,

Mouse River, Newport, Normal, North Prairie, Norwich, Odin, Olivia, Pratt, Riga, Rose Hill, Round Lake, Saline, Schiller, Spring Grove, Strege, Velva, Villard, Voltaire, Wager, and Willow Creek.

The following jurisdictions in McHenry County, North Dakota, are unincorporated: Berwick, Cole Ford, Denbigh, Funston, Genoa, Guthrie, Kottkethal, Milroy, Newport, Norfolk, Norwich, Rangeley, Riga, Rising, Rose Hill, Simcoe, Verendrye, Willowdale, Willow Vale, Willow Valley, and Willow Creek.

A map of McHenry County, North Dakota, is shown in Chapter 9, Maps.

Climate and Geography

Information on climate, geology, and natural resources of McHenry County, North Dakota, are provided in the following section.

The monthly average temperature, monthly average maximum temperature, monthly average minimum temperature, and average total precipitation are shown for McHenry County, North Dakota, in Table 3.1. The monthly averages are based on information collected between 1991 and 2020 by the High Plains Regional Climate Center. The average temperature ranges from 7.69 degrees in January to 80.61 degrees in July. Average total precipitation ranges from approximately 0.52 inches in February to 3.78 inches in June. The range of average maximum and minimum temperatures are also shown in the table.

Table 3.1 – 1991 to 2020 McHenry County, North Dakota, Average Monthly Climate Summaries

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg. Temp (F)	7.69	11.90	24.55	40.27	53.69	63.39	68.44	67.08	57.18	42.53	26.48	13.52
Average Max. Temp (F)	17.76	22.46	34.98	52.56	66.14	74.92	80.61	80.58	70.54	54.51	36.39	22.94
Average Min. Temp (F)	-2.42	1.29	14.04	27.87	40.94	51.76	56.16	53.48	43.71	30.46	16.49	4.04
Average Total Precip. (in.)	0.55	0.52	0.70	1.11	2.58	3.78	2.76	2.14	1.67	1.44	0.85	0.69

Source(s): High Plains Regional Climate Center

McHenry County, North Dakota, has a sub-humid continental climate characterized by marked fluctuations in daily and seasonal maximum and minimum temperatures, and light to moderate precipitation. The precipitation tends to be irregular in occurrence, amount, and area of coverage. The inconsistency of the county's weather arises from the interaction of three major air masses which originate in distinct global regions: cold, dry air from the polar region; warm, moist air from the Gulf of Mexico; and cool, moist air from the northern Pacific. Both the temperature and the moisture characteristics of a northern Pacific air mass change as the air moves across the Rocky Mountains. The resulting air, which is usually mild and dry, reinforces the continental nature of the county's climate. The polar air mass tends to dominate the other two, but its influence is considerably lessened during the summer.

Normally the temperature is moderate until the beginning of July, after which short, hot periods are experienced until the end of August. The freeze-free period is the number of days between the average last occurrence of freezing temperatures in the spring and average first occurrence of 32 degrees or lower in the fall. The length of the freeze-free period approximates the length of the

growing season which ranges from 110 days to 129 days between May and September of every year. Topography and local weather conditions can produce subfreezing temperatures at the ground surface while the air temperature a few feet above the ground remains above 32 degrees.

Watersheds

Watersheds are basin-like landforms defined by highpoints and ridgelines that descend into lower elevations. The form of the land dictates the flow of water from all streams and rainfall to a common outlet such as the outflow of a reservoir, mouth of a bay, or any point along a stream channel. The hydrography of McHenry County, North Dakota, includes five watersheds. Table 3.2 summarizes information on the five watersheds and Figure 3.2 illustrates the geographic extent of the watersheds in McHenry County, North Dakota.

- The Deep Watershed includes west central and northwest McHenry County, North Dakota. The cities of Deering, Granville, and Upham are in this watershed.
- The Lower Souris Watershed traverses central McHenry County, North Dakota from north-to-south. The cities of Balfour, Bergen, Drake, Granville, Karlsruhe, Kief, Towner, Voltaire, and unincorporated Bantry and Denbigh in McHenry County, North Dakota, are in this watershed.
- The Moose Mountain Creek Souris River Watershed includes an extreme west-central portion of McHenry County, North Dakota. The city of Velva, North Dakota is just east of the terminus of this watershed in McHenry County, North Dakota.
- The Willow Watershed includes portions of extreme east-central and northeast McHenry County, North Dakota. There are no incorporated city jurisdictions in McHenry County, North Dakota, in this watershed.
- The Upper Sheyenne Watershed includes portions of extreme southeast and east-central McHenry County, North Dakota. The city of Anamoose is in this watershed.

Table 3.2 – McHenry County, North Dakota, Watersheds

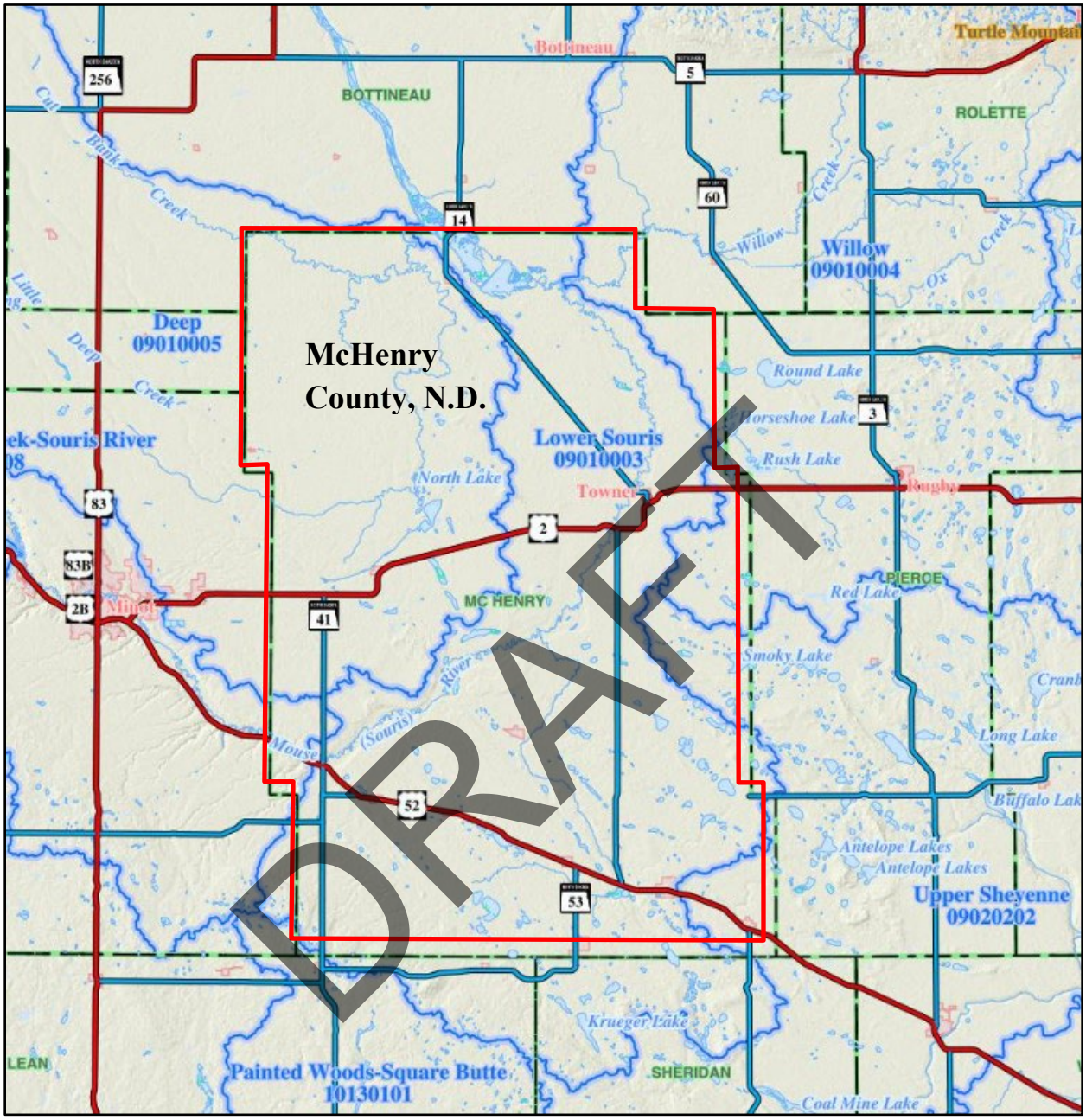
Watershed	Hydrologic Unit Code (HUC)	Square Miles*
Deep	09010005	1,685.00
Lower Souris	09010003	4,992.00
Moose Mountain Creek Souris River**	09010008	2,642.00
Willow	09010004	1,794.00
Upper Sheyenne	09020202	1,883.00

*Square miles shown are for the entirety of the watershed and does not represent the extent within McHenry County, North Dakota.

** Extends into Canada.

Source(s): N.D. Dept. of Water Resources; U.S. Geological Survey

Figure 3.2 – McHenry County, North Dakota, Watersheds



Source: N.D. Dept. of Water Resources

Demographics

Information on population and poverty for McHenry County, North Dakota, is provided in the following section.

Population

Population trends and projections for McHenry County, North Dakota, for the years 1990, 2000, and 2010, 2020, and estimates for 2022, were obtained through the U.S. Census Bureau-Decennial Census.

Population projections for 2030 were calculated through a combination of by applying previous decade population growth/decline statistics, and knowledge of local economic trends, to 2020 population statistics. Table 3.3 summarizes the population statistics for McHenry County, North Dakota. Statistics on population trends and projections are needed to understand the distribution of people across the county. These statistics also highlight where potential future needs will be for emergency services based on population distribution growth and density.

The population of McHenry County, North Dakota, has been declining for the past several decades despite efforts to create new businesses and new jobs. The decline in population is primarily due to mechanization of the agriculture sector and subsequent decreases in family size. Between 1990 and 2000, the county lost 8.3 percent of its population and an additional 9.9 percent between 2000 and 2010. However, decline is projected to slow in the future, with a recorded decrease of 0.9 percent through 2020, the lowest since the 1920s. With a resurgence in energy development in the western portion of North Dakota, jobs and support services for this industry will disperse geographically. Thus, population growth and an increase in job opportunities are likely to occur in McHenry County, North Dakota, through 2030, most likely in areas of the county along U.S. Highways 2 and 52.

Poverty

Table 3.3 – 1990 to 2030 McHenry County, North Dakota, Population Trends and Projections

Jurisdiction	1990	2000	2010	2020	Percent Change 2000 to 2010	Percent Change 2010 to 2020	Est.	Projections
							2022	2030
McHenry County	6,528	5,897	5,395	5,345	-9.9 percent	-0.9 percent	5,189	5,050
City of Anamoose	277	282	227	230	-19.5 percent	1.3 percent	219	233
City of Balfour	33	20	26	20	30.0 percent	-23.1 percent	15	12
City of Bergen	16	19	14	6	-36.4 percent	42.9 percent	6	4
City of Deering	99	118	98	94	-16.9 percent	4.1 percent	91	85
City of Drake	361	622	275	292	-14.6 percent	6.2 percent	282	300
City of Granville	236	286	241	240	-15.7 percent	0.4 percent	230	250
City of Karlsruhe	143	119	82	87	-31.1 percent	6.1 percent	85	75
City of Kief	24	13	13	8	0.0 percent	-38.5 percent	7	10
City of Towner	669	574	533	479	-7.1 percent	-10.1 percent	464	475
City of Upham	205	155	130	135	-16.1 percent	3.8 percent	131	120
City of Velva	968	1,049	1,084	1,086	3.3 percent	0.2 percent	1,064	1,110
City of Voltaire	63	51	40	46	-21.6 percent	15.0 percent	43	40
Remainder of Co.	3,434	2,589	2,632	2,622	1.7 percent	0.4 percent	2,552	2,336

Source(s): 2020 U.S. Decennial Census; American Community Survey; Maxfield Research; Nexus Planning & Consulting, LLC

4. Threat and Hazard Identification and Risk Assessment (THIRA)

McHenry County, North Dakota, has a history of damages to crops, livestock, people and property from natural hazards and man-made threats. The Steering Committee, county and city officials, and members of the public identified nine hazards and threats to be included in this plan because risk analysis showed that mitigation, planning, response, and preparedness would assist in limiting injury, loss of life, and loss of property. The following sections of this chapter detail the risk assessment and profile each natural hazard and man-made threat for McHenry County, North Dakota, and its incorporated jurisdictions.

The 14 natural hazards and man-made threats are:

- Civil Disturbance
- Criminal, Terrorist, or Nation/State Attack
- Cyberattack
- Dam Failure
- Drought
- Fire (Urban/Structure & Wildland)
- Flood (Overland & Riverine)
- Geologic Hazards
- Hazardous Material Release
- Infectious Disease & Pest Infestations – Animal, Human & Plant
- Severe Summer Weather
- Severe Winter Weather
- Space Weather
- Transportation Incident

McHenry County, North Dakota, history shows a high risk of damage from disasters. The North Dakota Presidential Disaster Declaration map in Figure 4.1 shows that North Dakota and McHenry County, North Dakota, are among areas in the nation with the most presidential disaster declarations in the past 50+ years.

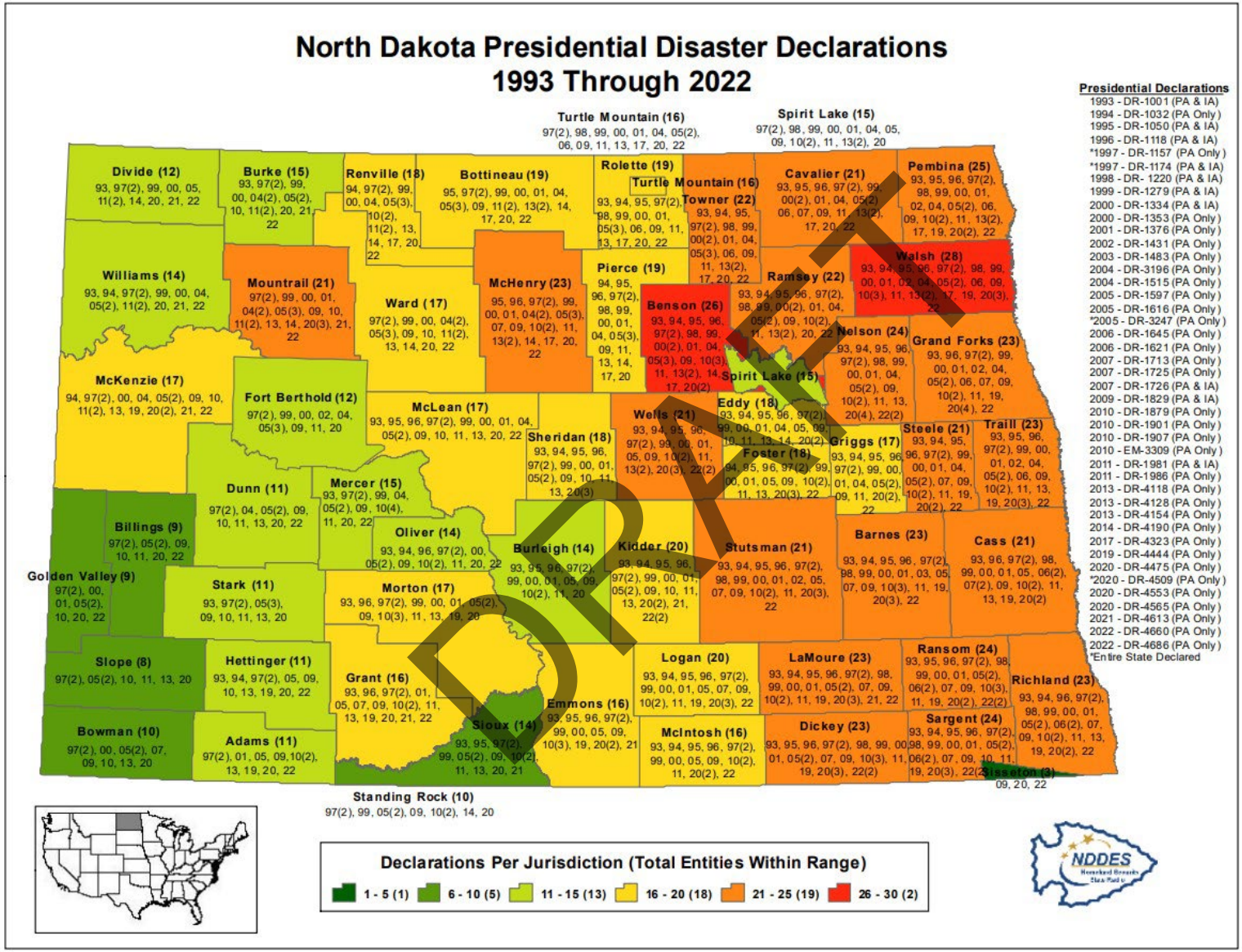
As indicated in Figure 4.1, McHenry County, North Dakota, parts of central North Dakota and the eastern third of North Dakota have had high frequencies of Presidential Disaster Declarations as shown by the dark shading of the counties. The frequency of declarations for severe storms and flooding highlights the need for continued mitigation in McHenry County, North Dakota, pertaining to these disasters. Between May 1, 1953, and March 1, 2024, the following declarations have occurred in McHenry County, North Dakota:

- McHenry County, North Dakota, has had 32 Presidential Disaster Declarations (Table 4.1), including declarations for blizzards, flooding, ground saturation, ice jams, severe storms, and snowmelt.

- Approximately 50.0 percent of the disaster declarations (16) have been flooding, and 81.3 percent of the disaster declarations (26) have occurred during the months of April, May, June, and July of any given year. These declarations highlight the level of losses experienced in McHenry County, North Dakota, and the value of mitigation to reduce and/or eliminate losses to people and property.

- No disaster declarations have been declared in McHenry County, North Dakota, during the months of February, October, or December.

Figure 4.1 – 1993 to 2022 North Dakota Presidential Disaster Declarations



Source(s): N.D. Dept. of Emergency Services (NDDES), Federal Emergency Management Agency (FEMA)

Table 4.1 – May 1, 1953, to March 1, 2024 -- McHenry County, North Dakota, Presidential Disaster Declarations

Year	Disaster Description/Title	Disaster No.
1966	Severe Storms & Flooding	220
1969	Flooding	256
1970	Severe Storms & Flooding	287
1974	Heavy Rains, Snowmelt & Flooding	434
1975	Flooding from Rain Events & Snowmelt	469
1976	Flooding	501
1979	Severe Storms, Snowmelt & Flooding	581
1995	Severe Storms, Flooding, and Ground Saturation	1050
1996	Severe Storms, Flooding, & Ice Jams	1118
1997	Severe Winter Storms and Blizzard Conditions	1157
1997	Severe Flooding, Severe Winter Storms, Snowmelt, Spring Rains	1174
1999	Severe Storms, Flooding, Snow, Ice Ground Saturation, Landslides, and Mudslides	1279
2000	Severe Storms, Flooding and Ground Saturation	1334
2001	Severe Storms, Flooding, & Ground Saturation	1376
2004	Snow	3196
2004	Severe Storms, Flooding, and Ground Saturation	1515
2005	Severe Storms, Flooding, and Ground Saturation	1597
2005	Hurricane Katrina Evacuation	3247
2005	Severe Winter Storm and Record and/or Near Record Snow	1616
2007	Severe Storms & Flooding	1713
2009	Severe Storms and Flooding	1829
2010	Severe Winter Storm	1901
2010	Flooding	1907
2011	Flooding	1981
2013	Severe Storms and Flooding	4118
2013	Flooding	4128
2014	Severe Storms and Flooding	4190
2017	Flooding	4323
2020	Biological	3477
2020	Biological	4509
2022	Severe Winter Storm & Flooding	4660
2023	Flooding	4717

Source: Federal Emergency Management Agency (FEMA)

Threat and Hazard Identification Risk Assessment (THIRA) Methodology

A risk assessment is process that collects information on the risk of natural hazards and man-made threats to incorporated jurisdictions, and assigns values to those risks to assist with:

1. Identifying and/or comparing courses of action
2. Developing priorities for future mitigation
3. Inform decision-making on creating a local mitigation strategy development

The risk assessment was conducted using the scoring and ranking process found on the following pages. Table 4.2 summarizes the risk assessment scoring of the natural hazards and man-made threats for

McHenry County, North Dakota, and incorporated jurisdictions, and is repeated in Chapter 8, Jurisdictions.

IMPACT is what damage or losses the hazard causes in a community.

Scored 1 Negligible – Minimal damage to jurisdiction infrastructure, people, and/or property
Scored 2 Limited – Noticeable damage to jurisdiction infrastructure, people, and/or property
Scored 3 Critical – Considerable damage to jurisdiction infrastructure, people, and/or property
Scored 4 Catastrophic – Substantial damage to jurisdiction infrastructure, people, and/or property

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FREQUENCY is how often the hazard occurs.

Scored 1 Never – history of events shows the hazard/threat has never occurred
Scored 2 Occasional – history of events shows the hazard/threat occurs every few years
Scored 3 Frequent – history of events shows the hazard/threat occurs once or twice annually
Scored 4 Very Frequent – history of events shows the hazard/threat is commonplace

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LIKELIHOOD is how probable it is that the hazard will happen.

Scored 1 Unlikely – No chance hazard/threat will occur
Scored 2 Possible – 25% chance hazard/threat will occur
Scored 3 Likely – 50% chance hazard/threat will occur
Scored 4 Highly likely – 100% chance hazard/threat will occur

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VULNERABILITY is the amount of:

1. vulnerable areas: mobile home neighborhoods, infrastructure, low-lying elevation, blocked roads
2. vulnerable population: individuals with special needs, day cares, elderly, care centers, and schools
3. resources: such as jurisdiction equipment, staff, plans, policies, services, and funding or lack thereof.

Who and what is affected? When? Identify specific areas of vulnerability. Who responds to the hazard/threat impact? What you have or lack: Equipment, vehicles, services available, shelters, buildings, and infrastructure

Scored 1 **No vulnerability:** No areas/populations and sufficient resources
Scored 2 **Moderate vulnerability:** Some areas/populations and various resources
Scored 3 **High vulnerability:** Areas/populations and little resources
Scored 4 **Very high vulnerability:** Numerous areas/populations and no resources

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CAPABILITY is the ability of jurisdictions to mitigate hazard with resources (i.e., buildings, infrastructure, equipment, personnel, plans, technical, financial/tax base). Capabilities are divided into four categories:

Scored 1 **No capability:** Little to no ability to implement mitigation actions
Scored 2 **Moderate capability:** Some abilities to implement mitigation actions
Scored 3 **High capability:** Sufficient abilities to implement mitigation actions
Scored 4 **Very high capability:** Exceptional abilities to implement mitigation actions

The formula to determine the total is: Impact plus Frequency plus Likelihood plus Vulnerabilities minus Capabilities equals Total. Higher total scores indicate more vulnerability, and lower scores indicate less vulnerability.

Table 4.2 – McHenry County, North Dakota, Jurisdiction Risk Assessment Scoring Summary

Risk Assessment			**Jurisdiction:**	**McHenry County, North Dakota**		
Hazard/Threat	Impact	Frequency	Likelihood	Vulnerability	Capabilities	**Total**
Civil Disturbance	4	1	5	5	2	**13**
Criminal, Terrorist or Nation-State Attack	4	3	5	5	2	**15**
Cyberattack	5	2	4	4	3	**12**
Dam Failure	5	1	2	3	2	**9**
Drought	5	4	4	3	4	**12**
Fire – Urban/Structure Collapse	5	2	3	4	2	**12**
Fire – Wildland (including Rural)	5	4	4	3	2	**14**
Flood	5	5	5	4	3	**16**
Geologic Hazards	5	2	5	3	2	**13**
Hazardous Material Release	5	3	5	5	3	**16**
Infectious Disease – Human	5	4	5	4	2	**16**
Infectious Disease – Animal & Plant	5	5	5	3	4	**14**
Severe Summer Weather	5	5	5	4	3	**16**
Severe Winter Weather	5	5	5	4	3	**16**
Space Weather	5	1	2	5	3	**10**
Transportation Incident	5	5	5	4	3	**16**

Risk Assessment			**Jurisdiction:**	**City of Anamoose, North Dakota**		
Hazard/Threat	Impact	Frequency	Likelihood	Vulnerability	Capabilities	**Total**
Civil Disturbance	4	2	2	2	1	**9**
Criminal, Terrorist, or Nation-State Attack	5	2	2	2	1	**10**
Cyberattack	5	3	4	3	2	**13**
Dam Failure	*NA*	*NA*	*NA*	*NA*	*NA*	***NA***
Drought	5	4	5	4	3	**15**
Fire – Urban/Structure Collapse	5	4	5	4	3	**15**
Fire – Wildland (including Rural)	5	4	5	4	3	**15**
Flood	2	2	2	2	4	**4**
Geologic Hazards	5	2	3	2	4	**7**
Hazardous Material Release	5	3	4	4	3	**13**
Infectious Disease & Pest Infestations	5	5	5	4	2	**17**
Severe Summer Weather	5	5	5	3	3	**15**
Severe Winter Weather	5	5	5	3	3	**15**
Space Weather	5	1	2	5	3	**10**
Transportation Incident	5	5	5	4	2	**17**

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 4.2 – McHenry County, North Dakota, Jurisdiction Risk Assessment Scoring Summary

Risk Assessment			**Jurisdiction:**	**City of Balfour, North Dakota**		
Hazard/Threat	Impact	Frequency	Likelihood	Vulnerability	Capabilities	**Total**
Civil Disturbance	4	1	1	1	1	**6**
Criminal, Terrorist, or Nation-State Attack	2	2	1	1	1	**5**
Cyberattack	3	1	1	2	2	**5**
Dam Failure	*NA*	*NA*	*NA*	*NA*	*NA*	***NA***
Drought	4	3	4	4	1	**14**
Fire – Urban/Structure Collapse	4	2	3	4	1	**12**
Fire – Wildland (including Rural)	5	2	3	4	1	**13**
Flood	4	2	2	4	1	**11**
Geologic Hazards	4	1	1	2	1	**7**
Hazardous Material Release	5	2	3	4	1	**13**
Infectious Disease & Pest Infestations	5	5	5	2	1	**16**
Severe Summer Weather	5	5	5	3	1	**1**
Severe Winter Weather	5	5	5	3	1	**17**
Space Weather	2	1	2	2	1	**6**
Transportation Incident	5	2	2	4	1	**12**

Risk Assessment			**Jurisdiction:**	**City of Bergen, North Dakota**		
Hazard/Threat	Impact	Frequency	Likelihood	Vulnerability	Capabilities	**Total**
Civil Disturbance	4	1	1	1	1	**6**
Criminal, Terrorist, or Nation-State Attack	2	2	1	1	1	**5**
Cyberattack	3	1	1	2	2	**5**
Dam Failure	*NA*	*NA*	*NA*	*NA*	*NA*	***NA***
Drought	4	3	4	4	1	**14**
Fire – Urban/Structure Collapse	5	2	3	4	1	**13**
Fire – Wildland (including Rural)	5	2	3	4	1	**13**
Flood	3	2	2	2	1	**8**
Geologic Hazards	4	1	1	2	1	**7**
Hazardous Material Release	5	2	2	2	1	**7**
Infectious Disease & Pest Infestations	5	5	5	2	1	**16**
Severe Summer Weather	5	5	5	2	1	**16**
Severe Winter Weather	5	5	5	2	1	**16**
Space Weather	2	1	2	2	1	**6**
Transportation Incident	3	2	2	2	1	**8**

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 4.2 – McHenry County, North Dakota, Jurisdiction Risk Assessment Scoring Summary

Risk Assessment			**Jurisdiction:**	**City of Deering, North Dakota**		
Hazard/Threat	Impact	Frequency	Likelihood	Vulnerability	Capabilities	**Total**
Civil Disturbance	5	1	2	5	4	**9**
Criminal, Terrorist, or Nation-State Attack	5	1	2	5	4	**9**
Cyberattack	5	1	2	3	2	**9**
Dam Failure	*NA*	*NA*	*NA*	*NA*	*NA*	***NA***
Drought	5	4	5	5	1	**18**
Fire – Urban/Structure Collapse	4	3	2	3	3	**9**
Fire – Wildland (including Rural)	5	4	5	5	2	**17**
Flood	3	3	5	4	2	**12**
Geologic Hazards	5	2	2	2	4	**7**
Hazardous Material Release	5	1	2	2	4	**6**
Infectious Disease & Pest Infestations						
Severe Summer Weather	5	5	5	4	5	**14**
Severe Winter Weather	5	5	5	4	5	**14**
Space Weather	5	1	2	4	3	**7**
Transportation Incident	5	4	4	3	3	**13**

Risk Assessment			**Jurisdiction:**	**City of Drake, North Dakota**		
Hazard/Threat	Impact	Frequency	Likelihood	Vulnerability	Capabilities	**Total**
Civil Disturbance	4	2	3	3	2	**10**
Criminal, Terrorist, or Nation-State Attack	4	2	3	3	2	**10**
Cyberattack	5	3	4	3	2	**13**
Dam Failure	*NA*	*NA*	*NA*	*NA*	*NA*	***NA***
Drought	5	4	5	5	1	**18**
Fire – Urban/Structure Collapse	5	2	3	2	3	**9**
Fire – Wildland (including Rural)	5	5	5	3	3	**15**
Flood	2	2	2	2	4	**4**
Geologic Hazards	5	2	2	2	4	**7**
Hazardous Material Release	5	2	4	5	2	**14**
Infectious Disease & Pest Infestations	5	5	5	4	3	**16**
Severe Summer Weather	5	5	5	3	4	**14**
Severe Winter Weather	5	5	5	3	4	**14**
Space Weather	5	1	2	5	3	**8**
Transportation Incident	5	3	4	4	2	**14**

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 4.2 – McHenry County, North Dakota, Jurisdiction Risk Assessment Scoring Summary

Risk Assessment			**Jurisdiction:**	**City of Granville, North Dakota**		
Hazard/Threat	Impact	Frequency	Likelihood	Vulnerability	Capabilities	**Total**
Civil Disturbance	4	5	4	5	2	**16**
Criminal, Terrorist, or Nation-State Attack	4	5	4	5	2	**16**
Cyberattack	5	3	5	2	2	**13**
Dam Failure	*NA*	*NA*	*NA*	*NA*	*NA*	***NA***
Drought	5	4	5	3	2	**15**
Fire – Urban/Structure Collapse	5	2	3	3	2	**11**
Fire – Wildland (including Rural)	5	4	5	4	2	**16**
Flood	2	3	4	2	2	**9**
Geologic Hazards	5	2	3	2	2	**10**
Hazardous Material Release	5	2	3	5	1	**14**
Infectious Disease & Pest Infestations	5	5	5	3	2	**16**
Severe Summer Weather	5	5	5	3	2	**16**
Severe Winter Weather	5	5	5	5	2	**18**
Space Weather	5	2	2	5	2	**13**
Transportation Incident	5	4	5	5	3	**16**

Risk Assessment			**Jurisdiction:**	**City of Karlsruhe, North Dakota**		
Hazard/Threat	Impact	Frequency	Likelihood	Vulnerability	Capabilities	**Total**
Civil Disturbance	5	1	1	4	2	**9**
Criminal, Terrorist, or Nation-State Attack	5	1	1	4	2	**9**
Cyberattack	3	1	2	2	1	**7**
Dam Failure	*NA*	*NA*	*NA*	*NA*	*NA*	***NA***
Drought	4	3	4	3	3	**11**
Fire – Urban/Structure Collapse						
Fire – Wildland (including Rural)						
Flood						
Geologic Hazards	4	2	2	2	2	**8**
Hazardous Material Release						
Infectious Disease & Pest Infestations	5	5	5	3	3	**15**
Severe Summer Weather	5	5	5	3	3	**15**
Severe Winter Weather	5	1	2	5	2	**11**
Space Weather	5	1	2	5	2	**11**
Transportation Incident						

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 4.2 – McHenry County, North Dakota, Jurisdiction Risk Assessment Scoring Summary

Risk Assessment			**Jurisdiction:**	**City of Kief, North Dakota**		
Hazard/Threat	Impact	Frequency	Likelihood	Vulnerability	Capabilities	**Total**
Civil Disturbance	4	1	1	3	1	**8**
Criminal, Terrorist, or Nation-State Attack	4	1	1	3	1	**8**
Cyberattack	4	1	1	2	1	**7**
Dam Failure	*NA*	*NA*	*NA*	*NA*	*NA*	***NA***
Drought	4	3	4	3	3	**11**
Fire – Urban/Structure Collapse						
Fire – Wildland (including Rural)						
Flood						
Geologic Hazards	4	2	2	2	2	**8**
Hazardous Material Release						
Infectious Disease & Pest Infestations	5	5	5	3	3	**15**
Severe Summer Weather	5	5	5	3	3	**15**
Severe Winter Weather	5	1	2	5	2	**11**
Space Weather	5	1	2	5	2	**11**
Transportation Incident						

Risk Assessment			**Jurisdiction:**	**City of Towner, North Dakota**		
Hazard/Threat	Impact	Frequency	Likelihood	Vulnerability	Capabilities	**Total**
Civil Disturbance	5	2	2	3	2	**10**
Criminal, Terrorist, or Nation-State Attack	5	2	2	3	2	**10**
Cyberattack	5	2	3	3	3	**10**
Dam Failure	*NA*	*NA*	*NA*	*NA*	*NA*	***NA***
Drought	5	4	5	5	3	**16**
Fire – Urban/Structure Collapse	4	2	3	3	2	**10**
Fire – Wildland (including Rural)	5	2	3	3	2	**11**
Flood	4	2	2	3	2	**9**
Geologic Hazards	4	2	2	2	2	**8**
Hazardous Material Release	5	3	4	5	3	**14**
Infectious Disease & Pest Infestations	5	3	5	3	3	**13**
Severe Summer Weather	5	5	5	3	3	**15**
Severe Winter Weather	5	5	5	3	3	**15**
Space Weather	5	1	2	5	2	**11**
Transportation Incident	5	3	5	3	2	**14**

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 4.2 – McHenry County, North Dakota, Jurisdiction Risk Assessment Scoring Summary

Risk Assessment			**Jurisdiction:**	**City of Upham, North Dakota**		
Hazard/Threat	Impact	Frequency	Likelihood	Vulnerability	Capabilities	**Total**
Civil Disturbance						
Criminal, Terrorist, or Nation-State Attack						
Cyberattack						
Dam Failure						
Drought						
Fire – Urban/Structure Collapse						
Fire – Wildland (including Rural)						
Flood						
Geologic Hazards						
Hazardous Material Release						
Infectious Disease & Pest Infestations						
Severe Summer Weather						
Severe Winter Weather						
Space Weather						
Transportation Incident						

Risk Assessment			**Jurisdiction:**	**City of Velva, North Dakota**		
Hazard/Threat	Impact	Frequency	Likelihood	Vulnerability	Capabilities	**Total**
Civil Disturbance	4	1	2	3	1	**9**
Criminal, Terrorist, or Nation-State Attack	4	1	2	3	1	**9**
Cyberattack	5	2	2	4	2	**11**
Dam Failure	5	1	1	5	3	**9**
Drought	5	2	5	3	3	**12**
Fire – Urban/Structure Collapse	5	2	2	2	2	**9**
Fire – Wildland (including Rural)	4	2	3	2	2	**9**
Flood	5	2	3	5	2	**13**
Geologic Hazards	4	3	4	4	1	**14**
Hazardous Material Release	4	2	4	4	2	**11**
Infectious Disease & Pest Infestations	5	4	5	3	2	**15**
Severe Summer Weather	5	5	5	3	2	**16**
Severe Winter Weather	5	5	5	3	2	**16**
Space Weather	5	1	2	5	1	**12**
Transportation Incident	4	2	4	3	2	**11**

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 4.2 – McHenry County, North Dakota, Jurisdiction Risk Assessment Scoring Summary

Risk Assessment			**Jurisdiction:**	**City of Voltaire, North Dakota**		
Hazard/Threat	Impact	Frequency	Likelihood	Vulnerability	Capabilities	**Total**
Civil Disturbance	5	1	1	3	1	**9**
Criminal, Terrorist, or Nation-State Attack	5	1	1	3	1	**9**
Cyberattack	2	1	2	2	1	**6**
Dam Failure	*NA*	*NA*	*NA*	*NA*	*NA*	***NA***
Drought	3	5	5	3	2	**14**
Fire – Urban/Structure Collapse	5	1	2	2	1	**9**
Fire – Wildland (including Rural)	5	2	3	5	1	**14**
Flood	2	2	2	2	1	**7**
Geologic Hazards	5	1	1	1	1	**7**
Hazardous Material Release	5	1	3	3	1	**11**
Infectious Disease & Pest Infestations	3	2	3	2	1	**9**
Severe Summer Weather	5	5	5	2	1	**16**
Severe Winter Weather	5	5	5	2	1	**16**
Space Weather	5	1	2	5	1	**12**
Transportation Incident	5	2	2	2	1	**10**

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

4.1 Civil Disturbance

Including events arising due to political grievances, economic disputes or social discord, terrorism, or foreign agitators.

Characteristics

Civil disturbance is activity from large groups, organizations, or distraught individuals with potentially disastrous or disruptive results.

Seasonal Pattern	None. Extreme winter weather can limit or eliminate activity altogether. More domestic activity during holidays.
Duration	Minutes/hours/days/weeks/months/potentially a year or more.
Speed of Onset	Little to no warning or several days/weeks.
Location	The total geographic extent of McHenry County, North Dakota. Most likely targeting critical facilities and infrastructure such as government facilities (city halls, courthouses, fire halls, public works, military operations), medical facilities, major employers, roads/highways, railroad infrastructure, or chemical and oil and gas infrastructure such as pipelines and Tier II Sites. • McHenry County Courthouse • Drake-Anamoose Public Schools • TGU Public Schools (Granville and Towner) • Velva Public School • First District Health Unit, McHenry County • Trinity Health, Velva Clinic • U.S. Highway 2/52 • N.D Highways 14, 19, 41, 53, and 97 • Tier II Sites • Alliance Natural Gas Pipeline • Prairie Rose Natural Gas Pipeline operated by Aux Sable • Enbridge Crude Oil Pipeline • Anhydrous plant near the city of Voltaire • Burlington Northern Santa Fe (BNSF) Railroad • Canadian Pacific (CP) Railway • Minot Air Force Base (AFB) and various missile/nuclear sites • Minot Air Force Base (AFB) Doppler Radar

For more information regarding civil disturbance please reference the **2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP).** The state plan can be accessed by following the electronic hyperlink or link to the N.D. Dept. of Emergency Services website:

2018 North Dakota Enhanced Mitigation Mission Area Operations Plan

https://www.des.nd.gov/planning

History

According to McHenry County Sheriff's Office and McHenry County Emergency Management, there are no incidents of civil disturbance occurring in McHenry County. However, the McHenry County Sheriff's Office did provide mutual aid during the Dakota Access Pipeline (DAPL) protest.

There has been no declared disaster/emergency pertaining to a civil disturbance in McHenry County.

Probability

The probability of a hazard or threat is how likely it will happen. Civil disturbances are hard to predict but are most probable at or near large venues and locations of significance such as stadiums, public schools, or government facilities like the McHenry County Courthouse. Due to McHenry County's proximity to the Minot AFB, numerous missile sites are located across the county. Military operations will contribute to an increase in probability of civil disturbance.

Profile meeting participants ranked the probability of civil disturbance as highly likely meaning that there is a 100 percent probability in the next year of an incident. The high probability ranking is linked to the county's proximity to the Minot AFB and missile/nuclear sites in the county's borders. It is likely a civil disturbance will occur at some point in the future in McHenry County and/or in North Dakota.

Extent/Magnitude

The extent/magnitude of a hazard or threat is expressed in the amount of damage or losses either caused or could occur in a community. Extent/magnitude of a civil disturbance can vary from a small protest at a government facility or health care clinic to large-scale at industrial sites, state capitols, or culturally sensitive areas. Due to McHenry County's proximity to the Minot AFB, numerous missile sites are located across the county. Military operations will contribute to an increase in the extent/ magnitude of civil disturbance if an incident did occur.

Profile meeting participants ranked the extent/magnitude of a civil disturbance as catastrophic meaning extreme/severe damage to jurisdiction infrastructure, people and/or property can occur. The extent/magnitude ranking is linked to the county's proximity to the Minot AFB and missile/nuclear sites in the county's borders.

Threat and Hazard Identification Risk Assessment (THIRA)

Table 4.1.1 shows the risk assessment as determined by individual jurisdictions, the Steering Committee, and meeting participants at the profile meeting for civil disturbance. The risk assessment methodology can be found in the beginning of Chapter 4, Threat and Hazard Identification Risk Assessment (THIRA). The total in Table 4.1.1 represents the sum of each jurisdiction's impact, frequency, likelihood, and vulnerability to a hazard/threat less the jurisdiction's capabilities to respond to the hazard/threat.

Table 4.1.1 – McHenry County, North Dakota, Civil Disturbance Risk Assessment Scored Chart Summary

Jurisdiction	Impact	Frequency	Likelihood	Vulnerability	Capabilities	Total

McHenry County	4	1	5	5	2	**13**
City of Anamoose						
City of Balfour						
City of Bantry						
City of Bergen						
City of Deering						
City of Drake						
City of Granville						
City of Karlsruhe						
City of Kief						
City of Towner						
City of Upham						
City of Velva						
City of Voltaire						

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 4.1.2 provides information on the specific impact, frequency, likelihood, vulnerability, and capability of civil disturbance in McHenry County. A list of impacts identified as commonplace for natural hazards and man-made threats regardless of the jurisdiction is shown at the beginning of Chapter 4, Threat and Hazard Identification Risk Assessment (THIRA).

Vulnerabilities to Publicly-Owned Buildings and Property

Publicly-owned buildings and property are vulnerable to civil disturbances as any government building can be targeted. Facilities supporting functions key to daily operations of the county and incorporated jurisdictions, such as the McHenry County Courthouse, McHenry County Highway Department shops, N.D. Dept of Transportation State Shops, public schools, or buildings supporting emergency services such as ambulance and fire halls, would be the most vulnerable to a civil disturbance. **The level of vulnerability depends on the activities performed or a level of security at a specific facility.**

A summary of publicly-owned buildings is provided in Chapter 3, Profile and Inventory.

Vulnerabilities of Critical Facilities and Infrastructure

Like publicly-owned buildings and property, the vulnerability of critical facilities and infrastructure to civil disturbance is imminent. Critical facilities such as the McHenry County Courthouse, McHenry County Highway Department shops, N.D. Dept of Transportation State Shops, ambulance and fire halls, and infrastructure such as electric power, water/wastewater facilities, and Tier II sites are vulnerable to the threat. In McHenry County, McHenry County's communication tower, electrical substations throughout the county, rural water infrastructure, municipal water wells and water treatment plants, cellular communication towers, and air force/military buildings are critical infrastructure and infrastructure vulnerable to civil disturbance.

Vulnerabilities to New and Future Development

Civil disturbances are hard to predict and, therefore, vulnerabilities to new and future development cannot be determined. However, large influxes of people in a short period of time into sparsely populated areas can be a source of civil disturbance and impact new development. New and future developments that are located at or adjacent to politically or culturally sensitive areas, near energy pipelines, or constructed near environmentally sensitive areas, may be targeted by a civil disturbance.

Data Limitations and Other Key Documents

Due to the confidentiality of information pertaining to civil disturbances, law enforcement agencies are limited in the ability to share detailed information about incidents.

This plan incorporates data from the following documents and information herein will be used in future updates.

- 2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP)
- 2023 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP)
- McHenry County, North Dakota, Commercial Animal Feed Operation Ordinance
- McHenry County, North Dakota, Courthouse Security Plan
- McHenry County, North Dakota, Evacuation Plan through McHenry County Emergency Management
- McHenry County, North Dakota, Local Emergency Operations Plan through McHenry County Emergency Management
- McHenry County, North Dakota, Mass Care Plan through First District Health Unit
- McHenry County, North Dakota, Shelter Plan through McHenry County Emergency Management
- McHenry County, North Dakota, Threat and Hazard Identification and Risk Assessment (THIRA)
- North Dakota Continuity of Operations Plan
- North Dakota Emergency Operations Plan, Civil Disturbance Annex
- North Dakota State Disaster Recovery Plan
- North Dakota State Preparedness Report (SPR)
- North Dakota Threat and Hazard Identification and Risk Assessment (THIRA)

Table 4.1.2 – McHenry County, North Dakota, Civil Disturbance Risk Assessment

Impact	• Blocked Roads • Business Interruptions • Delayed Emergency Response • Financial Hardship/Strain (public and private) • HAZMAT Release – Tier II Sites or transportation vehicles • Human Injury/Death • Increased Public Safety Runs	• Loss/Overcrowded Medical Facilities • Loss of Potable Water • Loss of Power • Mass Casualties/Fatalities • Property Damage (Structure) • Property Damage (Vehicle)
Frequency	•	
Likelihood	More Likely • Increasing hostility/turmoil directed at the energy industry • Increasing political turmoil at all levels of government • Social discord from the COVID-19 and social media • **Presence of Tier II Sites and pipelines** • **CP and BNSF railroads** • **U.S. Highways 2/52, & N.D. Highways** 14, 19, 41, 53, and 97 • Minot Air Force Base (AFB) and various missile sites • Minot Air Force Base (AFB) Doppler Radar is 11 miles east of the city of Deering.	Less Likely • Sparse population and rural area of the state/country • County not located near a major metropolitan population, international airport, stadiums, or significant tourist attraction • Lack of major television station in McHenry County • No interstate highway
Vulnerability	More Vulnerable • Increasing hostility/turmoil directed at the energy industry • Increasing political turmoil at all levels of government • Social discord from the COVID-19 and social media • **Funding of extreme groups by "Dark Money" from billionaires/crowd-funding websites** • **Limited law enforcement in rural areas of county** • **Inadequate mental health services in county/state** • **Presence of Tier II Sites and pipelines** • **CP and BNSF Railroad** • **U.S. Highways 2/52, & N.D. Highways 14, 19, 41, 53, and 97**	Less Vulnerable • Sparse population and rural area of the state/country • County not located near a major metropolitan population, international airport, stadiums, or significant tourist attraction • Lack of major television station in McHenry County • Minor energy pipeline traversing the county • No interstate highway • McHenry County Sheriff's Office • N.D. State and Local Intelligence Center (SLIC) • Civic participation by location population in neighborhood watch-like activities reporting suspicious behavior

	• Minot Air Force Base (AFB) and various missile sites • Minot Air Force Base (AFB) Doppler Radar is 11 miles east of the city of Deering.	• The courthouse and public schools have cameras and door locking systems
Capability	• See Chapter 7 for a list of capabilities to address civil disturbance.	

4.2 Criminal, Terrorist, or Nation/State Attack

Including armed assault, biological, chemical, explosive, food/food production, nuclear, radiological, and vehicular attacks.

Characteristics

Any intentional adversarial human-caused incident, domestic or international, that causes mass casualties, large economic losses, or widespread panic. Universities, industry, government officials and buildings, power grids, telecommunication systems, dams, water supplies, and pipelines are potential terrorism targets. Another potential terrorist activity that must be considered is violence in the workplace.

Seasonal Pattern	None. More likely during political unrest or social discord. Extreme winter weather can limit or eliminate activity altogether.
Duration	Minutes/hours/days/weeks/months/potentially a year or more.
Speed of Onset	Little to no warning or several days/weeks.
Location	The total geographic extent of McHenry County, North Dakota. Most likely targeting information databases at critical facilities and infrastructure such as government facilities (city halls, courthouses, fire halls, public works, military operations), medical facilities, major employers, roads/highways, and railroad infrastructure, or chemical and oil and gas infrastructure such as pipelines and Tier II Sites. • McHenry County Courthouse • Drake-Anamoose Public Schools • TGU Public Schools (Granville and Towner) • Velva Public School • First District Health Unit, McHenry County • Trinity Health, Velva Clinic • U.S. Highway 2/52 • N.D Highways 14, 19, 41, 53, and 97 • Tier II Sites • Alliance Natural Gas Pipeline • Prairie Rose Natural Gas Pipeline operated by Aux Sable • Enbridge Crude Oil Pipeline • Anhydrous plant near the city of Voltaire • Burlington Northern Santa Fe (BNSF) Railroad • Canadian Pacific (CP) Railway • Minot Air Force Base (AFB) and various missile/nuclear sites • Minot Air Force Base (AFB) Doppler Radar

For more information regarding criminal, terrorist, or nation-state attack please reference the **2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP).** The state plan can be accessed by following the electronic hyperlink or link to the N.D. Dept. of Emergency Services website:

2018 North Dakota Enhanced Mitigation Mission Area Operations Plan

https://www.des.nd.gov/planning

History

The following information on incidents of criminal, terrorist, or nation-state attack in McHenry County was provided by the McHenry County Sheriff's Office, McHenry County Emergency Management, and the 2018 N.D. Enhanced Mitigation Mission Area Operations Plan.

- **August 2007.** A manhunt for an individual that murdered people between the states of Louisiana and Minnesota. The individual was believed to be in McHenry County. Mutual aid from local, state, and federal resources were requested. The individual was apprehended near the city of Drake.

- A group of men lived on a farm near the city of Karlsruhe near a military launch facility. The group was driven by conspiracy theories/anti-government and were interfering with military operations at the launch facility. A six-month no-fly-zone was declared in the area to mitigate escalation.

- In 2022, there was a report of a possible explosive device in the bank in Towner. Local, state, and federal authorities were called and assisted with the incident. The subject did place a device in the bank, but it was not explosive.

2018 N.D. Enhanced Mitigation MAOP

According to the 2018 N.D. Enhanced Mitigation MAOP, the following criminal, terrorist, or nation-state attack events occurred either in McHenry County or nearby. Table 4.2.1 shows vandalism and theft claims paid on critical facilities insured by the state in McHenry County between 1989 and 2023.

Table 4.2.1 – 1989 to 2018 McHenry County, North Dakota, Vandalism and Theft Claims Paid on Critical Facilities Insured by State

Jurisdiction	State Agencies	Adjutant General	State Universities	Local Governments	School Districts	Total
McHenry Co.	$0	$0	$0	$6,703.00	$37,518.00	**$44,221.00**

Source(s): 2018 N.D. Enhanced Mitigation MAOP; N.D. Dept. of Emergency Services

- Vandalism and theft claims paid on state facilities and other critical facilities insured by the state since 1989 resulted in zero paid to state agencies, the adjutant general, and state universities. Approximately $6,703.00 and $37,518.00 had been paid to local governments and school districts in McHenry County for vandalism and theft claims paid, respectively.

- Granville Public School had an individual in the early 2000s that caused extensive vandalism to the school through graffiti, broken windows, and various property damage.

There have been no declared disasters or emergencies pertaining to a criminal, terrorist, or nation-state attack in McHenry County.

Probability

The probability of a hazard or threat is how likely it will happen. Criminal, terrorist, or nation-state attacks are hard to predict but are most probable at or near jurisdictions with large, dense populations near

major attractions or buildings/infrastructure of significance. Due to McHenry County's proximity to the Minot AFB, numerous missile sites are located across the county. Military operations will contribute to an increase in probability of a criminal, terrorist, or nation-state attack.

During jurisdictional meetings, meeting participants said there is always a chance for an incident to occur at any time and no community is immune to the threat. However, the probability is much lower in jurisdictions without schools since schools in the United States have had numerous incidents involving active shooters over the past three decades.

The McHenry County Courthouse and public schools in McHenry County, North Dakota, implemented security camera surveillance systems in recent years and will continue investments where necessary. The courthouse has what is called an intrusion system. Public schools have implemented access control measures.

Profile meeting participants ranked the probability of criminal, terrorist or nation-state attack as highly likely meaning that there is a 100 percent probability in the next year of an incident. The high probability is linked to the county's proximity to the Minot AFB and missile/nuclear sites in the county's borders.

Extent/Magnitude

The extent/magnitude of a hazard or threat is expressed in the amount of damage or losses either caused or could occur in a community. Extent/magnitude of a criminal, terrorist or nation-state attack can vary from an extreme event such as one that affects the national or agricultural economy or requires deployment of military personnel and drafting of soldiers, or smaller extent/magnitude events such as specialized attacks on schools or businesses involving active-shooters, homemade bombs and/or hostages. **An incident of any size at a school could have a large extent and/or magnitude.** Due to McHenry County, North Dakota's, proximity to the Minot AFB, numerous missile sites are located across the county. Military operations will contribute to an increase in the extent/magnitude of a criminal, terrorist or nation-state-attack if an incident did occur.

Profile meeting participants ranked the extent/magnitude of a criminal, terrorist or nation-state attack as catastrophic meaning extreme/severe damage to jurisdiction infrastructure, people and/or property can occur. The extent/magnitude ranking is linked to the county's proximity to the Minot AFB and missile/nuclear sites in the county's borders.

Energy. An attack on existing pipelines, energy-related or agriculture-related infrastructure would likely cause a hazardous material release and/or fire and an explosion. The attack may result in significant environmental damage, depending on where the attack occurred and the overall impact on the existing infrastructure. This type of attack may also cause the shutting down of regional commerce that would have a spill-over effect into intrastate and national economic systems.

Food. An adversarial threat to food is the potential for interruption within the production and distribution of food, and the potential for adulteration, obstruction of operation, or intentional damage to a facility or product. If successful, the extent/magnitude of this type of attack could be widespread and result in mass casualties/fatalities. With the economy of McHenry County, North Dakota, largely based on agriculture, an incident involving the agriculture sector or at a manufacturing facility has the potential to be disastrous

and large in extent/magnitude if targeting food or hazardous chemicals. However, the likelihood is low, and the impact would be limited based on food inspection practices and other regulations.

Infrastructure. The most likely scenario would be targeting the drinking/potable water systems in incorporated jurisdictions. An attack of this nature could result in widespread illness or even mass casualties/fatalities.

Transportation systems. The most likely scenario would be impacts from an interruption of the transportation system. Transportation systems have far less oversight and regulations than food production and supply chains, and water treatment and infrastructure. This type of attack could impact a substantial area and result in the shutting down of regional commerce. With the presence of two U.S. highways, but a lack of a major interstate traversing McHenry County, the extent/magnitude would be minor if an incident involved the local road system, and major if involving a U.S. highway or the railroad.

Threat and Hazard Identification Risk Assessment (THIRA)

Table 4.2.2 shows the risk assessment as determined by individual jurisdictions and the Steering Committee for criminal, terrorist, or nation-state attack. The risk assessment methodology can be found in the beginning of Chapter 4, Threat and Hazard Identification Risk Assessment (THIRA). The total in Table 4.2.2 represents the sum of each jurisdiction's impact, frequency, likelihood, and vulnerability to a hazard/threat less the jurisdiction's capabilities to respond to the hazard/threat.

Table 4.2.2 – McHenry County, North Dakota, Criminal, Terrorist or Nation/State Attack Risk Assessment Scored Chart Summary

Jurisdiction	Impact	Frequency	Likelihood	Vulnerability	Capabilities	Total
McHenry County	4	3	5	5	2	**15**
City of Anamoose						
City of Balfour						
City of Bantry						
City of Bergen						
City of Deering						
City of Drake						
City of Granville						
City of Karlsruhe						
City of Kief						
City of Towner						
City of Upham						
City of Velva						
City of Voltaire						

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 4.2.3 provides information on the specific impact, frequency, likelihood, vulnerability and capability of criminal, terrorist, or nation-state attack in McHenry County. A list of impacts identified as commonplace for natural hazards and man-made threats regardless of the jurisdiction is shown at the beginning of Chapter 4, Threat and Hazard Identification Risk Assessment (THIRA).

Vulnerabilities to Publicly-Owned Buildings and Property

Publicly-owned buildings and property are vulnerable to criminal, Terrorist or Nation-State Attack as any government building can be targeted. Facilities supporting functions key to daily operations of the county and incorporated jurisdictions, such as the McHenry County Courthouse, public schools, or buildings supporting emergency services such as ambulance and fire halls, would be the most vulnerable to a criminal, terrorist or nation-state attack. **The level of vulnerability depends on the activities performed or a level of security at a specific facility.**

A summary of publicly-owned buildings is provided in Chapter 3, Profile and Inventory.

Table 4.2.3 – McHenry County, North Dakota, Criminal, Terrorist or Nation/State Attack Risk Assessment

Impact	• Blocked Roads • Delayed Emergency Response • HAZMAT Release • Human Injury/Death & Mass Casualties/Fatalities • Increased Public Safety Runs • Loss of Economy • Loss/Overcrowded Medical Facilities	• Loss of Drinking/Potable Water or Power • Disruption of services to maintain economic activity/daily life • Potential population loss due to harm to reputation of county as a safe place to reside and raise a family • **Shutting down of regional commerce indefinitely if an attack targets transportation – specifically bridges and railroads** • **Potential for mass casualties or widespread sickness if water or wastewater infrastructure was targeted**
Frequency	• **August 2007.** A manhunt for an individual that murdered people between the states of Louisiana and Minnesota. The individual was believed to be in McHenry County. Mutual aid from local, state, and federal resources were requested. The individual was apprehended near the city of Drake.	• A group of men lived on a farm near the city of Karlsruhe near a military launch facility. The group was driven by conspiracy theories/anti-government and were interfering with military operations at the launch facility. A six-month no-fly-zone was declared in the area to mitigate escalation. • In 2022, there was a report of a possible explosive device in the bank in Towner. Local, state, and federal authorities were called and assisted with the incident. The subject did place a device in the bank, but it was not explosive.
Likelihood	<u>More Likely</u> • Increasing hostility/turmoil directed at the energy industry • Increasing political turmoil at all levels of government • Social discord from the COVID-19 and social media • **Presence of Tier II Sites and pipelines** • **BNSF Railroad and CP Railway** • **U.S. Highways 2/52, & N.D. Highways 14, 19, 41, 53, and 97** • **Minot AFB infrastructure and missile/nuclear sites**	<u>Less Likely</u> • Sparse population and rural area of the state/country • County not located near a major metropolitan population, international airport, stadiums, or significant tourist attraction • Lack of major television station in McHenry County • No interstate highway
Vulnerability	<u>More Vulnerable</u> • Increasing hostility/turmoil directed at the energy industry • Increasing political turmoil at all levels of government • Social discord from the COVID-19 and social media	<u>Less Vulnerable</u> • Sparse population and rural area of the state/country • County not located near a major metropolitan population, international airport, stadiums, or significant tourist attraction • Lack of major television station in McHenry County

	• **Funding of extreme groups by "Dark Money" from billionaires/crowd-funding websites** • **Limited law enforcement in rural areas of county** • **Inadequate mental health services in county/state** • **Presence of Tier II Sites and pipelines** • **BNSF Railroad and CP Railway** • **U.S. Highways 2/52, & N.D. Highways 14, 19, 41, 53, and 97** • **Minot AFB infrastructure and missile/nuclear sites** • **Increased drug use and trafficking**	• No interstate highway • McHenry County Sheriff's Office deputies (human and canine) • N.D. State and Local Intelligence Center (SLIC) • Civic participation by location population in neighborhood watch-like activities reporting suspicious behavior • **The courthouse and public schools have security camera surveillance systems.** • **Public schools have access control**
Capability	• See Chapter 7 for a list of capabilities to address criminal, terrorist, or nation-state attack.	

Vulnerabilities of Critical Facilities and Infrastructure

Like publicly-owned buildings and property, the vulnerability of critical facilities and infrastructure to criminal, terrorist or nation-state attack is imminent. Critical facilities such as the McHenry County Courthouse, McHenry County Highway Department shops, N.D. Dept. of Transportation state shops, ambulance and fire halls, and infrastructure such as electric power, water/wastewater facilities, and Tier II sites are vulnerable to the threat. In McHenry County, McHenry County's communication tower, electrical substations throughout the county, rural water infrastructure, municipal water wells and water treatment plants, cellular communication tower, and air force/military buildings are critical infrastructure vulnerable to criminal, terrorist or nation-state attack.

Vulnerabilities to New and Future Development

Criminal, terrorist or nation-state attacks are hard to predict and, therefore, vulnerabilities to new and future development cannot be determined. However, large influxes of people in a short period of time into sparsely populated areas can be a source of a criminal, terrorist or nation-state attack and impact new development. New and future developments that are located at or adjacent to politically or culturally sensitive areas, near energy pipelines, or constructed near environmentally sensitive areas, may be targeted by a criminal, terrorist or nation-state attack.

Agriculture. The agricultural industry, with its increasing mechanization and industrialization, is not always located in urban areas, but is at risk to a criminal, terrorist, or nation-state attack.

Energy Development. The anticipated continuation of development of the oil and gas industry in the western portion of the state will result in transportation of energy products/materials, whether by pipeline, rail, or road, will also contribute to an increased risk of a criminal, terrorist, or nation-state attack due to past events and an increasing focus on political intervention and climate change. There are oil-producing sites in the northwest corner of McHenry County. There are two wind energy facilities in the county – one north and one south of the city of Velva.

Immigration. Illegal immigration to the United States by-way of Canada. Due to the county's proximity to the Canadian border, and far less-scrutiny versus the southern border, this method of immigration may contribute to a criminal, terrorist, or nation-state attack. McHenry County Sheriff's Office has bi-monthly intelligence meetings with state and federal agencies.

Population. The population density of North Dakota's major cities continues to increase as people leave rural areas in favor of urban lifestyles. This trend increases the vulnerability of cities to a criminal, terrorist or nation-state attack as higher density living situations are the primary target for this threat.

Data Limitations and Other Key Documents

The probability and vulnerability of a criminal, terrorist or nation-state attack is hard to quantify given its isolated nature and the little recorded history of its impact to North Dakota, until recent large-scale events such as the Dakota Access Pipeline protest in the western portion of the state.

This plan incorporates data from the following documents and information herein will be used in future updates.

- 2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP)
- 2023 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP)
- Federal planning documents specific to border/immigration security
- McHenry County, North Dakota, Commercial Animal Feed Operation Ordinance
- McHenry County, North Dakota, Courthouse Security Plan
- McHenry County, North Dakota, Evacuation Plan through McHenry County Emergency Management
- McHenry County, North Dakota, Local Emergency Operations Plan through McHenry County Emergency Management
- McHenry County, North Dakota, Mass Care Plan through First District Health Unit
- McHenry County, North Dakota, Shelter Plan through McHenry County Emergency Management
- McHenry County, North Dakota, Threat and Hazard Identification and Risk Assessment (THIRA)
- North Dakota Continuity of Operations Plan
- North Dakota Emergency Operations Plan, Criminal, Terrorist or Nation-State Attack Annex
- North Dakota State Disaster Recovery Plan
- North Dakota State Preparedness Report (SPR)
- North Dakota Threat and Hazard Identification and Risk Assessment (THIRA)

4.3 Cyberattack

An attack or hijack of digital/technological information and/or infrastructure critical to the functions controlled by computer networks such as: operating, financial, communications, and trade systems.

Characteristics

Any cyberattack that creates unrest, instability, or negatively impacts confidence of citizens/consumers can be considered cyber terrorism. According to N.D. Information Technology (NDIT), the seven common types are Advanced Persistent Threats, Distributed Denial of Service, Doxing, Malware, Media Threats, Password Phishing Attacks, and Socially Engineered Malware. The following information details the extent of cyberattack in McHenry County, North Dakota.

Seasonal Pattern	None. More frequent during Christmas/holidays and after final testing at schools. Increased activity is experienced during other hazardous events such as a pandemic (COVID-19).
Duration	Varies based on the type of attack method used. Seconds/minutes/hours/days/weeks/months/potentially a year or more.
Speed of Onset	Little to no warning or up to several days/weeks.
Location	Total geographic extent of McHenry County, North Dakota – most likely targeting information databases at critical facilities and infrastructure such as the McHenry County Courthouse, public school districts, military facilities, chemical or oil and gas infrastructure, major employers, etc.

For more information regarding cyberattack please reference the **2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP).** The plan can be accessed by following the links:

2018 North Dakota Enhanced Mitigation Mission Area Operations Plan

https://www.des.nd.gov/planning

History

- According to information technology support for McHenry County, North Dakota, no cyberattacks have been executed on the digital/technological infrastructure at the McHenry County, North Dakota, Courthouse in the city of Towner, North Dakota.

- According to the public schools in McHenry County, North Dakota, no major cyberattacks have been executed on the digital/technological infrastructure aside from fraud emails.

2018 N.D. Enhanced Mitigation MAOP

According to the 2018 N.D. Enhanced Mitigation MAOP, the following Cyberattack events occurred either in McHenry County, North Dakota, or the state.

- In December 2017, several North Dakota Counties experienced a Cryptominer Virus that was eating CPU. The virus infected 81 computers. The spread of the virus was stopped at the firewall level and the antivirus vendor performed cleanup and extended monitoring. NDIT assisted with eradication and remediation of the virus. The incident lasted for approximately one day.

- **Dakota Access Pipeline (DAPL**). During the protest, personal information of law enforcement officers across the state who assisted in response to the protest was released with the intent to harass and/or intimidate them and their families. Doxing was the type of cyberattack used. There was also a significant increase in network traffic with intent to access state systems. This increased traffic required the state to increase its capacity with a larger firewall.

United States

- On May 7, 2021, Colonial Pipeline (an American oil pipeline company) was the target of a ransomware cyberattack that impacted computerized equipment responsible for managing the pipeline. The company shut down the pipeline to contain the attack. The company was ordered to pay a requested ransom of $4.4 million to regain control of its pipeline and did so within hours of the attack. DarkSide was the criminal hacking group responsible for the attack.

  The Federal Motor Carrier Safety Administration issued a regional emergency declaration for 17 states and Washington D.C. to keep fuel supply lines open on May 9, 2021. It was the largest cyberattack on oil infrastructure in United States History.

According to EMSISoft, a New Zealand-based blog focusing on malware protection, the following information on ransomware attacks occurred in the United States:

- In 2019, the U.S. was hit by an unprecedented and unrelenting barrage of ransomware attacks that impacted at least 966 government agencies, educational establishments and healthcare providers at a potential cost more than $7.5 billion. The impacted organizations included 113 state and municipal governments and agencies, 764 healthcare providers, and 89 universities, colleges and school districts, with operations at up to 1,233 individual schools potentially affected.

  The incidents were not simply expensive inconveniences; the disruption they caused put people's health, safety and lives at risk.

  - Emergency patients had to be redirected to other hospitals;
  - Medical records were inaccessible and, in some cases, permanently lost;
  - Surgical procedures were canceled, tests were postponed and admissions halted;
  - services were interrupted;
  - Dispatch centers had to rely on printed maps and paper logs to keep track of emergency responders in the field;
  - Police were locked out of background check systems and unable to access details about criminal histories or active warrants;
  - Surveillance systems went offline;
  - Badge scanners and building access systems ceased to work;
  - Jail doors could not be remotely opened, and
  - Schools could not access data about students' medications or allergies.

  Other effects of the incidents included:

- Property transactions were halted;
- Utility bills could not be issued;
- Grants to nonprofits were delayed by months;
- Websites went offline;
- Online payment portals were inaccessible;
- Email and phone systems ceased to work;
- Driver's licenses could not be issued or renewed;
- Payments to vendors were delayed;
- Schools closed;
- Students' grades were lost, and
- Tax payment deadlines had to be extended.

There have been no declared disasters or emergencies pertaining to cyberattack in McHenry County, North Dakota.

Probability

The probability of a hazard or threat is how likely it is it will happen. Cyberattacks are hard to predict but most probable at all levels of government (federal, local, and state), private businesses employing large numbers of people, and organizations/institutions. According to the 2018 N.D. Enhanced Mitigation MAOP, due to widespread and growing use of technology and the prevalence of ever-changing cyberattack methods, the probability of cyberattacks is very high.

Profile meeting participants ranked the probability of cyberattack as highly likely meaning that there is a 100 percent probability in the next year of an attack, which does not always result in an incident.

Extent/Magnitude

The extent/magnitude of a hazard or threat is expressed in the amount and/or number of damages or losses either actualized in a community or estimated based on known assets and levels of risk. The extent/magnitude of a cyberattack can vary from a loss of personal information such as an individual's pictures and music to high extent/magnitude events such as one that affects the national or agricultural economy, or information systems of critical facilities and infrastructure.

According to the 2018 N.D. Enhanced Mitigation MAOP, loss estimates for cyberattack incidents in North Dakota are not available. However, the following national cyberattacks provide insight into the potential impacts of the threat.

- The 2017 WannaCry ransomware attack caused $4 billion in financial losses.
- The 2017 NotPetya attack caused an estimated $300 million in economic losses for FedEx subsidiary TNT Express and another $300 million in losses for shipping. The attack originated in Ukraine.
- Lloyds of London, an insurance underwriter, developed a scenario for an attack on the Eastern Interconnection, which is one of two major electrical grids in the United States serving half the

country. The economic loss of an attack was estimated at $243 billion. The 2003 Northwest Blackout resulted in economic losses of between $4 billion and $10 billion.

Threat and Hazard Identification Risk Assessment (THIRA)

Table 4.3.1 shows the risk assessment as determined by individual jurisdictions, the Steering Committee, and participants at the profile meeting for cyberattack. The risk assessment methodology can be found in the beginning of Chapter 4, Threat and Hazard Identification Risk Assessment (THIRA). The total in Table 4.3.1 represents the sum of each jurisdiction's impact, frequency, likelihood, and vulnerability to a hazard/threat less the jurisdiction's capabilities to respond to the hazard/threat.

Table 4.3.1 – McHenry County, North Dakota Cyberattack Risk Assessment Scored Chart Summary

Jurisdiction	Impact	Frequency	Likelihood	Vulnerability	Capabilities	Total
McHenry County	5	2	4	4	3	**12**
City of Anamoose						
City of Balfour						
City of Bergen						
City of Deering						
City of Drake						
City of Granville						
City of Karlsruhe						
City of Kief						
City of Towner						
City of Upham						
City of Velva						
City of Voltaire						

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 4.3.2 provides information on the specific impact, frequency, likelihood, vulnerability, and capability of cyberattack in McHenry County, North Dakota. A list of impacts identified as commonplace for natural hazards and man-made threats regardless of the jurisdiction is shown at the beginning of Chapter 4, Threat and Hazard Identification Risk Assessment (THIRA).

Vulnerabilities to Publicly-Owned Buildings and Property

Publicly-owned buildings and property are vulnerable to cyberattack as all state and local governments, businesses, and organizations/institutions use digital/technological systems. As day-to-day and extended operations become more reliant on digital/technological infrastructure to operate, the vulnerability to publicly-owned buildings and property will increase. Facilities supporting functions key to daily operations of the county and incorporated jurisdictions, such as the McHenry County Courthouse, city halls, buildings for emergency services, public schools, and state and federal agencies such as military facilities located in McHenry County, North Dakota, would be the most vulnerable to a cyberattack. **Any digital/technological systems not protected by a firewall are the most vulnerable.**

A summary of publicly-owned buildings and property in McHenry County, North Dakota, is provided in Chapter 3, Profile and Inventory.

Table 4.3.2 – McHenry County, North Dakota, Cyberattack Risk Assessment

Impact	• Delayed Emergency Response • HAZMAT Release • Increased Public Safety Runs • Government Interruptions • Loss of Communication Systems – Loss of 9-1-1 • Loss of Economy • Loss of Potable Water • Loss of Power • Mass Casualties/Fatalities • Loss/Overcrowded Medical Facilities	• **Increased and unforeseen public and private costs due to response and recovery requirements** • **Loss of websites and information for critical facilities** • **Shutting down of infrastructure systems resulting in loss of economy activity as technological systems are used in nearly all industries, both public and private** • **Targeting of emergency services personnel** • **Loss of public confidence in city and county government** • **Loss of archived data and records** • **Shutting down of the McHenry County Courthouse and/or public schools**
Frequency	• Significant increase in network traffic with intent to access state systems. This increased traffic required the state to increase its capacity with a larger firewall.	• **NDIT indicated an average of 5.7 million cyberattack attempts every month on the state level, but all do not result in an event/incident.**
Likelihood	<u>More Likely</u> • Digital economy with nation-wide banks and other institutions electronically linked to the state and county • Growing automation of daily tasks • Social media • Digital/technological systems used in nearly all industries	<u>Less Likely</u> • State installed larger firewall – has a direct impact on county functions • Increased investment in security measures to the public sectors by the state (i.e., firewalls, Cortex XDR, Tenable, Security Awareness Training, Dark Web Monitoring, etc.) • Ongoing investment in preventative education and enhanced countermeasures • NDIT and NDSLIC • Redundancies in state and county technology and power systems • McHenry County is fully migrated over to NDIT's Cortex XDR security package and replaced switches in 2020 • **Public schools have firewalls through NDIT**

Table 4.3.2 – McHenry County, North Dakota, Cyberattack Risk Assessment - Continued

Vulnerability	More Vulnerable • **All state and local governments, businesses, and organizations/institutions that use digital/technological systems** • Growing automation of daily tasks in individual's lives, and private and public sectors • Social media • Technological systems used in nearly all industries • Elderly population relying largely on landlines for communication purposes, remote medical care and equipment monitoring • McHenry County, North Dakota, lacks ESET Endpoint Security which adds another layer of protection on all workstations and servers and renews every year	Less Vulnerable • NDIT has a Cyberattack Incident Response Plan that covers Sheridan County systems • State installed larger firewall after DAPL protest • Ongoing investment in preventative education and enhanced countermeasures • NDIT and NDSLIC • **66th Legislative Assembly of ND, Senate Bill 2110 to amend and reenact sections 54-50-01 and 54-59-05 of the N.D. Century Code. NDIT setting strategies and advising all branches of government for cyberattack and counter measures – signed on April 12, 2021** • Redundancies in state and county technology and power systems • High regulation of banking and other industries to mitigate cyberattacks • K20W Initiative – training school-aged kids on cyber education • McHenry County is fully migrated over to NDIT's Cortex XDR security package and replaced switches in 2020 • **Public schools have firewalls through NDIT**
Capability	• See Chapter 7 for a list of capabilities to address cyberattack • NDIT Cyberattack Incident Response Plan - includes Pierce County systems • McHenry County, North Dakota, Local Emergency Operations Plan, Cyberattack Response Plan • Technology Plans for public schools (includes a statement on cybersecurity)	

Vulnerabilities of Critical Facilities and Infrastructure

Like publicly-owned buildings and property, the vulnerability of critical facilities and infrastructure to cyberattacks is imminent as all state and local governments, businesses, and organizations/institutions use digital/technological systems. Digital/technological systems used by emergency services and branches of government such as GIS mapping or financial software, and utilities such as electric and natural gas are types of critical facilities and infrastructure most at risk to a cyberattack. In addition, the vulnerability from the threat to public works infrastructure for incorporated jurisdictions such as drinking/potable water and wastewater treatment systems will increase if digital water meters and SCADA systems are installed.

Vulnerabilities to New and Future Development

Cyberattacks target digital information and technological systems and therefore should have little to no impact on new and future development. However, with the increasing use of internet-connected technological systems in American households and the world economy, the understanding of the vulnerability to new and future development is evolving/expanding.

Data Limitations and Other Key Documents

The probability and vulnerability of a cyberattack are hard to quantify given the multitude of plausible scenarios for an event. The threat has had little recorded history in North Dakota, until DAPL.

This plan incorporates data from the following documents. Information from this plan will be incorporated in the update of said documents.

- 2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP)
- Cyberattack Response Plans for public schools
- McHenry County, North Dakota, Local Emergency Operations Plan, Cyberattack Annex
- McHenry County, North Dakota, Threat and Hazard Identification and Risk Assessment (THIRA)
- North Dakota Continuity of Operations Plan
- North Dakota Cybersecurity Framework (NDCSF)
- North Dakota Emergency Operations Plan, Cyberattack Annex
- NDIT Cyberattack Incident Response Plan - includes Pierce County systems
- NDIT Security Incident Response Plan
- North Dakota State Disaster Recovery Plan
- North Dakota State Preparedness Report (SPR)
- North Dakota Threat and Hazard Identification and Risk Assessment (THIRA)

4.4 Dam Failure

Characteristics

A dam is any artificial man-made barrier that impounds or diverts water or underground streams. A dam failure is defined as a sudden, rapid, and uncontrolled release of impounded water that will create a potential significant downstream hazard.

Seasonal Pattern	None. More likely during spring seasonal runoff due to snowmelt.
Duration	Minutes/Hours/Days/Weeks – dependent on respective inundation area
Speed of Onset	Minutes to Hours
Location	Inundation area specific to each dam and the corresponding geography of the local area and critical facilities and infrastructure.

For more information regarding dam failure please reference the **2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP).** The state plan can be accessed by following the electronic hyperlink or link to the N.D. Dept. of Emergency Services website:

2018 North Dakota Enhanced Mitigation Mission Area Operations Plan

https://www.des.nd.gov/planning

History

- Per the National Performance of Dams Program, Stanford University, no dam incidents were reported for McHenry County, North Dakota.
- According to McHenry County Emergency Management and profile meeting participants, no dam incidents were reported for McHenry County, North Dakota.

List of Dams – McHenry County, North Dakota

Per information provided by the N.D. Dept. of Water Resources, there are approximately 83 dams in McHenry County, North Dakota. The 21 dams within the geography of McHenry County are low-hazard and impact agricultural land. Table 4.4.1 lists the Garrison Dam and its respective inundation areas.

Table 4.4.1 – Dams in McHenry County, North Dakota – add in Eaton here

Dam	Auth. Purpose	Classification	Location	Area(s) of Inundation

Source(s): Bureau of Reclamation; N.D. Dept. of Water Resources; N.D. Game & Fish; National Inventory of Dams

- Per the 2023 N.D. Enhanced Mitigation MAOP, there are no high-hazard dams physically located in McHenry County. Due to homeland security purposes, limited information is shown regarding high and medium hazard dams impacting McHenry County, North Dakota. Additional information can be accessed through the National Inventory of Dams website or by contacting the N.D. Dept. of Water Resources or McHenry County Emergency Management.

Probability

Based on dam failure history for McHenry County, North Dkota, and the risk assessment conducted at the profile meeting, the probability of dam failure is unlikely. The 2023 N.D. Enhanced Mitigation MAOP lists McHenry County, North Dakota, as a low vulnerability jurisdiction for dam failure.

Extent/Magnitude

The magnitude of dam failure in McHenry County can be determined by the area or areas of inundation from the Balta Dam. The extent/magnitude of a failure of the Balta Dam would impact 25th Ave NE, 51st St. NE, agricultural lands and Balta Dam Recreation Area. The extent/magnitude of the Buffalo Lake Diversion Dam would impact two single-family homes and three farm structures at the base of the dam, 39th St NE, and surrounding agricultural land.

Although it is recognized that loss of life is possible with any dam failure, the following categories of dams have been established to convey the extent/magnitude of dam failure in McHenry County, North Dakota.

- **Low Hazard** – Dams located in rural or agricultural areas with little possibility of future development. Failure of low-hazard dams may damage agricultural land, township and county roads, and farm buildings other than residences. No loss of life is expected if the dam fails.
- **Medium (Significant) Hazard** – Dams located in predominantly rural or agricultural areas where failure may damage isolated homes, main highways, and railroads or cause interruption of minor public utilities. The potential for a few lives lost may be expected if the dam fails.
- **High Hazard** – Dams located upstream of developed and urban areas where failure may cause severe damage to homes, industrial and commercial buildings, and major public utilities. If the dam fails, there is a potential for losing more than a few lives.

All federal dams in North Dakota are required to have an emergency action plan (EAP). In addition, per the N.D. Century Code 61-03-25, emergency action plans are required for the nonfederal dams classified as medium/significant-or high-hazard dams in North Dakota.

Threat and Hazard Identification Risk Assessment (THIRA)

Table 4.4.2 shows the risk assessment as determined by individual jurisdictions, the Steering Committee, and meeting participants at the profile meeting for dam failure. The risk assessment methodology can be found in the beginning of Chapter 4, Threat and Hazard Identification Risk Assessment (THIRA). The total in Table 4.4.2 represents the sum of each jurisdiction's impact, frequency, likelihood, and vulnerability to a hazard/threat less the jurisdiction's capabilities to respond to the hazard/threat.

Table 4.4.2 – McHenry County, North Dakota, Dam Failure Risk Assessment Scored Chart Summary

Jurisdiction	Impact	Frequency	Likelihood	Vulnerability	Capabilities	Total
McHenry County	5	1	2	3	2	**9**
City of Anamoose	NA	NA	NA	NA	NA	**NA**
City of Balfour	NA	NA	NA	NA	NA	**NA**
City of Bantry	NA	NA	NA	NA	NA	**NA**

City of Bergen	NA	NA	NA	NA	NA	**NA**
City of Deering	NA	NA	NA	NA	NA	**NA**
City of Drake	NA	NA	NA	NA	NA	**NA**
City of Granville	NA	NA	NA	NA	NA	**NA**
City of Karlsruhe	NA	NA	NA	NA	NA	**NA**
City of Kief	NA	NA	NA	NA	NA	**NA**
City of Towner	NA	NA	NA	NA	NA	**NA**
City of Upham	NA	NA	NA	NA	NA	**NA**
City of Velva	5	1	1	5	3	**9**
City of Voltaire	NA	NA	NA	NA	NA	**NA**

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 4.4.3 provides information on the specific impact, frequency, likelihood, vulnerability, and capability of dam failure in McHenry County, North Dakota. A list of impacts identified as commonplace for natural hazards and man-made threats regardless of the jurisdiction is shown in Chapter 4, Threat and Hazard Identification Risk Assessment (THIRA).

Vulnerabilities of Publicly-Owned Buildings and Property

Medium/significant and high hazard dams have the potential to impact publicly-owned buildings and property. County-owned buildings located in inundation areas are vulnerable to the hazard. Due to homeland security concerns, publicly-owned buildings in located in dam inundation areas in McHenry County, North Dakota, are not identified. Please contact McHenry County Emergency Management for this information. Contact information can be found in Chapter 10, Plan Maintenance.

Chapter 3, Profile and Inventory, provides a summary of publicly-owned buildings in McHenry County, North Dakota.

Vulnerabilities of Critical Facilities and Infrastructure

Critical facilities and infrastructure are vulnerable to dam failures like publicly-owned buildings and property if located in the inundation area of a dam. Critical facilities and infrastructure located in inundation areas are highly susceptible to impacts from flood waters with the potential to be destroyed. Due to homeland security concerns, critical facilities and infrastructure located in dam inundation areas in McHenry County, North Dakota, are not identified. Please contact McHenry County Emergency Management for this information. Contact information can be found in Chapter 10, Plan Maintenance.

Chapter 3, Profile and Inventory, provides a summary of critical facilities and infrastructure in McHenry County, North Dakota.

Vulnerabilities to New and Future Development

New and future development geographically located in dam inundation areas are most at risk of dam failure. New and future development would not be at risk of dam failure if constructed at an elevation outside of inundation areas. However, given the nature of the hazard, a dam failure incident would have catastrophic impacts on structures located in or out of inundation areas. Although flood waters resulting from dam failures tend to flow along floodplains, flood waters would extend beyond the floodplain due to the volume of water released. As such, development located outside of the floodplain can still be at risk of a dam failure.

Chapter 3, Profile and Inventory, provides a summary of new and future development in McHenry County, North Dakota.

Table 4.4.3 – McHenry County, North Dakota, Dam Failure Risk Assessment

Impact	• Blocked Roads – U.S. Highway 52 and N.D. Highway 41, rural highway and township roads • Business Interruptions • Delayed Emergency Response • Evacuation (Localized) • Government Interruptions	• Loss of Critical Facilities and Infrastructure • **Loss of Drinking/Potable Water** • Loss of Power/Electricity Outage • **Mass Casualties/Fatalities** • **Loss of drinking/potable water** • **Public Distress/Social Discord**
Frequency	• Never an occurrence in McHenry County, North Dakota	
Likelihood	More Likely • Heavy rains and/or melting of snow pact may lead to dams becoming overwhelmed • Aging infrastructure – at 50 years the likely/probability of a dam failure increases	Less Likely • Annual and ongoing dam inspections and routine maintenance - USACE • Permanent trained subject matter experts providing continuous monitoring and maintenance of dams
Vulnerability	More Vulnerable • Agricultural land • County highways and township roads	Less Vulnerable • McHenry County mass notification capabilities • Annual and ongoing dam inspections and routine maintenance • Permanent trained subject matter experts providing continuous monitoring and maintenance of dams • **N.D. Dam Safety Program**
Capability	• See Chapter 7 for a list of capabilities to address dam failure • McHenry County mass notification capabilities • **N.D. Dam Safety Program**	

The N.D. Dam Design Handbook is out of date and is being updated. This plan incorporates data from the following documents and information from this plan will be incorporated in the update of the following documents.

- 2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP)
- 2023 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP
- McHenry County, North Dakota, Comprehensive Plan
- McHenry County, North Dakota, Continuity of Operations Plan through McHenry County Emergency Management
- McHenry County, North Dakota, Evacuation and Shelter Plan through McHenry County Emergency Management
- McHenry County, North Dakota, Local Emergency Operations Plan through McHenry County Emergency Management
- McHenry County, North Dakota, Mass Care Plan through McHenry County Emergency Management
- McHenry County, North Dakota, Strategic Plan
- McHenry County, North Dakota, Threat and Hazard Identification and Risk Assessment (THIRA)
- North Dakota Continuity of Operations Plan
- *North Dakota Dam Design Handbook (being updated)*
- North Dakota Emergency Operations Plan, Dam Failure Annex
- North Dakota State Disaster Recovery Plan
- North Dakota Threat and Hazard Identification and Risk Assessment (THIRA)

4.5 Drought

Including precipitation levels well below normal and heat – temperatures higher than normal.

Characteristics

Drought is a deficiency in precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals, and/or people. Drought is a temporary diversion from normal climatic conditions and is different than aridity, which is a permanent feature of climate in regions where low precipitation is the norm, as in a desert. Drought characteristics usually include precipitation levels well below normal and temperatures higher than normal.

According to the National Drought Mitigation Center, the following types of droughts exist.

- **Agricultural drought** occurs when there is not enough soil moisture to meet the needs of a crop at any given time. Agricultural drought happens after meteorological drought but before hydrological drought. Agriculture is usually the first economic sector to be affected by drought.
- **Hydrological drought** refers to deficiencies in surface and subsurface water supplies. It is measured as streamflow and as lake, reservoir, and groundwater levels. There is a time lag between lack of rain and less water in streams, rivers, lakes, and reservoirs, so hydrological measurements are not the earliest indicators of drought. When precipitation is reduced or deficient over an extended period, this shortage will be reflected in declining surface and subsurface water levels.
- **Meteorological drought** is usually an expression of precipitation's departure from normal over some period. These definitions are usually region-specific, and presumably based on a thorough understanding of regional climatology. The 2023 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP) lists snow drought as an event included in drought.
- **Socioeconomic drought** occurs when physical water shortage starts to affect people, individually and collectively. Or, in more abstract terms, most socioeconomic definitions of drought associate it with the supply and demand of an economic good.

Seasonal Pattern	Primarily summer, but can occur in spring, fall, and winter (snow drought)
Duration	Weeks/months, up to a decade in severe cases
Speed of Onset	Slow and gradual
Location	Total geographic extent of McHenry County, North Dakota, across all jurisdictions (incorporated and unincorporated)

For more information regarding drought please reference the **2023 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP).** The state plan can be accessed by following the electronic hyperlink or link to the N.D. Dept. of Emergency Services website:

2018 North Dakota Enhanced Mitigation Mission Area Operations Plan

https://www.des.nd.gov/planning

History

The U.S. is vulnerable to the social, economic, and environmental impacts of drought. The over 100-year weather record of the U.S. indicates that there were three to four major drought events. Two of these, the 1930s Dust Bowl drought and the 1950s drought, each lasted five to seven years and covered large areas of the continental United States.

Information on the history of drought in McHenry County was obtained from the National Oceanic and Atmospheric Administration's National Climatic Data Center (NCDC); 2023 N.D. Enhanced Mitigation MAOP; USDA, Risk Management Agency; Palmer Drought Severity Index (PDSI); U.S. Drought Monitor, and McHenry County Emergency Management/NDSU Extension-McHenry County, and profile meeting participants. A detailed hazard history for McHenry County can be found on a disc located at the beginning of Chapter 4, Threat and Hazard Identification Risk Assessment.

National Climatic Data Center/National Oceanic and Atmospheric Administration

- According to the National Climatic Data Center (NCDC), nine occurrences of drought were reported in McHenry County between January 1, 1996, and December 31, 2023.

2023 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP)

- Since 1930, North Dakota has suffered drought in the 1930s, 1950s, early 1960s, mid 1970s, early 1980s, 1988 through 1991/1992, 2002 through 2004, 2006, 2008, 2012/2013, 2017, 2018, 2020/2021, and 2023, which included McHenry County.
- A state-wide drought was declared in 1980, 1981, 1988/1989, 1992/1993, 2002, 2005, 2006, 2008, 2012, and 2017, impacting all counties in North Dakota.
- **Typically, presidential declarations pertaining to drought occur before secretarial declarations by the USDA as secretarial declarations are not permitted without a presidential declaration. Since 1976, McHenry County has been included in 33 drought declared disasters or emergencies, of which 11 were state declared emergency orders, one was presidential, and 21 were USDA Secretarial Declarations.**

U.S. Dept. of Agriculture (USDA)

- McHenry County, North Dakota, was included in USDA Secretarial Disaster Designations S3467, S3620, S3804, S3959, S3961, S4186, S4196, S4200, S4204, S4227, S4330, S4346, S4353, S4401, S4418, S4640, S4939, S4949, S5203, S5520, and S5556.

U.S. Dept. of Agriculture, Risk Management Agency

- Crop loss from drought is tracked by the U.S. Dept. of Agriculture, Risk Management Agency (RMA). The RMA provides data on the crop type affected, damage cause description, determined acres, and indemnity amount. The damage-cause description identifies the cause of damage and the number of acres lost due to damage, and the indemnity amount identifies the total amount of

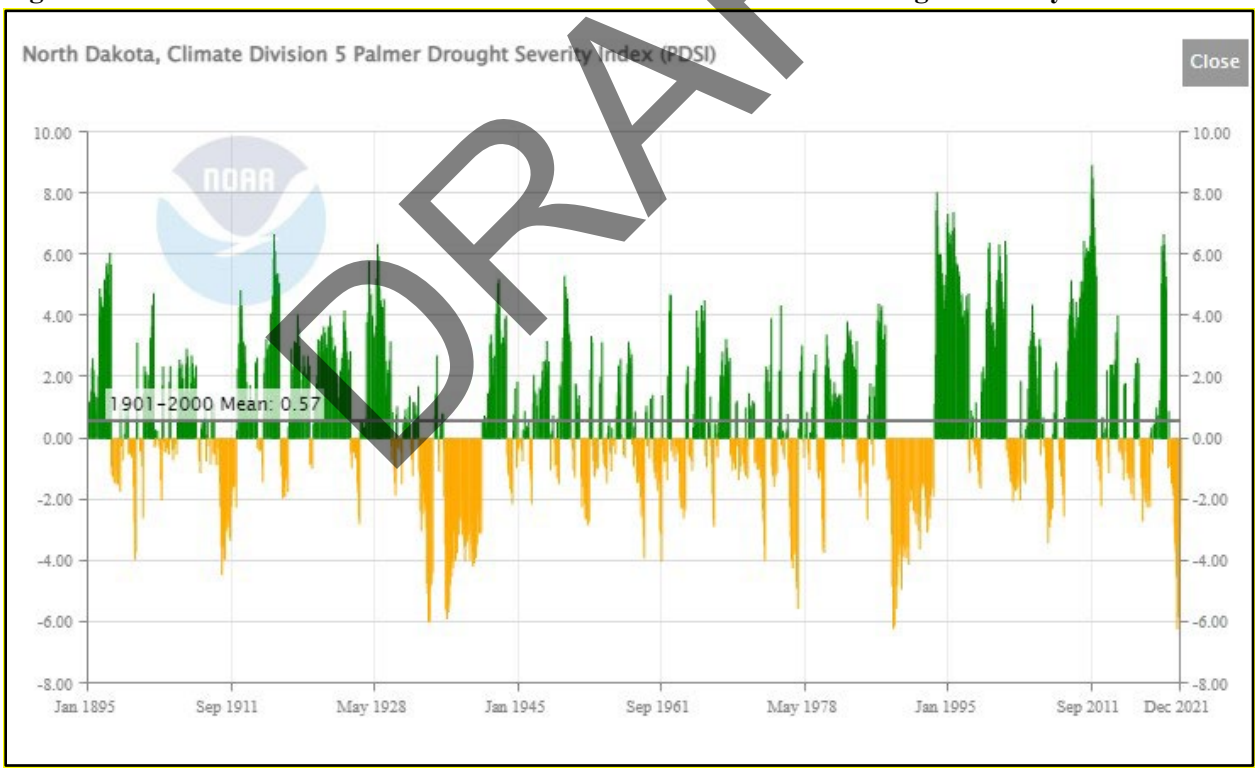
the loss for the designated peril. **Between January 1, 2001, and December 31, 2023, McHenry County experienced 640 incidents of crop loss due to drought impacting approximately 818,945.27 acres of crops totaling $87,976,438.97 in losses.**

Palmer Drought Severity Index (PDSI)

The Palmer Drought Severity Index (PDSI) is an estimated measurement of dryness based on temperature and precipitation based available. It is a standardized index that generally spans -10 (dry) to +10 (wet). Maps of operational agencies like NOAA typically show a range of -4 to +4, but more extreme values are possible. The PDSI has been reasonably successful at quantifying long-term drought. As it uses temperature data and a physical water balance model, it can capture the basic effect of global warming on drought through changes in potential evapotranspiration. Monthly PDSI values do not capture droughts on time scales less than about 12 months; more pros and cons are discussed in the Expert Guidance.

- Figure 4.5.1 is the PDSI and was provided by the North Dakota State Climatologist at North Dakota State University.
- According to PDSI, between 1895 and 2021 North Dakota experienced multi-year droughts in the 1930s, 1950s, 1980s, and 2000s, and 2020/2021.

Figure 4.5.1 – 1895 to 202 North Dakota Climate Division 2 Palmer Drought Severity Index



Source(s): Palmer Drought Severity Index (PDSI); North Dakota State University

McHenry County Emergency Management/NDSU Extension-McHenry County

Information gathered from the drought profile meeting and Steering Committee meetings indicated that while dryer periods have come and gone, the most recent droughts of significance occurred in 1988/1989

and lasted until 1991/1992, and the summer/fall of 2020/2021. Participants also noted a five-to 10-year cyclical pattern where dry conditions will persist for that period, then transition to more wet conditions.

Probability

The probability of a hazard or threat is how likely it will happen. The probability of drought varies annually and is highly dependent on seasonal weather patterns. According to profile meeting participants, the probability of drought in McHenry County, North Dakota, is highly likely meaning that there is a 100 percent probability in the next year of a drought to a varying degree of severity. Drought is a naturally occurring phenomenon and, therefore, it is indisputable that a drought of significance will occur based on climatic patterns at some point in the future.

- **Based on 11 state declared emergency orders, one presidential, and 21 USDA Secretarial Declarations pertaining to drought between 1976 and 2023, the probability of drought is 68.8 percent in any given year.**

- With the local economy of small, incorporated cities in the county heavily reliant on the agriculture industry, the probability of drought can be measured by crop loss. According to crop loss data from the USDA-RMA, McHenry County experienced $3,825,062.56 in annualized average crop damage impacting 35,606.32 acres resulting in approximately 27.8 annual claims of indemnity between 2001 and 2023. **Therefore, based on data available, the probability of crop loss from drought is calculated to be 100 percent annually.**

Extent/Magnitude

The extent/magnitude of a hazard or threat is expressed in the amount and/or number of damages or losses either actualized in a community or estimated based on known assets and levels of risk. Profile meeting participants indicated the magnitude or impact of drought in McHenry County as catastrophic meaning extreme or severe damage to jurisdiction infrastructure, people, and/or property would be affected if a drought of significance occurred. The following are key points from the state risk assessment in the 2023 N.D. Enhanced Mitigation MAOP.

- According to the National Risk Index Community Information and Summary Rating for drought in North Dakota states that McHenry County, North Dakota, possesses an agricultural value of $167,836,023.00, and has a “Relatively Moderate” community resilience rating and a “Very Low” social vulnerability rating to drought.

- McHenry County, North Dakota, incurred $73,297,944.97 in crop indemnity from drought between 2017 and 2023, resulting in an annualized loss of $12,216,324.16.

- McHenry County, North Dakota, 71.6 percent of all annualized crop loss is caused by drought equating to a 7.2 percent loss in total sales resulting in a “high” vulnerability rating to drought.

- The population of McHenry County, North Dakota, is projected to increase from 6,215 people in 2020 to 6,848 people in 2040, an increase of 723 people or 11.8 percent. The increase in population results in a “high” vulnerability rating for drought.

- According to profile meeting participants, irrigation from the agricultural sector is one of the largest consumers of water in McHenry County, North Dakota, and would be the most impacted by catastrophic drought.

U.S. Drought Monitor (USDM). The USDM is a drought communication system managed by the National Drought Mitigation Center at the University of Nebraska-Lincoln updated every Thursday to show the location and intensity of drought across the United States. The USDM uses the following five-category system, labeled:

- Abnormally Dry or D0, (a precursor to drought, not actually drought);
- Moderate (D1);
- Severe (D2);
- Extreme (D3), and
- Exceptional (D4) Drought.

Drought categories show experts' assessments of conditions related to dryness and drought including observations of how much water is available in streams, lakes, and soils compared to usual amounts for the same time of year. U.S. Drought Monitor data go back to 2000. Figures 4.5.2, 4.5.3, and 4.5.4 show the status of drought conditions in North Dakota as of August 17, 2021, August 11, 2022, and August 8, 2023, respectively.

- McHenry County was classified as D4 (Exceptional Drought) in August 2021
- No drought classifications were present in McHenry County August 2022.
- McHenry County was classified as D (Abnormally Dry) in the extreme south and southwest, D1 (Moderate Drought) in central, southwest, and northwest, and D2 (Severe Drought) in the eastern, central, and northwest.

Threat and Hazard Identification Risk Assessment (THIRA)

Table 4.5.1 shows the risk assessment as determined by individual jurisdictions, the Steering Committee, and meeting participants at the profile meeting for drought. The risk assessment methodology can be found in the beginning of Chapter 4, Threat and Hazard Identification Risk Assessment (THIRA). The total in Table 4.5.1 represents the sum of each jurisdiction's impact, frequency, likelihood, and vulnerability to a hazard/threat less the jurisdiction's capabilities to respond to the hazard/threat.

Table 4.5.1 – McHenry County, North Dakota, Drought Risk Assessment Scored Chart Summary

Jurisdiction	Impact	Frequency	Likelihood	Vulnerability	Capabilities	Total
McHenry County	5	4	4	3	4	**12**
City of Anamoose						
City of Balfour						
City of Bantry						
City of Bergen						
City of Deering						
City of Drake						
City of Granville						

City of Karlsruhe						
City of Kief						
City of Towner						
City of Upham						
City of Velva						
City of Voltaire						

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

A list of impacts identified as commonplace for natural hazards and man-made threats regardless of the jurisdiction is shown in Chapter 4, Threat and Hazard Identification Risk Assessment (THIRA). Table 4.5.2 provides information on the specific impact, frequency, likelihood, vulnerability, and capability of drought in McHenry County.

Vulnerabilities to Publicly-Owned Buildings and Property

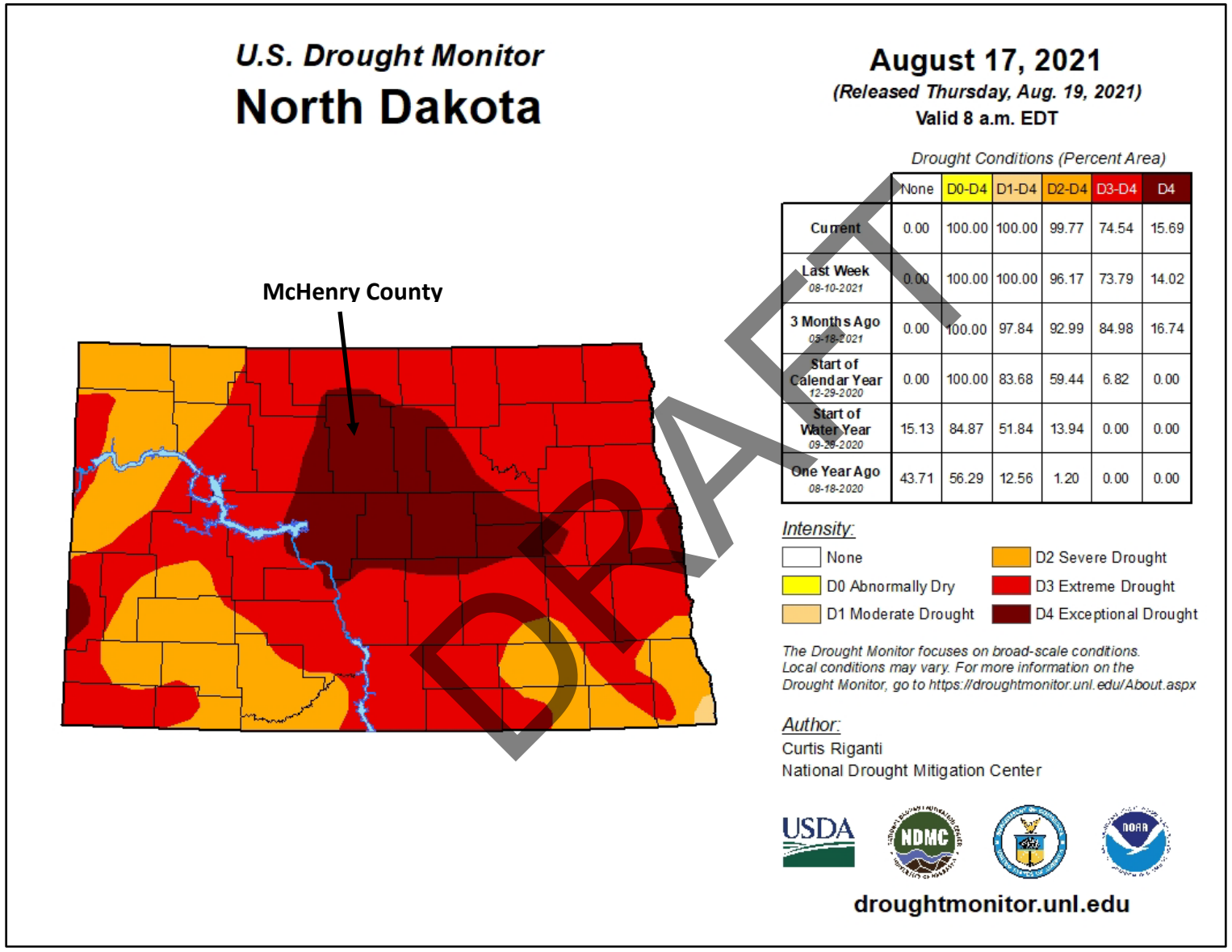
Drought has not had a direct impact on publicly-owned buildings and property in McHenry County. Loss of water supply would influence the function of publicly-owned buildings and property, but not cease operation altogether. Disruptions in service and extended periods of closure may occur. Drought would threaten publicly-owned buildings and property from the increase in fire threat and the potential decrease in available water for fire suppression.

A summary of publicly-owned buildings is provided in Chapter 3, Profile and Inventory.

Vulnerabilities of Critical Facilities and Infrastructure

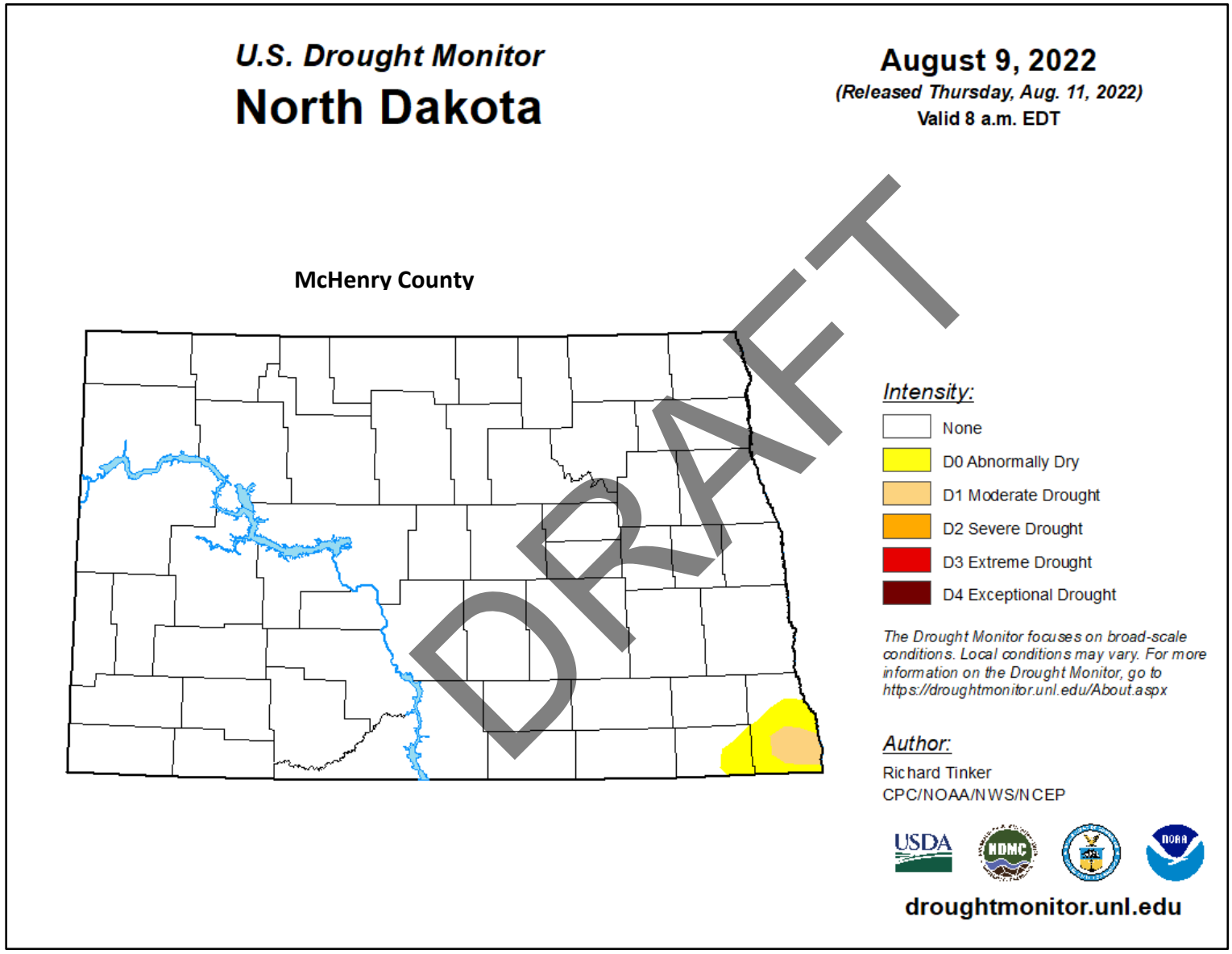
Critical facilities that rely on water for operation and continued use are most vulnerable to drought. In McHenry County, the McHenry County Courthouse, fire and ambulance halls, drinking/potable water, an sanitary lagoon/sewer systems rely on water to maintain continuous operation. The cities of Anamoose, of Velva's drinking/potable water system is a source of water for North Prairie Regional Water District. Large employers in the agriculture and manufacturing sectors can be negatively affected by drought and are viewed as critical facilities, depending on the number of people they employ and the impact they have on local economies.

Figure 4.5.2 – August 17, 2021, U.S. Drought Monitor, North Dakota



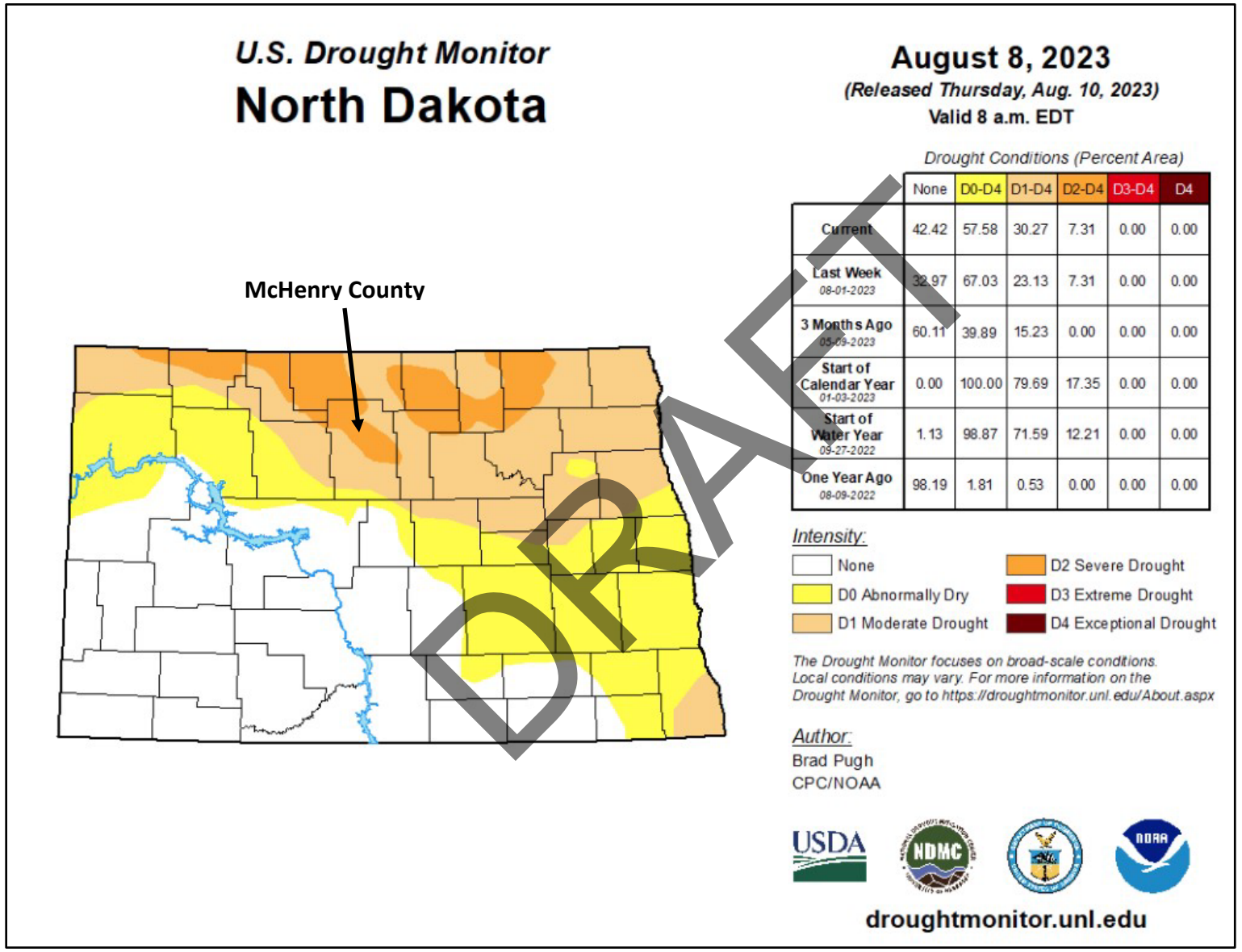
Source(s): U.S. Drought Monitor

Figure 4.5.3 – August 9, 2022, U.S. Drought Monitor, North Dakota



Source(s): U.S. Drought Monitor

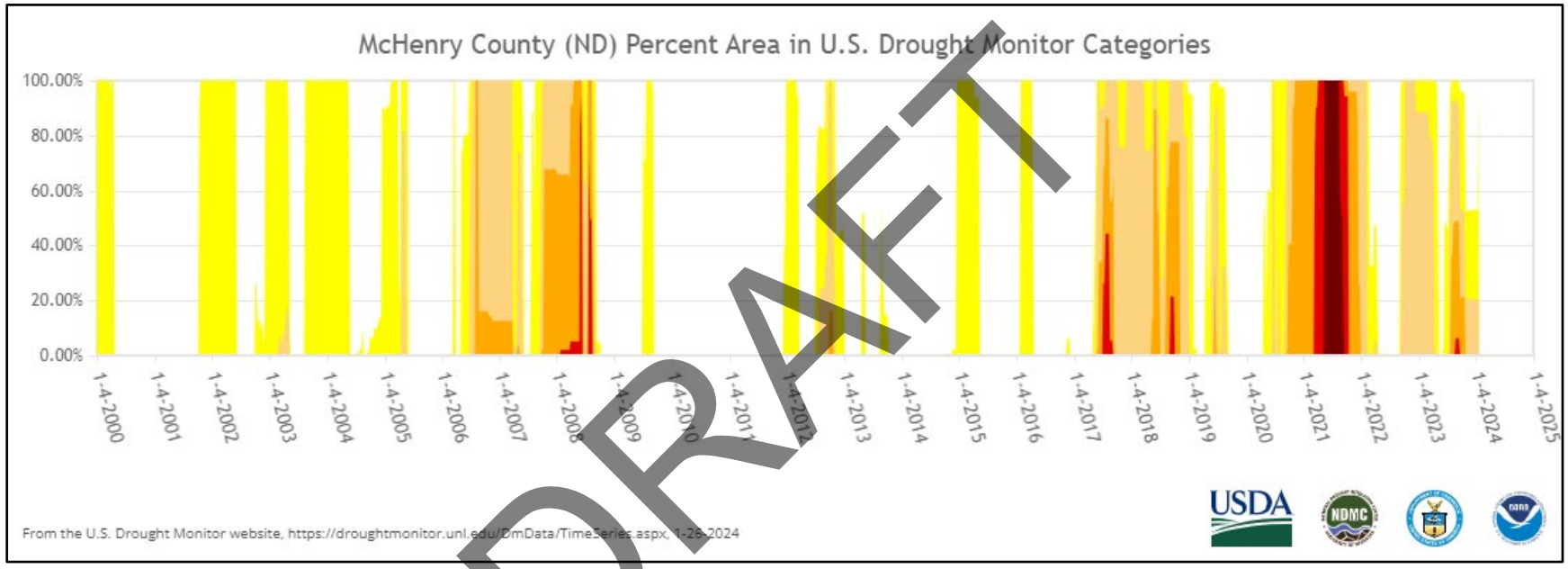
Figure 4.5.4 – August 8, 2023, U.S. Drought Monitor, North Dakota



Source(s): U.S. Drought Monitor

Figure 4.5.5 shows the time series of drought for McHenry County. North Dakota, from January 4, 2000, to January 4, 2025, and the percentage of the county and its respective drought classification. The figure is shown to assist in understanding the characteristics of local drought impacts. As seen in the figure, McHenry County, North Dakota, has had a majority of abnormally dry conditions every year with brief periods of moderate drought mixed with small instances of severe and extreme drought between 2006 and 2007, 2012 and 2013, the summer of 2017, and 2020/2021.

Figure 4.5.5 – January 4, 2000, to January 4, 2025, McHenry County, North Dakota, Drought Time Series



Source(s): U.S. Drought Monitor

Table 4.5.2 – McHenry County, North Dakota, Drought Risk Assessment

Impact	• Crop Loss • Loss of Economy • Loss of Livestock • Loss of Wildlife Habitat • Increase in Wildland Fire Potential • Water quality compromised from lakes and stock dams • Diminished soil health and air quality from dust • Negative impact on mental health of producers and first responders – "community impact" • Soil erosion	• Local producers forced to reduce herd sizes and restructuring of harvest usage • **Between January 1, 2001, and December 31, 2023, McHenry County experienced 640 incidents of crop loss due to drought impacting approximately 818,945.27 acres of crops totaling $87,976,438.97 in losses. (USDA, RMA)**
Frequency	• Severe Drought of 1961/1962, 1988/1989 through 1991/1992, 2012/2013, 2017, 2020/2021 • Summer of 2017 and 2020/2021 local producers forced to sell off portions of their herds • End of July through winter of 2017 and 2020/2021 – county reached exceptional drought status • **Severe drought conditions winter 2020/2021 and summer/fall 2021** • **CRP was released from haying during severe years** • **In 2021, McHenry County was affected greatly by drought. The county was in the D4 category on the drought monitor for an estimated 18 consecutive weeks. A main concern during the drought was water quality issues and forage nitrate issues.**	• **Based on 11 state declared emergency orders, on presidential, and 21 USDA Secretarial Declarations pertaining to drought between 1976 and 2023, the probability of drought is 68.8 percent in any given year.** • **According to crop loss data from the USDA-RMA, McHenry County experienced $3,825,062.56 in annualized crop damage impacting 35,606.32 acres resulting in approximately 27.8 annual claims of indemnity between 2001 and 2023.** • **McHenry County incurred $73,297,944.97 in crop indemnity between 2017 and 2023, resulting in an annualized loss of $12,216,324.16 (2023 N.D. State Enhanced Mitigation MAOP)** • **FSA activated the Livestock Forage Program in 2012, 2017, and 2020/2021**

Table 4.5.2 – McHenry County, North Dakota, Area Drought Risk Assessment – Continued

Likelihood	More Likely • Dry/wet cycle every five to 10 years • Climatic patterns will result in an eventual drought of significance • Lack of precipitation (rain and snow) • Weather patterns becoming more irregular and extreme • Timing of rain impacts likelihood in any given year • Lack of subsoil moisture • High temperature and high winds	Less Likely • Heavy precipitation (rain and snow) • Producers and incorporated jurisdctions work with state and rural water to develop water conservation measures • Timing of rain impacts likelihood in any given year • Low temperatures and low winds
Vulnerability	More Vulnerable • Agriculture economy (crops and livestock) • Loss of economy from decreased wildlife & hunting • Elderly population • Flat terrain/open topography contributes to conditions • Pastureland adjacent to structures and city limits • Lack of water sources for drought relief (crops and livestock) and suppression of fires resulting from decreased water resources • Lack of irrigation systems in some areas of the county • Tillage systems for crops • Presence of lighter soil (sand and gravel) in McHenry County • **Presence of aquifers or source water, which are used for livestock and municipal water sources, can be depleted during droughts of significance**	Less Vulnerable • Financial assistance programs made available by the state and federal government • Burn Restrictions • Fire Index monitoring and mapping from NDDES • Drought Monitor updating drought conditions on a weekly basis (every Thursday) • Advanced communications such as internet and TV • Education and outreach by county emergency management, FSA, NRCS, NDSU Extension, Emergency Management • **Incorporated jurisdictions with water towers and water storage** • **Regional (rural water) systems** • **Irrigation systems in some areas of the county** • **No-till farming practices in use across the county** • **Presence of CRP** • **Presence of aquifers for water supplies** • **N.D. Agriculture Weather Network**

Table 4.5.2 – McHenry County, North Dakota, Area Drought Risk Assessment - Continued

Capability	Administrative and Technical • Active county commission and part-time emergency manager • NDSU Extension/McHenry County • Farm Service Agency (FSA) and Natural Resource Conservation Service (NRCS) • Contracts for engineering, planning and grant writing • GIS services provided through the USDA, state of North Dakota, and contracted at the county-level (Sidwell) • County-wide mutual aid agreements • USDA Emergency Board • McHenry County Soil Conservation District (SCD) • N.D. Agriculture Weather Network • **North Dakota State University (NDSU) Climatologist** • **Stockmen's Association** • **NDAWN Station (Karlsruhe). A second NDAWN is needed for a second station in northern McHenry County.** Education and Outreach • **McHenry County Emergency Management has education and outreach on the county website and social media** • Farm Service Agency (FSA) and Natural Resource Conservation Service (NRCS) • McHenry County Soil Conservation District (SCD) • NDSU Extension/McHenry County Financial • FSA has programs designed to financially assist farmers in times of need (FLP, LIP, LFAP – all cattle) • N.D. Dept. of Agriculture • NRCS (ECP – all cattle) • USDA, Risk Management Agency crop insurance subsidized by federal government • USDA Rural Development-REAP grants • Rural water district Planning and Regulatory • **Burn Restrictions implemented by county commission and emergency management** • State implements burn restrictions • Farmers receiving USDA benefits required to have a highly erodible plan of operation • Drought management and water conservation plans at the county and city level • Rural Water Districts – have drought management and water conservation plans

Vulnerabilities to New and Future Development

The greatest vulnerability from drought to new and future development would be underground water sources, the agriculture industry, and energy development. New and future development has the potential to diminish underground sources of water with increases in population and economic activity as municipal water is sourced from the city of Velva for city residents and rural water. Incorporated jurisdictions and individuals with wells and septic systems are not regulated and are more susceptible to drought.

The agriculture sector is becoming increasingly precision-based with advanced technological systems, which can simultaneously increase and decrease the demand for water and the vulnerability of drought in McHenry County.

With the possibility of future extreme climate variability, the state can expect drought conditions affecting certain counties and regions to occur more frequently. It is anticipated that drought will impact McHenry County with more frequency and increased severity in the future.

Data Limitations

A data limitation for understanding impacts from drought is the difficulty in identifying the true extent of the drought in terms of time, or when a drought begins and when a drought concludes. Characteristics of drought are hard to distinguish between periods of dryer than normal conditions and cyclical weather patterns. Droughts tend to impact areas slowly and is not sudden like other hazards such as severe winter weather or flooding. In addition, impacts of drought are far-reaching and tend to have a trickle-down effect on many sectors of the economy. Therefore, a process to determine near accurate loss estimates for drought is challenging, at best.

National Climatic Data Center/National Oceanic and Atmospheric Administration

The hazard history provided in terms of property damage and crop damage (which are only estimates) is calculated based on what the National Weather Service received from insurance companies and individual property owners upon request. Both sources have been reluctant to share that information. Therefore, both practices were discontinued. Because of this, the National Weather Service makes a best guess using all available data at the time of the publication. The damage amounts are received from a variety of sources. Property and crop damage should be considered as a broad estimate.

The hazard history provided through the National Climatic Data Center/National Oceanic Atmospheric Administration's Storm Events Database contains data as entered by NOAA's National Weather Service (NWS). Due to changes in the data collection and processing procedures over time, there are unique periods of record available depending on the event type. The following timelines show the different time spans for each period of unique data collection and processing procedures. **Drought was not recorded as a separate incident until 1996. Therefore, the drought of 1988/1989 through 1991/1992, which was a significant event in recent North Dakota history, was not listed as impacting McHenry County when hazard history was taken from the National Climatic Data Center.**

1. **Tornado:** From 1950 through 1954, only tornado events were recorded.

2. Tornado, Thunderstorm Wind and Hail: From 1955 through 1992, only tornado, thunderstorm wind and hail events were keyed from the paper publications into digital data. From 1993 to 1995, only tornadoes, thunderstorm wind and hail events have been extracted from the Unformatted Text Files.

3. All Event Types (48 from Directive 10-1605): From 1996 to present, 48 event types are recorded as defined in NWS Directive 10-1605.

U.S. Dept. of Agriculture, Farm Service Agency

According to the Farm Service Agency, crop loss due to drought is calculated at harvest time due to planted acres determined at the beginning of the season. Therefore, the data could be skewed due to prior impacts from other hazards.

Other Key Documents

This plan incorporates data from the following documents and information herein will be used in future updates.

- 2023 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP)
- Burn Restrictions
- Farm Service Agency's Annual Yield Estimate Reporting
- McHenry County Comprehensive Plan (2019)
- McHenry County Commercial Animal Feed Operation Ordinance
- McHenry County Evacuation Plan through McHenry County Emergency Management
- McHenry County Local Emergency Operations Plan through McHenry County Emergency Management
- McHenry County Mass Care Plan through First District Health Unit
- McHenry County Shelter Plan through McHenry County Emergency Management
- McHenry County Threat and Hazard Identification and Risk Assessment (THIRA)
- National Agricultural Statistics Service's (NASS) Crop Progress and Condition Report
- National Drought Mitigation Center's Drought Condition Monitoring Observations Report (CMOR)
- North Dakota Continuity of Operations Plan
- North Dakota Drought Response Plan
- North Dakota Emergency Operations Plan, Drought Annex
- North Dakota State Disaster Recovery Plan
- North Dakota State Preparedness Report (SPR)
- North Dakota Threat and Hazard Identification and Risk Assessment (THIRA)

4.6 Fire

Including urban fire/structure collapse, rural fire, and wildland fire.

Characteristics

Fire is the rapid oxidation of a material in the exothermic chemical process of combustion, releasing heat, light, and various reaction products.

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

Structure Collapse. Structure collapse occurs when the forces of gravity or other external forces overcome the structural integrity of a building. The reasons for structure collapse can vary from poor construction to explosions to extreme winds to heavy snow loads. Structure collapse can trap occupants and damage property. In Pierce County, North Dakota, numerous commercial, private elevators, and large storage bins could be subject to structure collapse. Cattle operations have large cattle confinement structures that are also at risk of collapse. Urban fire/structure collapse can happen independently from other incidents.

Rural Fire. Rural fires result from farming activities whereby farm equipment may ignite a fire while haying, harvesting and other farming activities.

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

Seasonal Pattern	**Urban Fire/Structure Collapse** – None. Probability is always more prevalent in urban areas due to large concentrations of structures . **Rural and Wildland Fire** – More prevalent during summer months
Duration	**Rural and Urban Fire/Structure Collapse** – Minutes/hours/days **Wildland Fire** – Minutes/hours/days, up to weeks in exceptional cases
Speed of Onset	Little to no warning. Wildland onset is quicker during drought/low humidity, high winds, etc.
Location	**Urban Fire/Structure Collapse** – incorporated jurisdictions – Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire **Rural and Wildland Fire** – rural areas of the county but may spread to incorporated jurisdictions

For more information regarding urban fire/structure collapse and wildland fire please reference the **2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP).** The state plan can be accessed by following the electronic hyperlink or link to the N.D. Dept. of Emergency Services website:

2018 North Dakota Enhanced Mitigation Mission Area Operations Plan
https://www.des.nd.gov/planning

Chapter 4.6.1 profiles urban fire/structure collapse and Chapter 4.6.2 profiles wildland fire.

4.6.1 Urban Fire/Structure Collapse

History

Statistical information on incidents of urban fire/structure collapse is provided by the National Fire Incident Reporting System (NFIRS), McHenry County Emergency Management, local fire departments, and the 2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP).

National Fire Incident Reporting System

Table 4.6.1.1 illustrates the history of urban fire/structure collapse in McHenry County between January 1, 2000, and December 31, 2022. The following are key points.

- There were 81 structure fires, 22 vehicle fires, and 37 other fires, for a total of 109 fire calls in McHenry County, North Dakota.
- Local fire agencies responded to 24 rescue calls (22 medical and two other). Fire departments are included on medical calls when they are in response to an accident, lift assistance or a specialized rescue.
- Fire losses from fire only totaled $3,785,611.00 while combined with other losses totaled $4,719,461.00 during the same period.

Table 4.6.1.1 – January 1, 2000, to December 31, 2021, McHenry County, North Dakota Urban Fire/Structure Collapse Hazard History Summary

	Fires				Rescue Calls			Losses	
Fire Protection Agency	Structure	Vehicle	Other	Total	Medical	All Others	Total	Total Fire	Total Loss
Rugby Fire Dept.	50	22	37	109	22	2	24	$1,512,310.00	$1,661,260.00
Rugby Fire Prot. Dist.	26	64	237	327	72	9	81	$2,209,301.00	$2,994,201.00
Wolford Fire Prot. Dist.	5	10	21	36	9	0	9	$64,000.00	$64,000.00
TOTAL	**81**	**96**	**295**	**472**	**103**	**11**	**114**	**$3,785,611.00**	**$4,719,461.00**

Note: All fires, rescue calls and loss statistics are from January 1, 2005 to December 31, 2021.

Source: National Fire Incident Reporting System Summary By Incident Type

The National Fire Incident Reporting System (NFIRS) data is summarized by fire department and district and the number of structure fires, vehicle fires, and unclassified (other) fires from January 1, 2000, through December 31, 2021. This information is used to help better understand the risk of urban fire/structure collapse in McHenry County. The data was provided by the N.D. State Fire Marshal's Office. A detailed hazard history for McHenry County can be found on a disc located at the beginning of Chapter 4, Threat and Hazard Identification Risk Assessment.

McHenry County, North Dakota, Emergency Management

The history of urban fire/structure collapse from McHenry County Emergency Management is summarized in the following section.

Fire departments from neighboring counties have coverage over parts of McHenry County, North Dakota, either through mutual aid agreements or their respective fire district extends into the county. Total number

of fires reported may be more than what occurred in the county. As such, data from departments in neighboring counties was excluded to avoid skewing of data history and is shown for supportive purposes of the continued need for investment of funding into fire departments and districts in McHenry County, North Dakota.

Fire Department/Fire Protection District

Fire Department

2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP)

- According to the 2018 N.D. Enhanced Mitigation MAOP, urban fire is ranked as high for McHenry County, North Dakota.

Probability

The probability of a hazard or threat is how likely it is it will happen. Per Tables 4.6.1.1, the probability of urban fire/structure collapse in McHenry County, North Dakota, is 100 percent.

Profile meeting participants indicated the probability of urban fire/structure collapse in McHenry County, North Dakota, as possible meaning there is between a one and 10 percent chance of an incident in the next year.

National Fire Incident Reporting System (NFIRS)

- Fire departments in McHenry County, North Dakota, respond to an average of 3.68 fire calls per year between January 1, 2000, and December 31, 2021. McHenry County, North Dakota, experiences, on average, $172,073.23 in fire losses and $214,520.95 in other losses annually.

Extent/Magnitude

The extent/magnitude of a hazard or threat is expressed in the amount and/or number of damages or losses either actualized in a community or estimated based on known assets and levels of risk. The extent/magnitude of a structure fire can range anywhere from negligible for small exterior or interior fires extinguished without professional help to catastrophic for fires threatening structural integrity of critical facilities and infrastructure, sometimes resulting in loss of service or demolition. A catastrophic incident would be the total loss of the McHenry County Courthouse, Heart of America Medical Center, Heart of America Correctional and Treatment Center, an emergency services building such as a fire or ambulance hall, public schools, churches serving as storm shelters, care centers, major employers, or transportation infrastructure. In addition, if an incident were to occur at an industrial subdivision, pipeline, or Tier II site, a catastrophic hazardous material release may occur with the potential to result in tens of millions of dollars in property damage, lost economic activity, shutting down of major transportation infrastructure, or mass casualties/fatalities.

- Profile meeting participants indicated the extent/magnitude or impact of urban fire/structure collapse as catastrophic meaning more than 50 percent of the jurisdiction and its people could be affected, depending on the structure. The extent/magnitude for structure fires in terms of human

life can be categorized as catastrophic as any loss of life would have a significant impact on a community.

National Fire Incident Reporting System (NFIRS)

- Fire losses from fire only totaled $3,785,611.00 between January 1, 2000, and December 31, 2021, while combined with other losses totaled $4,719,461.00 during the same period.

McHenry County, North Dakota Emergency Management

- **2020.** The

Threat and Hazard Identification Risk Assessment (THIRA)

Table 4.6.1.2 shows the risk assessment as determined by individual jurisdictions, the Steering Committee, and meeting participants at the profile meeting for urban fire/structure collapse. The risk assessment methodology can be found in the beginning of Chapter 4, Threat and Hazard Identification Risk Assessment (THIRA). The total in the table represents the sum of each jurisdiction's impact, frequency, likelihood, and vulnerability to a hazard/threat less the jurisdiction's capabilities to respond to the hazard/threat.

Table 4.6.1.2 – McHenry County, North Dakota, Urban Fire/Structure Collapse Risk Assessment Scored Chart Summary

Jurisdiction	Impact	Frequency	Likelihood	Vulnerability	Capabilities	Total
McHenry County	5	2	3	4	2	**12**

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 4.6.1.3 provides information on the specific impact, frequency, likelihood, vulnerability, and capability of urban fire/structure collapse in McHenry County. A list of impacts identified as commonplace for natural hazards and man-made threats regardless of the jurisdiction is shown at the beginning of Chapter 4, Threat and Hazard Identification Risk Assessment (THIRA).

Table 4.6.1.3 – McHenry County, North Dakota, Urban Fire/Structure Collapse Risk Assessment

Impact	• Blocked Roads • Building Collapse • Business Interruptions/Loss of Economy • Delayed Emergency Response • Evacuation (Localized)	• Explosion • Human Injury/Death & Mass Casualties/Fatalities • Increased Fire Potential • Loss of Power/Downed Power Lines
Frequency	• Annual occurrences of structures/vehicle fires • Significant fire once every 5 to 10 years	• Local fire agencies based in McHenry County responded to 81 structure fires, 22 vehicle fires, and 37 other fires, for a total of 109 fire calls in McHenry County, North Dakota between January 1, 2000, and December 31, 2021.
Likelihood	More Likely • Close spacing and age of some structures • Increased use of electric heaters and devices • Outdated electric wiring and heating systems in older homes/buildings • Older trees and unkept vegetation in cities • Agriculture-related industries based in county • Increased fuel costs leads to more wood burning	Less Likely • Smoke detectors required by code • Adequately-equipped fire departments with volunteers • Annual inspections of commercial properties by the local and state fire marshal • Updated furnaces and/or heating devices • McHenry County Burn Restrictions • Fire Safety Prevention Week
Vulnerability	More Vulnerable • Close spacing and age of some structures • Increased use of electric heaters and devices • Outdated electric wiring and heating systems in older homes/buildings • Older trees and unkept vegetation in cities • Agriculture-related industries based in county • Lack of building code enforcement	Less Vulnerable • Smoke detectors required by code • Well-equipped fire departments with volunteers • Annual inspections of commercial properties by the local and state fire marshal • Less people burn wood in fireplaces in homes • Updated furnaces and/or heating spaces • McHenry County Burn Restrictions • Fire Safety Prevention Week • Sprinkler systems at Haaland Home, Heart of America Medical Center, Heart of America Correctional and Treatment Center (HACTC) • **Lack of shrinking volunteerism for fire protection**
Capability	• See Chapter 7 for a list of capabilities to address urban fire/structure collapse.	

Vulnerabilities to Publicly-Owned Buildings and Property

All publicly-owned buildings and property are vulnerable to urban fire/structure collapse. The risk to the hazard depends on the location of the building and if it is equipped with fire suppression mechanisms, such as sprinkler systems and smoke detectors, among others. Risk to publicly-owned buildings and property also depends on the proximity of fire suppression equipment and response times from fire departments/districts. The McHenry County Courthouse lacks sprinkler systems and possess outdated electrical wiring. Older publicly-owned buildings may be more susceptible to fire being built prior to building and electrical codes. Publicly-owned buildings with flat roofs are more at risk to building collapse from snow loads. Flat-roofed buildings, whether publicly-owned or privately owned, are typically located in the downtown area or older and/or more established neighborhoods of incorporated jurisdictions.

A summary of publicly-owned buildings is provided in Chapter 3, Profile and Inventory.

Vulnerabilities of Critical Facilities and Infrastructure

Like publicly-owned buildings and property, critical facilities and infrastructure are vulnerable to urban fire/structure collapse. If an incident were to occur, the critical facility or infrastructure impacted could result in loss of or delay in services. A fire affecting critical infrastructure such as power lines, water wells, or lift stations could leave residents without power, drinking/potable water, or sanitary sewer, depending on the severity of the incident. Loss of communications (the McHenry County Public Service Answering Point at the Heart of America Correctional and Treatment Center) from fire can also occur and result in an outage of local 9-1-1 dispatching services, or daily operations of critical facilities and infrastructure. Communication infrastructure suspended in the air and not buried underground is most vulnerable.

Vulnerabilities to New and Future Development

New and future development could be more vulnerable in communities that lack building codes. Buildings in jurisdictions that lack building codes could be more susceptible to snow loads, structural instability, and may lack fire suppression systems. McHenry County and incorporated jurisdictions have adopted the state building codes, which cover new and future development in the county. Adoption and enforcement of building codes should reduce the risk and vulnerability to new and future development. However, no incorporated jurisdictions in McHenry County have building code enforcement.

An inventory of household units by type by jurisdiction in McHenry County is shown in Chapter 3, Profile and Inventory.

Strengthening and enforcement of building codes would mitigate impacts from the hazard as populations grow and more people are at risk of injury and potential death. This mitigation project for the county can be found in Chapter 6, Mitigation Strategy.

Data Limitations and Other Key Documents

National Fire Incident Reporting System (NFIRS)

The NFIRS data does not distinguish between an urban fire and structure collapse. As a result, there is difficulty in determining the true probability and overall impact of structure collapse. Fire department and district boundaries also cross county lines as fire departments/districts from neighboring counties have coverage over parts of McHenry County through mutual aid agreements. As a result, the total number of fires reported may be more than what occurred in the county. Smaller and rural fire departments/districts do not tabulate history and therefore, it is difficult to determine impact, frequency, likelihood and overall probability. Also, the lack of a definition of the 'Other Fires' category in data from NFIRS limits the understanding of the hazard to develop appropriate mitigation strategies.

North Dakota State Fire School

According to local fire department chiefs across the state, the North Dakota State Fire School has instructed fire chiefs to not report dollar losses when reporting fire incidents. The reason being due to potential legal ramifications or liability of the local department/district when losses occur.

This plan incorporates data from the following documents and information from this plan will be incorporated in the update of the following documents.

- 2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP)
- Annual Reports – local fire departments
- McHenry County, North Dakota, Comprehensive Plan (2019)
- McHenry County, North Dakota, Commercial Animal Feed Operation Ordinance
- McHenry County, North Dakota, Evacuation Plan through McHenry County Emergency Management
- McHenry County, North Dakota, Local Emergency Operations Plan (LEOP)
- McHenry County, North Dakota, Mass Care Plan through First District Health Unit, McHenry County
- McHenry County, North Dakota, Shelter Plan through McHenry County Emergency Management
- McHenry County, North Dakota, Threat and Hazard Identification and Risk Assessment (THIRA)
- Local Fire Department/Protection District Standard Operations Procedures (SOP)
- North Dakota Continuity of Operations Plan
- North Dakota Emergency Operations Plan, Fire Annex
- North Dakota State Disaster Recovery Plan
- North Dakota State Preparedness Report (SPR)
- North Dakota Threat and Hazard Identification and Risk Assessment (THIRA)

4.6.2 Wildland Fire (including Rural)

History

Statistical information on incidents of wildland fire is provided by the National Oceanic and Atmospheric Administration's (NOAA) National Climatic Data Center (NCDC); U.S. Dept. of Agriculture (USDA), Risk Management Agency (RMA); NDSU/ND Forest Service; 2023 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP), and McHenry County Emergency Management.

National Oceanic and Atmospheric Administration's National Climatic Data Center

- According to the NOAA's NCDC, no incidents of wildland fire have occurred in McHenry County, North Dakota.

U.S. Dept. of Agriculture, Risk Management Agency

- Crop loss from wildland fire is tracked by the USDA, RMA. The RMA provides data on the crop type affected, damage cause description, determined acres and indemnity amount. The damage cause description identities the cause of damage, determines acres identifies the number of acres lost due to damage, and the indemnity amount identifies the total amount of the loss for the designated peril. **Between January 1, 2001, and December 31, 2023, McHenry County experienced four incidents of crop loss due to wildland fire impacting approximately 183.8 acres of crops totaling $12,766.00 in losses.**

NDSU/ND Forest Service

- Table 4.6.2.1 shows wildland fire history in McHenry County, North Dakota, from 2017 to 2022. A total of 159 wildland fires were reported between 2017 and 2022 impacting a total of 4,311.20 acres. On average, 26.50 wildland fires occur in McHenry County, North Dakota, annually impacting 718.53 acres.

2023 N.D. Enhanced Mitigation MAOP

- A statewide fire emergency declaration and burn restrictions are issued in response to extremely dry conditions, local/tribal burn bans and fire restrictions declared throughout the state, Fire Weather Watches, and Red Flag Warnings issued by the National Weather Service, unseasonably warm temperatures, low humidity, and high winds. Table 4.6.2.2 shows the history of statewide fire emergency declarations in North Dakota. **According to the 2018 N.D. Enhanced Mitigation MAOP, between 1980 and June 26, 2017, the state of North Dakota had declared 17 fire emergencies.**

- **There have been no locally declared disasters or emergencies pertaining to wildland fire in McHenry County. See Table 4.6.2.2 for a list of statewide fire emergencies declared in North Dakota.**

McHenry County, North Dakota, Emergency Management

- **April 1 to April 3, 2021.** A wildland fire occurred at unincorporated Pleasant Lake in

neighboring Benson County impacting approximately 300 acres. Rugby Fire Department responded to the incident for three days due to re-ignition of the fire from surrounding vegetation and fuel.

Table 4.6.2.1 – 2017 to 2022 McHenry County, North Dakota, Wildland Fire History

	2017		2018		2019		2020		2021		2022	
Cause	**Fires**	**Acres**	**Fires**	**Acres**	**Fires**	**Acres**	**Fires**	**Acres**	**Fires**	**Acres**	**Fires**	**Acres**
Arson	--	--	--	--	--	--	--	--	--	--	4	126.25
Campfire			2	2.10								
Children	--	--			--	--	--	--	--	--	--	--
Debris Burning	5	9.00	3	183.00	7	272.00	6	75.00	15	62.75	3	36.00
Equipment Use	7	44.00	6	79.00	4	45.00	1	2.00	15	543.70	2	15.50
Lightning	--	--	1	1.00	--	--			6	616.00	2	5.00
Miscellaneous	13	210.00	4	93.00	3	2.50	9	10.00	19	1610.10	10	18.50
Railroads	--	--	3	153.00			--	--	5	92.30	--	--
Smoking	--	--	2	2.00	--	--	1	0.50	1	2.00	--	--
TOTAL	**25**	**263.00**	**21**	**513.10**	**14**	**319.50**	**17**	**87.50**	**61**	**2,926.85**	**21**	**201.25**
Class	**Fires**	**Acres**	**Fires**	**Acres**	**Fires**	**Acres**	**Fires**	**Acres**	**Fires**	**Acres**	**Fires**	**Acres**
Class A - 0.25 acres or less	--	--	1	0.10	--	--	4	0.5	8	0.85	2	0.25
Class B - 0.26 to 9 acres	20	43.00	13	23.00	8	9.50	11	17.00	34	59.00	14	26.00
Class C - 10 to 99 acres	4	120.00	5	240.00	5	210.00	2	70.00	12	322.00	4	55.00
Class D - 100 to 299 acres	1	100.00	2	250.00	1	100.00	--	--	3	470.00	1	120.00
Class E - 300 to 999 acres	--	--	--	--	--	--	--	--	4	2075.00	--	--
Class F - 1,000 to 4,999 acres	--	--	--	--	--	--	--	--	--	--	--	--
Class G - 5,000 to 9,999 acres	--	--	--	--	--	--	--	--	--	--	--	--
Class H - 10,000 to 49,999 acres	--	--	--	--	--	--	--	--	--	--	--	--
Class I - 50,000 to 99,999 acres	--	--	--	--	--	--	--	--	--	--	--	--
Class J - 100,000 to 499,999 acres	--	--	--	--	--	--	--	--	--	--	--	--
Class K - 500,000 to 999,999 acres	--	--	--	--	--	--	--	--	--	--	--	--
Class L - 1,000,000+ acres	--	--	--	--	--	--	--	--	--	--	--	--
TOTAL	**25**	**263.00**	**21**	**513.10**	**14**	**319.50**	**17**	**87.50**	**61**	**2,926.85**	**21**	**201.25**

Source(s): NDSU/ND Forest Service

Table 4.6.2.2 – 1980 to June 26, 2017, North Dakota, Statewide Fire Emergency Declarations

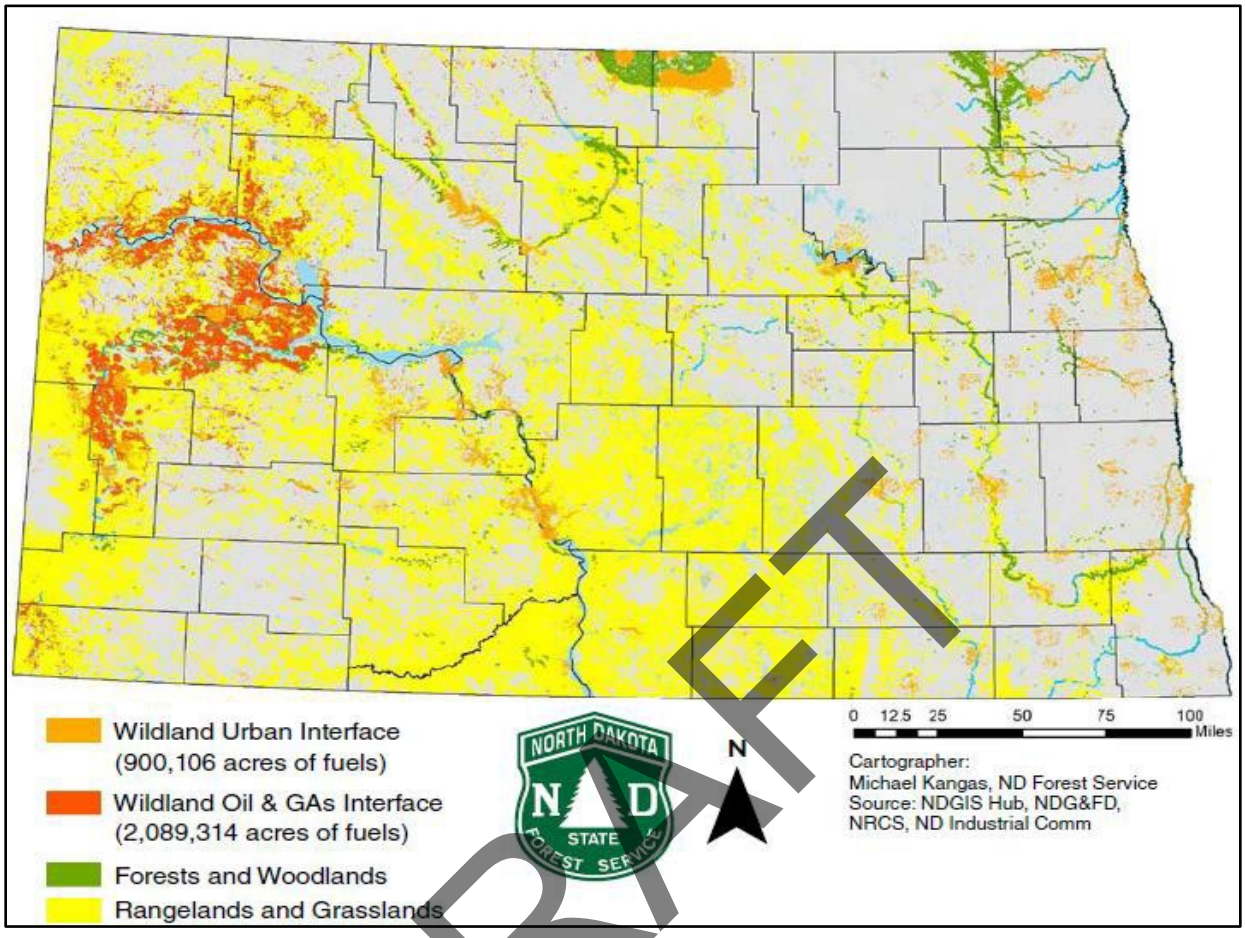
Declaration	Location	Date	Magnitude
State EO	North Dakota	1980	State Declared Fire Disaster
State EO	North Dakota	1981	State Declared Fire Disaster
State EO	North Dakota	1988	State Declared Fire Disaster
State EO	North Dakota	1990	State Declared Fire Disaster
State EO	North Dakota	1999	State Declared Fire Disaster
State Request	North Dakota	2000	Governor's Request for USDA assistance for Montana Wildfires
State EO	North Dakota	2000	State Declared Fire Disaster
State EO	North Dakota	2002	State Declared Fire Disaster
State EO	North Dakota	2004	State Declared Drought Disaster/Fire Danger Emergency
State EO	North Dakota	2005	State Declared Fire Disaster
State EO 2005-01	North Dakota	3/10/2005	State declared drought disaster and fire danger emergency
State EO 2006-06	North Dakota	6/28/2006	State declared rural fire emergency potential
State EO 2008-01	North Dakota	4/25/2008	State declared fire emergency
State EO 2012-02	North Dakota	3/30/2012	State declared fire emergency
State EO 2012-09	North Dakota	9/5/2012	State declared fire emergency
State EO	North Dakota	4/1/2015	State declared fire emergency
State EO 2017-07	North Dakota	6/26/2017	Statewide fire and drought emergency

Source(s): 2018 N.D. Enhanced Mitigation MAOP

Probability

The probability of a hazard or threat is how likely it is it will happen. Profile meeting participants indicated the probability of wildland fire in McHenry County is highly likely meaning there is a 100 percent chance in the next year of an occurrence of the hazard.

The probability of a wildland occurrence can be measured by the presence and extent of the wildland-urban interface. The population living and/or number of housing units in rural residential areas in McHenry County has increased over the last five years.



Source(s): USDA Forest Service, 2023; 2023 N.D. Enhanced Mitigation MAOP

NDSU/N.D. Forest Service

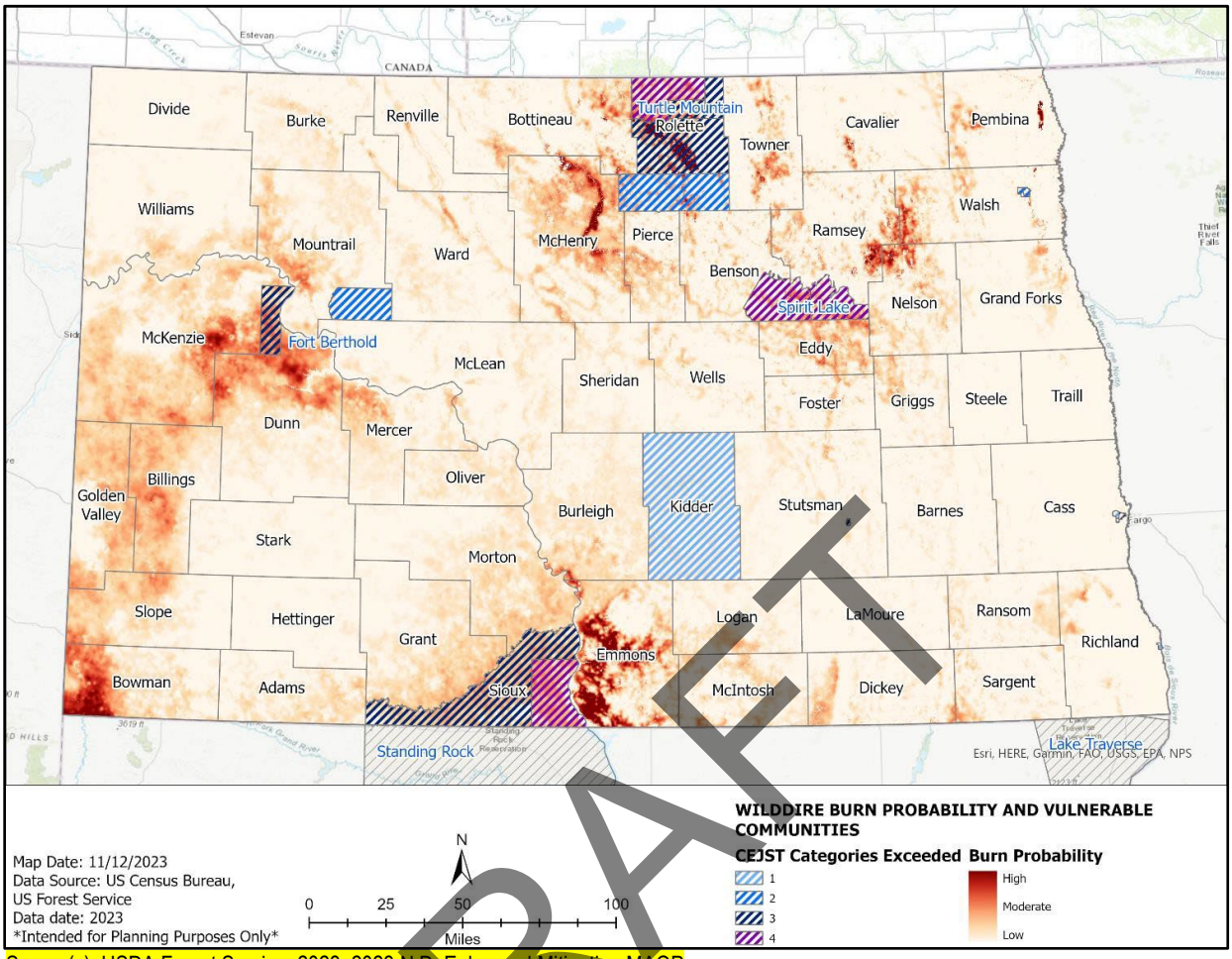
- Table 4.6.2.1 shows wildland fire history in McHenry County, North Dakota, from 2017 to 2022. A total of 73 wildland fires were reported between 2017 and 2022 impacting a total of 2,101.50 acres. On average, 12 wildland fires occur in McHenry County annually impacting 350.25 acres.

2023 N.D. Enhanced Mitigation MAOP

The Climate and Economic Justice Screening Tool (CEJST) is a product from the Council on Environmental Quality (CEQ) which has datasets that are indicators of burdens in eight categories: climate change, energy, health, housing, legacy pollution, transportation, water and wastewater, and workforce development (CEQ, 2023). The purpose of the CEJST is to help identify disadvantaged communities, and with that knowledge the state can better direct, assist, and leverage resources to the most vulnerable communities. CEJST scores range from 1 to 4, with four signifying higher levels of vulnerability.

- The probability of wildland fires can be linked to emergency declarations. Table 4.6.2.3 shows statewide fire emergency declarations in North Dakota between 1980 and June 2017. A total of 17 fire emergency declarations were issued resulting in an overall probability of 45 percent.

Table North Dakota Climate and Economic Justice Screening Tool Burn Probability



Source(s): USDA Forest Service, 2023; 2023 N.D. Enhanced Mitigation MAOP

Extent/Magnitude

The extent/magnitude of a hazard or threat is expressed in the amount and/or number of damages or losses either actualized in a community or estimated based on known assets and levels of risk. Profile meeting participants indicated the magnitude or impact of wildland fire as catastrophic meaning more 50 percent of people and property in McHenry County, North Dakota, could be affected. In terms of extent/magnitude, smaller and less severe fires are more frequent with larger and more severe fires happening sparingly. The probability of wildland fires fluctuates based on season, local weather patterns, traffic conditions, among other variables. The chance of wildland fires increases during summer months when the agriculture sector is in full force and natural vegetation can become dry due to extreme heat. Larger fires can skew averages as one large incident can offset many smaller incidents.

NDSU/N.D. Forest Service

- The extent/magnitude of wildland fire in McHenry County, North Dakota, can be measured by the single-largest wildland fire occurring within the county. According to data provided by the NDSU/N.D. Forest Service, Class E wildland fires are those impacting between 300 and 999 acres. In 2021, a fire impacting 139.0 acres occurred in McHenry County, North Dakota.

2018 N.D. Enhanced Mitigation MAOP

The extent/magnitude of wildland fire in McHenry County, North Dakota, can also be determined by using data provided by the 2018 N.D. Enhanced Mitigation MAOP. The following are key points.

- McHenry County, North Dakota, has $2,859,500.00 (2013 dollars) in housing unit values in high and moderate wildfire risk areas.

- McHenry County, North Dakota, has 66 people and 35 housing units in the High and Moderate Wildland Urban Interface Threat Zones; 44 people and 26 housing units in high-risk areas, and 22 people and nine housing units in moderate risk areas.

Wildland-Urban Interface (WUI)

The probability of wildland fire impacting people and property depends on the Wildland-Urban Interface (WUI). WUI is the zone of transition between unoccupied land and human development. Communities that are within 0.5 miles of the zone may also be included. These lands and communities adjacent to and surrounded by wildlands are at risk from wildland fires. There are two types of WUI: intermix and interface.

- **Intermix** refers to areas where housing and vegetation intermingle.
- **Interface** refers to areas with housing near contiguous wildland vegetation.

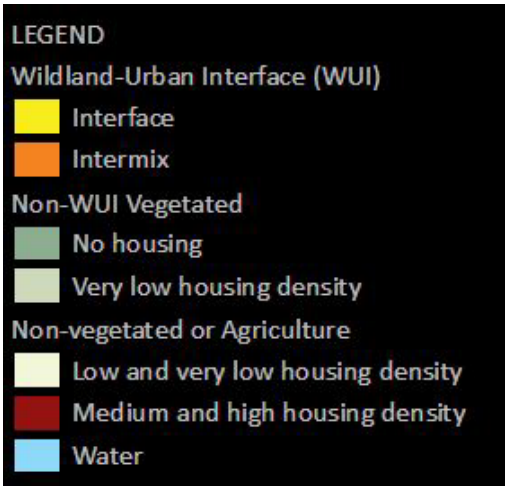
Figures 4.6.2.2 to 4.6.2.4 show the WUI for the cities of Balta, Rugby, and Wolford. The areas colored in yellow indicate the interface while areas colored in orange indicate intermix. Area colored in red indicate low and high housing density.

Figure 4.6.2.1 – North Dakota Fire Risk Index Based on 2013 WWA

Source(s): 2018 N.D. Enhanced Mitigation MAOP; 2013 West Wide Wildfire Risk Assessment (WWA)

Figure 4.6.2.1 – City of Balta, North Dakota, Wildland-Urban Interface (WUI)

Source: University of Wisconsin, Silvis Lab – Spatial Analysis for Conservation and Sustainability



The city of Balta, North Dakota, does not have a wildland fire interface or intermix according to the WUI map above. Therefore, it is assumed the city is at a lower risk to wildland fire than jurisdictions with an interface or intermix present.

Figure 5.11.2 – City of Rugby, North Dakota, Wildland-Urban Interface (WUI)

Source: University of Wisconsin, Silvis Lab – Spatial Analysis for Conservation and Sustainability

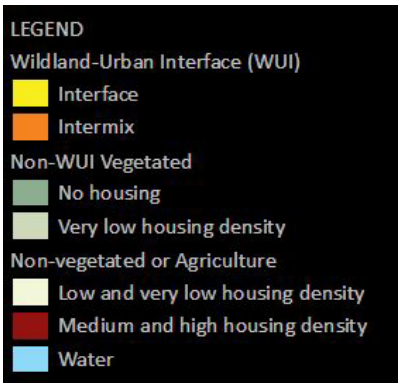
LEGEND
Wildland-Urban Interface (WUI)
- Interface
- Intermix

Non-WUI Vegetated
- No housing
- Very low housing density

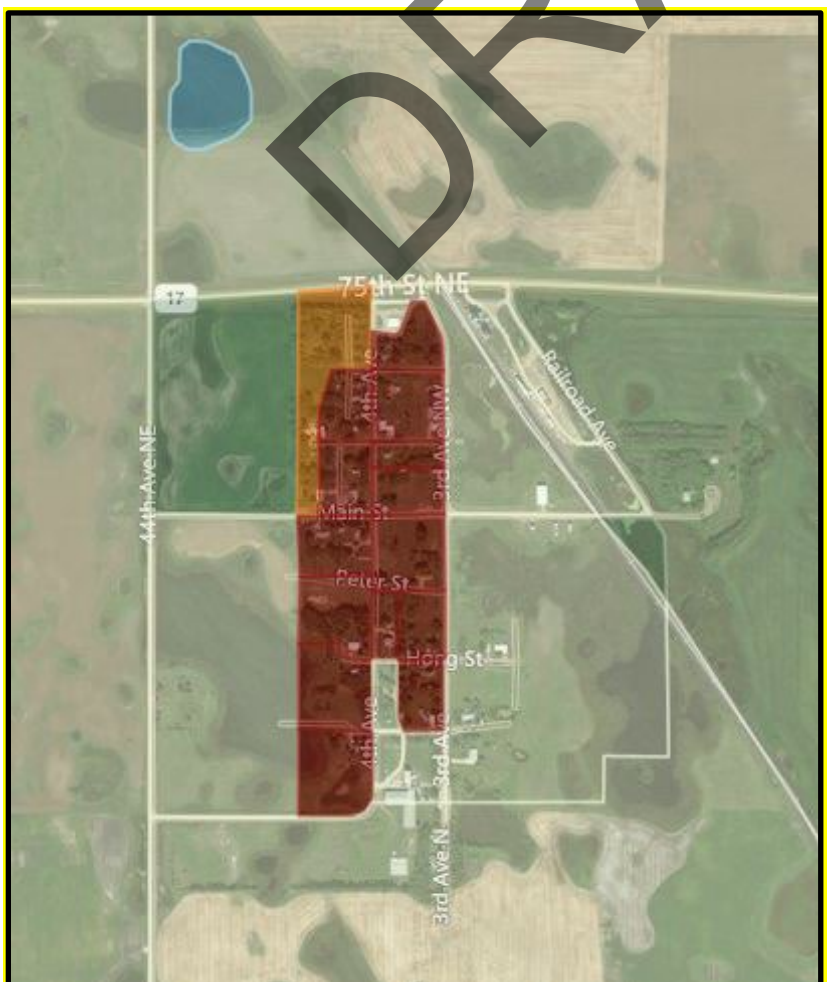
Non-vegetated or Agriculture
- Low and very low housing density
- Medium and high housing density
- Water

The city of Rugby, North Dakota, has a wildland-urban intermix according to the WUI map above. Therefore, it is assumed the city at higher risk to wildland fire in these areas as housing and vegetation intermingle. Areas of intermix in the city of Rugby include the west side of the city along 7th Ave SW and Parkland Dr. SW (Parkland Dr. Trailer Court), and a northeast section of the city bounded by the railroad tracks on the north and 2nd St SE on the south (Eastgate Trailer Court).

Figure 5.11.3 – City of Wolford, North Dakota, Wildland-Urban Interface (WUI)



The city of Wolford, North Dakota, has a wildland-urban intermix according to the WUI map above. Therefore, it is assumed the city at higher risk to wildland fire in these areas as housing and vegetation intermingle. The area of intermix in the city of Wolford is found on the northwest corner of the city along Oakland Street and Selden St.



Source: University of Wisconsin, Silvis Lab – Spatial Analysis for Conservation and Sustainability

Threat and Hazard Identification Risk Assessment (THIRA)

Table 4.6.2.4 shows the risk assessment as determined by individual jurisdictions, the Steering Committee, and meeting participants at the profile meeting for wildland fire. The risk assessment methodology can be found in the beginning of Chapter 4, Threat and Hazard Identification Risk Assessment (THIRA). The total in the table represents the sum of each jurisdiction's impact, frequency, likelihood, and vulnerability to a hazard/threat less the jurisdiction's capabilities to respond to the hazard/threat.

Table 4.6.2.4 – McHenry County, North Dakota, Wildland Fire Risk Assessment Scored Chart Summary

Jurisdiction	Impact	Frequency	Likelihood	Vulnerability	Capabilities	Total
McHenry County						
City of Balta						
City of Rugby						
City of Wolford						

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 4.6.2.5 provides information on the specific impact, frequency, likelihood, vulnerability, and capability of wildland fire in McHenry County. A list of impacts identified as commonplace for natural hazards and man-made threats regardless of the jurisdiction is shown at the beginning of Chapter 4, Threat and Hazard Identification Risk Assessment (THIRA).

Wildland-Urban Interface (WUI)

The probability of wildland fire impacting people and property depends on the Wildland-Urban Interface (WUI). WUI is the zone of transition between unoccupied land and human development. Communities that are within 0.5 miles of the zone may also be included. These lands and communities adjacent to and surrounded by wildlands are at risk from wildland fires.

There are two types of WUI: intermix and interface.

- **Intermix** refers to areas where housing and vegetation intermingle.
- **Interface** refers to areas with housing near contiguous wildland vegetation.

Figures 4.6.2.2 to 4.6.2.4 show the WUI for the cities of Balta, Rugby, and Wolford. The areas colored in yellow indicate interface while the areas colored in orange indicate intermix. The areas colored in red indicate medium and high housing density.

Table 4.6.2.5 – McHenry County, North Dakota, Wildland Fire Risk Assessment

Impact	• Building Collapse • Crop Loss • Delayed Emergency Response • Evacuation (Localized) • Explosion • Increase Fire Potential • Loss of Livestock	• Loss of Power/Downed Power Lines • Mass Casualties/Fatalities • **Property damage on a significant scale if becoming urban and transforming into a large-scale urban fire/structure collapse incident** • **Loss of farm equipment or buildings**
Frequency	• Approximately 25 wildland fires occurring annually • Controlled burns becoming out of control approximately 50 percent of the time • 90 percent of wildland fires responded to by local departments are wildland from hay land	• A total of 18.0 wildland fires were reported between 2017 and 2022 impacting a total of 229.0 acres averaging three wildland fires impacting 38.2 acres annually in McHenry County.
Likelihood	More Likely • Agricultural burn-off • High winds in conjunction with dry conditions • Drought conditions and abundant vegetation • **CRP adjacent to structures/city limits** • **Pastureland adjacent to structures/city limits** • **Changing climates and weather patterns** • **Human activity – smoking and glass bottles** • **County motor-graders striking rocks producing sparks causing fires in ditches along roadways** • **Vehicular equipment dragging on paved county and state roads/highways producing sparks** • **Rural farmsteads burning trash pits** • CP Railway and BNSF Railroad infrastructure – sparks from trains igniting surrounding interface and/or intermix • Education and outreach to permanent and recreation **Wildland-Urban Intermix present in the city of Rugby, North Dakota, at two mobile home communities – Parkland Dr. Trailer Court in western Rugby and Eastgate Dr. Trailer Court in**	Less Likely • McHenry County Burn Restrictions • Removal of CRP • Summer and winter weather with heavy precipitation • Education and outreach to permanent and recreation populations on the dangers of wildland fires by the county, state, and federal • **The non-Wildland-Urban Interface (WUI), both intermix and interface, consists of 100.00 percent of the total land area of McHenry County, North Dakota**

	northeast Rugby • **Rural residential development at Antelope Lake**

Table 4.6.2.5 – McHenry County, North Dakota, Wildland Fire Risk Assessment – Continued

Vulnerability	More Vulnerable • Agricultural burn-off • High winds in conjunction with dry conditions • Drought conditions and abundant vegetation • **CRP adjacent to structures/city limits** • **Pastureland adjacent to structures/city limits** • Large fire districts – strained coverage/resources • **Lack of reliable water sources in rural areas** • **Lack of fire breaks around incorporated cities** • **Lack of permanent generators at fire halls** • **County motor-graders strike rocks producing sparks causing fires in ditches along roads** • **McHenry County the location of an NDDOT Station, state radio tower, cell phone tower/buildings, anhydrous plants, NDAWN tower, electrical substations, electrical infrastructure** • CP Railway and BNSF Railroad infrastructure – sparks from trains igniting surrounding interface and/or intermix • **Wildland-Urban Intermix present in the city of Rugby, North Dakota, at two mobile home communities – Parkland Dr. Trailer Court in western Rugby and Eastgate Dr. Trailer Court in northeast Rugby** • **Rural residential development at Antelope Lake**	Less Vulnerable • McHenry County Burn Restrictions • Removal of CRP • Heavier precipitation than other parts of the state • MOUs with neighboring fire departments – maintaining good working relationships on a personal basis – • **Incorporated jurisdictions with limited wildland-urban interface** • **Investments in equipment for local fire departments** • **The non-Wildland-Urban Interface (WUI), both intermix and interface, consists of 100.00 percent of the total land area of McHenry County, North Dakota** • **Local fire agencies have access to rural water lines in the county** • **Lack of shrinking volunteerism for fire protection** • **Fire index sign at Rugby Fire Hall** • **Presence of man-camp ordinances at the county level decreases the risk to human-induced wildland fires**
Capability	• See Chapter 7 for a list of capabilities to address wildland fire (including rural).	

Vulnerabilities to Publicly-Owned Buildings and Property

Publicly-owned buildings and property located in the Wildland-Urban Interface (WUI) or in remote areas are vulnerable to wildland fire. The risk of the hazard depends on the building and property location, and if emergency services can reach the property in a timely manner.

An inventory of publicly-owned buildings and property is shown in Chapter 3, Profile and Inventory.

The lack of firebreaks around all incorporated cities in McHenry County, North Dakota, increases the vulnerability to publicly-owned buildings and property to wildland fire. If a wildland fire were to grow and become uncontrollable, buildings and properties would be at risk from the spread of the fire. Firebreaks can and should be implemented where the WUI poses the greatest threat to people and property. Maps of the WUI shown in this chapter illustrate where measures should be implemented to mitigate wildland fires. **The WUI Intermix, areas where housing and vegetation intermingle, consists of zero percent of the total land area in McHenry County, North Dakota.**

Vulnerabilities of Critical Facilities and Infrastructure

Like publicly-owned buildings and property, critical facilities and infrastructure are vulnerable to wildland fire. The vulnerability will vary depending on location from the wildland-urban interface. If an incident were to occur, depending on the facility or infrastructure impacted, a loss of or delay in emergency or utility services could be the result. Maps of the WUI shown in this chapter illustrate where measures should be implemented to mitigate wildland fires.

A summary of critical facilities and infrastructure is shown in Chapter 3, Profile and Inventory.

Vulnerabilities to New and Future Development

Rural homesteads on large parcels of land in remote areas are a trend in residential development in areas of North Dakota surrounding larger cities like Bismarck, Jamestown, and Minot. McHenry County should strengthen planning and zoning regulations limiting where new residential development can occur, specifically large rural lots. The vulnerability of new and future development to wildland fire also increases as the distance from fire departments and emergency services increases. Residential development in remote areas increases the opportunity for human-induced wildland fires. The presence of man-camp ordinances at the county level decreases the risk to human-induced wildland fires. **The non-Wildland-Urban Interface (WUI), both intermix and interface, consists of 100.00 percent of the total land area of McHenry County, North Dakota, as of 2020.**

Data Limitations and Other Key Documents

McHenry County fire department and district boundaries cross county lines, and therefore, provide coverage in neighboring counties. This cross-over may provide challenges to data tracking purposes.

National Association of State Foresters

- The historical data provided by the National Association of State Foresters did not indicate the county where the fire occurred.

National Fire and Aviation Management

- Information from the National Fire and Aviation Management did not provide crop or property loss, cause of the fire or the responding fire departments/districts but did include the final fire acre quantity and latitude and longitude coordinates.

National Fire Incident Management System (NFIRS)

- Information from NFIRS does not distinguish which fires were wildland in nature.

NDSU/N.D. Forest Service

- The NDSU/N.D. Forest Service reported that due to database system errors, the history of wildland fires in North Dakota was lost between 2008 and 2016.

This plan incorporates data from the following documents and information from this plan will be incorporated in the update of the following documents.

- 2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP)
- Burn Restrictions
- City of Rugby, North Dakota, Fire Department Standard Operations Procedures (SOP)
- Fire Management Plans for federal lands
- North Dakota Continuity of Operations Plan
- North Dakota Emergency Operations Plan, Fire Annex
- North Dakota Forest Service, Building Sustainable Communities Through Forestry
- North Dakota State Disaster Recovery Plan
- North Dakota State Preparedness Report (SPR)
- North Dakota Statewide Assessment of Forest Resources and Forest Resource Strategy
- North Dakota Threat and Hazard Identification and Risk Assessment (THIRA)
- McHenry County Comprehensive Plan (2019)
- McHenry County Evacuation Plan through McHenry County Emergency Management
- McHenry County Local Emergency Operations Plan (LEOP)
- McHenry County Mass Care Plan through First District Health Unit, McHenry County
- McHenry County Shelter Plan through McHenry County Emergency Management
- McHenry County Threat and Hazard Identification and Risk Assessment (THIRA)

4.7 Flood

Including closed basin, flash floods, groundwater saturation and seepage, high dam release, ice jams, levee/floodwall failure, overland flooding, and river flooding.

Characteristics

Flooding, as a natural hazard, has been a part of the county's conflict with nature throughout history and is defined as an overflow of water on land not normally covered by water. Floods are a natural phenomenon; however, flood hazards are often both intensified and mitigated by man-made interference with nature.

Flooding, as a natural hazard, has been a part of the county's conflict with nature throughout history and is defined as an overflow of water on land not normally covered by water. Floods are a natural phenomenon; however, flood hazards are often intensified by man-made interference with nature.

A brief description of the types of flooding are as follows and was provided by the 2023 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP):

- **Closed Basin:** Flooding in a closed basin occurs when surface water cannot flow naturally out of the basin as a river does (until a natural overflow elevation is reached), and therefore, normally dry locations can fill in with water during wet periods.

- **Flash Floods:** Flash flooding occurs when heavy rain falls in such a short time that the soil cannot absorb it and/or drainage systems (natural or human-made) cannot carry the volume of water away as quickly as it accumulates.

  A flash flood is usually caused by severe thunderstorms, heavy rains on snowpack, slow moving storms, dam, dike, or levee failures, or ice jam releases. Flash floods can occur anywhere when a large volume of water inundates an area over a short time period. Because of the localized nature of flash floods and variables in rainfall amounts and duration, clearly defined areas prone to flash flooding are difficult to identify.

- **Groundwater Seepage:** Groundwater seepage occurs when water (originating from rainwater and soaks into the ground filling available space in the soil) flows or collects beneath the ground and makes its way back to the surface.

- **High Dam Release:** High dam release flooding is caused by intentional water release from dams to prevent water from breaching a spillway or the ends of the dam. A high dam release is typically a slow release of water from the dam over time but can cause flooding in surrounding areas.

- **Ice Jams:** Flooding can also result from ice jamming or blockage along streams. Ice breaking up into pieces, called flows, move along with the flowing rivers or streams. The ice flows can jam at curves, narrow places in the channel, structures, river/stream confluences, or where there is a sharp decrease in riverbed gradient, creating an effective dam that produces water backup and

overflow. Ice jams can cause considerable increases in upstream water levels, while at the same time downstream water levels may drop.

- **Levee/Floodwall Failure:** Levees are earth embankments constructed along rivers and coastlines to protect adjacent lands from flooding. Floodwalls are concrete structures, often components of levee systems, designed for urban areas where there is insufficient room for earthen levees. Levees are usually engineered to withstand a flood with a computed risk of occurrence. When a larger flood occurs and/or levees and floodwalls and their appurtenant structures are stressed beyond their capabilities to withstand floods, levee failure can result in loss of life and injuries as well as damage to property, the environment, and the economy.

- **Overland Flooding:** Overland Flooding occurs when flood waters flow overland from an outside source or body of water onto dry land and seeps into buildings and/or infrastructure.

- **Riverine Flooding:** Riverine flooding originates from a body of water, typically a river, creek, or stream, as water levels rise onto normally dry land. Most riverine floods are slow developing events with a natural, predictable source of water or moisture, such as snowmelt, slow rain, or a controlled dam release. This type of flood can often be forecast based on the amount of moisture or water available. The timing and location of flood conditions can often be calculated to a reasonable degree. If implemented in a timely manner, protective measures can sometimes mitigate potential damage and loss.

Seasonal Pattern	More frequent during spring and summer with thawing of winter snow pact and summer rainfall. Fall flooding occurs on very rare occasions. Spring and winter flooding can occur from ice jams in culverts and local bodies of water.
Duration	Several hours for flash flooding; up to two weeks or several months depending on severity for major overland flooding.
Speed of Onset	Minutes for flash flooding. Between 12 and 24 hours warning for closed basin, riverine, and overland flooding.
Location	McHenry County, North Dakota • Annual occurrences of localized flooding of streets in incorporated cities • Annualized occurrences of county and townships roads flooding • Rural roads near unincorporated Verendrye **City of Anamoose, North Dakota** **City of Balfour, North Dakota** **City of Bantry, North Dakota** **City of Deering, North Dakota** **City of Drake, North Dakota** **City of Granville, North Dakota** **City of Karlsruhe, North Dakota**

Location – Ctnd.	**City of Kief, North Dakota** **City of Towner, North Dakota** • Inadequate drainage N.D. Highway 14 underpass in Towner **City of Upham, North Dakota** **City of Velva, North Dakota** • The city lies within the Souris (Mouse) River Valley. Therefore, the entire city is located in the 1000-year floodplain. **City of Voltaire, North Dakota**

For more information regarding flooding please reference the **2023 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP).** The state plan can be accessed by following the electronic hyperlink or link to the N.D. Dept. of Emergency Services website:

2018 North Dakota Enhanced Mitigation Mission Area Operations Plan

https://www.des.nd.gov/planning

History

Information on the history of flooding in McHenry County, North Dakota, was obtained from the Federal Emergency Management Agency (FEMA); National Climatic Data Center (NCDC); National Oceanic and Atmospheric Administration (NOAA); U.S. Dept. of Agriculture (USDA), Risk Management Agency (RMA); McHenry County Office of Emergency Management, and the 2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP).

Federal Emergency Management Agency

- Since 1953, McHenry County has had 23 Presidential Disaster Declarations, of which 10 were for flooding and another nine were severe storm declarations that had flooding as a resulting impact of some kind. According to McHenry County, North Dakota, Emergency Management and the McHenry County, North Dakota, Auditor's Office, most of the presidential disaster declarations have occurred since 1994.

National Climatic Data Center/National Oceanic and Atmospheric Administration

Table 4.7.1 summarizes the history of flooding in McHenry County between January 1, 1996, and December 31, 2022. Data was not available between January 1, 1950, to December 31, 1995, as only occurrences of tornado, thunderstorm wind, and hail were recorded. Starting January 1, 1996, all event types (48) are recorded. A detailed hazard history for McHenry County can be found on a disc located at the beginning of Chapter 4, Threat and Hazard Identification Risk Assessment. The following are key points.

- McHenry County, North Dakota, experienced four occurrences of flooding resulting in approximately one incident of significance every eight to 10 years.

- Approximately $5,510,000.00 in property damage and no crop damage was reported. A flooding incident on May 1, 2011, resulted in $500,000.00 in damage in the city the city of Deering, North Dakota.

- No injuries or fatalities were reported.

Table 4.7.1 – 1996 to 2022 McHenry County, North Dakota, Flood Hazard History Summary

Occurrences	Fatalities	Injuries	Property Damage	Crop Damage
16	0	0	$5,510,000.00	$0.00

Source(s): National Climatic Data Center (NCDC), National Oceanic and Atmospheric Administration (NOAA)

McHenry County, North Dakota, Emergency Management

Table 4.7.2 illustrates public infrastructure damage information from presidential disaster declarations from flooding in McHenry County, North Dakota between 2009 and 2022. The following are key points.

- **DR-1829.** A total of 154 damaged projects were identified from the Spring 2009 flood declaration totaling $1,700,777.13. The cost share was approximately three percent local, seven percent state, and 90.0 percent federal. The average cost per damaged project was $11,044.01.

- **DR-1907.** A total of 49 damaged projects were identified from the Spring 2010 flood declaration totaling $791,343.86. The cost share was approximately 15.0 percent local, 10.0 percent state, and 75.0 percent federal. The average cost per damaged project was $11,044.01.

- **DR-1981.** A total of 151 damaged projects were identified from the Spring 2011 flood declaration totaling $5,031,794.24. The cost share was approximately 15.0 percent local, 10.0 percent state, and 75.0 percent federal. The average cost per damaged project was $33,323.17.

- **DR-4118.** A total of six damaged projects were identified from the Spring 2013 flood declaration totaling $357,201.59. The cost share was approximately 15.0 percent local, 10.0 percent state, and 75.0 percent federal. The average cost per damaged project was $59,533.60.

- **DR-4128.** A total of 14 damaged projects were identified from the Fall 2013 flood declaration totaling $1,203,715.15. The cost share was approximately 15.0 percent local, 10.0 percent state, and 75.0 percent federal. The average cost per damaged project was $85,979.65.

- **DR-4190.** A total of four damaged projects were identified from the Spring 2014 flood declaration totaling $1,203,715.15. The cost share was approximately 15.0 percent local, 10.0 percent state, and 75.0 percent federal. The average cost per damaged project was $45,330.14.

- **DR-4323.** A total of four damaged projects were identified from the Spring 2017 flood declaration totaling $538,902.19. The cost share was approximately 15.0 percent local, 10.0 percent state, and 75.0 percent federal. The average cost per damaged project was $134,725.55.

Table 4.7.2 2009 to 2022 McHenry County, North Dakota, Public Infrastructure Damages from Presidentially Declared Disaster – Flooding Events

Disaster No.	Year	Projects/Sites	Local Share	State Share	Federal Share	Total Cost
1829	2009	154	$51,023.05	$119,054.37	$1,530,599.71	$1,700,777.13
1907	2010	49	118,701.57	$79,134.30	$593,507.99	$791,343.86
1981	2011	151	$150,953.78	$352,225.88	$4,528,618.58	$5,031,794.24
4118	2013	6	$53,580.21	$35,720.18	$267,901.20	$357,201.59
4128	2013	14	$180,557.25	$120,371.53	$902,786.37	$1,203,715.15
4190	2014	4	$26,451.68	$18,132.06	$136,736.82	$181,628.42
4323	2017	4	$80,835.32	$53,890.22	$404,176.65	$538,902.19

Source(s): McHenry County Auditor's Office; McHenry County Commission; McHenry County Emergency Management

U.S. Dept. of Agriculture, Risk Management Agency

- Crop loss from flood is tracked by the USDA, RMA. The RMA provides data on the crop type affected, damage cause description, determined acres and indemnity amount. The damage-cause description identifies the cause of damage and the number of acres lost due to damage, and the indemnity amount identifies the total amount of the loss for the designated peril. **Between January 1, 2001, and December 31, 2023, McHenry County experienced 13 incidents of crop loss due to flooding impacting approximately 428.96.00 acres of crops totaling $37,085.00 in losses.**

2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP)

According to the 2018 N.D. Enhanced Mitigation MAOP, the following information was obtained on flooding in McHenry County, North Dakota.

- According to the National Centers for Environmental Information, as of 2018, McHenry County has been impacted by seven flash food events and nine flood events for a total of $183,000.00 and $5,327,000.00 in property damage, respectively.

- DR-4190 from June 25 to July 2, 2014, was a public assistance flooding declaration that included McHenry County, North Dakota. Approximately $2,416,454.00 in federal share damages were incurred.

Probability

The probability of a hazard or threat is how likely it is it will happen. Profile meeting participants and the Steering Committee indicated the probability of a flood in McHenry County, North Dakota, as highly likely meaning that there is a 100 percent probability in the next year of an incident. The probability of flood in McHenry County can be determined through data provided by the National Climatic Data Center/National Oceanic and Atmospheric Administration; McHenry County Auditor's Office and McHenry County Highway Department; the USDA, RMA; the 2018 N.D. Enhanced Mitigation MAOP, and McHenry County Emergency Management.

The N.D. Dept. of Water Resources has a flood risk mapping service. Figures 4.7.1 to 4.7.3 illustrate the base level engineering for flood risk for incorporated jurisdictions in McHenry County, North Dakota

National Climatic Data Center/National Oceanic and Atmospheric Administration

Per Table 4.7.1, the following statistics on the probability of flooding in McHenry County is as follows:

- McHenry County experienced 16 occurrences of flooding resulting in approximately 0.57 incidents of significance every year, or one incident every other year.
- Approximately $5,510,000.00 in property damage was reported resulting in $196,785.71 in damages annually.
- No injuries or fatalities were reported.

U.S. Dept. of Agriculture, Risk Management Agency

- According to information obtained from the USDA, RMA, approximately $38,085.00 in crop loss due to flood occurs in McHenry County, North Dakota, annually.

2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP)

- Figure 4.7.5 is from the 2018 N.D. Enhanced Mitigation MAOP and shows the one-percent annual chance floodplain in North Dakota based on FEMA's NFHL, which only shows areas with DFIRM data available. The One-Percent Annual Chance (100-Year) Floodplain is present in McHenry County, North Dakota, along the Souris (Mouse) River.

Extent/Magnitude

The extent/magnitude of a hazard or threat is expressed in the number of damages or losses either actualized in a community or estimated based on known assets and levels of risk. Profile meeting participants and the Steering Committee indicated the extent/magnitude of a flood in McHenry County, North Dakota, as catastrophic meaning substantial impact to jurisdiction, its people and/or property.

Based on the history of flooding in Tables 4.7.1 and 4.7.2 and crop loss information from the USDA, RMA, the following extent/magnitude of flooding in McHenry County, North Dakota, is determined.

- Per Table 4.7.1, approximately $5,000,000.00 in property damage occurred from a flood event on May 1, 2011, in the city of Deering, North Dakota.
- Per Table 4.7.2, the largest flooding event in terms of total monetary damage was DR-1981 with $5,031,794.24. DR-1829 had the largest flooding event in terms of total damaged projects with 154 damaged projects. However, DR-4323 had four damaged projects identified with an average cost per damaged project at $134,725.55.

U.S. Dept. of Agriculture, Risk Management Agency

- Crop loss data from the USDA, RMA shows minimal crop loss due to flooding with 428.96 acre impacted totaling $37,085.00 in indemnity paid between Janyar 1, 2001, and December 31, 2023.

Figure 4.7.1 – City of Anamoose North Dakota, Base Level Engineering Flood Risk Map

Source(s): N.D. Risk Assessment MapService

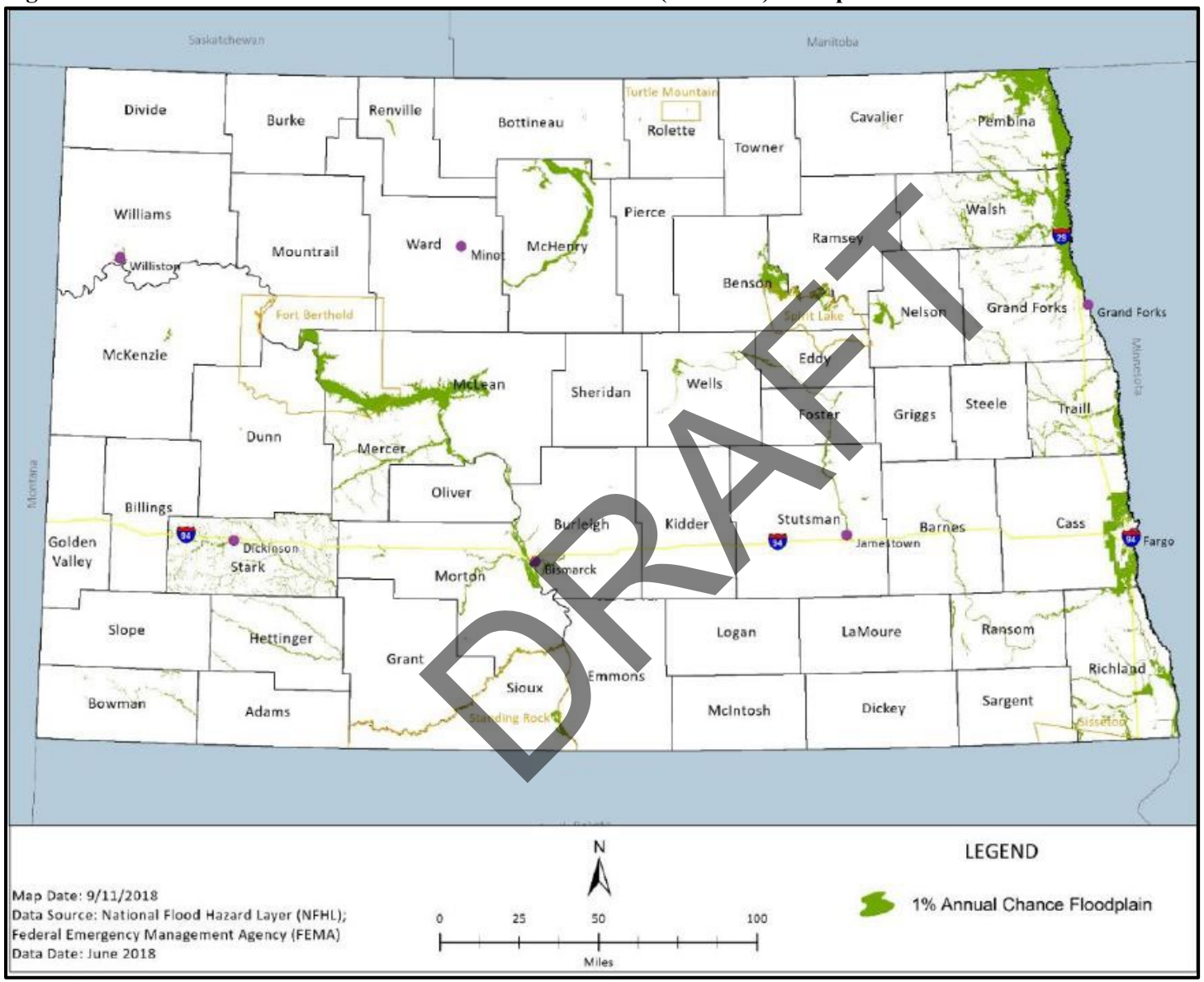
Figure 4.7.2 – City of Balfour, North Dakota, Base Level Engineering Flood Risk Map

Source(s): N.D. Risk Assessment MapService

Figure 4.7.3 – City of Bergen, North Dakota, Base Level Engineering Flood Risk Map

Source(s): N.D. Risk Assessment MapService

Figure 4.7.4 – 2019 North Dakota One-Percent Annual Chance (100-Year) Floodplain



Source(s): 2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP)

National Flood Insurance Program (NFIP)

The National Flood Insurance Program (NFIP), managed by the Federal Emergency Management Agency (FEMA), enables homeowners, business owners, and renters in participating communities to purchase federally backed flood insurance. The NFIP provides affordable insurance to property owners and encourages communities to adopt and enforce floodplain management regulations. This insurance offers an insurance alternative to disaster assistance to meet the escalating costs of repairing flood damage to buildings and their contents.

Participating communities agree to adopt and enforce floodplain management ordinances to reduce future flood damage. There are now more than 20,600 participating communities across the United States and its territories.

Federal flood insurance is available for residents and business owners in both high-risk and moderate-to-low risk areas. Insurance is required for buildings in high-risk areas that have loans from federally regulated or insured lenders. This requirement extends to disaster assistance loans from the Small Business Administration. However, it is not a requirement of the NFIP to have a mortgage or SBA loan or live in a high-risk area to obtain flood insurance. It is available community-wide, with premiums that vary according to the level of risk.

Table 4.7.3 shows the communities participating in the National Flood Insurance Program. Communities that participate in the National Flood Insurance Program (NFIP) are required to adopt flood plain regulations that meet NFIP objectives:

- New buildings must be protected from flooding damage because of a 1-percent chance flood.
- New development must not cause an increase in flood damage to other property.
- The Digital Flood Insurance Rate Maps (DFIRM) for McHenry County, North Dakota, and incorporated jurisdictions can be found on a disc located at the beginning of Chapter 4, Threat and Hazard Identification Risk Assessment (THIRA).
- A map of the watersheds of McHenry County, North Dakota, is shown in Chapter 3, Profile & Inventory, and Chapter 9, Maps.
- Chapter 6, Mitigation Strategy includes mitigation projects to enroll jurisdictions and encourage participation in the National Flood Insurance Program (NFIP).
- Mitigation Project PR-3 encourages enrollment and participation in the NFIP.
- Mitigation Project PR-4 encourages review of local ordinances to meet or exceed minimum federal and state requirements, comply with NFIP, and enroll in the Community Rating System.
- Chapter 6, Mitigation Strategy includes mitigation projects to enroll jurisdictions and encourage participation in the National Flood Insurance Program (NFIP). Mitigation Project PR-3 encourages enrollment and participation in the NFIP. Mitigation Project PR-4 encourages review

of local ordinances to meet or exceed minimum federal and state requirements, comply with NFIP, and enroll in the Community Rating System.

Table 4.7.3 – McHenry County, North Dakota, Participation in National Flood Insurance Program

Jurisdiction Name	CID #	Initial FHBM Identified	Initial FIRM Identified	Mapped
McHenry County	030307	09/18/87	09/18/87	07/18/11
Anamoose, City of	380154	01/17/75	10/14/80	07/18/11
Drake, City of	380222	02/21/75	01/19/00	(NSFHA)
Karlsruhe, City of	380048	01/10/75	09/22/99	(NSFHA)
Lebanon, Township of	380309	09/18/87	09/18/87	07/18/11
Newport, Township of	380308	09/18/87	09/18/87	07/18/11
Upham, City of	380050	12/06/74	01/19/00	(NSFHA)
Velva, City of	380051	03/22/74	08/15/77	07/18/11
Velva, Township of	380310	--	09/18/87	07/18/11
Villard, Township of	380317	09/18/87	09/18/87	07/18/11
Willow Creek, Township of	380065	09/18/87	09/18/87	07/18/11

Source(s): FEMA Community Status Book Report, North Dakota

NFIP Program Policies, Claims, and Loss Payments

According to the N.D. Dept. of Water Resources as of October 13, 2013, and the 2018 N.D. Enhanced April 16, 2018, there is one NFIP policy in McHenry County, North Dakota, providing $16,000 in coverage. A total of six claims have been paid in 1978 totaling $45,786.00.

NFIP Repetitive Loss Properties

Per FEMA, a repetitive loss (RL) property is any insurable building for which two or more claims of more than $1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978. The losses must be within 10 years of each other and be at least 10 days apart. A RL property may or may not be currently insured by the NFIP.

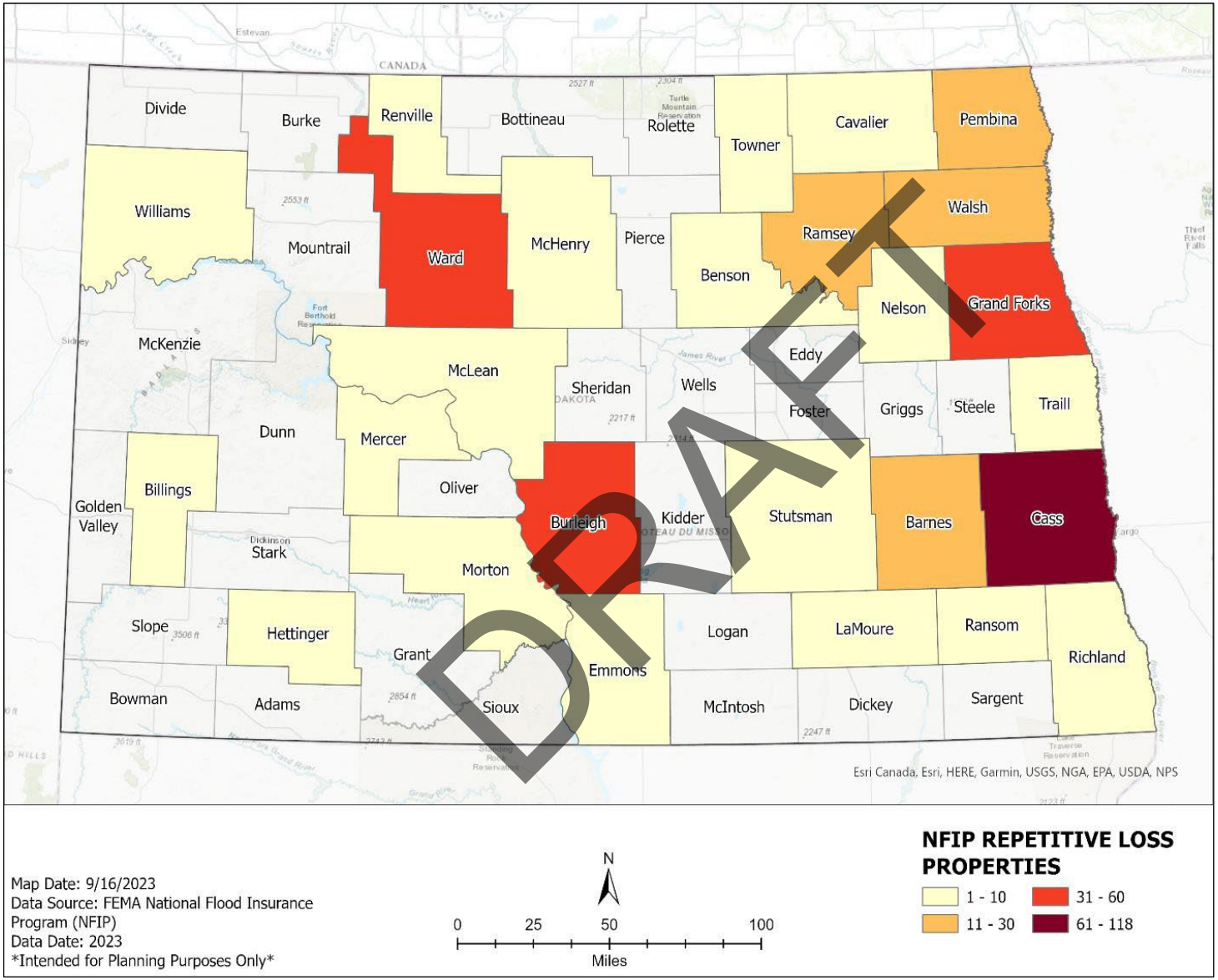
As of February 2, 2024, there are six repetitive loss properties in McHenry County, North Dakota. Figure 4.7.3 shows the NFIP repetitive losses in North Dakota by county. According to the 2023 N.D. Enhanced Mitigation MAOP, one property in McHenry County, North Dakota, has been mitigated.

NFIP Severe Repetitive Loss Properties

A Severe Repetitive Loss (SRL) property is a residential property that has had at least four NFIP claim payments over $5,000 each with two such claims occurring within any ten-year period, or residential property that has had at least two separate claim payments within any ten-year period that have cumulatively exceeded the value of the property.

As of February 2, 2024, there are no severe repetitive loss properties in McHenry County, North Dakota.

Figure 4.7.3 – 2023 NFIP Repetitive Losses in North Dakota by County



Source(s): 2023, N.D. Enhanced Mitigation MAOP

Threat and Hazard Identification Risk Assessment (THIRA)

Table 4.7.3 shows the risk assessment as determined by individual jurisdictions, the Steering Committee, and participants at the flood profile meeting. The risk assessment methodology can be found in the beginning of Chapter 4, Threat and Hazard Identification Risk Assessment (THIRA). The total in Table 4.7.3 represents the sum of each jurisdiction's impact, frequency, likelihood and vulnerability to a hazard/threat less the jurisdiction's capabilities to respond to the hazard/threat.

Table 4.7.3 – McHenry County, North Dakota, Flood Risk Assessment Scored Chart Summary

Jurisdiction	Impact	Frequency	Likelihood	Vulnerability	Capabilities	Total
McHenry County	5	5	5	4	3	**16**
City of Anamoose						
City of Balfour						
City of Bantry						
City of Bergen						
City of Deering						
City of Drake						
City of Granville						
City of Karlsruhe						
City of Kief						
City of Towner						
City of Upham						
City of Velva						
City of Voltaire						

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 4.7.4 provides information on the specific impact, frequency, likelihood, vulnerability and capability of flood in McHenry County. A list of impacts identified as commonplace for natural hazards and man-made threats regardless of the jurisdiction is shown in Chapter 4, Threat and Hazard Identification Risk Assessment (THIRA).

Table 4.7.4 – McHenry County, North Dakota, Flood Risk Assessment

Impact	• Loss of economy resulting from crop damage • Increased mosquitos-may transmit disease due to lots of grass and standing water • Large property loss, equipment/vehicles, personal property • Can impact lift stations and cause sewer backups contributing to infectious disease • Power outages, sometimes prolonged • Damage to critical facilities and infrastructure • Potential loss of life from fast moving water running over roads and producing washouts • Homes with basements can become flooded from ground saturation/seepage • Increased crime/fraud as emergency services are limited in access and mobility • Cause of secondary hazards such as shortage or outage of critical materials or infrastructure, transportation incidents, and/or adversarial activity • **Increase in traveling distances for residents commuting to work, school buses, emergency response vehicles, general economic activity, and agriculture-related activity due to blocked roads from flooding** • **Potential for permanent closure of county and township roads** • **Compromised/diminished/murky water quality from agricultural runoff carried by flood waters**	• Between January 1, 2001, and December 31, 2023, McHenry County experienced 13 incidents of crop loss due to flooding impacting approximately 428.96.00 acres of crops totaling $37,085.00 in losses. • Per Table 4.7.2, the largest flooding event in terms of total monetary damage was DR-1981 with $5,031,794.24. DR-1829 had the largest flooding event in terms of total damaged projects with 154 damaged projects. However, DR-4323 had four damaged projects identified with an average cost per damaged project at $134,725.55. **Blocked Roads** • Annual occurrences of localized flooding of streets in incorporated cities • Annualized occurrences of county and townships roads flooding

Table 4.7.4 – McHenry County, North Dakota, Flood Risk Assessment – Continued

Frequency	• Annual occurrences of localized flooding of streets in incorporated cities, and bi-annual flooding of county and township roads • Periodic flash flooding from heavy rains in the summer • Overland flooding from increased heavy rains in the summer and snow melt in the spring occurring each year to varying degrees of severity • Increasing irregularity in precipitation patterns • Agricultural land management practices to maximize production can impact the severity flooding • **Presidential Disaster Declarations in McHenry County, North Dakota, in 2009, 2011, 2013, 2014, and 2017** • Per Table 4.7.1, probability of flooding in McHenry County is approximately one incident every 0.57 years or one incident every other year.	• Saturation of roadways annually due to inadequate drainage of snow melt hinders travel • **N.D. Highway 14 underpass in the city of Towner, North Dakota, the county seat, becomes blocked during heavy rain multiple times annually**
Likelihood	More Likely • Inadequate drainage of N.D. Highway 14 underpass in the city of Towner, the county seat • Low spots on county highways and township roads • Inadequate control of vegetation in ditches and culverts • Inadequate size of culverts in rural areas • Rapid change of seasons = excessive snow melt/drainage • **Overland flooding due to lack of storm water systems in smaller incorporated cities and rural areas** • **High water table in specific locations/wet closed basins** • Prevalence of impervious surfaces and pavement increases runoff and decreases water absorbed naturally • **A large portion of northern McHenry County and incorporated jurisdictions have heavy clay-base soil which contributes to rapid drainage of runoff** • Farm and field drain tile and dewatering systems • Northern half of McHenry seeing flooding due to soil types	Less Likely • Dependent local weather and climate patterns • Upgraded culverts installed from federal funding received during presidential disaster declarations • Farm and field drain tile and dewatering systems • Majority of culverts upgraded after 2009 and 2011 flooding • **South half of McHenry County (except for Velva) sees very little flooding due to topography and the absence of tributaries for other bodies of water**

	and numerous tributaries for other bodies of water

Table 4.7.4 – McHenry County, North Dakota, Flood Risk Assessment – Continued

Vulnerability	More Vulnerable • Inadequate drainage of N.D. Highway 14 underpass in the city of Towner, the county seat • Low spots on county highways and township roads • Inadequate control of vegetation in ditches and culverts • Inadequate size of culverts in rural areas • Rapid change of seasons = excessive snow melt/drainage • Lack of storm water systems in small cities and rural areas • Wetlands/prairie pot holes throughout the county • Agriculture-based economies are vulnerable to crop and livestock losses from flooding impacts • Multiple severe weather systems occurring close together further inundating existing flooding impacts • Limited local financial resources to accomplish projects independently during Presidential Disaster Declarations • **Decommissioned railroad right-of-way infrastructure is abandoned and deteriorates to a point of restricting drainage and causing overland flooding** • Cities of are not enrolled in the NFIP – list here • BNSF trains blocking the only at-grade crossing in the cities of Drake, Karlsruhe, • **Lack of flood updated ordinances in incorporated cities** • **Souris (Mouse) River flooding from McHenry County during wet years** • **Log jams on Souris (Mouse) River contribute to physical damage to bridges and influence the extent of riverine**	Less Vulnerable • **LiDAR and constant improvements in technology is available for flood mapping. The DWR is currently updating all DFIRMS through a FEMA grant.** • Advanced warning systems such as IPAWS, cell phones, internet, and TV for flash flooding events • Some (not all) road grade raises have been completed • Upgraded culverts installed from federal funding received during presidential disaster declarations • McHenry County enrolled in the NFIP • No areas in McHenry County protected by USACE Levee Safety Program Levees • Alternate routes were identified for townships when roads are blocked

	flooding

Table 4.7.4 – McHenry County, North Dakota, Flood Risk Assessment – Continued

Capability	Administrative and Technical • **FEMA Flood Maps – being updated through a federal grant managed by the N.D. Dept. of Water Resources to include enhanced aerial imagery and the base level engineering data** • Active County Commission, City Council(s), McHenry County Water Resource District Board • Contracts for engineering, planning, and grant writing • GIS services on McHenry County, North Dakota, website • McHenry County with GIS capabilities through tax equalization • ND Dept. of Water Resources - ND Risk Assessment Mapping (NDRAM) • Administration of Public Assistance (PA) funding through FEMA from Presidential Disaster Declarations • **McHenry County, North Dakota, Road Superintendent and Emergency Manager** Education and Outreach • Active emergency management department with education and outreach capabilities • Social media accounts – McHenry County Emergency Management, NDSU Extension/McHenry County, McHenry County Sheriff's Office • USDA, NRCS • McHenry County, North Dakota, Water Resource District Board provides regulation to land-owners for issues pertaining to water Financial • Relies on federal and state entities for assistance with major projects • Public Assistance (PA) funding through FEMA from Presidential Disaster Declarations

	Planning and Regulatory • McHenry County adopted NFIP and has flood plain ordinances • McHenry County Water Resource District Board • McHenry County Planning and Zoning Committee and Administrator • McHenry County Floodplain Administrator • ND Dept. of Water Resources - ND Risk Assessment Mapping (NDRAM) • ND Dept. of Water Resources also has regulations in place for surface water • USDA, FSA • USDA, NRCS

Vulnerabilities to Publicly-Owned Buildings and Property

Vulnerabilities to publicly-owned buildings and property from flooding is always present whether flooding is due to flash flooding, overland, ground seepage, river channel, or closed basin, whether a direct impact to the structure or through secondary affects. The McHenry County Road Department shops are not located on high points throughout the county and therefore are vulnerable to flooding.

A summary of publicly-owned buildings and property in McHenry County, North Dakota, is provided in Chapter 3, Profile and Inventory.

Vulnerabilities of Critical Facilities and Infrastructure

Damage to critical facilities and infrastructure such as drinking/potable water and sewer systems, roadways, and electric power lines can happen when flooding occurs. Drinking/potable water and sewer systems can be shut down when power to lift stations and water treatment facilities are suspended, or the systems become overwhelmed. Roads can be washed out or blocked from overland flooding, which limits access for emergency services. The Steering Committee and profile meeting participants identified lift stations and roads located in low-lying areas as the most vulnerable to flooding.

An inventory of critical facilities and infrastructure in McHenry County, North Dakota, is provided in Chapter 3, Profile and Inventory.

Vulnerabilities to New and Future Development

New and future development in McHenry County, North Dakota, is at high risk of flooding if allowed in a floodplain and not constructed using flood mitigation practices. With projected local populations stable in McHenry County, North Dakota, through 2030, the vulnerability to flooding will not change if development is restricted from flood-prone areas.

Flood mapping helps determine which areas are flood-prone and not suitable for development. New and future development in McHenry County, North Dakota, and incorporated jurisdiction is more vulnerable to flooding as it does not have flood maps with enough detail to assist the county and cities in planning for future growth accordingly. However, with the completion of the updated FEMA flood maps and the N.D. Risk Assessment MapService through the N.D. Dept. of Water Resources, vulnerabilities to new and future development from flooding will be easier to identify.

An inventory of new and future development in McHenry County, North Dakota, is provided in Chapter 3, Profile and Inventory.

Data Limitations

The lack of digitized records of public assistance provided to local governments from flood events makes collection and analysis of impacts from the hazard difficult to comprehend during mitigation planning processes.

National Climatic Data Center/National Oceanic and Atmospheric Administration

The hazard history provided in terms of property damage and crop damage (which are only estimates) is calculated based on what the National Weather Service received from insurance companies and individual property owners upon request. Both sources have been reluctant to share that information. Therefore, both practices were discontinued. Because of this, the National Weather Service makes a best guess using all available data at the time of the publication. The damage amounts are received from a variety of sources. Property and crop damage should be considered as a broad estimate.

In addition, the hazard history provided through the National Climatic Data Center/National Oceanic Atmospheric Administration's Storm Events Database contains data from **1950 to 2021**, as entered by NOAA's National Weather Service (NWS). Due to changes in the data collection and processing procedures over time, there are unique periods of record available depending on the event type. The following timelines show the different time spans for each period of unique data collection and processing procedures. **Flooding was not recorded as a separate incident until 1996.**

1. **Tornado:** From 1950 through 1954, only tornado events were recorded.
2. **Tornado, Thunderstorm Wind and Hail:** From 1955 through 1992, only tornado, thunderstorm wind and hail events were keyed from the paper publications into digital data. From 1993 to 1995, only tornadoes, thunderstorm wind and hail events have been extracted from the Unformatted Text Files.
3. **All Event Types (48 from Directive 10-1605):** From 1996 to present, 48 event types are recorded as defined in NWS Directive 10-1605.

Other Key Documents

This plan incorporates data from the following documents and information from this plan will be incorporated in the update of the following documents.

- 2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP)
- 2023 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP)
- International Building Codes
- McHenry County, North Dakota, Comprehensive Plan
- McHenry County, North Dakota, Evacuation Plan through McHenry County Emergency Management and First District Health Unit
- McHenry County, North Dakota, Local Emergency Operations Plan
- McHenry County, North Dakota, Mass Care Plan through First District Health Unit
- McHenry County, North Dakota Shelter Plan through McHenry County Emergency Management
- McHenry County, North Dakota, Threat and Hazard Identification and Risk Assessment (THIRA)
- McHenry County, North Dakota Zoning Ordinances
- North Dakota Continuity of Operations Plan
- North Dakota Dept. of Transportation Design Manual
- North Dakota Emergency Operations Plan, Severe Winter Weather Annex
- North Dakota League of Cities: Planning and Zoning Handbook
- North Dakota State Building Code

- North Dakota State Disaster Recovery Plan
- North Dakota State Preparedness Report (SPR)
- North Dakota Threat and Hazard Identification and Risk Assessment (THIRA)
- McHenry County, North Dakota, Zoning Ordinances

4.9 Hazardous Material Release

Characteristics

Hazardous materials are any substance in any quantity or form that may pose an unreasonable risk to the safety, health, environment, and property of citizens. The term "hazardous material" covers a wide array of products, from innocuous ones such as hair spray in aerosol dispensers and wash preservatives such as creosote to highly toxic or poisonous material such as polychlorinated biphenyl (PCB's) and phosgene gas. The potential severity of hazards of these materials is varied but the primary reason for their designation is their risk to public safety. The Federal Motor Carrier Safety Administration has nine categories of hazardous materials that are:

- Explosives (Class 1)
- Gases (Class 2)
- Flammable and combustible liquids (Class 3)
- Flammable solids, spontaneously combustible, and dangerous when wet (Class 4)
- Oxidizing substances and organic peroxides (Class 5)
- Toxic/poisonous substances poison inhalation (Class 6)
- Radioactive materials (Class 7)
- Corrosive substances (Class 8)
- Miscellaneous hazardous materials/products, substances, or organisms (Class 9)

Hazardous material incidents can be categorized into two distinct groups – incidents of a transportation nature and those that occur at a stationery or fixed facility (Tier II).

Seasonal Pattern	None. Anhydrous Ammonia is more likely in the spring and fall.
Duration	Minutes/hours/days/weeks
Speed of Onset	No warning
Location	Along major transportation routes. Tier II and agricultural and/or industrial storage sites, and roads: U.S. Highways 2 and 52, N.D. Highways 14 and 41; and local/township roads. • BNSF railroad and CP Railway • No transportation of chemicals via airplane to McHenry County but are applied to fields/crops in the county via crop sprayers/small airplanes. • Crude Oil and Natural Gas pipelines traversing McHenry County

For more information regarding hazardous material release please reference **2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP).** The state plan can be accessed by following the electronic hyperlink or link to the N.D. Dept. of Emergency Services website:

2018 North Dakota Enhanced Mitigation Mission Area Operations Plan

https://www.des.nd.gov/planning

History

Information on the history of hazardous material release in McHenry County, North Dakota, was provided by the N.D. Dept. of Health and McHenry County, North Dakota, Emergency Management. Table 4.9.1 summarizes the history of hazardous material release in McHenry County from the N.D. Dept. of Health. A detailed hazard history for McHenry County, North Dakota, can be found on a disc located at the beginning of Chapter 4, Threat and Hazard Identification Risk Assessment.

N.D. Dept. of Health

- Per table 4.9.1, a total of 11 releases/spills were reported in McHenry County from 1975 to 2022. Of the 11 reported incidents, nine reported the volume and units of the contaminant released, ranging from one gallon of crude oil to 2,500.00 gallons of Gasoline.

Table 4.9.1 – 1975 to 2022 McHenry County, North Dakota, Hazardous Material Release History

Incident Date	TwnRngSec	Latitude	Longitude	Contaminant	Volume	Units	Contained
1/1/1977	15607301	48.36291	-99.98782	Gasoline	2,500.00	Gallons	NA
2/7/1985	15107406	47.92699	-100.18724	Diesel Fuel	1.00	Gallons	NA
12/17/2000	15107230	47.86917	-99.93031	Diesel Fuel (100-200 gallons)	150.00	Gallons	NA
4/8/2004	15507404	48.27573	-100.18253	Diesel Fuel and Motor Oil	8.00	Gallons	NA
2/9/2005	15107233	47.85472	-99.88754	Propane	--	--	--
9/1/2008	156 N & 73W	48.35279	99.99799	Oil/Gas Spill	--	--	NA
7/22/2013	15607401	48.36312	-100.11718	Crude Oil	7.00	Gallons	NA
2/4/2014	15607403	48.36467	-100.15243	Crude Oil	1.00	Gallons	NA
8/1/2014	15507233	48.20569	-99.91947	Crude Oil	2.00	Gallons	Yes
3/10/2017	15607207	48.35171	-99.95773	Non PCB Transformer Oil	50.00	Gallons	Yes
1/28/2020	15407313	48.16156	-99.99461	Mineral Oil	5.00	Gallons	Yes
TOTAL					**2,724.00**		

Source(s): N.D. Dept. of Health

McHenry County, North Dakota, Emergency Management

- Approximately 2,724.00 gallons of hazardous materials were spilled between 1975 and 2022. Not all reported spills in McHenry County, North Dakota, reported the volume of the spill.
- There are no reported incidents of a plane crash carrying hazardous materials in McHenry County, North Dakota.

2018 N.D. Enhanced Mitigation MAOP

- On July 22, 2013, a pipeline incident occurred in McHenry County, North Dakota, resulting in $737,394.00 in damages.

Probability

The probability of a hazard or threat is how likely it is it will happen. Per Table 4.9.1, the probability of a hazardous material release is one incident every six and-a-half to four years based on seven occurrences from 1975 to 2022. Meeting participants also indicated the probability of a hazardous material release meaning that there is between a 10 and 100 percent probability in the next year of an occurrence. The following are key points regarding hazardous material release probability in McHenry County, North Dakota:

- **Airports.** Hazardous materials are not transported via plane to and from McHenry County, North Dakota, using the Rugby Municipal Airport or private landing strips. However, crop sprayers use local airports or landing strips for commercial applications.

- **Fixed Facilities (Tier II and Extremely Hazardous Substance).**

  Tier II. Tier II refers to facilities covered by the Emergency Planning and Community Right-to-Know Act (EPCRA). These facilities are required to maintain a material safety data sheet and report the chemical quantities that equal or exceed either five hundred pounds or the threshold planning quantity and submit an inventory of chemicals used to their Local Emergency Plan Update Committee (LEPC), the state emergency response commission and local fire departments each year. **According to the N.D. Dept. of Emergency Services, HAZ Connect, McHenry County, North Dakota, has 30 Tier II facilities.**

  Extremely Hazardous Substance Facilities. These facilities are required under Occupational Safety and Health Administration regulations to maintain the material safety data sheets and report the chemical quantities that equal or exceed either 500 pounds or the threshold planning quantity. As of December 2023, it is estimated there are three facilities that meet this definition in McHenry County. According to the Steering Committee and profile meeting participants, there is a bulk anhydrous plant half-mile west of city of Rugby, an anhydrous plant immediately east of city of Wolford, and a farm chemical storage warehouse one-mile southwest of the city of Rugby.

  Pipelines. According to the 2018 N.D. Enhanced Mitigation MAOP, there is a crude oil pipeline and a natural gas pipeline traversing McHenry County, North Dakota.

  Figures 4.9.1 and 4.9.2 illustrate the locations of crude oil pipelines and natural gas pipelines in the state of North Dakota.

- **Rail.** No hazardous material incidents involving railroads have occurred in McHenry County, North Dakota. Canadian Pacific Railway (CP) operates railroad infrastructure in extreme southwest and section of the county while Burlington Northern-Santa Fe (BNSF) operates railroad infrastructure across the northern and southwest sections of the county.

- **Road.** It is unknown if the reported incidents in Table 4.9.1 were the result of a transportation accident or a leak from a storage site. The N.D. Dept. of Health provided the data but did not specify the cause of each release. However, according to McHenry County, North Dakota, Emergency Management and meeting participants, releases/spills do occur from road transportation incidents. Large quantities of hazardous materials are transported via U.S. Highways 2 and 52 and N.D. Highway 3.

Extent/Magnitude

The extent/magnitude of a hazard or threat is expressed in the amount and/or number of damages or losses either actualized in a community or estimated based on known assets and levels of risk. The extent/magnitude of a hazardous material release can vary from minimal in localized incidents to

catastrophic in situations of explosions or high wind. Releases when high winds are present may carry chemicals and material great distances and impact many people.

- **Airports.** Hazardous materials are not transported via plane to and from McHenry County, North Dakota, using the Rugby Municipal Airport or private landing strips. The extent/magnitude is low for this type of hazardous material release in McHenry County, North Dakota.

  Crop sprayers utilizing airplanes for application, and private airplane owners, can result in local releases into the environment.

- **Fixed Facilities (Tier II and Extremely Hazardous Substance).**

  Per Table 4.9.1, the largest reported spill/release was 2,500.00 gallons of gasoline on January 1, 1977. Planning for the extent/magnitude of hazardous material releases is difficult to determine as reporting history lacks the cause for the leak/spill in most cases. However, any type of release/spill in rural areas of the county could pose a challenge to smaller emergency services.

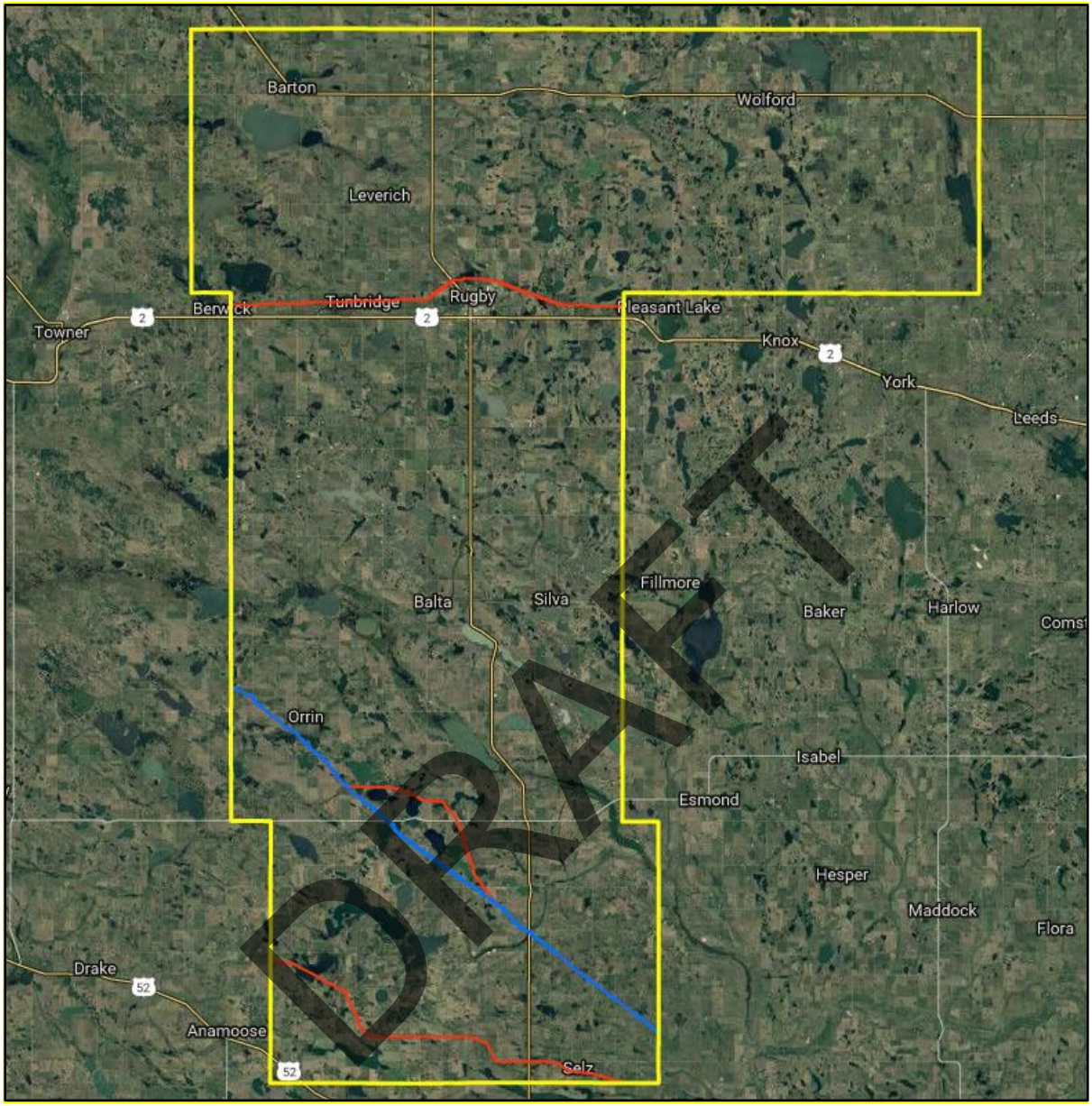
- **Pipelines.** According to the 2018 N.D. Enhanced Mitigation MAOP, there is a crude oil pipeline and a natural gas pipeline traversing McHenry County, North Dakota.

  There are four total pipelines with three pipelines traversing southwest portions of McHenry County. Of the three southwest pipelines, the two pipelines that traverse the more-central portion of the county are parallel to the BNSF railroad. The fourth pipeline runs parallel to U.S. Highway 2 and passes north of the city of Rugby. Figure 5.5.1 on the following page illustrates the extent of pipelines in McHenry County.

  According to the National Pipeline Mapping System website, the Alliance Pipeline and Kinder Morgan pipelines operate on a simultaneous right-of-way. The Alliance Pipeline transports natural gas and the Kinder Morgan Cochin pipeline transports propane. The pipeline owned and operated by Cenex Pipeline transports Non-HVL Products.

  Per the 2015 Wells County Hazardous Materials Flow Study, the Alliance Pipeline transports a total of 1.6 billion cubic feet of natural gas each day, equivalent to the heating needs of seven million homes. The pipeline is remotely monitored and operated by a gas control center 24 hours a day, 365 days a year. Any portion of the pipeline can be isolated if leaks or other problems are detected. The Cenex Pipeline transports gasoline and diesel. The pipeline is operated via a Supervisory Control and Data Acquisition (SCADA) system equipped with leak detection monitoring and is monitored 24/hour a day. The Kinder Morgan Chochin Pipeline transports Liquefied Petroleum Gas. Information on the volume of the hazardous materials transported through these pipelines was not available.

Figure 4.9.1 McHenry County, North Dakota, Pipelines



Source: National Pipeline Mapping System

- **Rail.** No hazardous material incidents involving railroads have occurred in McHenry County, North Dakota. Canadian Pacific Railway (CP) operates railroad infrastructure in extreme southwest and section of the county while Burlington Northern-Santa Fe (BNSF) operates railroad infrastructure across the northern section of the county.

- **Road.** It is unknown if the reports incidents in Table 5.5.1 were the result of a transportation accident or a leak from a storage site. The N.D. Dept. of Health provided the data but did not specify the cause of the release/spill.

Profile meeting participants indicated the extent/magnitude or impact of a hazardous material release as catastrophic meaning more than 50 percent of the county, its people and property could be affected.

Threat and Hazard Identification Risk Assessment (THIRA)

Table 4.9.2 shows the risk assessment as determined by individual jurisdictions, the Steering Committee, and meeting participants at the profile meeting for hazardous material release. The risk assessment methodology can be found in the beginning of Chapter 4, Threat and Hazard Identification Risk Assessment (THIRA). The total in Table 4.9.2 represents the sum of each jurisdiction's impact, frequency, likelihood, and vulnerability to a hazard/threat less the jurisdiction's capabilities to respond to the hazard/threat.

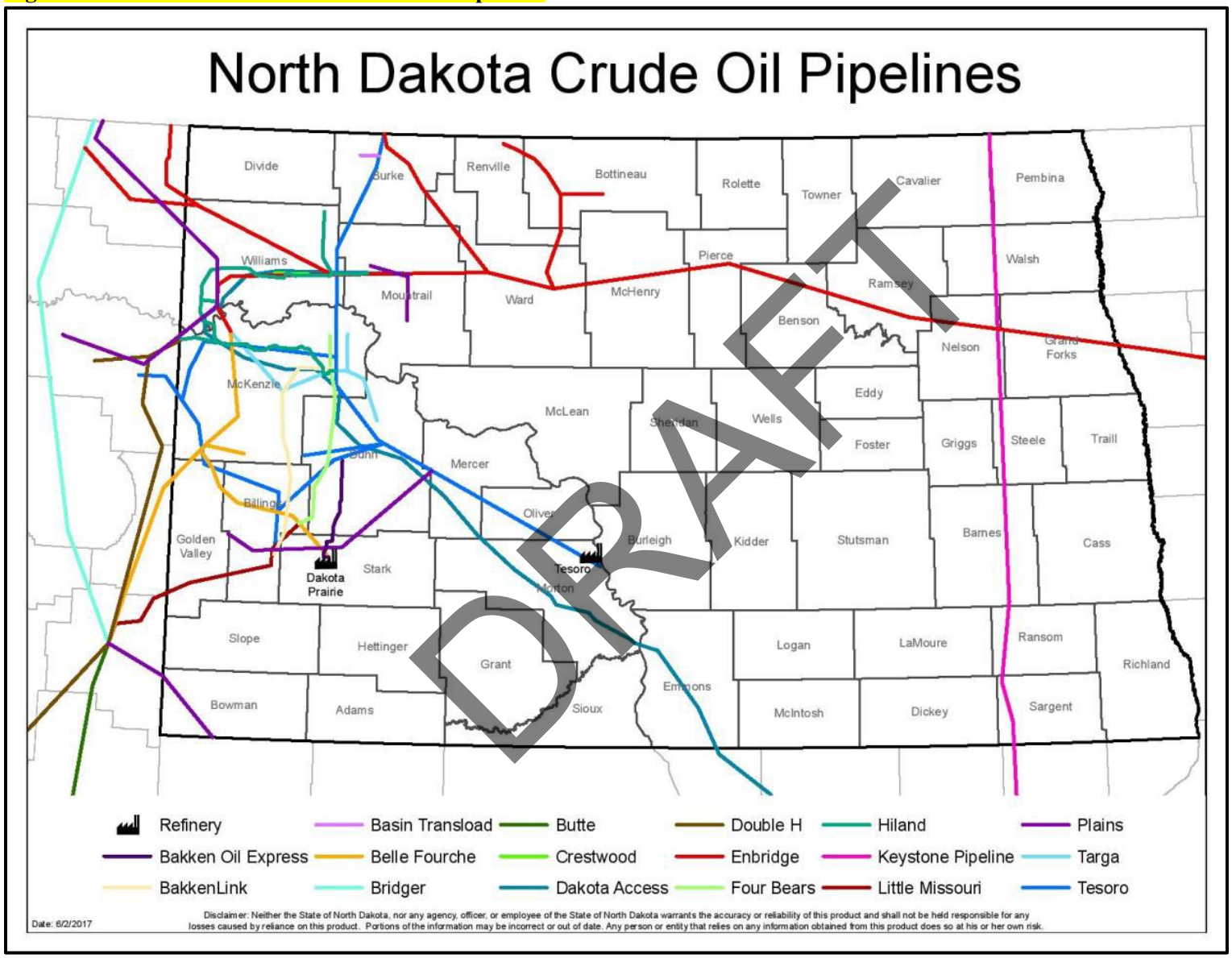
Table 4.9.2 – McHenry County, North Dakota, Hazardous Material Release Risk Assessment Scored Chart Summary

Jurisdiction	Impact	Frequency	Likelihood	Vulnerability	Capabilities	Total
McHenry County	4	2	3	4	2	**11**
City of Balta	3	1	2	3	1	**8**
City of Rugby	4	2	4	4	2	**12**
City of Wolford	4	1	2	3	1	**9**

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

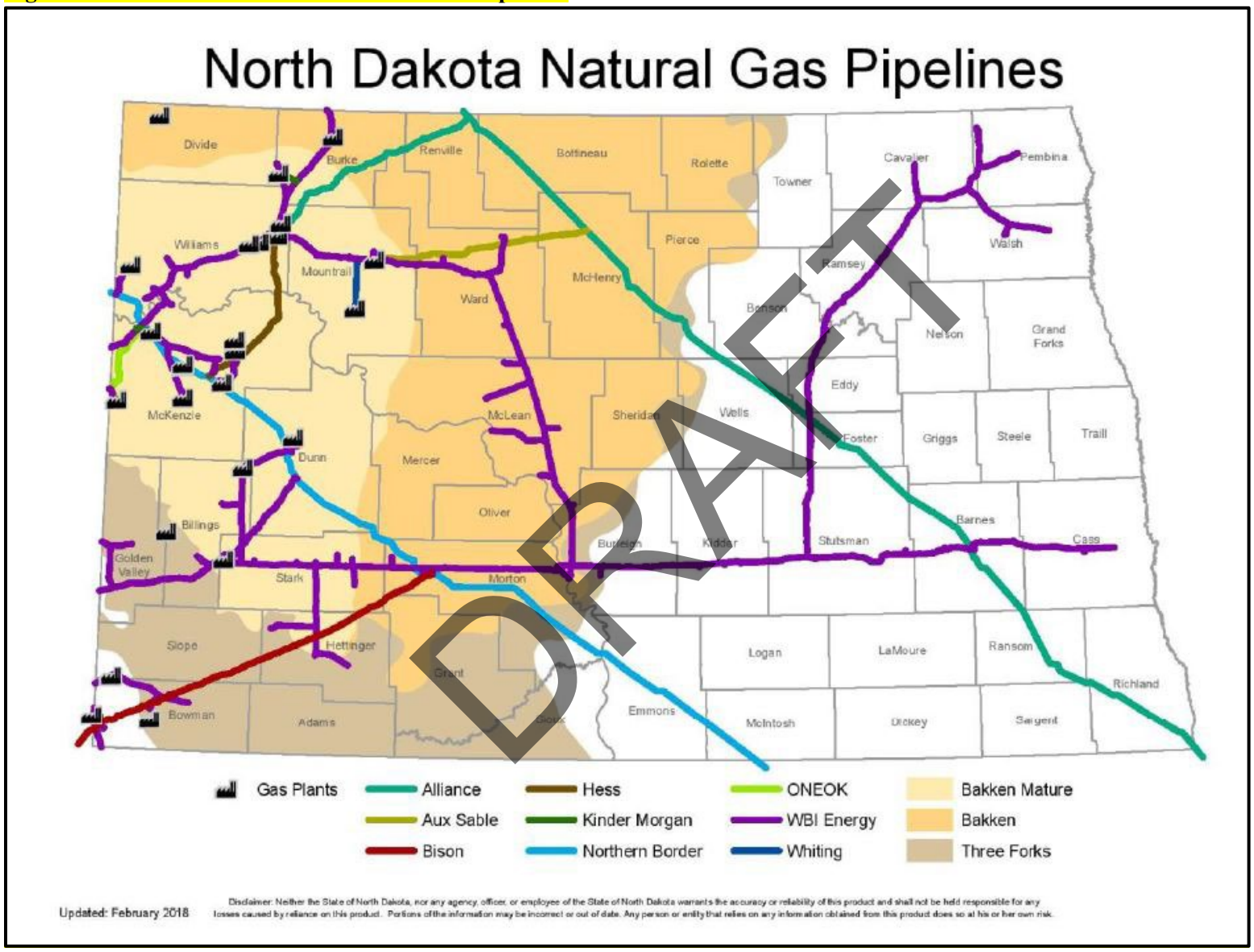
Table 4.9.3 provides information on the specific impact, frequency, likelihood, vulnerability and capability of hazardous material release in McHenry County. A list of impacts identified as commonplace for natural hazards and man-made threats regardless of the jurisdiction is shown in Chapter 4, Threat and Hazard Identification Risk Assessment (THIRA).

Figure 4.9.1 – 2018 North Dakota Crude Oil Pipelines



Source(s): 2018 N.D. Enhanced Mitigation MAOP

Figure 4.9.2 – 2018 North Dakota Natural Gas Pipelines



Source(s): 2018 N.D. Enhanced Mitigation MAOP

Table 4.9.3 – McHenry County, North Dakota, Hazardous Material Release Risk Assessment

Impact	• Business Interruptions/Loss of Economy • Explosion • Environmental Degradation • Fuel Outage/Shortage • Human/Injury Death • Increased Public Safety Runs	• Loss of Critical Facilities and Infrastructure • Loss/Overcrowded Medical Facilities • **Loss of Transportation Systems/Accessibility - Blocking of roads when emergency services respond to incidents** • **Leaking fuel tanks contaminate local waterways and drinking/potable water supplies (individual wells)** • **Closure of recreation areas**
Frequency	• One or two minor anhydrous tanks leak annually • Two or three leaking propane tank incidents annually	• Approximately 2,724.00 gallons of hazardous materials were spilled between 1975 and 2022. Not all reported spills in McHenry County, North Dakota, reported the volume.
Likelihood	More Likely • U.S. Highways 2 and 52, and N.D. Highway 3 • Agriculture economy with heavy use of chemicals • Crop sprayers and private plane operators • **McHenry County has 30 Tier II Sites** • Propane and fuel oil are main heating source throughout county • **Lack of passing lanes on highways in McHenry County** • **CP Railway and BNSF Railroad traversing McHenry County** • Cenex has bulk anhydrous plant half-mile west of Rugby • Anhydrous plant east of Wolford • Farm chemical storage warehouse one-mile southwest of Rugby • **Presence of crude oil and natural gas pipelines**	Less Likely • Tier II reporting and regulations (fixed facilities only) • No major commercial airport • Ordinances regulating development/placement of HAZMAT • **Fire departments have HAZMAT training** • County and cities did not experience heavy energy development • HAZMAT route around the city of Rugby
Vulnerability	More Vulnerable • U.S. Highways 2 and 52, and N.D. Highway 3 • Agriculture economy with heavy use of chemicals • Crop sprayers and private plane operators • **McHenry County has 30 Tier II Sites** • Propane and fuel oil are main heating source throughout county • **Lack of passing lanes on highways in McHenry County**	Less Vulnerable • Tier II reporting and regulations (fixed facilities only) • No major commercial passenger airport • Ordinances regulating development/placement of HAZMAT • **Fire departments have HAZMAT training**

Table 4.9.3 – McHenry County, North Dakota, Hazardous Material Release Risk Assessment – Continued

Vulnerability	More Vulnerable • **CP Railway and BNSF Railroad traversing McHenry County** • Cenex has bulk anhydrous plant half-mile west of Rugby • Anhydrous plant east of Wolford • Farm chemical storage warehouse one-mile southwest of Rugby • **Presence of crude oil and natural gas pipelines** • **McHenry County, North Dakota, Fairgrounds located near elevator, railroad infrastructure, and a crude oil pipeline**	Less Vulnerable • **Winter months sees decrease in agriculture-related chemicals and activity in general** • **NDDES HAZConnect** • City and county level ordinances regulating development and placement of hazardous materials • HAZMAT route around the city of Rugby
Capability	• See Chapter 7 for a list of capabilities to address hazardous material release.	

Vulnerabilities to Publicly-Owned Buildings and Property

All publicly-owned buildings and property are at risk of hazardous material release as this type of hazard/threat can occur anywhere at any given time for a multitude of reasons. Buildings and property located near or adjacent to transportation modes, such as highways, railroads or airports are more at risk as the hazard/threat typically occurs during transportation of hazardous materials. In the city of Rugby, the McHenry County Courthouse, law enforcement center, hospital, and public schools may be vulnerable to a hazardous material release from a fixed site or transportation of hazardous materials through city limits. **The McHenry County Courthouse, the new Heart of America Medical Center, Heart of America Correctional and Treatment Center, and Rugby City Hall are located blocks from railroad, pipeline, and highway infrastructure.**

If facilities are located near fixed hazardous material sites (Tier II), such as propane or anhydrous ammonia tanks, the risk is increased as the source for the hazard/threat will always be present. If an explosion were to occur, buildings and properties located nearby could experience moderate to severe damage and contamination, depending on the intensity and duration of the release.

A summary of publicly-owned buildings is provided in Chapter 3, Profile and Inventory.

Vulnerabilities of Critical Facilities and Infrastructure

Like publicly-owned buildings and property, the vulnerability of the hazard/threat to critical facilities and infrastructure depends on location. Critical facilities and infrastructure located near transportation arteries or hazardous material storage sites are most at risk. Depending on the facility or infrastructure, impact could range from moderate to severe. Water infrastructure could become contaminated and threaten public health. Critical facilities such as the McHenry County Courthouse, the new Heart of America Medical Center, Heart of America Correctional and Treatment Center, and Rugby City Hall could be shut down temporarily or indefinitely. Amtrak offers passenger rail service to the city of Rugby, North Dakota. The station is adjacent to railroad, pipeline, and highway infrastructure. If a release were to occur on a major roadway, emergency services would be limited and response times could be increased.

In addition, the fire hall for smaller incorporated jurisdictions is typically located near the highway and is vulnerable to hazardous material release. The Rugby Fire Hall is near the intersection of U.S. Highway 2 and N.D. Highway 3.

Vulnerabilities to New and Future Development

The vulnerability of new and future development depends on the type and density being proposed and where development is allowed. Residential development should be developed in areas away from hazardous material storage sites or major transportation arteries where chemicals are transported. If new development is already in progress, a development moratorium should be implemented to stop future growth or densities should be limited to reduce the number of people at risk.

New development located near or adjacent to industrial areas or transportation infrastructure in McHenry County, North Dakota, will be vulnerable to hazardous material releases. The county and incorporated jurisdictions should update zoning ordinances to implement setbacks from hazardous material sites or infrastructure for new development.

Development in the industrial and agricultural sectors maintain demand for hazardous materials and are best situated near storage sites or transportation arteries to limit time spent in transit. Hazardous materials should be prohibited from being in residential or commercial areas, near hospitals, schools, or community gathering spaces. If already existing, plans should be put into place for relocation at a future time when funding permits or an appropriate alternative site becomes available. **This type of development should also be prohibited from being developed or located within 1,000 feet of a public school or facility with vulnerable populations such as daycares and/or care centers.**

Data Limitations

The difficulty in understanding a hazardous material release is the lack of complete data reported on past releases. If any of the following information – location, time of day, wind speed/direction, temperature, humidity, method of release (transportation or facility failure), the amount of release and what material(s) are involved – is not reported, the ability to understand the true impact of the hazard/threat and develop mitigation strategies is limited. With numerous sources for potential release, whether from the agriculture sector, oil and gas sector, commercial and residential entities, or a combination from another hazard/threat such as a transportation incident, understanding how releases occur and identifying ways to mitigate this hazard proves impractical. Developing an inventory of hazardous materials from agriculture operations on the location and type of hazardous material being used, and what mode is being utilized for transportation, would assist in understanding the hazard.

Other Key Documents

This plan incorporates data from the following documents and information from this plan will be incorporated in the update of the following documents.

- 2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP)
- North Dakota Continuity of Operations Plan
- North Dakota Emergency Operations Plan, HAZMAT Annex
- North Dakota State Disaster Recovery Plan
- North Dakota State Preparedness Report (SPR)
- North Dakota Threat and Hazard Identification and Risk Assessment (THIRA)
- McHenry County Comprehensive Plan (2019)
- McHenry County Commercial Animal Feed Operation Ordinance
- McHenry County Evacuation Plan through McHenry County Emergency Management
- McHenry County Local Emergency Operations Plan (LEOP)
- McHenry County Mass Care Plan through First District Health Unit, McHenry County
- McHenry County Shelter Plan through McHenry County Emergency Management
- McHenry County Threat and Hazard Identification and Risk Assessment (THIRA)

4.10 Infectious Disease & Pest Infestations

Including animal, human, and plant diseases.

Characteristics

Infectious disease and pest infestations are an illness caused by an infectious agent, such as bacteria, virus, fungi or parasites, and toxic microorganisms, and is transmittable from an infected animal, human, or plant to another animal, human, or plant.

Seasonal Pattern	Animal. Depends on the organism and the current season. Human. Depends on the organism and the current season. Influenza is more prevalent during winter months. Plant. They are more susceptible in the summer as they are dormant in the winter and year-round for indoor plants such as greenhouses.
Duration	Hours/Days/Weeks/Months/Years
Speed of Onset	Disease. Hours to weeks (12 hours for most diseases in humans) Pest Infestations. Hours to Days to Weeks
Location	Total geographic extent of McHenry County, North Dakota, across all jurisdictions (incorporated and unincorporated)

For more information regarding infectious disease and pest infestations, please reference the **2023 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP).** The state plan can be accessed by following the electronic hyperlink or link to the N.D. Dept. of Emergency Services website:

2018 North Dakota Enhanced Mitigation Mission Area Operations Plan

https://www.des.nd.gov/planning

History

Information on infectious disease and pest infestations was obtained from the U.S. Dept. of Agriculture (USDA), Farm Service Agency (FSA); N.D. Health & Human Services (NDHHS); First District Health Unit, McHenry County (FDHU); U.S. Dept. of Agriculture (USDA), Risk Management Agency (RMA); McHenry County Emergency Management; and NDSU Extension/McHenry County. The history of infectious disease and pest infestations for animals, humans, and plants is summarized for McHenry County in the following section.

A detailed hazard history for McHenry County, North Dakota, can be found on a disc at the beginning of Chapter 4.

Animal – Livestock. According to the Farm Service Agency (FSA), livestock losses can be tracked by analyzing payments made under the Livestock Indemnity Program (LIP). However, the cause of the loss is not recorded. The FSA stated that infectious disease and pest infestations likely contribute to losses under LIP. Table 4.10.1 illustrates the payable established count and the program payment signed amount for McHenry County, North Dakota, between 2013 and 2021.

Based on information from FSA, the following data was assumed to be paid to cover animal losses in McHenry County, North Dakota, resulting from infectious disease and pest infestations. The following are key points:

- A total of 30 payable established counts were made through the LIP program between 2013 and 2021 totaling $391,431.00 in program payment signed amounts.
- The highest payable established count occurred in 2013 with 13 counts totaling $271,615.00 in program payments.

Table 4.10.1 – 2013 to 2021 McHenry County, North Dakota, Livestock Indemnity Program (LIP) History

Year	Payable Established Count	Payment Signed Amount
2013	13	$271,615.00
2014	6	$42,934.00
2015	--	--
2016	4	$43,496.00
2017	2	$21,634.00
2018	2	$4,380.00
2019	1	$1,485.00
2020	1	$2,692.00
2021	1	$3,195.00
TOTAL	**30**	**$391,431.00**

Source(s): USDA, FSA, Livestock Indemnity Program (LIP)

Animal – Rabies. According to the NDHHS, McHenry County, North Dakota, experienced two cases of rabies in 2018 (one cat and one skunk), one case of rabies in a skunk in 2020 and in 2021, one case of rabies in a cat in 2022, and one case of rabies in a skunk in 2023.

Human. A history of infectious disease in humans is shown in Tables 4.10.2 and 4.10.3 in McHenry County, North Dakota. Table 4.10.2 shows the history of influenza by season, defined as between August 1 to July 31 of any given year from 2010 to 2022. Table 4.10.3 shows the history of infectious disease in McHenry County, North Dakota between 2004 and 2022.

The following are key points.

- Between 2010 and 2022, McHenry County, North Dakota, recorded an average of 40.6 cases of influenza annually. The 2019-2020 flu season had the highest number of reported cases at 95, followed by the 2017-2018 flu season where 81 cases were reported.

Table 4.10.2 – 2010 to 2022 McHenry County, North Dakota. Influenza History

Season	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
Cases	4	10	29	29	48	6	53	81	60	95	2	70

Note: Each seasonal total includes cases recorded between August 1 to July 31 of any given year.

Source(s): N.D. Health and Human Services

- Aside from influenza, McHenry County, North Dakota, recorded 348 infectious disease cases between 2004 and 2022, or an average of approximately 20 cases yearly.

- Between 2004 and 2022, McHenry County, North Dakota, recorded 141 cases of Chlamydia, 48 cases of Hepatitis C Chronic, 35 cases of Campylobacteriosis, and 33 cases of Salmonellosis, representing 40.5 percent, 13.8 percent, 10.1 percent, and 9.5 percent of reported infectious diseases, respectively.

- According to FDHU, McHenry County, as of January 24, 2024, the following COVID-19 cases occurred in McHenry County, North Dakota, between 2019 and 2023: zero cases in 2019, 531 cases in 2020, 536 cases in 2021, 481 cases in 2022, and 128 cases in 2023 for a total of 1,676 cases.

Plant. The USDA, RMA tracks crop loss from infectious disease and pest infestations. The RMA provides data on the crop type affected, damage cause description, determined acres, and indemnity amount. The damage description identifies the cause of damage, determines acres, identifies the number of acres lost due to damage, and the indemnity amount identifies the total amount of the loss for the designated peril. The indemnity amount was not available before 2001.

- Between January 1, 2001, and December 31, 2022, McHenry County, North Dakota, experienced 144 incidents of crop loss due to infectious disease, impacting approximately 92,741.00 acres of crops totaling $8,274,765.555 in losses.

- Between January 1, 2001, and December 31, 2022, McHenry County, North Dakota, experienced 112 incidents of crop loss due to pest infestations, impacting approximately 27,563.07 acres of crops totaling $2,275,933.17 in losses.

- NDSU Extension/McHenry County, North Dakota indicated that crop/plant losses occur annually and vary in severity.

Table 4.10.2 – 2004 to 2022 McHenry County, North Dakota, Human Infectious Disease History

Infectious Disease	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total by Disease	Percent by Disease
Babesiosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0%**
Brucellosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0%**
Campylobacteriosis	0	1	2	2	1	1	2	0	1	0	0	7	3	6	3	0	0	3	3	**35**	**10.1%**
Chickenpox	2	2	3	5	0	0	0	0	0	1	0	0	1	1	1	1	0	0	0	**15**	**4.3%**
Chlamydia	7	2	8	9	2	4	8	2	20	7	13	5	10	13	9	11	7	7	4	**141**	**40.5%**
Coccidioidomycosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0%**
Cryptosporidiosis	0	0	1	1	0	1	1	1	1	1	0	0	0	0	0	0	2	0	0	**9**	**2.6%**
E.coli, shiga toxin-producing	0	0	0	1	0	0	0	0	1	0	1	0	0	1	0	0	0	1	1	**6**	**1.7%**
Ehrlichiosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0%**
Giardiasis	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	**4**	**1.1%**
Gonorrhea	0	1	2	0	0	0	0	0	1	1	0	1	1	0	2	2	2	2	1	**16**	**4.6%**
Hepatitis A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0%**
Hepatitis B Acute	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0%**
Hepatitis B Chronic	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0	**3**	**0.9%**
Hepatitis C Acute	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0%**
Hepatitis C Chronic	0	2	0	5	0	1	2	3	1	3	2	5	3	4	7	4	1	3	2	**48**	**13.8%**
Legionellosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0%**
Listeriosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0%**
Lyme Disease	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	**3**	**0.9%**
Malaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0%**
Measles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0%**
Meningococcal meningitidis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0%**
Mumps	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	**2**	**0.6%**
Pertussis	16	0	0	0	0	1	0	0	5	0	0	0	3	3	0	0	0	0	0	**12**	**3.4%**
Q Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0%**
Rocky Mountain Spotted Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0%**
Rubella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0%**
Salmonellosis	1	0	0	2	1	0	0	0	0	2	0	4	8	3	4	3	0	5	1	**33**	**9.5%**
Shigellosis	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	**2**	**0.6%**
Syphilis	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2	0	**4**	**1.1%**
Tetanus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0%**
Trichinellosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0%**
Tuberculosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	**1**	**0.3%**
Tularemia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0%**
Typhoid Fever (Salmonella Typhi)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0.0%**
West Nile Virus	0	0	1	3	0	0	0	0	1	2	0	0	1	1	4	1	0	0	0	**14**	**4.0%**
TOTAL BY YEAR	**27**	**9**	**17**	**28**	**4**	**8**	**14**	**6**	**32**	**19**	**17**	**22**	**33**	**33**	**31**	**24**	**13**	**24**	**14**	**348**	**100.0%**

Source(s): N.D. Health & Human Services

Probability

The probability of a hazard or threat is how likely it will happen. Jurisdictions with the highest animal and human populations, and crop exposure are at the most significant risk of infectious disease and pest infestations occurrences.

Animal. Based on data from the Livestock Indemnity Program (LIP) and the assumption that all losses are disease-related, the probability of losses resulting from infectious disease in animals is $48,928.88 in annual losses on average. Profile meeting participants indicated the probability of infectious disease and pest infestations in animals as highly likely, meaning there is a 100 percent probability in the next year of an occurrence.

Human. Per the human infectious disease history in McHenry County, North Dakota, the probability of infectious disease is 100 percent. Profile meeting participants indicated the probability of infectious disease and pest infestations in humans as highly likely meaning there is a 100 percent chance in the next year of an occurrence.

- McHenry County, North Dakota, recorded 348 infectious disease cases between 2004 and 2021, or an average of approximately 20 cases yearly.

Plant. Per the infectious disease history for plants in McHenry County, North Dakota, the probability of infectious disease and pest infestations in any given year is approximately 100 percent. Profile meeting participants indicated the likelihood of infectious disease and pest infestations in crops as highly likely, meaning there is a 100 percent chance in the next year of an occurrence.

- There were 144 incidents of crop loss due to infectious disease between January 1, 2001, and December 31, 2022, resulting in approximately four incidents of crop losses due to infectious disease annually.
- On average, crop losses from infectious disease impacts 4,032.22 acres annually, resulting in an average of 359,772.37 in crop losses due to fest infestations annually. Add in 5 incidents average

Extent/Magnitude

The extent/magnitude of a hazard or threat is expressed in the amount of damage or losses caused, or that could occur in a community. Jurisdictions with the highest animal and human populations and crop exposure are at the most significant risk of impacts from infectious disease occurrences.

Animal. With the lack of cause description and total number of animals lost in the data from the FSA, the extent/magnitude of animal loss from infectious disease cannot be determined.

- **Figure 4.10.1 illustrates the cattle and calf inventory in North Dakota. McHenry County, North Dakota has 97,000 heads as of 2018, the second highest in the state.**
- The highest payable established count occurred in 2013 with 13 counts totaling $271,615.00 in program payments.

- A total of six rabies cases were recorded in McHenry County, North Dakota, between 2018 and 2023.

- Profile meeting participants indicated that with the local economy heavily dependent on agriculture, significant animal losses might have a catastrophic impact.

Human. The extent/magnitude of infectious disease for humans can range from low to high, depending on the disease involved and the specific location of occurrence. If an outbreak occurred in a remote area with a shortage of health professionals, the extent/magnitude could be catastrophic. Figure 4.10 shows the regions in North Dakota that have a lack of health professionals. McHenry County, North Dakota is designated as a Health Professionals Shortage Area (HPSA).

- According to First District Health Unit, McHenry County, North Dakota if a pandemic from a new strain of Influenza or Avian Flu occurred in McHenry County, North Dakota, the impact could be catastrophic, like the COVID-19 Pandemic. The COVID-19 pandemic resulted in 32 fatalities in McHenry County, North Dakota between 2020 and 2022. The total economic losses from the pandemic are still unknown but are estimated to be in the hundreds of thousands to millions of dollars in McHenry County, North Dakota. Approximately 50.0 percent of McHenry County, North Dakota, residents contracted the disease as of January 26, 2024.

- Influenza is a commonplace infectious disease, and modern medical advances manage the extent/magnitude. However, the jet age has contributed to the faster spread of disease. With the re-emergence of Ebola and the onset of COVID-19, the extent/magnitude of infectious disease in humans can be catastrophic, resulting from modern-day travel.

- Profile meeting participants indicated that human infectious diseases could have a catastrophic impact after what was experienced in McHenry County, North Dakota, due to the COVID-19 Pandemic. The pandemic resulted in a temporary but near-total shutdown of local economic and human activity.

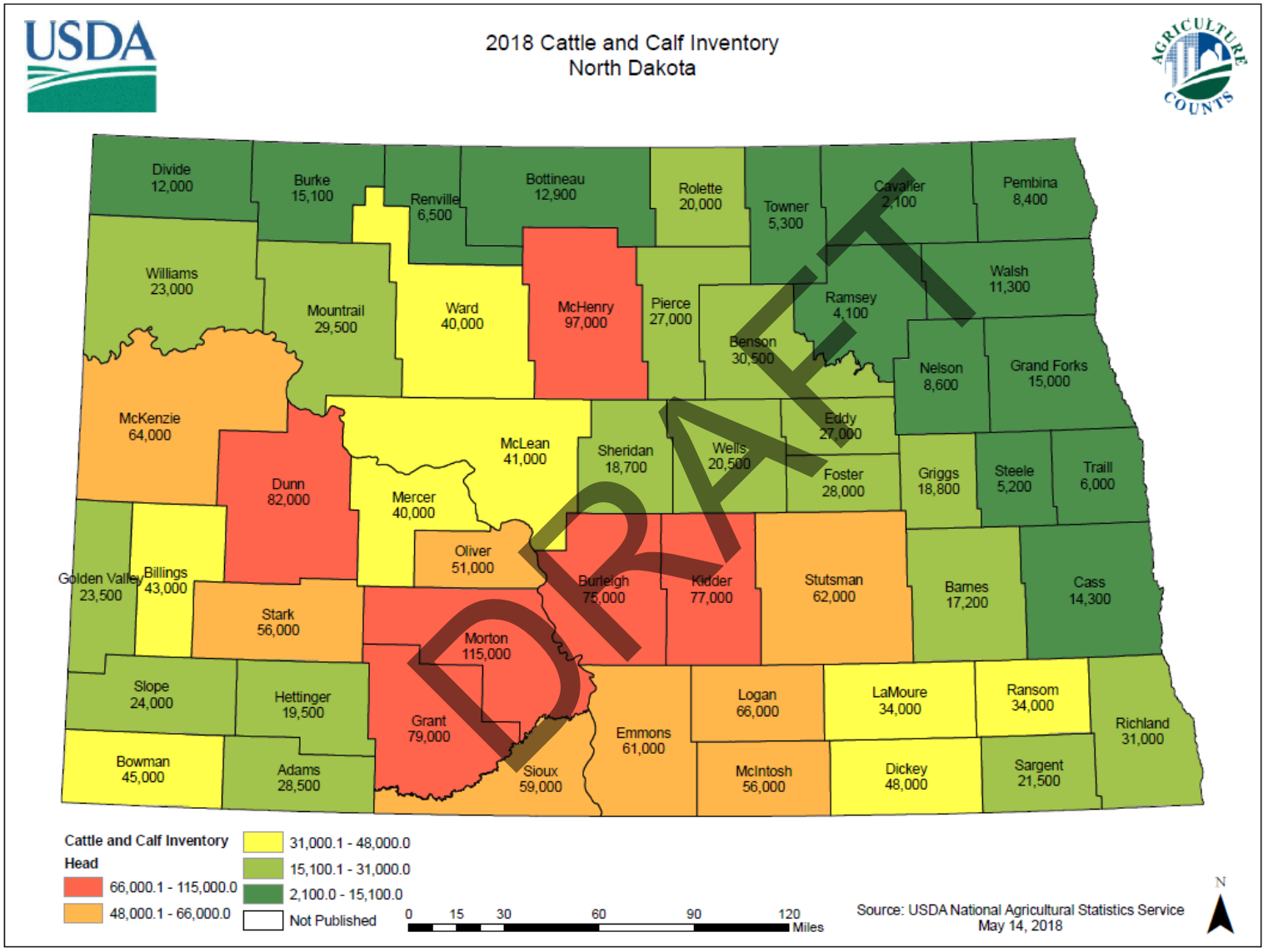
- Impacts to public and private education, regardless of the intensity, can be considered catastrophic as it directly impacts vulnerable populations/school-aged children. McHenry County, North Dakota ,schools experienced a noticeable learning loss in its school-aged population.

Plant. Per crop loss data from the USDA, RMA the following statistics illustrate the extent/magnitude of infectious diseases on crops in McHenry County, North Dakota.

- Between January 1, 2001, and December 31, 2022, McHenry County, North Dakota, experienced 144 incidents of crop loss due to infectious disease, impacting approximately 92,741.00 acres of crops totaling $8,274,765.55 in losses; and experienced 112 incidents of crop loss due to pest infestations, impacting approximately 27,563.07 acres of crops totaling $2,275,933.17 in losses.

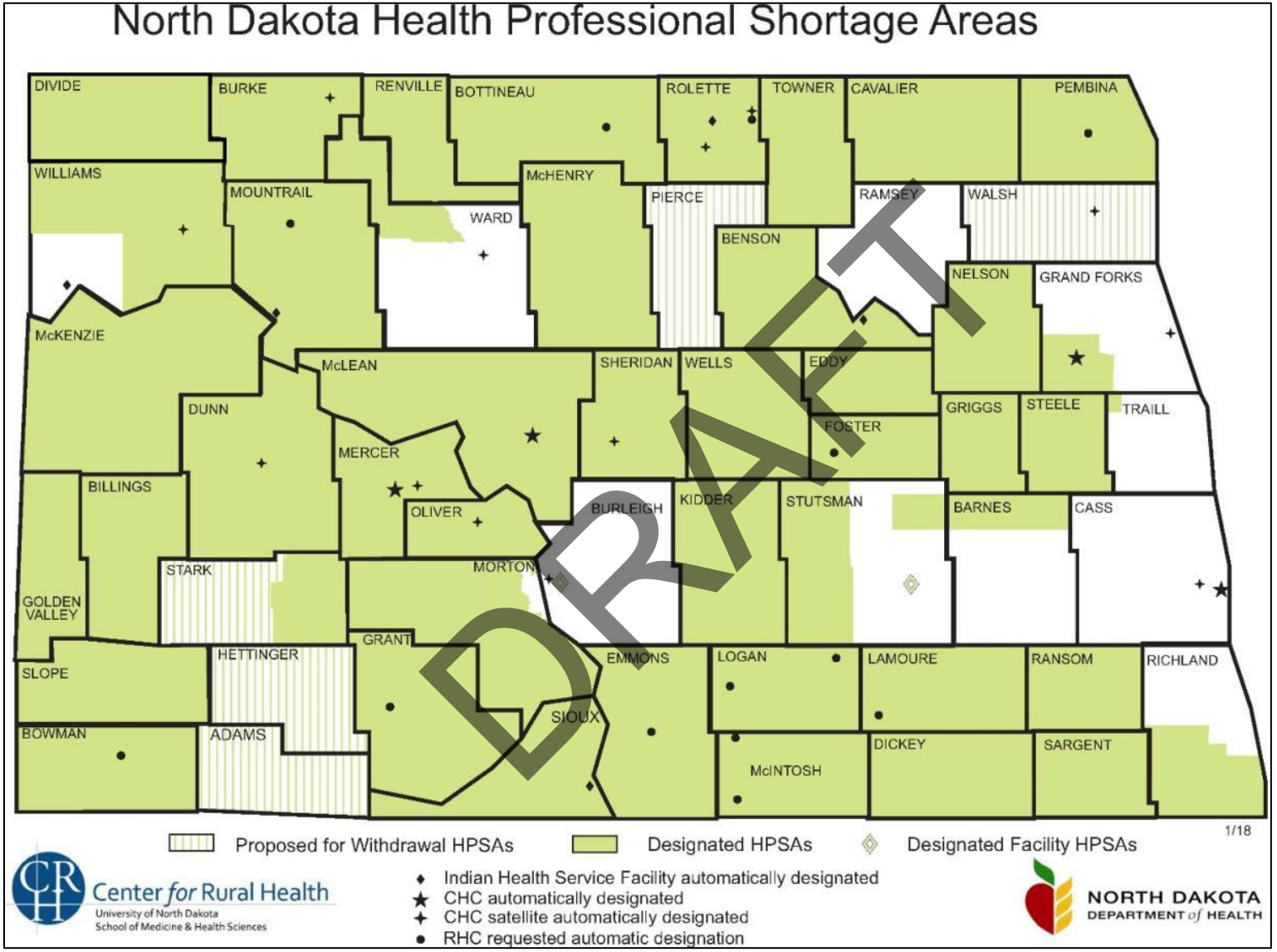
- Profile meeting participants indicated that with the local economy heavily dependent on agriculture, significant crop losses might have a catastrophic impact.

Figure 4.10.1 – 2018 North Dakota Cattle and Calf Inventory



Source(s): 2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP); USDA National Agricultural Statistics Service, 2018

Figure 4.10.2 – North Dakota Health Professional Shortage Areas



Source(s): 2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP); Center for Rural Health, University of North Dakota School of Medicine and Health Sciences

Threat and Hazard Identification Risk Assessment (THIRA)

Table 4.10.4 shows the risk assessment determined by individual jurisdictions and the Plan Update Committee for infectious disease. The risk assessment methodology can be found at the beginning of Chapter 4, Threat and Hazard Identification Risk Assessment. The total in Table 4.10.4 represents the sum of each jurisdiction's impact, frequency, likelihood, and vulnerability to a hazard less the jurisdiction's capabilities to respond to the hazard.

Table 4.10.4 – McHenry County, North Dakota, Infectious Disease & Pest Infestations Risk Assessment Scored Chart Summary

Jurisdiction	Impact	Frequency	Likelihood	Vulnerability	Capabilities	Total
McHenry County – Human	5	4	5	4	2	**16**
McHenry County – Animal & Plant	5	5	5	3	4	**14**
City of Anamoose						
City of Balfour						
City of Bantry						
City of Bergen						
City of Deering						
City of Drake						
City of Granville						
City of Karlsruhe						
City of Kief						
City of Towner						
City of Upham						
City of Velva						
City of Voltaire						

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Tables 4.10.5, 4.10.6, and 4.10.7 provide information on the specific impact, frequency, likelihood, vulnerability, and capability of infectious disease in McHenry County, North Dakota in animals, humans, and plants, respectively. A list of impacts identified as commonplace for natural hazards and man-made threats regardless of the jurisdiction is shown at the beginning of Chapter 4, Threat and Hazard Identification Risk Assessment (THIRA).

Table 4.10.5 – McHenry County, North Dakota, Infectious Disease & Pest Infestations Risk Assessment - Animal

Impact	• Disease Outbreak/Mass Infections – (animals only) • Government Interruptions • Labor Shortages • Livestock Loss • Loss of Economy • Loss/Overcrowded Veterinarian Facilities • Loss of Drinking/Potable Water • Lack of awareness of the public resulting from difficulties in communicating through media sources	• **Strain on local veterinarian resources** • **Financial cost to local producers and the public** • Distress of local producers from a pandemic • Compression of the supply chain can lead to supplies and vaccination shortages • Carcass disposal • Between January 1, 2001, and December 31, 2022, McHenry County, North Dakota, experienced 144 incidents of crop loss due to infectious disease, impacting approximately 92,741.00 acres of crops totaling $8,274,765.55 in losses.
Frequency	• A total of six rabies cases were recorded in McHenry County between 2018 and 2023.	•
Likelihood	<u>More Likely</u> • 97,000 head of cattle & calves in 2018 in the county • Agriculture economy • Dependent on the weather for animals and crops • Transporting of animals across state lines • **U.S. Highway 2 & 52 = heavy livestock traffic** • **Overuse of antibiotics leading to disease tolerance**	<u>Less Likely</u> • Advanced communications such as Internet and tv • Public health and employment regulations for public and private facilities, producers, etc. • **Impact is highly dependent on the type of disease and its effect on the population of livestock**
Vulnerability	<u>More Vulnerable</u> • 97,000 head of cattle & calves in 2018 in the county • Agriculture economy • Dependent on the weather for animals and crops • Transporting of animals across state lines • **U.S. Highway 2 & 52 = heavy livestock traffic** • **Overuse of antibiotics leading to disease tolerance** • **Shortage of veterinary service** • **Dry/drought conditions can result in outbreaks of blue/green algae** • Mold can contribute to illness in animals	<u>Less Vulnerable</u> • Advanced communications such as Internet and tv • Public health and employment regulations for public and private facilities, producers, etc. • **Veterinarian clinics (with four vets) in the county help address the need for services but do not meet the overall demand** •

Capability	• See Chapter 7 for a list of capabilities to address infectious disease and pest infestations.

Table 4.10.6 – McHenry County, North Dakota Infectious Disease & Pest Infestations Risk Assessment - Human

Impact	• Human Injury/Death • Loss of Economy (crop, livestock, manufacturing, etc.) • Loss/Overcrowded Medical Facilities • Loss of Drinking/Potable Water • Mass Casualties/Fatalities • Public Distress/Social Discord • School Closure • Compression of the supply chain can lead to shortages of supplies and vaccinations • Disruptions in essential services and critical infrastructure operations due to lack of alternative staff	• **Financial cost to public health resources** • **Infrastructure degradation resulting from labor shortages** • **Mass casualties can overwhelm funeral homes** • **Labor shortages in medical facilities** • **Loss of capability to transfer patients to other facilities with higher levels of care** • **Psychological impacts on the public and medical community – medical staff leaving the profession** • **Loss of confidence in local government**
Frequency	• Annual occurrences of death, primarily among elderly • **32 deaths from COVID-19 between 2020 and 2022** • McHenry County experiences an average of 40.6 influenza cases annually.	• McHenry County, North Dakota, recorded 348 infectious disease cases between 2004 and 2022, or an average of approximately 20 cases yearly.
Likelihood	More Likely • Growing elderly population • Public schools, daycares, skilled nursing, assisted living • Increasing number of adults avoiding COVID-19 vaccinations for themselves and their children • Small increase in avoidance of vaccinating in general • **Emergence of the COVID-19 variants** • **Public Schools in Drake, Anamoose, Granville, Towner, and Velva** • **Souris Valley Care Center in Velva**	Less Likely • Advanced communications such as Internet and tv promoting wellness and preventative measures – conducted through public health and McHenry County • Public health and employment regulations for public and private facilities • Immunizations & medications • Lower institutionalized population • Wearing of face coverings (when needed) • Population density is lower than larger cities/jurisdictions resulting in less transmission

Table 4.10.5 – McHenry County, North Dakota, Infectious Disease & Pest Infestations Risk Assessment – Human – CONTINUED

Likelihood	More Likely • **Breakthrough infectious cases in vaccinated individuals** • **Unvaccinated individuals are more likely to contract infectious cases compared to vaccinated individuals and are more likely to be hospitalized** • **Resistance of the public to government guidelines related to infectious disease**	
Vulnerability	More Vulnerable • Growing elderly population • Public schools, daycares, skilled nursing, assisted living • Increasing number of adults avoiding COVID-19 vaccinations for themselves and their children • Small increase in avoidance of vaccinating in general • **Emergence of the COVID-19 variants** • **McHenry County Public Health in Towner** • **Public Schools in Drake, Anamoose, Granville, Towner, and Velva** • **Souris Valley Care Center in Velva** • **Increase in air travel and mobility** • Shortage of health professionals in McHenry County • Lack of advanced medical equipment – i.e., ventilators, BiPAP, bypass, dialysis, air, and surface-sterilization due to no hospitals in McHenry County • **The prevalence of social media increasing skepticism of disease prevention measures** • Public schools, daycares, skilled nursing, assisted living	Less Vulnerable • Advanced communications such as the Internet and tv promoting wellness and preventative measures • Public health and employment regulations for public and private facilities, producers, etc. • Immunizations & medications • The population density of the rural parts of McHenry County is sparse, and the rural setting allows for immediate social distancing • Colder climate limits social public interactions • **FDHU, McHenry County Public Health in Towner** • **FDHU has adequate storage space and refrigeration units for a stockpile of medical supplies at their offices in Towner and Minot** • **McHenry County is ranked as having a low social vulnerability** • **N.D. Health & Human Services is statutorily responsible for disease outbreaks – local public health departments work under this direction by way of an MOU**

	• **N.D. State Legislature voted in 2021 that the State Health Officer and the Governor cannot implement a mask mandate** • Colder climate increases indoor public interactions • **Dry/drought conditions can result in outbreaks of blue/green algae** • **Mold in buildings can contribute to illness in humans**

Table 4.10.5 – McHenry County, North Dakota, Infectious & Pest Infestations Disease Risk Assessment – Human – CONTINUED

Vulnerability	More Vulnerable • **Emergence of the COVID-19 variants** • **Breakthrough infectious cases in vaccinated individuals** • **Unvaccinated individuals are more likely to contract infectious cases compared to vaccinated individuals and are more likely to be hospitalized** • **Resistance of the public to government guidelines related to infectious disease** • Resistance of the public to government guidelines related to infectious disease • Lack of local epidemiologists providing specific disease statistics and reporting for McHenry County • Lack of indoor drive-through mass vaccinating/testing facility • **Lack of backup generators for local vaccination refrigeration unit at FDHU, McHenry County in the FDHU, McHenry County Building** • Lack of consistent information from state leaders • Infectious disease statistics are not always indicative of community spread, as not all cases of the disease are reported	Less Vulnerable • FDHU, McHenry (includes public health nurse) • McHenry County Emergency Management/PIO • Regional and state epidemiologists working with local public health to manage disease outbreaks • Regional Public Information Officer (PIO) • Regional Environmental Health Practitioner • Regional Emergency Preparedness and Response Coordinator • **McHenry County has a low Social Vulnerability Index per the CDC as of 2021** • FDHU has a stockpile of medical supplies and medications at its office in Minot
Capability	• See Chapter 7 for a list of capabilities to address infectious disease and pest infestations.	

Table 4.10.7 – McHenry County, North Dakota, Infectious Disease & Pest Infestations Risk Assessment - Plant

Impact	• Crop Loss • Disease Outbreak/Mass Infections (plants only) • Livestock Loss • Loss of Economy • Soil Erosion	• **Strain on local, state, and federal governments resources and private enterprise** • Between January 1, 2001, and December 31, 2022, McHenry County experienced 144 incidents of crop loss due to infectious disease, impacting approximately 92,741.00 acres of crops totaling $8,274,764.55 in losses.
Frequency	• Crop loss due to infectious disease occurs annually	• There were 144 incidents of crop loss due to infectious disease between January 1, 2001, and December 31, 2023, resulting in approximately six incidents of crop losses due to infectious disease annually.
Likelihood	More Likely • Agriculture economy • Dependent on the weather for animals and crops	Less Likely • Advanced communications such as Internet and tv • Public health and employment regulations for public and private facilities, producers, etc. • Pesticide Training facilitated by NDSU Extension/McHenry County • Spraying for mosquitos
Vulnerability	More Vulnerable • Agriculture economy • Dependent on the weather for animals and crops	Less Vulnerable • Advanced communications such as Internet and tv • Public health and employment regulations for public facilities • Pesticide Training facilitated by NDSU Extension/McHenry County • Spraying for mosquitos • **Approximately 10 agronomists living in McHenry County**
Capability	• See Chapter 7 for a list of capabilities to address infectious disease and pest infestations.	

Vulnerabilities to Publicly-Owned Buildings and Property

Most structures remain unaffected by impacts from infectious diseases as only animals, humans, and plants are susceptible to the hazard. Buildings can become contaminated and uninhabitable due to secondary impacts from a pandemic – i.e., people sheltering in place and inadvertently neglecting the building or property. Also, critical facilities are not always available for vaccinations or testing due to competing community events/uses. An increase in disinfection measures, both staff time and cost to local budgets, does occur during influenza season and pandemics, such as COVID-19.

Chapter 3, Profile and Inventory, provides a summary of publicly-owned buildings in McHenry County, North Dakota.

There are almost no physical vulnerabilities to publicly-owned buildings and property from infectious diseases in animals, humans, and plants.

Vulnerabilities of Critical Facilities and Infrastructure

Since animals, humans, and plants are affected by infectious diseases, critical facilities and infrastructure are unaffected in structural terms. However, critical facilities such as public health clinics, hospitals, and veterinarian clinics can become contaminated and quickly overwhelmed if an outbreak/pandemic of infectious disease occurs in animals or humans. **The surge in infectious cases and shortages or outages of medical supplies (personal protective equipment, also known as PPE) and staff can limit or stop the functionality of medical and veterinarian facilities and services altogether.** The stress/strain infectious disease can place on the private sector (businesses or individuals) and public sector also impacts the vulnerability to critical facilities and infrastructure due to people sheltering in place, resulting in labor shortages.

Similarly, emergency services can also become stressed in rural areas where populations are dispersed over a large geographic expanse. The vulnerability and exposure to infectious disease will likely increase due to the greater frequency of emerging diseases, increased mobility (primarily jet travel), an aging population, and anti-vaccination trends.

Infrastructure for drinking/potable water and wastewater could be impacted by infectious disease through contamination or quarantine of a large portion of a given population, which could delay physical maintenance and repair to infrastructure. Aged drinking/potable or wastewater systems in incorporated jurisdictions could result in water line breaks, which can contribute to higher rates of infectious diseases in humans.

Due to the presence of the livestock industry in McHenry County, North Dakota, veterinary services can also become overwhelmed in the case of an outbreak in farm animals and livestock.

Chapter 3, Profile and Inventory, provides a summary of critical facilities and infrastructure in McHenry County, North Dakota.

There are almost no physical vulnerabilities to critical facilities and infrastructure from infectious diseases in animals, humans, and plants.

Vulnerabilities to New and Future Development

New and future development would largely avoid physical impact from infectious diseases and pest infestations and not be vulnerable. While mold may make a building uninhabitable, it is not an infectious disease or pest infestation. However, "mold illness" can occur in humans due to mold exposure. However, new structures could be susceptible to deterioration from contamination if mechanical systems are not constructed properly. In addition, drainage in new development needs to be appropriately designed or installed; standing water could foster vector growth.

Chapter 3, Profile and Inventory, provides a summary of new and future development in McHenry County, North Dakota.

There are almost no physical vulnerabilities to new and future development from infectious disease and pest infestations in animals, humans, and plants.

Population growth or decline, attributable to new and future development, will either increase or decrease the vulnerability to infectious disease and pest infestations. Similarly, population growth in livestock could increase or reduce the vulnerability to infectious disease and pest infestations.

Data Limitations

Animal

The lack of available animal loss data from the N.D. Dept. of Agriculture results in the inability to track livestock losses from infectious diseases and pest infestations. Similarly, the Farm Service Agency (FSA) provided information on payments made through the Livestock Indemnity Program (LIP). Still, the cause of the loss and the number of animals impacted is not available. For plan development purposes, the infectious disease profile includes statistics from the LIP program.

Statistics on infectious diseases in animals and humans are available on the N.D. Health & Human Services website but cannot be downloaded and must be manually compiled and analyzed. Statistics on COVID-19, influenza, HIV/AIDS, rabies, and all other diseases are fragmented on the website, available in separate sections.

Human

Statistics on infectious diseases in humans are available on the N.D. Health & Human Services and human Services website cannot be downloaded and must be manually compiled and analyzed. Statistics on influenza and COVID-19 are shown in separate sections on the department's website from all other infectious diseases impacting humans.

The delay in information sharing about disease trends and statistics from the N.D. Health & Human Services and Human Services to local public health units disrupts service delivery and reduces mitigation capability.

Plant

The U.S. Dept. of Agriculture-Risk Management Agency can only provide monetary crop loss information after 2001.

Other Key Documents

This plan incorporates data from the following documents, and information from this plan will be included in the update of the following documents.

- 2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP)
- 2023 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP)
- Centers for Disease Control Social Vulnerability Index, McHenry County, North Dakota
- McHenry County, North Dakota, Local Emergency Operations Plan, Infectious Disease and Pest Infestations Annex
- McHenry County, North Dakota, Continuity of Operations Plan
- McHenry County, North Dakota, Vaccination Plan through First District Health Unit, McHenry County
- McHenry County, North Dakota, North Dakota, Pandemic Influenza Response Plan through First District Health Unit, McHenry County, North Dakota
- McHenry County, North Dakota, Point of Dispensing Plan (POD) through First District Health Unit, McHenry County, and McHenry County Emergency Management (non-medical supplies or medications)
- McHenry County, North Dakota, Mass Care Plan through First District Health Unit, McHenry County
- McHenry County, North Dakota, Shelter Plan through McHenry County Emergency Management
- McHenry County, North Dakota, Social Vulnerability Index Report
- McHenry County, North Dakota, Threat and Hazard Identification and Risk Assessment (THIRA)
- North Dakota Continuity of Operations Plan
- North Dakota Emergency Operations Plan, Infectious Disease & Pest Infestations Annex
- North Dakota State Disaster Recovery Plan
- North Dakota Threat and Hazard Identification and Risk Assessment (THIRA)

4.11 Severe Summer Weather

Including downbursts, extreme heat, hail, high wind, lightning, and tornadoes.

Characteristics

Summer storms are caused by atmospheric temperature imbalances. Thunderstorms develop as warm, moist air rises. These conditions will produce updrafts and downdrafts that can reach velocities of 170 mph. Updrafts and downdrafts are the reason for gust fronts, heavy rain (flash severe summer weather), lightning, hail, and high winds. Downburst or straight-line winds can be as deadly as tornadoes. If a thunderstorm continues to intensify, a tornado may develop. A thunderstorm affects a relatively small area when compared to a winter storm. A typical thunderstorm is 15 miles in diameter and lasts an average of 30 minutes. Despite their small size, all thunderstorms are dangerous. Severe summer storms can result in loss of life, injuries, and damage to property and crops.

Seasonal Pattern	March to November
Duration	2 to 6 hours
Speed of Onset	12 to 24 hours warning
Location	Total geographic extent of McHenry County, North Dakota. **City of Anamoose, North Dakota** **City of Balfour, North Dakota** **City of Bantry, North Dakota** **City of Deering, North Dakota** **City of Drake, North Dakota** **City of Granville, North Dakota** **City of Karlsruhe, North Dakota** **City of Kief, North Dakota** **City of Towner, North Dakota** • N.D. Highway 14 underpass in Towner **City of Upham, North Dakota** **City of Velva, North Dakota** **City of Voltaire, North Dakota**

Downbursts: Strong winds can form along the leading edge of a thunderstorm. Downburst winds occur when air is carried into a storm's updraft, cools rapidly, and comes rushing to the ground. These winds are forced horizontally when they reach the ground and can cause significant damage. These types of strong winds can also be referred to as straight-line winds.

Extreme Heat: According to information provided by FEMA, extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks. Heat kills by taxing the human body beyond its abilities.

Hail: Hail is frozen precipitation that forms and falls from cumulonimbus clouds. Hail occurs when strong rising currents of air within a storm, called updrafts, carry water droplets to a height where freezing occurs. The ice particles grow, finally becoming too heavy to be supported by the updraft and fall to the ground.

High Wind: High wind events occur separately from tornadoes and severe thunderstorms. These winds typically develop with strong pressure gradients and gusty frontal passages. The closer and stronger the two systems are, (one high pressure, one low pressure) the stronger the pressure gradient, and therefore, the stronger the winds are.

Lightning: Lightning develops when ice particles in a cloud move around, colliding with other particles. These collisions cause a separation of electrical charges. Positively charged ice particles rise to the top of the cloud and negatively charged ones fall to the middle and lower sections of the cloud. The negative charges at the base of the cloud attract positive charges at the surface of the Earth.

Tornado: A tornado is a violently rotating column of air extending from a thunderstorm to the ground. Most tornadoes develop from supercell thunderstorms. Supercell thunderstorms have a persistent rotating updraft and can form when there is sufficient vertical wind shear in the atmosphere. A funnel cloud is a rotating column of air extending out of a cloud base, but not yet touching the ground. Once a funnel cloud reaches the ground, it becomes a tornado. Tornadoes can create tremendous damage over a small area.

For more information regarding severe summer weather please reference the **2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP).** The state plan can be accessed by following the electronic hyperlink or link to the N.D. Dept. of Emergency Services website:

2018 North Dakota Enhanced Mitigation Mission Area Operations Plan

https://www.des.nd.gov/planning

History

Information on the history of severe summer weather in McHenry County was obtained from the National Climatic Data Center (NCDC); the National Oceanic and Atmospheric Administration's (NOAA) National Climatic Data Center (NCDC); the U.S. Dept. of Agriculture (USDA), Risk Management Agency (RMA); and McHenry County Emergency Management. A detailed hazard history for McHenry County can be found on a disc located at the beginning of Chapter 4, Threat and Hazard Identification Risk Assessment.

National Oceanic and Atmospheric Administration's National Climatic Data Center

Table 4.11.1 summarizes the history of severe summer weather in McHenry County, North Dakota, between January 1, 1950, to December 31, 2023. The following are key points.

- McHenry County, North Dakota, experienced 113 occurrences of severe summer weather resulting in approximately one-and-a-half storms of significance annually.
- Approximately $2,658,500.00 in property damage and $1,029,000.00 in crop damage was reported.
- No injuries or fatalities were reported.

Table 4.11.1 – 1950 to 2022 McHenry County, North Dakota, Severe Summer Weather Hazard History Summary

Occurrences	Injuries	Fatalities	Property Damage	Crop Damage
113	0	0	$2,658,500.00	$1,029,000.00

Source(s): National Climatic Data Center (NCDC); National Oceanic and Atmospheric Administration (NOAA)

U.S. Dept. of Agriculture, Risk Management Agency

- Crop loss from severe summer weather is tracked by the U.S. Dept. of Agriculture, Risk Management Agency (RMA). The RMA provides data on the crop type affected, damage cause description, determined acres and indemnity amount. The damage description identifies the cause of damage, determines acres identifies the number of acres lost due to damage, and the indemnity amount identifies the total amount of the loss for the designated peril. Cause of Loss categories included in severe summer weather include cold wet weather, excess moisture/precip/rain, hail, heat, hot wind, tornado, and wind/excess wind. **Between January 1, 2001, and December 31, 2023, McHenry County, North Dakota, experienced 1,934 incidents of crop loss due to severe summer weather impacting approximately 1,292,381.19 acres of crops totaling $154,311,134.13 in losses.**

McHenry County Emergency Management.

- There have been disaster declarations and emergencies pertaining to severe summer weather in McHenry County, North Dakota.

Probability

The probability of a hazard or threat is how likely it is it will happen. Profile meeting participants and the Steering Committee indicated the probability of severe summer weather in McHenry County, North Dakota, is highly likely, meaning that there is a 100 percent probability in the next year of an occurrence.

National Climatic Data Center/National Oceanic and Atmospheric Administration

Per Table 4.11.1, the following statistics on the probability of severe summer weather in McHenry County, North Dakota, are as follows.

- The probability of severe summer weather is 100 percent based on 113 occurrences between January 1, 1950, and December 31, 2023, or one-and-a-half severe summer weather events of significance annually.
- McHenry County, North Dakota, experiences approximately $35,925.28 in property damage and $13,905.41 in crop damage annually between January 1, 1950, and December 31, 2023.

U.S. Dept. of Agriculture, Risk Management Agency

- According to information obtained from the U.S. Dept. of Agriculture, Risk Management Agency (RMA), crop loss due to severe summer weather impacts 56,190.49 acres totaling $6,709,179.74 annually in McHenry County, North Dakota, between January 1, 2001, and December 31, 2023.

Extent/Magnitude

The extent/magnitude of a hazard or threat is expressed in the amount and/or number of damages or losses either actualized in a community or estimated based on known assets and levels of risk. The extent/magnitude of the severe summer weather ranges from large tornados directing hitting incorporated jurisdictions with dense populations, hail causing massive property and crop damage, power outages, and loss of critical facilities and infrastructure, to localized flooding and fallen tree branches. Figures 4.11.1 to 4.11.3 illustrate the history of significant hail, and wind speed occurrences recorded between 1955 and 2022, and tornado occurrences recorded between 1950 and 2022 in McHenry County, North Dakota. Profile meeting participants and the Steering Committee indicated the magnitude or impact of severe summer weather as catastrophic meaning substantial impact to the jurisdiction, its people and/or property could be affected.

2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP)

- According to the 2018 N.D. Enhanced Mitigation MAOP, FEMA recognizes four wind zones in the United States. Winds speeds can reach up to 160 miles per hour in Zone II and 200 miles per hour in Zone III. No special wind regions are identified in North Dakota. McHenry County, North Dakota, is geographically in Zone II.

National Climatic Data Center (NCDC)

- **June 22, 2007.** An EF1 Tornado caused $100,000.00 in property damage in McHenry County, North Dakota, near the city of Upham. According to the National Weather Service, the Enhanced Fujita Scale (EF Scale) is used to assign tornadoes a "rating" based on estimated wind speeds and related damage. The EF Scale ratings are zero (65 to 85 m.p.h.), one (86 to 110 m.p.h.), two (111 to 135 m.p.h.), three (136 to 165 m.p.h.), four (166 to 200 m.p.h.), and five (over 200 m.p.h.).

- **July 17, 2011.** A hailstorm produced hail 2.75 inches in diameter in McHenry County, North Dakota, at the city of Velva, resulting in $150,000.00 in property damage and $250,000.00 in crop damage. According to the National Weather Service, hail threat can be classified as non-threatening, very low, low, moderate, high, or extreme. This hailstorm event can be classified as a high event.

- **July 7, 2020.** A Thunderstorm Wind event impacted the city of Anamoose and produced winds of 78 m.p.h. resulting in $850,000.00 in property damage and no crop damage. **According to meeting participants and profile meeting participants, the agronomy center in Anamoose was destroyed and comprises most of the property damage in this incident.** According to the National Weather Service, this event can be classified as a violent storm event based on the Beaufort Wind Scale.

Threat and Hazard Identification Risk Assessment (THIRA)

Table 4.11.2 shows the risk assessment as determined by individual jurisdictions, the Steering Committee, and meeting participants at the profile meeting for severe summer weather. The risk assessment methodology can be found in the beginning of Chapter 4, Threat and Hazard Identification Risk Assessment (THIRA). The total in Table 4.11.2 represents the sum of each jurisdiction's impact, frequency, likelihood, and vulnerability to a hazard/threat less the jurisdiction's capabilities to respond to the hazard/threat.

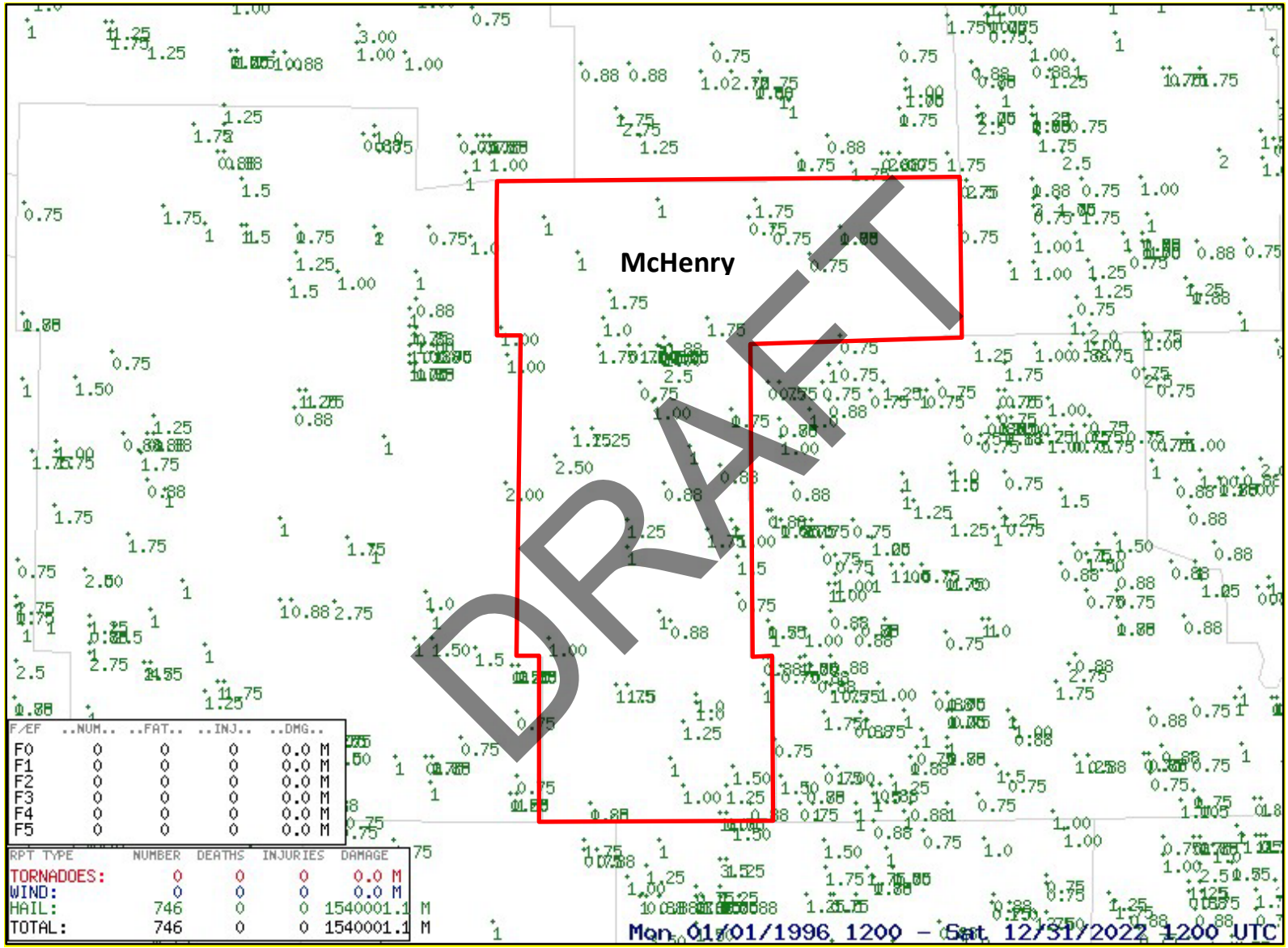
Table 4.11.2 – McHenry County, North Dakota, Severe Summer Weather Risk Assessment Scored Chart Summary

Jurisdiction	Impact	Frequency	Likelihood	Vulnerability	Capabilities	Total
McHenry County	5	5	5	4	3	**16**
City of Anamoose						
City of Balfour						
City of Bantry						
City of Bergen						
City of Deering						
City of Drake						
City of Granville						
City of Karlsruhe						
City of Kief						
City of Towner						
City of Upham						
City of Velva						
City of Voltaire						

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

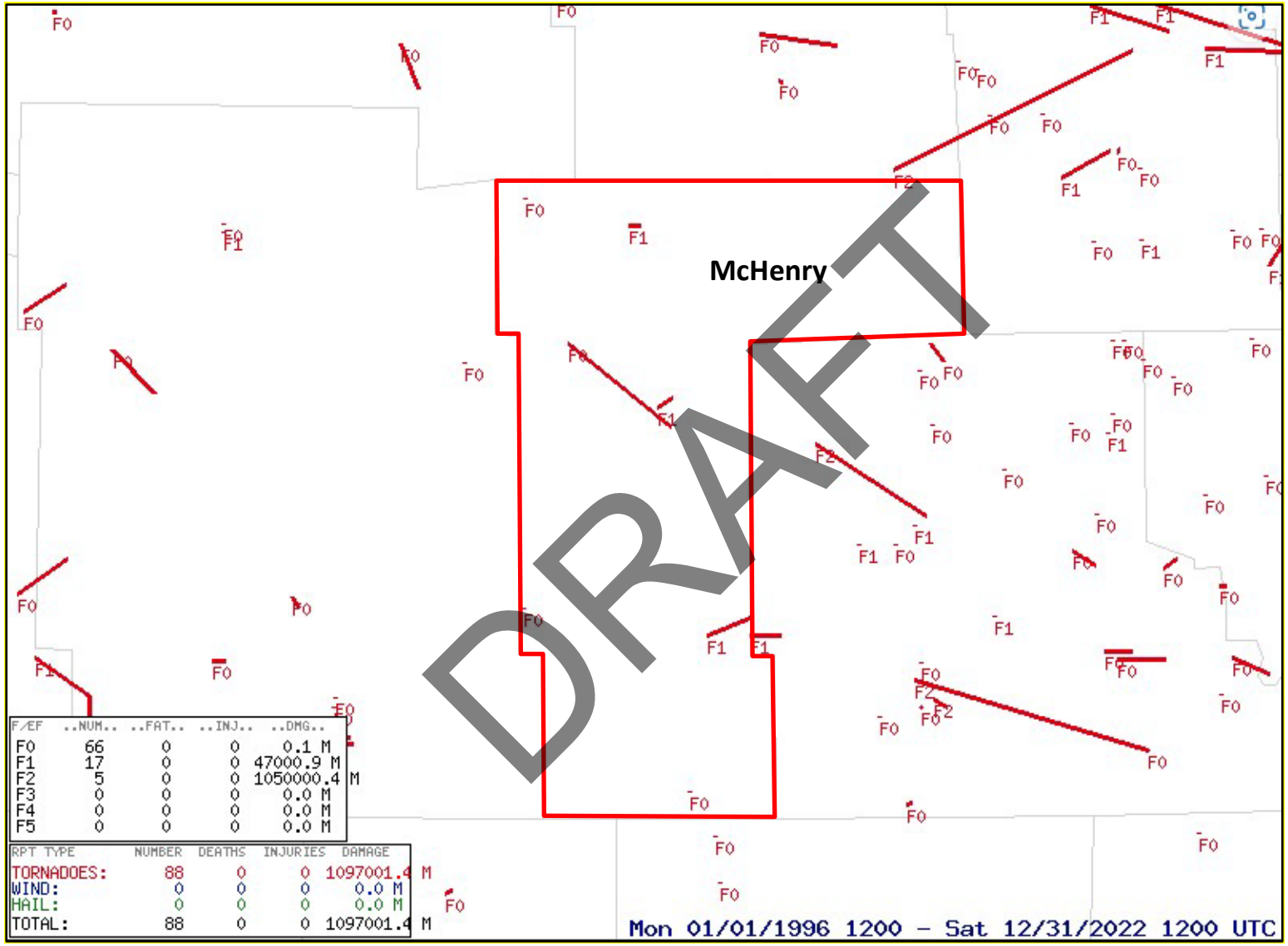
Table 4.11.3 provides information on the specific impact, frequency, likelihood, vulnerability, and capability of severe summer weather in McHenry County, North Dakota. A list of impacts identified as commonplace for natural hazards and man-made threats regardless of the jurisdiction is shown at the beginning of Chapter 4, Threat and Hazard Identification Risk Assessment (THIRA).

Figure 4.11.1 – 1955 to 2023 McHenry County, North Dakota, Recorded Hail Occurrences



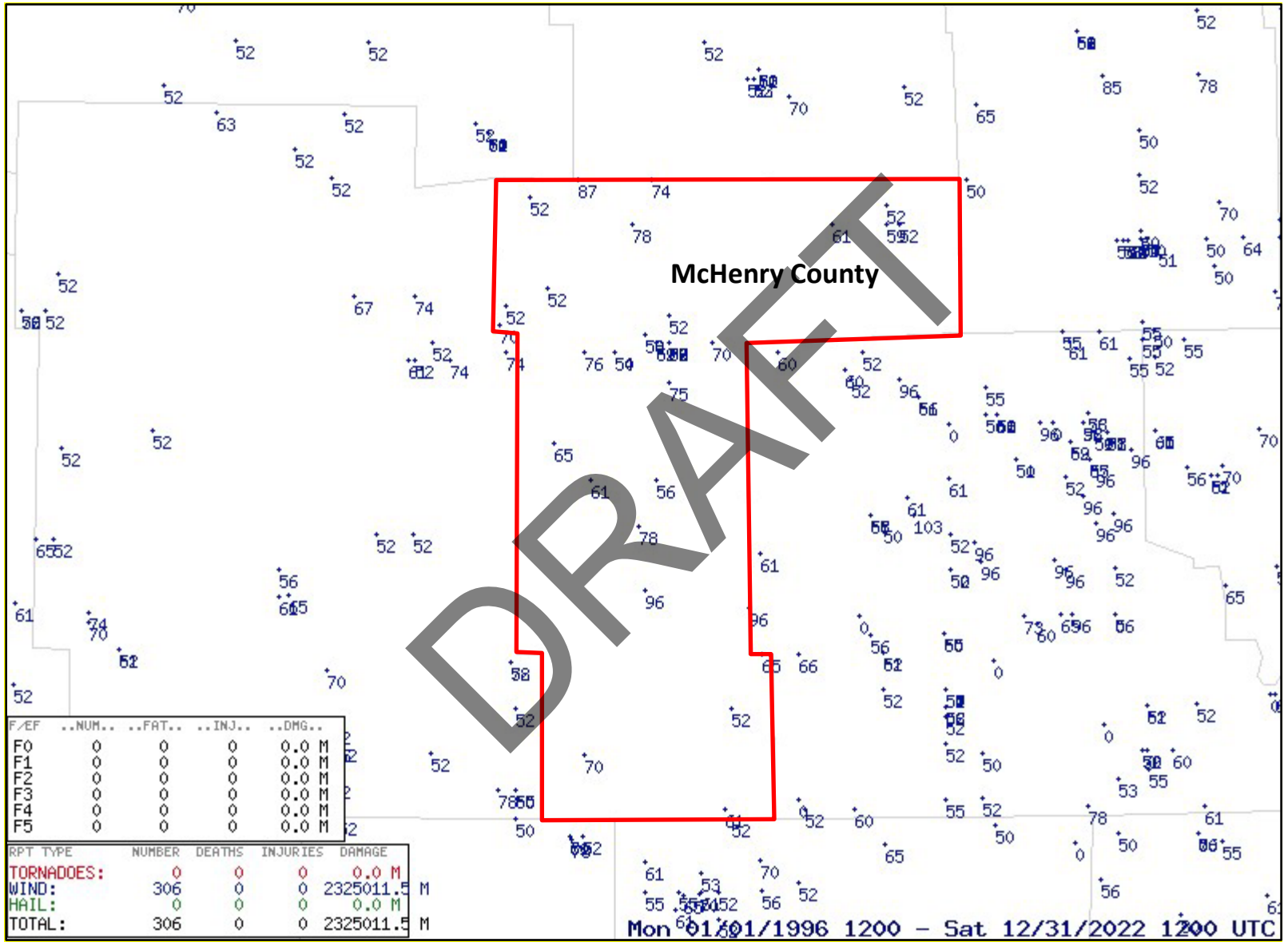
Source(s): National Oceanic and Atmospheric Administration (NOAA), Storm Prediction Center

Figure 4.11.2 – 1950 to 2022 McHenry County, North Dakota, Recorded Tornado Occurrences



Source(s): National Oceanic and Atmospheric Administration (NOAA), Storm Prediction Center

Figure 4.11.3 – 1955 to 2022 McHenry County, North Dakota, Recorded Wind Speed Occurrences



Source(s): National Oceanic and Atmospheric Administration (NOAA), Storm Prediction Center

Table 4.11.3 – McHenry County, North Dakota, Severe Summer Weather Risk Assessment

Impact	**Blocked Roads/Culverts** List same roads for flood McHenry County, North Dakota • Annual occurrences of localized flooding of streets in incorporated cities • Annualized occurrences of county and townships roads flooding	• Evacuation (Localized) • Human Injury/Death – heat exhaustion or from flying debris • Loss of Livestock • Loss of Crops • Loss of Power/Downed Power Lines Property/Vehicle Damage – repair of roofing, siding, and drainage systems for homes, windows, and paint for cars • Sewer Backup • Shelter-in-place Strain to emergency services and responders if damage is widespread • Overland flooding in incorporated jurisdictions due to improper drainage in some areas • **Unpaved streets in small jurisdictions can become damaged from rainfall and moisture** • **Direct hit from a tornado would be catastrophic** • **Temporary economic boost due to rebuilding/repairs of homes, businesses, and other structures.**

Table 4.11.3 – McHenry County, North Dakota, Severe Summer Weather Risk Assessment – Continued

Likelihood	• Heat exhaustion occurring during summer months	•
Likelihood	• Climatic patterns will result in numerous annual occurrences of the hazard	
Vulnerability	More Vulnerable • High elderly population • Public schools seeing slight increase in enrollment • Inadequate drainage N.D. Highway 14 underpass in Towner • Lack of storm shelters for • Aging infrastructure (roads, water systems, electrical systems, shelter in city of Rugby) • Short staffing of local employers and employees/general population • **Lack of building codes or enforcement** • Small communities have experienced prolonged response from emergency services due to location and blocked roads • Lack of funding to improve previously low-traffic roads as traffic volumes increase due to economic activity • Increase in permanent and temporary populations, and economic activity, will increase amount of people and community assets exposed to severe summer weather event	Less Vulnerable • Lack of building codes and enforcement • Advanced warning/notification such as internet and TV • Switching of overhead power lines to underground – change to fiber-optic lines • Instant communication capabilities through cell phones • Independent work ethic of local populations • Better weather alerts and education of residents through internet, TV and cable • Increase in digital/technological capabilities of tractors and farm equipment to warn farmers of severe storms • Outdoor emergency sirens are in place in city of Rugby • Education in schools has increased/expanded • Better predictions from the National Weather Service • Switch to no-till farming reduces blowing of soil • **Increased awareness through McHenry County Everbridge and IPAWS** • **Presence of social media alerting to the public**

Table 4.11.3 – McHenry County, North Dakota, Severe Summer Weather Risk Assessment – Continued

Vulnerability	More Vulnerable • Presence of pipelines, railroad, and truck traffic carrying hazardous materials through the county • **Lack of 24-hour storm shelters in smaller communities and rural areas of the county** • **Lack of outdoor emergency sirens in** • Structural integrity of temporary housing • County and city staff limitations during events of significance • Lack of storm water systems in small cities and rural areas	Less Vulnerable • **County highway department and NDDOT will assist ambulances to calls in rural areas during incidents of severe summer weather** • **Appropriately positioned living fences** • **Advancements in public works equipment to use for responding to significant incidents** • **Permanent generator for…..**

	• Lightning strikes causing fires and damage to structures • **McHenry County needs additional equipment – payloaders and dump trucks** • **Some township roads lack signage for navigation for emergency services and first responders in rural areas** • Removal of shelterbelts leaves little to no protection to structures from severe summer weather • **Critical facilities: McHenry County Courthouse, all fire halls and ambulance buildings, FDHU, McHenry Offices in Towner, Drake-Anamoose Public Schools, TGU Public Schools, Velva Public School, city halls/community centers, Souris Valley Care Center** • Undersized culverts for drainage • McHenry County is not StormReady Certified	• **McHenry County has private contractors in the area with heavy equipment capable of responding to and mitigating impacts from severe summer weather**
Capability	• See Chapter 7 for a list of capabilities to address severe summer weather.	

Vulnerabilities to Publicly-Owned Buildings and Property

Publicly-owned buildings and property are susceptible to severe summer weather in many forms. Buildings are often constructed to withstand impacts from severe summer weather, but may not sustain high wind speeds, tornadoes, or large hail. Large hail can damage building roofs, break windows, injure people and/or result in fatalities. Depending on the size of the building and the role it plays in day-to-day operations, the vulnerability to severe summer weather can vary from nominal for larger structures such as the McHenry County Courthouse, to severe for county shops in smaller cities, which are considerably less sturdy. The lack of stormwater management in smaller incorporated jurisdictions contributes to the vulnerability of publicly-owned buildings and property from flash flooding due to severe summer weather.

A summary of publicly- owned buildings is provided in Chapter 3, Profile and Inventory.

Vulnerabilities of Critical Facilities and Infrastructure

Critical facilities such as the McHenry County Courthouse, schools, water towers, roadways, publicly-owned buildings and other specialty facilities and assisted living facilities are vulnerable to severe summer weather in a similar fashion to publicly-owned buildings and property. In terms of infrastructure, overhead power lines are susceptible to wind and debris, which can disrupt electricity and cause power outages, sometimes prolonged. Disruptions in water service can be caused by physical damage to water towers or lift stations, or a loss of power. Roadways can become blocked due to flash flooding and overland flooding or from windblown debris, which limits access for emergency services and disrupts economic activity. The lack of stormwater management in smaller incorporated jurisdictions contributes to the vulnerability of critical facilities and infrastructure to severe summer weather.

Vulnerabilities to New and Future Development

Building codes ensure buildings and structures are built adequately to better withstand severe summer weather. **McHenry County, North Dakota, and incorporated jurisdictions have adopted buildings codes, but none have enforcement capabilities.** Similarly, incorporated jurisdictions with a high number of trailer and mobile homes, which are more susceptible to severe weather, may experience more impacts from the hazard. As populations grow, more people are at risk of injury and potential death from tornadoes, large hail, and windblown debris such as tree branches. Strengthening and enforcement of buildings codes would mitigate impacts from the hazard. This mitigation project for the county can be found in Chapter 6, Mitigation Strategy.

An inventory of the household units by type in jurisdictions in McHenry County is shown in Chapter 3, Profile and Inventory.

Data Limitations

Residents often experience impacts from severe summer weather, such as broken windows on homes or damage to vehicles, they do not report. Weather data provided by NCDC, NOAA, and other agencies can be incomplete and reported damages can vary significantly from local sources. Fewer active storm spotters reduce the amount of reported weather information available to county emergency management.

National Climatic Data Center/National Oceanic and Atmospheric Administration

The hazard history provided through the National Climatic Data Center/National Oceanic Atmospheric Administration's Storm Events Database contains data as entered by NOAA's National Weather Service (NWS). Due to changes in the data collection and processing procedures over time, there are unique periods of record available depending on the event type. The following timelines show the different time spans for each period of unique data collection and processing procedures. **All types of severe summer weather were not recorded cohesively until 1996.**

1. Tornado: From 1950 through 1954, only tornado events were recorded.

2. Tornado, Thunderstorm Wind and Hail: From 1955 through 1992, only tornado, thunderstorm wind and hail events were keyed from the paper publications into digital data. From 1993 to 1995, only tornadoes, thunderstorm wind and hail events have been extracted from the Unformatted Text Files.

3. All Event Types (48 from Directive 10-1605): From 1996 to present, 48 event types are recorded as defined in NWS Directive 10-1605.

U.S. Dept. of Agriculture, Farm Services Agency

The Livestock Indemnity Program (LIP) provides financial assistance to local producers that experience livestock losses. The program does not provide the cause of loss and, therefore, an accurate description of livestock loss from severe summer weather cannot be identified.

U.S. Dept. of Agriculture, Risk Management Agency

One of the Cause of Loss categories for crop loss data from the USDA, RMA is titled Other (snow, lightning, etc.) combines elements of severe summer weather and severe winter weather. Therefore, crop loss data for any given jurisdiction is incomplete.

Other Key Documents

This plan incorporates data from the following documents and information from this plan will be incorporated in the update of the following documents.

- 2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP)
- 2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP)
- 2023 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP)
- International Building Codes
- McHenry County, North Dakota, Comprehensive Plan
- McHenry County, North Dakota, Evacuation Plan through McHenry County Emergency Management and First District Health Unit
- McHenry County, North Dakota, Local Emergency Operations Plan
- McHenry County, North Dakota, Mass Care Plan through First District Health Unit
- McHenry County, North Dakota Shelter Plan through McHenry County Emergency Management

- McHenry County, North Dakota, Threat and Hazard Identification and Risk Assessment (THIRA)
- McHenry County, North Dakota Zoning Ordinances
- North Dakota Continuity of Operations Plan
- North Dakota Dept. of Transportation Design Manual
- North Dakota Emergency Operations Plan, Severe Winter Weather Annex
- North Dakota League of Cities: Planning and Zoning Handbook
- North Dakota State Building Code
- North Dakota State Disaster Recovery Plan
- North Dakota State Preparedness Report (SPR)
- North Dakota Threat and Hazard Identification and Risk Assessment (THIRA)
- McHenry County, North Dakota, Zoning Ordinances

4.12 Severe Winter Weather

Including blizzards, extreme cold, heavy snow, ice storms, recycled snow, structure collapse, and secondary hazards.

Characteristics

Winter storms have the capability to completely immobilize large areas of a state or several states simultaneously. Winter storms occur in several forms, such as heavy snowstorms, blizzards, and ice storms. Each in its own way is a potential killer of hundreds of people, livestock, and wildlife, whenever the storm strikes. A brief explanation of each follows Figure 4.12.1.

Blizzards are the most dramatic and dangerous winter storms. A blizzard has winds of 35 mph or more with snow and blowing snow reducing visibility to less than ¼ mile for at least 3 hours. Blizzards are usually characterized by low temperatures and by strong winds bearing substantial amounts of snow. Snowfall is usually present during the preliminary stages of the blizzard. However, most of the snow in a blizzard is in the form of fine, powdery particles of snow which are whipped up from the surface in such great density that at times the visibility is only a few yards, creating a blinding condition.

Extreme Cold includes prolonged periods of cold temperatures throughout the winter months. People are forced to limit time spent outdoors in extreme frigid conditions. When cold temperatures combine with wind, dangerous wind chills occur. Wind chill describes how cold it feels and is based on heat loss on exposed skin from wind and cold. The wind chill makes it feel much colder than the actual temperature.

Heavy Snow is probably the most significant winter weather phenomenon. Snow can be continuous, intermittent, flurries or if showery in nature, snow squalls. Snow squalls are brief and intense for short durations and are comparable to summer rain showers. Blowing and drifting snow often occur together, due to strong winds and falling or loose snow on the ground.

Ice Storms are freezing rain or drizzle that occurs when surface temperatures are below freezing. The moisture falls in liquid form freezing upon impact, resulting in ice or glaze on exposed surfaces and is called an ice storm. Sleet sometimes incorrectly referred to as an ice storm; is frozen rain drops and ice pellets, which bounce when hitting the ground. Sleet does not stick to trees but enough can cause hazardous driving conditions. Heavy accumulations of ice can bring down trees, topple utility poles/power lines and communication towers; and can disrupt communications and power for days while utility companies repair extensive damage. Small accumulations of ice can be extremely dangerous to motorists and pedestrians because bridges and overpasses freeze before other surfaces.

Recycled Snow is the ongoing blowing and drifting of already accumulated snow from one or more snow events that continues to blow and drift for days and weeks. The blowing snow is raised above the surface and blows in quantities that reduce visibility, continuously form new drifts, and fills in plowed roads up to three or four times per day. It is the most significant winter weather phenomenon in the county.

Structure collapse occurs when the forces of gravity or other external forces overcome the structural integrity of a building. A severe winter weather event, accompanied by ice and heavy snow, can lead to structure failure due to overwhelming ice and snow loads. Power lines and communications towers also topple during winter storms, disrupting supplies to residents, businesses, and agricultural producers.

Secondary hazards are often associated with severe winter weather. The most common hazards during winter weather events are transportation incidents. Roadways become hazardous quickly during snow, blowing snow, and ice events. Most incidents involve passenger vehicles; however, an incident involving a commercial vehicle transporting hazardous chemicals is always possible.

Seasonal Pattern	October to April – will occur in May in rare instances
Duration	Hours/days/up to a week in severe cases
Speed of Onset	12 to 24 hours warning
Location	Total geographic extent of McHenry County, North Dakota. **City of Anamoose, North Dakota** **City of Balfour, North Dakota** **City of Bantry, North Dakota** **City of Deering, North Dakota** **City of Drake, North Dakota** **City of Granville, North Dakota** **City of Karlsruhe, North Dakota** **City of Kief, North Dakota** **City of Towner, North Dakota** • N.D. Highway 14 underpass in Towner **City of Upham, North Dakota** **City of Velva, North Dakota**

For more information regarding severe winter weather please reference the **2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP).** The state plan can be accessed by following the electronic hyperlink or link to the N.D. Dept. of Emergency Services website:

2018 North Dakota Enhanced Mitigation Mission Area Operations Plan

https://www.des.nd.gov/planning

History

Information on the history of severe winter weather in McHenry County, North Dakota, was obtained from the National Climatic Data Center (NCDC); the National Oceanic and Atmospheric Administration's (NOAA) National Climatic Data Center (NCDC); the U.S. Dept. of Agriculture (USDA), Risk Management Agency (RMA); and McHenry County Emergency Management. A detailed

hazard history for McHenry County, North Dakota, can be found on a disc located at the beginning of Chapter 4, Threat and Hazard Identification Risk Assessment.

National Climatic Data Center/National Oceanic and Atmospheric Administration

Table 4.12.1 summarizes the history of severe winter weather in McHenry County, North Dakota, between January 1, 1996, and December 31, 2022. Data was not available between January 1, 1950, to December 31, 1995, as only occurrences of tornado, thunderstorm wind and hail were recorded. Starting January 1, 1996, all event types (48) are recorded. The following are key points.

- McHenry County, North Dakota, experienced 113 occurrences of severe winter weather resulting in approximately four storms of significance annually.
- Approximately $2,630,000.00 in property damage and no crop damage was reported.
- No injuries or fatalities were reported.

Table 4.12.1 – 1996 to 2022 McHenry County, North Dakota, Severe Winter Weather Hazard History Summary

Occurrences	Injuries	Fatalities	Property Damage	Crop Damage
113	0	0	$2,630,000.00	$0.00

Source(s): National Climatic Data Center (NCDC), National Oceanic and Atmospheric Administration (NOAA)

U.S. Dept. of Agriculture, Risk Management Agency

- Crop loss from severe winter weather is tracked by the USDA, RMA. The RMA provides data on the crop type affected, damage cause description, determined acres and indemnity amount. The damage cause description identities the cause of damage, determines acres identifies the number of acres lost due to damage, and the indemnity amount identifies the total amount of the loss for the designated peril. Cause of Loss categories included in severe winter weather include cold winter, freeze, and frost. **Between January 1, 2001, and December 31, 2023, McHenry County, North Dakota, experienced 104 incidents of crop loss due to severe winter weather impacting approximately 51,669.61 acres of crops totaling $3,935, 617.80.**

2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP)

- McHenry County experienced $110,000.00 in property damage from 89 severe winter weather events between 2000 and 2018.

McHenry County, North Dakota, Emergency Management

- There have been disaster declarations and emergencies pertaining to severe winter weather in McHenry County.

Probability

The probability of a hazard or threat is how likely it is it will happen. Profile meeting participants and the Steering Committee indicated the probability of severe winter weather in McHenry County is highly likely, meaning that there is a 100 percent probability in the next year the hazard will occur to some

extent.

National Climatic Data Center/National Oceanic and Atmospheric Administration

Per Table 4.12.1, the following statistics on the probability of severe winter weather in McHenry County is as follows:

- The probability of severe winter weather in McHenry County is 100 percent based on 105 occurrences between January 1, 1996, to December 31, 2022, resulting in approximately four incidents of significance annually. McHenry County, North Dakota, experiences approximately $84,814.81 in property damage annually.

- No injuries or fatalities were reported between January 1, 1996, and December 31, 2022.

U.S. Dept. of Agriculture, Risk Management Agency

- According to information obtained from the U.S. Dept. of Agriculture, Risk Management Agency (RMA), crop loss due to severe winter weather impacts 3,138.23 acres totaling $281,877.88 annually in McHenry County, North Dakota, between January 1, 2001, and December 31, 2022.

Extent/Magnitude

The extent/magnitude of a hazard or threat is expressed in the amount and/or number of damages or losses either actualized in a community or estimated based on known assets and levels of risk. The extent/magnitude of the severe winter weather ranges from large blizzard with prolonged sub-zero temperatures causing widespread power outages and loss of critical facilities and infrastructure to localized icy road conditions with minor traffic accidents.

- Several major blizzards and severe winter weather events occurred in McHenry County resulting in prolonged power outages for several weeks.

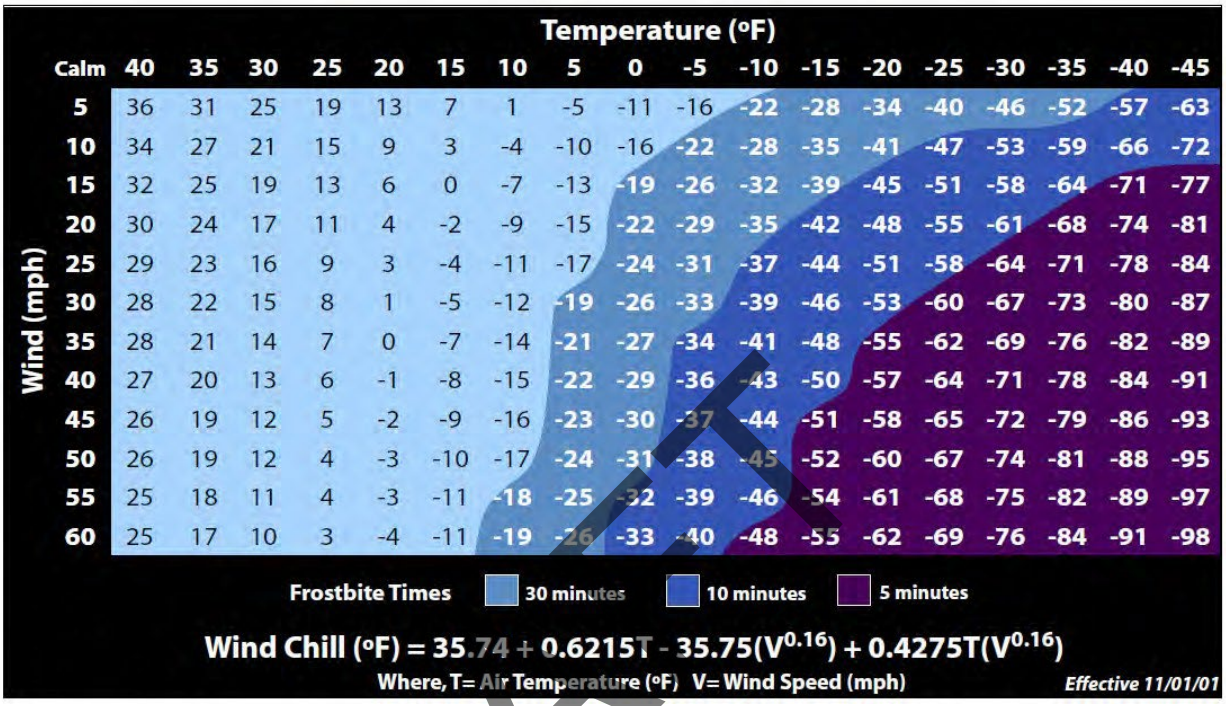
- **January 9, 1997**. A blizzard resulted in $1,530,000.00 in property damage.

- **April 4, 1997**. A blizzard event resulted in $650,000.00 in property damage.

- Profile meeting participants and the Steering Committee indicated the magnitude or impact of severe winter weather as catastrophic meaning 50 percent or more of McHenry County and its people could be affected.

- **Figure 4.12.1 – Wind Chill Chart**

Wind Chill Chart



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

Frostbite Times: 30 minutes; 10 minutes; 5 minutes

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

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

- Source: National Weather Service

Threat and Hazard Identification Risk Assessment (THIRA)

Table 4.12.2 shows the risk assessment as determined by individual jurisdictions, the Steering Committee, and meeting participants at the profile meeting for severe winter weather. The risk assessment methodology can be found in the beginning of Chapter 4, Threat and Hazard Identification Risk Assessment (THIRA). The total in Table 4.12.2 represents the sum of each jurisdiction's impact, frequency, likelihood, and vulnerability to a hazard/threat less the jurisdiction's capabilities to respond to the hazard/threat.

Table 4.12.2 – McHenry County, North Dakota, Severe Winter Weather Risk Assessment Scored Chart Summary

Jurisdiction	Impact	Frequency	Likelihood	Vulnerability	Capabilities	Total
McHenry County – Human	5	5	5	4	3	**16**
City of Anamoose						
City of Balfour						
City of Bantry						
City of Bergen						
City of Deering						
City of Drake						
City of Granville						
City of Karlsruhe						
City of Kief						
City of Towner						
City of Upham						
City of Velva						
City of Voltaire						

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 4.12.3 provides information on the specific impact, frequency, likelihood, vulnerability, and capability of severe winter weather in McHenry County, North Dakota. A list of impacts identified as commonplace for natural hazards and man-made threats regardless of the jurisdiction is shown in Chapter 4, Threat and Hazard Identification Risk Assessment (THIRA).

Table 4.12.3 – McHenry County, North Dakota, Severe Winter Weather Risk Assessment

Impact	**Blocked Roads:** McHenry County, North Dakota • Annual occurrences of localized flooding of streets in incorporated cities • Annualized occurrences of county and townships roads flooding •	• Saturation of roadways annually due to inadequate/blocked drainage of snow melt • Restricted access for emergency services from snow blocking roads • Loss of Economy • Increased isolation of rural residents/small communities • Severe low temperatures may increase utility costs • Increased cost for fuel for snow removal during large snow events • Highways can become icy reducing mobility speeds • Heavy snow causing spring melting and potential flooding • Delayed Emergency Response • Human Injury/Death • Livestock Loss • Loss of Power/Downed Power lines • Limited mobility of local employers and employees/general population • Additional calls for emergency services may strain resources • Sheltering stranded people • All county and city roads are impacted by severe winter weather, depending on wind direction and quantity of snow received and duration of the incident • Disruption in economic activity and transportation routes moving goods and people, and provided services • Increased difficulty in mobility of general population may result in missed work or school • May contribute to shortage or outage of critical materials and infrastructure due to limited mobility from blocked roads and restrict delivery of commodities and products to the marketplace

		• **McHenry County experiences approximately 128,888.00 in property damage annually from NCDC/NOAA.** • **Per crop loss information obtained from the U.S. Dept. of Agriculture, Risk Management Agency (RMA), crop loss due to severe winter weather totals $120,941.19 annually in McHenry County.** • **Temporary economic boost due to rebuilding/repairs of homes, businesses and other structures.**

Table 4.12.3 – McHenry County, North Dakota, Severe Winter Weather Risk Assessment – Continued

Frequency	• Annual occurrences of power loss from ice storms • Occurrences of blocked roads from heavy snow occurs frequently • Multiple occurrences of blizzard, extreme cold, and heavy snow annually • March 2017 snowstorm resulted in blocked roads all over the county and in city limits • Blizzard conditions, heavy snow, extreme wind chill occur each year • March 2017 snow storm resulted in blocked roads all over the county	• **According to the National Climatic Data Center, (NCDC), 105 occurrences between January 1, 1996, and December 31, 2022, resulting in a probability of 100 percent.** • According to information obtained from the U.S. Dept. of Agriculture, Risk Management Agency (RMA), crop loss due to severe winter weather impacts 3,138.23 acres totaling $281,877.88 annually in McHenry County, North Dakota, between January 1, 2001, and December 31, 2022.
Likelihood	• Climatic patterns will result in numerous annual occurrences of the hazard	
Vulnerability	More Vulnerable • High elderly population • Public schools seeing slight increase in enrollment • Inadequate drainage N.D. Highway 14 underpass in Towner • **Lack of storm shelters for incorporated cities – Balfour, Bergen, Deering, Karlsruhe, Kief Voltaire, Upham** • Aging infrastructure (roads, water systems, electrical systems) • Short staffing of local employers and employees/general population • **Lack of building codes or enforcement** • Small communities have experienced prolonged response from emergency services due to location and blocked roads • Low-lying roads shut down from snow accumulation • Longer response times from emergency services • Stranded motorists - primarily U.S. Highways 2 and 52 • Lack of funding to improve previously low-traffic roads as traffic volumes increase due to economic activity	Less Vulnerable • International building codes adopted, lack enforcement • Advanced warning and notification such as internet and TV • Switching of overhead telecommunication lines to underground – change to fiber-optic lines • Instant communication capabilities through cell phones • Independent work ethic of local populations • Better weather alerts and education of residents through internet, TV and cable • Outdoor emergency sirens are in place in city of Rugby • Education in schools has increased/expanded • Better predictions from the National Weather Service • Switch to no-till farming reduces blowing of soil • **Increased awareness through McHenry County Everbridge and IPAWS** • **Presence of social media alerting to the public**

	• Increase in permanent and temporary populations, and economic activity, will increase amount of people and community assets exposed to severe summer weather events • Presence of pipelines, railroad, and truck traffic carrying hazardous materials through the county • **Lack of 24-hour storm shelters in smaller communities and rural areas of the county** • **Lack of outdoor emergency sirens in Balta and Wolford** • Structural integrity of temporary housing • County and city staff limitations during events of significance • Lightning strikes causing fires and damage to structures • **Presence of 72-inch culvert transporting water through the Wentz Canal from sanitary sewer lagoons on the west to the east side of the city** • **Rugby has an inadequate city excavator, and needs one more payloader and dump truck** • **McHenry County needs additional equipment – payloaders and dump trucks** • Increased removal of shelterbelts allows more ground blizzard conditions • **Some township roads lack signage for navigation for emergency services and first responders in rural areas** • **Improper placement of existing shelter belts adjacent to roadways contributes to blockage** • **Lack of storm water systems in some communities may contribute to overland flooding during thaw**	• **County highway department and NDDOT will assist ambulances to calls in rural areas during incidents of severe winter weather** • **McHenry County Road Department is on-call during blizzard warnings** • **Appropriately positioned living snow fences** • **Advancements in public works equipment to use for responding to significant incidents** • **Portable generators at 8 lift stations for sanitary sewer and one for storm water city of Rugby** • **Permanent generator for Rugby water treatment plant and water wells** • **McHenry County Water Resource District Board is removing sediment from Wentz Canal – waterway is complete from McHenry County Line to 1.5 mile west of Rugby city limits** • **Most Rugby stormwater is diverted to Wentz Canal** • **McHenry County and City of Rugby have private contractors in the area with heavy equipment capable of responding to and mitigating impacts from severe summer weather**

	• Critical facilities: McHenry County Courthouse, Heart of America Medical Center, Ely Elementary School, Rugby High School, Haaland Home, all fire halls and ambulance buildings county-wide • Lack of traffic gates on U.S. Highway 2 and N.D. Highway • **Lack of appropriately positioned living snow fences** • Undersized culverts for drainage • McHenry County is StormReady Certified • **Log jams on Souris (Mouse) River contribute to physical damage to bridges**

Vulnerabilities to Publicly-Owned Buildings and Property

Most publicly-owned buildings and property remain unaffected by impacts from severe winter weather. Damage occurs from heavy snow, frozen pipes, power outages or potential damage to structural foundations from freezing and thawing of soil. Roof collapses are the biggest single-event on property resulting from heavy snow loads that can result in the loss of life. Heavy snow can also block sewer vents on single-family homes which can cause fatalities. **According to McHenry County, North Dakota, Auditor's office, a roof collapses on a residential structure somewhere in the county once every other year.**

A summary of publicly-owned buildings in McHenry County, North Dakota, is provided in Chapter 3, Profile and Inventory.

Vulnerabilities of Critical Facilities and Infrastructure

The greatest issues for critical facilities and infrastructure resulting from severe winter weather impacts are inaccessibility due to blocked roads, and utility and power outages. McHenry County Courthouse, should install a new generator to maintain power. See Chapter 6, Mitigation Strategy for a list of generators needed throughout the county.

Power. Critical facilities with backup generators are better equipped to handle impacts from severe winter weather if loss of power does occur. Suspended power lines are highly susceptible to high winds and subsequent fallen tree branches, other debris or accumulation of ice on power lines, leading to power outages. Restoration of power can take several days or up to several weeks in rare instances. All jurisdictions in the county have experienced power outages during severe winter weather to varying degrees of severity.

Road. The greatest issue for critical facilities and infrastructure is maintenance of the road system during severe winter weather. Emergency services can have trouble responding during power outages and are limited in responding to emergencies when roads are blocked from snow drifts. During blizzards or snowstorms, cars and trucks can become stranded if roads are blocked with heavy snow and ice. When U.S. Highway 2 or 52 are closed, it results in a high frequency of stranded motorists, most of whom are from out of town and state. Response times for emergency services can also be prolonged and prevent access to communities. Prolonged closures of roads can threaten propane, fuel and food supplies, and delivery of medical supplies.

Sanitary Sewer. Sanitary sewer systems can fail from loss of power causing sewer backup resulting in property damage. Sanitary sewer systems also freeze and prevent the flow of material properly.

Water. Disruptions in drinking/potable water service can be caused by physical damage to water towers, the well house, or a loss of power. Delivery of water to incorporated jurisdictions can be interrupted by water main breakage resulting from freeze and thaw cycles.

A summary of critical facilities and infrastructure in McHenry County, North Dakota, is provided in Chapter 3, Profile and Inventory.

Vulnerabilities to New and Future Development

Building codes ensure critical facilities and infrastructure are built adequately to better withstand severe summer weather. **McHenry County, North Dakota, and incorporated jurisdictions have not adopted buildings codes and do not enforcement capabilities except for the city of Velva.** New and future development could be seriously impacted by severe winter weather in jurisdictions that lack building codes and/or enforcement. Homes and businesses lacking the capability of supporting heavy snow loads could experience roof collapse. Jurisdictions without building codes and/or enforcement should have improved construction methods to better withstand severe winter weather.

Street design also plays an important role in vulnerability to severe winter weather. New and future development developed in a "suburban style" manner containing curvilinear roads and cul-de-sacs are more susceptible to severe winter weather impacts. Snow removal on these roadways has proven difficult and raises the potential for blocked roads and limits access for emergency services. Maintaining a high level of connectivity, which is defined as how often streets or roadways intersect, can increase the ease of snow removal and lessen the impact of blocked roads and maintain access for emergency services.

Increases in population further complicate matters when dealing with severe winter weather. An example of this would be higher numbers of people susceptible to vehicle accidents on icy or blocked roads, health hazards due to wind chill and extreme cold, etc. Conversely, increases in populations in existing jurisdictions may lessen the risk of impacts from severe winter weather as it leads to less isolated populations and increases the number of people reachable by emergency services during an emergency.

A summary of new and future development in McHenry County, North Dakota, is provided in Chapter 3, Profile and Inventory.

Data Limitations

Residents often experience impacts from severe winter weather, such as minor structural damage, increased utilities, loss of livestock, frozen water lines, but do not report.

National Climatic Data Center/National Oceanic and Atmospheric Administration

The hazard history provided in terms of property damage and crop damage (which are only estimates) is calculated based on what the National Weather Service received from insurance companies and individual property owners upon request. Both sources have been reluctant to share that information. Therefore, both practices were discontinued. Because of this, the National Weather Service makes a best guess using all available data at the time of the publication. The damage amounts are received from a variety of sources. Property and crop damage should be considered as a broad estimate.

The hazard history provided through the National Climatic Data Center/National Oceanic Atmospheric Administration's Storm Events Database contains data as entered by NOAA's National Weather Service (NWS). Due to changes in the data collection and processing procedures over time, there are unique periods of record available depending on the event type. The following timelines show the different time spans for each period of unique data collection and processing procedures. **Severe winter weather was not recorded as a separate incident until 1996.**

1. **Tornado:** From 1950 through 1954, only tornado events were recorded.

2. Tornado, Thunderstorm Wind and Hail: From 1955 through 1992, only tornado, thunderstorm wind and hail events were keyed from the paper publications into digital data. From 1993 to 1995, only tornadoes, thunderstorm wind and hail events have been extracted from the Unformatted Text Files.

3. All Event Types (48 from Directive 10-1605): From 1996 to present, 48 event types are recorded as defined in NWS Directive 10-1605.

U.S. Dept. of Agriculture, Farm Services Agency

The Livestock Indemnity Program (LIP) provides financial assistance to local producers that experience livestock losses. The program does not provide the cause of loss and, therefore, an accurate description of livestock loss from severe winter weather cannot be identified.

U.S. Dept. of Agriculture, Risk Management Agency

One of the Cause of Loss categories for crop loss data from the U.S.D.A., RMA is titled Other (snow, lightning, etc.) combines elements of severe summer weather and severe winter weather. Therefore, crop loss data for any given jurisdiction is incomplete.

Other Key Documents

This plan incorporates data from the following documents and information from this plan will be incorporated in the update of the following documents.

- 2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP)
- 2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP)
- 2023 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP)
- International Building Codes
- McHenry County, North Dakota, Comprehensive Plan
- McHenry County, North Dakota, Evacuation Plan through McHenry County Emergency Management and First District Health Unit
- McHenry County, North Dakota, Local Emergency Operations Plan
- McHenry County, North Dakota, Mass Care Plan through First District Health Unit
- McHenry County, North Dakota Shelter Plan through McHenry County Emergency Management
- McHenry County, North Dakota, Threat and Hazard Identification and Risk Assessment (THIRA)
- McHenry County, North Dakota Zoning Ordinances
- North Dakota Continuity of Operations Plan
- North Dakota Dept. of Transportation Design Manual
- North Dakota Emergency Operations Plan, Severe Winter Weather Annex
- North Dakota League of Cities: Planning and Zoning Handbook
- North Dakota State Building Code
- North Dakota State Disaster Recovery Plan
- North Dakota State Preparedness Report (SPR)
- North Dakota Threat and Hazard Identification and Risk Assessment (THIRA)

- McHenry County, North Dakota, Zoning Ordinances

4.13 Space Weather

Conditions in space that affects Earth and its digital/technological and infrastructure systems.

Characteristics

Space Weather is a consequence of activity on the sun, the Earth's magnetic field and atmosphere, and the Earth's location in the solar system. These storms originate from the sun and occur in space near Earth or its atmosphere. Disruptions are primarily categorized into three types of events: geomagnetic storm, solar flares, and solar radiation storms. The storms can affect critical facilities and infrastructure such as blackouts, and disruptions in high-frequency radios and satellite navigation.

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

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

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

Seasonal Pattern	None.
Duration	Minutes. Secondary impacts could last hours, days, weeks, months or even years.
Speed of Onset	Immediate identification from NOAA Space Weather Prediction Center; 8 minutes to reach the Earth.
Location	Total geographic extent of McHenry County, North Dakota.

For more information regarding space weather please reference the **2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP).** The plan can be accessed by following the link:

2018 North Dakota Enhanced Mitigation Mission Area Operations Plan

https://www.des.nd.gov/planning

History

According to the 2018 and 2023 N.D. Enhanced Mission Area Operations Plan (MAOP), there are no recorded catastrophic space weather events impacting North Dakota. However, the following events from other locations across North America and the World provide insight.

- The nearest recorded event affected Montreal, Quebec, Canada on March 13, 1989, when a geomagnetic storm took out the electric power for nine hours impacting six million people.
- The largest geomagnetic storm in modern recorded history is named the Carrington Event. The solar super storm occurred on September 1st and 2nd, 1859, and impacted telegraph systems across Europe and North America. Auroras were recorded as far south as the Caribbean in the northern hemisphere.

There have been no declared disasters or emergencies pertaining to a space weather in McHenry County.

Probability

The probability of space weather is 100 percent as the hazard is a natural phenomenon uncontrollable by humans and will occur at some point in the future. The 2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP) documented six occurrences impacting Earth.

Profile meeting participants indicated the probability of space weather as possible, meaning that there is between a one and 10 percent chance of an occurrence in the next year.

Extent/Magnitude

The extent/magnitude of space weather can range from minimal to catastrophic. The National Oceanic and Atmospheric Administration Space Weather Prediction Center has created scales to communicate impacts on people and technologies from the hazard to the public. The scales have numbered levels of one to five, like other measurement scales for natural hazards like tornadoes and hurricanes. The scales rate the severity of possible effects of space weather. The extent/magnitude of a space weather event can range from extreme (radio blackout on the entire sunlit side of the earth or outages in maritime and aviation systems) to minor (slight degradation of radio communication or navigation signals).

Profile meeting participants indicated the magnitude or impact of space weather as catastrophic meaning 50 percent or more of McHenry County, North Dakota, and its people could be affected.

Threat and Hazard Identification Risk Assessment (THIRA)

Table 4.13.1 shows the risk assessment as determined by individual jurisdictions, the Steering Committee, and meeting participants at the profile meeting for space weather. The risk assessment methodology can be found in the beginning of Chapter 4, Threat and Hazard Identification Risk Assessment. The total in Table 4.13.1 represents the sum of each jurisdiction's impact, frequency, likelihood, and vulnerability to a hazard/threat less the jurisdiction's capabilities to respond to the hazard/threat.

Table 4.13.1 – McHenry County, North Dakota, Space Weather Risk Assessment Scored Chart Summary

Jurisdiction	Impact	Frequency	Likelihood	Vulnerability	Capabilities	Total
McHenry County	5	1	2	5	3	**10**
City of Anamoose						
City of Balfour						
City of Bergen						
City of Deering						
City of Drake						
City of Granville						
City of Karlsruhe						
City of Kief						
City of Towner						

City of Upham						
City of Velva						
City of Voltaire						

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 4.13.2 provides information on the specific impact, frequency, likelihood, vulnerability, and capability of space weather in McHenry County, North Dakota. A list of impacts identified as commonplace for natural hazards and man-made threats is shown in Chapter 4.

Table 4.13.2 – McHenry County, North Dakota, Space Weather Risk Assessment

Impact	• Business Interruptions • Delayed Emergency Response • Explosion • Financial Hardship (Private and Public) • Government Interruptions • HAZMAT Release • Human Injury/Death • Increased Fire Potential • Increased Public Safety Runs • Infrastructure Degradation • Labor Shortages • Loss of Communications • Loss of Economy • Loss/Overcrowded Medical Facilities • Loss/Overcrowded Veterinarian Facilities • Loss of Potable Water	• Loss of Power/Electricity Outage • Loss of Transportation Accessibility • Mass Casualties/Fatalities • Property Damage (Structure, Equipment & Vehicle) • Public Distress/Social Discord • School Closure • Sewer Backup • Sheltering of Displaced Populations • Utility Outage/Shortage • **Loss of digital infrastructure at McHenry County Courthouse, public school, emergency services buildings, city halls, energy pipelines, railroad infrastructure**
Frequency	• Never a recorded occurrence in McHenry County or North Dakota	• The nearest recorded event affected Montreal, Quebec, Canada on March 13, 1989, when a geomagnetic storm took out their commercial electric power for nine hours. The storm impacted six million people.
Likelihood	• Dependent on solar activity and the 11-year solar cycle	• Likely to occur once every 500 years per the 2018 N.D. Enhanced Mitigation MAOP
Vulnerability	<u>More Vulnerable</u> • Advanced warning and notification such as internet and TV – over-reliance on these systems to support society • Increasing dependency of digital/technological systems in agriculture, private and public sectors • Gas-powered backup generators for critical facilities and infrastructure – the availability of fuel sources may be impacted and/or not available to replenish systems	<u>Less Vulnerable</u> • Advanced warning and notification such as internet & TV • Local food production/households with gardens • Gas-powered backup generators for critical facilities and infrastructure
Capability	• See Chapter 7 for a list of capabilities to address space weather.	

Vulnerabilities to Publicly-Owned Buildings and Property

The physical integrity of publicly-owned buildings and property would not be impacted directly from space weather, but secondary impacts such as loss of electric power or digital/technological systems could affect operations. Secondary impacts resulting from loss of power include loss of heat during severe winter weather, which could result in frozen and burst water pipes causing widespread interior damage, sewer backups, and subsequent flooding, or loss of digital assets from damaged servers and other telecommunications infrastructure. Conversely, loss of power from a space weather event could compromise cooling systems during severe summer weather, which could result in server rooms overheating and shutting down either temporarily or permanently. The interdependency of electricity with the operation of publicly-owned buildings and property can lead to more complex issues and prolonged outages.

A summary of publicly-owned buildings and property in McHenry County, North Dakota, is provided in Chapter 3, Profile and Inventory.

Vulnerabilities of Critical Facilities and Infrastructure

Critical facilities such as the McHenry County Courthouse, public school, emergency services buildings, and city halls are vulnerable to space weather in a similar fashion to publicly-owned buildings and property. The McHenry County Courthouse has a specific vulnerability to space weather as prolonged outages of power and data/technological systems could compromise security and endanger the overall functionality of the city of Towner, the county seat, and greater McHenry County, North Dakota. Communication and utility infrastructure would also be disrupted from loss of power from space weather compromising the capabilities of emergency services and public and private sectors. The interdependency of electricity with the operation of critical facilities and infrastructure can lead to more complex issues and prolonged outages.

An inventory of critical facilities and infrastructure is provided in Chapter 3, Profile and Inventory.

Vulnerabilities to New and Future Development

As populations grow, more people are at risk to impacts from space weather such as those described in vulnerabilities to publicly-owned buildings and property, and critical facilities and infrastructure. A breakdown of population trends and projections by jurisdiction in McHenry County, North Dakota, is shown in Chapter 3, Profile and Inventory, and Chapter 8, Jurisdictions.

Installation of faraday cages/shields at specific locations and/or equipment such as digital/technological systems for buildings (both public and private) and sewer backup valves at critical facilities and infrastructure should be considered for new and future development, but also for existing publicly-owned buildings and property, and critical facilities and infrastructure. Investment in power grid system redundancies can also mitigate the impacts of space weather.

Data Limitations and Other Key Documents

Power and digital/technological system outages, whether brief or prolonged, occur on a regular basis across North Dakota and McHenry County, North Dakota. Since these events are not considered normal

for critical facilities and infrastructure and are caused by other hazards such as severe summer or winter weather, identification of the role space weather is limited. An analysis of each critical facility and infrastructure would be needed to identify specific vulnerabilities from space weather.

This plan incorporates data from the following documents and information from this plan will be incorporated in the update of the following documents.

- 2018 and 2023 N.D. Enhanced Mitigation MAOP
- McHenry County, North Dakota, Local Emergency Operations Plan
- McHenry County, North Dakota, Threat and Hazard Identification and Risk Assessment (THIRA)
- North Dakota Continuity of Operations Plan
- North Dakota Emergency Operations Plan, Space Weather Annex
- North Dakota State Disaster Recovery Plan
- North Dakota State Preparedness Report (SPR)
- North Dakota Threat and Hazard Identification and Risk Assessment (THIRA)

4.14 Transportation Incident

Including aircraft, bicycle, boat, bus (school or passenger), motorcycle, pedestrian, railway (cargo or passenger), semi-truck, automobile vehicle, and recreational vehicle (ATV, side-by-side, etc.) incidents.

Characteristics

A transportation incident is any small or large-scale aircraft, bicycle, boat, bus (school or passenger), motorcycle, pedestrian, railway (cargo or passenger), truck, automobile vehicle, and recreational vehicle (ATV, side-by-side, etc.) involving mass casualties. Mass casualties can be defined as an incident resulting in many deaths and/or injuries that reach a magnitude that overtaxes the response abilities of local resources. In most disasters, death and injury represent one of the hazard impacts. In transportation incidents, mass casualties and/or resulting evacuations or hazardous material releases are often the primary impact and focus of the event.

Transportation incidents occur with little or no warning. They involve many people and require special types of equipment and emergency medical personnel. Such incidents not only affect people with significant numbers of deaths/injuries, but also cause traffic problems, property damage, or even a hazardous material release and/or explosion. The probability is increased during winter storms, periods of poor visibility from snow, smoke, or dust; festivities with more opportunities for drinking and driving; and times of increased traffic volume. The agricultural and energy economy of the region also increases the opportunity for the release of hazardous materials in a transportation incident.

Seasonal Pattern	None. Prevalent with the agriculture sector and general vehicular traffic. Incidents in rural areas of the county are more prevalent during severe winter weather/winter conditions. Incidents involving wild animals typically occur in late fall/early winter.
Duration	Minutes/hours/days/weeks/months – depending on extent of the incident. Longer duration incidents would most likely involve the railroad.
Speed of Onset	Little to no warning.
Location	Total geographic extent of the McHenry County with a focus on U.S. Highways 2 and 52, and N.D Highways 14, 19, 41, 53, and 97; county and township roads (McHenry County Roads 3, 44 and 46); airports and landing strips; boating/recreational traffic on Buffalo Lake Lodge, George Lake, and Freeman Lake/Jay Clark Wildlife Refuge; BNSF Railroad and CP Railway. No commercial passenger air service. Amtrak provides passenger rail service that traverses through the county but does not stop for passenger access.

For more information regarding transportation incident please reference the **2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP).** The state plan can be accessed by following the electronic hyperlink or link to the N.D. Dept. of Emergency Services website:

2018 North Dakota Enhanced Mitigation Mission Area Operations Plan

https://www.des.nd.gov/planning

History

Per the profile meeting participants, traffic incidents with minor damage or injuries occur annually in McHenry County, primarily on U.S. Highway 2). Incidents involving cars and farm equipment occur annually. The history of transportation incidents in McHenry County was provided by the McHenry County Sheriff's Office, McHenry County Emergency Management, and the N.D. Dept. of Transportation.

McHenry County Sheriff's Office/McHenry County Emergency Management

- Approximately three incidents involving planes spraying for agriculture-related activities crashing near the city of Upham.
- The McHenry County Sheriff's Office stated the intersection of U.S. Highway 52 and N.D. Highway 14 is prone to transportation incidents involving cars and trucks. The following incidents were provided by the sheriff's office:
    - **March 20, 2019.** A car traveling south on N.D. Highway 14 failed to yield at the stop sign and struck an east-bound vehicle on U.S. Highway 52. The incident resulted in a possible injury.
    - **July 6, 2019.** A vehicle traveling south-bound on N.D. Highway 14 failed to yield at the stop sign and struck an east-bound car on U.S. Highway 52. This incident was property damage only.
    - **June 7, 2021.** A heavy truck traveling north-bound on N.D. Highway 14 failed to yield at the stop sign and struck a west-bound truck tractor on U.S. Highway 52 that was slowing/stopping. This incident resulted in a non-capacitating injury.
    - **July 15, 2021.** A passenger car traveling north-bound on N.D. Highway 14 ran the stop sign and struck a west-bound pickup on U.S. Highway 52. This incident resulted in an incapacitating injury.
    - **June 5, 2022.** A pickup traveling north-bound on N.D. Highway 14 failed to yield to a west-bound pickup on U.S. Highway 52. This incident resulted in an incapacitating injury.
    - **November 3, 2022.** A pickup traveling south-bound on N.D. Highway 14 failed to yield to an east-bound pickup on U.S. Highway 52. This incident resulted in an incapacitating

injury.

- There was an incident involving a pedestrian being struck by a train approximately five miles north of the city of Velva, North Dakota, near N.D. Highway 41 in the mid-2010s.

- **October 9, 2020.** A Minot man was injured after the bridge he was traversing over the Souris (Mouse) River with his John Deere tractor collapsed. The bridge, located northwest of the city of Velva on the McHenry County-Ward County line, was restricted to nine-ton axles and 21 tons gross vehicle weight.

Source(s): Ward County Road Department; KFYR-TV

- In 2020/2021, a pedestrian was fatally struck by a car in the city of Towner.

- In 2017/2018, Amtrak struck a semi-truck hauling sand resulting in passengers being evacuated off the train. Multi passengers needed medical attention.

- Put in kelseys' train derail info here.

- In 2017/2018, a semi-truck was traversing a county bridge southeast of the city of Karlsruhe when the bridge collapsed. No major injuries were reported.

- In 2022, an individual was hauling implement equipment and traversed a county bridge on the McHenry-Ward County line (owned by Ward County) collapsed southeast of the city of Karlsruhe when the bridge collapsed. No major injuries were reported. – look at news article

- There are approximately one to two train incidents involving vehicles annually in McHenry County, North Dakota.

- There are approximately one to two serious ATV incidents involving the movement of cattle in McHenry County, North Dakota, annually.

N.D. Dept. of Transportation

Table 4.14.1 shows crash data provided by the N.D. Dept. of Transportation and is for crashes occurring on state highways in McHenry County between 2005 and 2021. The following are key points from Table 4.14.1.

- Between 2005 and 2021, McHenry County experienced 2,383 total crashes of which 1,963 were property damage only crashes, 389 were injury crashes resulting in 540 injuries, and 31 were fatal crashes resulting in 34 fatalities.
- Approximately 82.4 percent of crashes were property-damage only.
- According to the McHenry County Sheriff's Office, incidents involving vehicles with wildlife with no injuries are no longer required to be reported as of 2014 and has resulted in a significant decrease in overall reported incidents in McHenry County, North Dakota.
- Put in dustins' excel sheet info here. Mention there is overlap with Table 4.14.1

Probability

The probability of a hazard or threat is how likely it is it will happen. Per the N.D. Dept. of Transportation, McHenry County experiences an average of 115.5 property-damage-only crashes, 22.9 injury crashes resulting in 33.8 injuries, and 1.8 fatal crashes or 2.1 fatalities annually between 2005 and 2021.

The profile meeting participants indicated the probability of a vehicular transportation incident for McHenry County is highly likely, meaning that there is a 100 percent probability in the next year of an incident. Transportation incidents involving aircraft, agricultural-related equipment, and pedestrian/other modes of transportation are occasional at best.

Table 4.14.1 – 2005 to 2021 McHenry County, North Dakota, Crash Summary

Year	Property Damage Only (PDO)	Injury Crashes	Total Injuries	Fatal Crashes	Total Fatalities	Total Crashes
2005	203	21	--	3	--	**227**
2006	190	17	26	3	3	**210**
2007	193	17	31	0	0	**210**
2008	199	25	31	1	1	**225**
2009	176	27	36	1	3	**204**
2010	166	24	40	1	1	**191**
2011	167	36	61	3	6	**206**
2012	170	31	43	3	3	**204**
2013	115	28	39	1	1	**144**
2014	81	24	33	4	4	**109**
2015	49	28	45	0	0	**77**
2016	54	25	39	3	3	**82**
2017	67	15	19	1	1	**83**
2018	40	10	12	2	2	**52**
2019	43	27	40	1	1	**71**
2020	28	14	16	1	1	**43**
2021	22	20	29	3	4	**45**
TOTAL	**1,963**	**389**	**540**	**31**	**34**	**2,383**

Source(s): N.D. Dept. of Transportation

Extent/Magnitude

The extent/magnitude of a hazard or threat is expressed in the amount of damage or losses either caused or could occur in a community. Meeting participants at the profile meeting indicated the extent/magnitude of a transportation incident for McHenry County, North Dakota, would be catastrophic meaning extreme/severe damage to jurisdiction infrastructure, people, and/or property either have or can occur. According to the 2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP), McHenry County, North Dakota, has a moderate vulnerability to transportation incidents based on analysis of its transportation infrastructure; the county does not have a commercial passenger airport, interstate, but has U.S. highways, Amtrak traversing the county, and BNSF Railroad and CP Railway.

According to 2019 N.D. Dept. of Transportation Crash Summary, approximately 10 percent of fatal crashes in the state occurred in urban locations and 90 percent of the fatal crashes occurred on rural roads.

Figure 4.14.1 illustrates the transportation system in North Dakota.

Figure 4.14.1 – North Dakota Transportation System – go on ND GIS portal and make one – send to Darlene when done.

Source(s): N.D. GIS HUB Data Portal

Threat and Hazard Identification Risk Assessment (THIRA)

Table 4.14.2 shows the risk assessment as determined by individual jurisdictions, the Steering Committee, and meeting participants at the profile meeting for transportation incident. The risk assessment methodology can be found in the beginning of Chapter 4, Threat and Hazard Identification Risk Assessment (THIRA). The total in Table 4.14.2 represents the sum of each jurisdiction's impact, frequency, likelihood, and vulnerability to a hazard/threat less the jurisdiction's capabilities to respond to the hazard/threat.

Table 4.14.2 – McHenry County, North Dakota, Transportation Incident Risk Assessment Scored Chart Summary

Jurisdiction	Impact	Frequency	Likelihood	Vulnerability	Capabilities	Total
McHenry County	5	5	5	4	3	**16**
City of Anamoose						
City of Balfour						
City of Bantry						
City of Bergen						
City of Deering						
City of Drake						
City of Granville						
City of Karlsruhe						
City of Kief						
City of Towner						
City of Upham						
City of Velva						
City of Voltaire						

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 4.14.3 provides information on the specific impact, frequency, likelihood, vulnerability and capability of transportation incident in McHenry County. A list of impacts identified as commonplace for natural hazards and man-made threats regardless of the jurisdiction is shown in Chapter 4, Threat and Hazard Identification Risk Assessment (THIRA).

Vulnerabilities to Publicly-Owned Buildings and Property

Publicly-owned buildings and property should not be affected by transportation incidents except in an instance where an airplane or vehicle crash impacts a building or property. However, any truck incident involving hazardous materials or aircraft incidents occurring in proximity of a publicly-owned buildings or property could result in property damage, mass casualties/fatalities, or large-scale evacuations. Should an incident of this nature occur, damage could exceed hundreds of thousands or millions of dollars, depending on the structure impacted. Buildings supporting key functions to daily county and incorporated jurisdiction operations most vulnerable include but are not limited to McHenry County Courthouse, McHenry County Highway Department shops, N.D. Dept. of Transportation state shops, public schools, and buildings supporting emergency services such as ambulance halls and fire stations. A transportation

incident can result in power outages if occurring near and impacting power infrastructure. Power losses could result in the prolonged loss of service to publicly-owned buildings and property.

There are vulnerabilities to publicly-owned buildings and property from transportation incidents involving trains as Amtrak, BNSF Railroad, and CP Railway operate in McHenry County, North Dakota.

A summary of publicly owned buildings and property in McHenry County, North Dakota, is provided in Chapter 3, Profile and Inventory.

Table 4.14.3 – McHenry County, North Dakota, Transportation Incident Risk Assessment

Impact	• **Blocked roads from severe weather and at-grade railroad crossing with roads and highways** • Explosion • HAZMAT Release • Human Injury/Death / Mass Casualties/Fatalities • Increased Fire Potential • Increased Public Safety Runs • Loss of Transportation/Accessibility – either blocking roads or from collapsed bridges	• Between 2005 and 2021, McHenry County experienced 2,383 total crashes of which 1,963 were property damage only crashes, 389 were injury crashes resulting in 540 injuries, and 31 were fatal crashes resulting in 34 fatalities. • **Temporary evacuation and medical assistance of passengers from Amtrak incidents.**
Frequency	• Annual occurrences of car crashes, truck-related incidents, and train incidents. • There are approximately one to two train incidents involving vehicles annually in McHenry County, North Dakota. • There are approximately one to two serious ATV incidents involving the movement of cattle in McHenry County, North Dakota, annually.	• Two or three annual calls from incidents on U.S. Highway 2 where it curves near the cities of Granville and Towner • Per the N.D. Dept. of Transportation, McHenry County experiences an average of 115.5 property-damage-only crashes, 22.9 injury crashes resulting in 33.8 injuries, and 1.8 fatal crashes or 2.1 fatalities annually between 2005 and 2022.
Likelihood	<u>More Likely</u> • Presence of Amtrak passenger rail service traversing the county but does not stop for passenger access • Presence of U.S. Highway 2/52 and N.D. Highways 14, 19, 41, 53, and 97 • Presence of railroad through county and cities • Intoxicated drivers/mentally unstable individuals • High wildlife population with extensive wildlife production areas (WPAs) and national wildlife refuges • **Undersized infrastructure (specifically bridges) that are not built to accommodate the weight of modern agriculture vehicles and/or equipment** • **Outdated design standards present on some state and county highways**	<u>Less Likely</u> • Lack of commercial passenger air service • U.S. Highways 2 and 52 have had retrofits/upgrades • U.S. Highway 52 was resurfaced and passing lanes added in 2022 and 2023 • **NDDOT has installed flashing lights/traffic control devices at the intersection of U.S. Highway 52 and N.D. Highway 14** • **NDDOT installed radar signs/traffic control devices on U.S. Highway 52, and N.D. Highways 14 and 41** • **The "curves" on U.S. Highway 2 have been flattened in 1980s and 1990s** • Lower population resulting in fewer vehicles on the road compared to bigger cities like Bismarck or Fargo

	• Rural/less traveled roads experience high incidents resulting in fatalities • "Towner Curve" and "Granville Curve" on U.S. Highway 2 – problematic for motorcycles **Rural highways experience an overwhelming majority of fatal crashes compared to urban locations in the state**

Table 4.14.3 – McHenry County, North Dakota, Transportation Incident Risk Assessment – Continued

Vulnerability	More Vulnerable • Presence of Amtrak passenger rail service traversing the county but does not stop for passenger access • Presence of U.S. Highway 2/52 and N.D. Highways 14, 19, 41, 53, and 97 • Intoxicated drivers/mentally unstable individuals • High wildlife population with extensive wildlife production areas (WPAs) and national wildlife refuges • **Undersized infrastructure (specifically bridges) that are not built to accommodate the weight of modern agriculture vehicles and/or equipment** • **Outdated design standards present on some state and county highways** • Rural/less traveled roads experience high incidents resulting in fatalities • "Towner Curve" and "Granville Curve" on U.S. Highway 2 – problematic for motorcycles • **Rural highways experience an overwhelming majority of fatal crashes compared to urban locations in the state** • **McHenry County has paved/improved county road 16 near Upham, county road 2 north of county road 16 near the city of Newburg in neighboring Bottineau County**	Less Vulnerable • Lack of commercial passenger air service • U.S. Highways 2 and 52 have had retrofits/upgrades • U.S. Highway 52 was resurfaced and passing lanes added in 2022 and 2023 • **NDDOT has installed flashing lights/traffic control devices at the intersection of U.S. Highway 52 and N.D. Highway 14** • **NDDOT installed radar signs/traffic control devices on U.S. Highway 52, and N.D. Highways 14 and 41** • **The "curves" on U.S. Highway 2 have been flattened in 1980s and 1990s** • Lower population resulting in fewer vehicles on the road compared to bigger cities like Bismarck or Fargo
Capability	• See Chapter 7 for a list of capabilities to address transportation incident.	

Vulnerabilities of Critical Facilities and Infrastructure

Critical facilities such as the McHenry County Courthouse, ambulance and fire halls, and infrastructure such as drinking/potable systems, wastewater treatment facilities, and power grid infrastructure should not be affected by transportation incidents, except in rare occurrences if an incident physically impacts these facilities and/or infrastructure, or personnel employed therein are impacted by an incident.

Medical. A transportation incident involving significant injuries or fatalities can result in overcrowding and/or a shortage of medical supplies at hospitals in Bottineau, Harvey, Minot, or Rugby.

Power. A transportation incident can result in power outages if occurring near and impacting power infrastructure. Power losses could result in the loss of critical facilities such as the McHenry County Courthouse or infrastructure such as lift stations or water treatment plants. According to profile meeting participants, there are electrical substations located throughout the county.

Railroad. The Burlington Northern Santa Fe (BNSF) Railroad traverses McHenry County and bisects the city of Towner. The McHenry County Courthouse and TGU Public School, Towner are vulnerable to transportation incidents involving trains due to their proximity to rail infrastructure. The Velva Public School is one block from CP Railway in the city of Velva. The Drake-Anamoose Public Schools (pre-school and elementary only) is located two blocks from CP Railway in the city of Anamoose.

Road. Roads would be affected as this is where transportation incidents are likely to occur. Vulnerabilities could include a closure of a major transportation artery such as U.S. Highway 2/52 and N.D Highways 14, 19, 41, 53, and 97 due to an incident, which can block access for emergency services, disrupt economic activity, and add strain onto other arteries in the overall transportation system.

Vulnerabilities to New and Future Development

New and future development could result in increased traffic related to commercial, industrial, or residential development. The location of new and future development will determine the probability of future transportation incidents and should be conducive to nearby transportation infrastructure – i.e., industrial development near major highways or commercial development near existing commercial corridors or transportation infrastructure with high visibility. The locations of new and future residential development conducive to transportation infrastructure are dependent on the local zoning code and proposed density of each respective development.

Data Limitations and Other Key Documents

This plan incorporates data from the following documents and information from this plan will be incorporated in the update of the following documents.

- 2018 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP)
- 2018 N.D. Highway Safety Plan
- 2023 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP)
- 2020 N.D. Dept. of Transportation Urban High Crash Locations Report
- McHenry County, North Dakota, Comprehensive Plan (2016)
- McHenry County, North Dakota, Zoning Ordinance (2016)

- McHenry County, North Dakota, Evacuation Plan through McHenry County Emergency Management
- McHenry County, North Dakota, Local Emergency Operations Plan (LEOP)
- McHenry County, North Dakota, Threat and Hazard Identification and Risk Assessment (THIRA)
- McHenry County, North Dakota, Mass Care Plan through First District Health Unit
- McHenry County, North Dakota, Shelter Plan through McHenry County Emergency Management
- North Dakota Continuity of Operations Plan
- North Dakota Department of Transportation Crash Summary
- North Dakota Emergency Operations Plan, Transportation Incident Annex
- North Dakota State Disaster Recovery Plan
- North Dakota Statewide Transportation Improvement Plan (STIP)
- North Dakota Threat and Hazard Identification and Risk Assessment (THIRA)
- TransAction III, North Dakota's Statewide Strategic Transportation Plan

5. Future Conditions (Extreme Climate Variability & Potential Climate Change)

As of April 2023, the Federal Emergency Management Agency (FEMA) requires the inclusion of information on the long-term effects of climate change on identified hazards and their potential impacts in state hazard mitigation plans. The 2024 McHenry County, N.D., Multi-Jurisdictional Multi-Hazard Mitigation Plan incorporates this information in coordination with state and federal guidance.

5.1. Primary Sources

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

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 - *https://nca2023.globalchange.gov/chapter/25/*.

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. *Source at https://statesummaries.ncics.org/chapter/nd/.*

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

Developed by the ND State Hazard Mitigation Team, the 2024 ND *Enhanced* 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. *Source at https://www.des.nd.gov/sites/www/files/documents/reports-plans/2024-2029_EnhancedMitigationPlan.pdf*

5.2. North Dakota Extreme Climate Variability

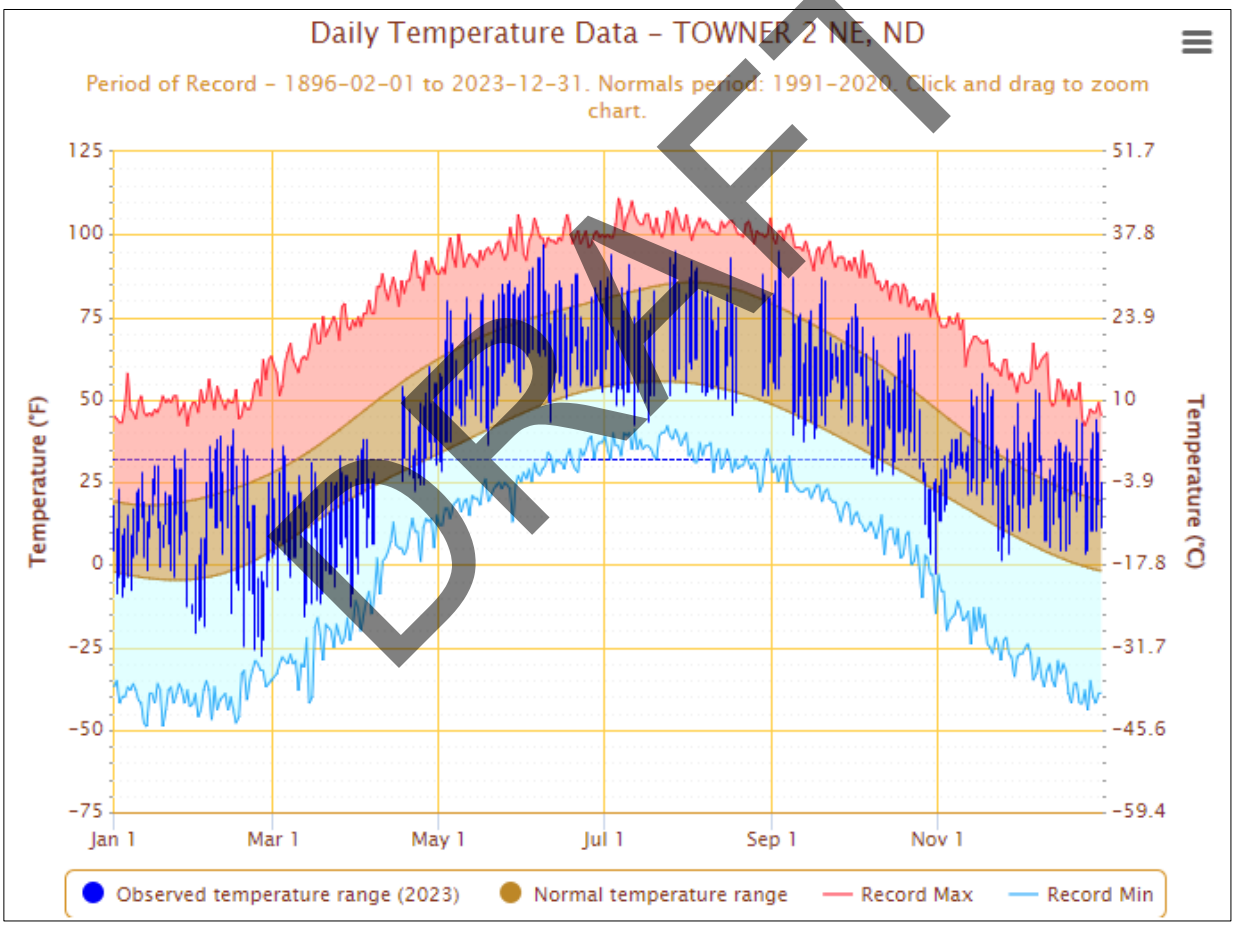
North Dakota has the highest degree of day-to-day, week-to-week, month-to-month, and year -to-year variability in both temperature and precipitation, **and this variability is likely to increase over time**.

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. *Source: 2022 ND State Climate Summary, at https://statesummaries.ncics.org/chapter/nd/*

Extreme Daily through Annual Variability

Figure 5.2.1 below shows the annual temperature pattern for the NOAA Cooperative Observation station at Towner 2NE, ND. Towner 2NE has one of the longest long-term observation station in the North-central ND Climate Division (CD-02), back to 1896, which is best representative of McHenry County, North Dakota.

Figure 5.2.1. Towner 2NE ND, Extreme Daily through Annual Variability



Source(s): National Oceanic and Atmospheric Administration (NOAA); N.D. Dept. of Emergency Services

The golden band represents the range of daily average maximum and minimum temperatures, based on the 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. Note that at Towner 2 NE, the all-time record maximum was 111F measured on 6 Jul 1936, and the record low was -49, measured on 13

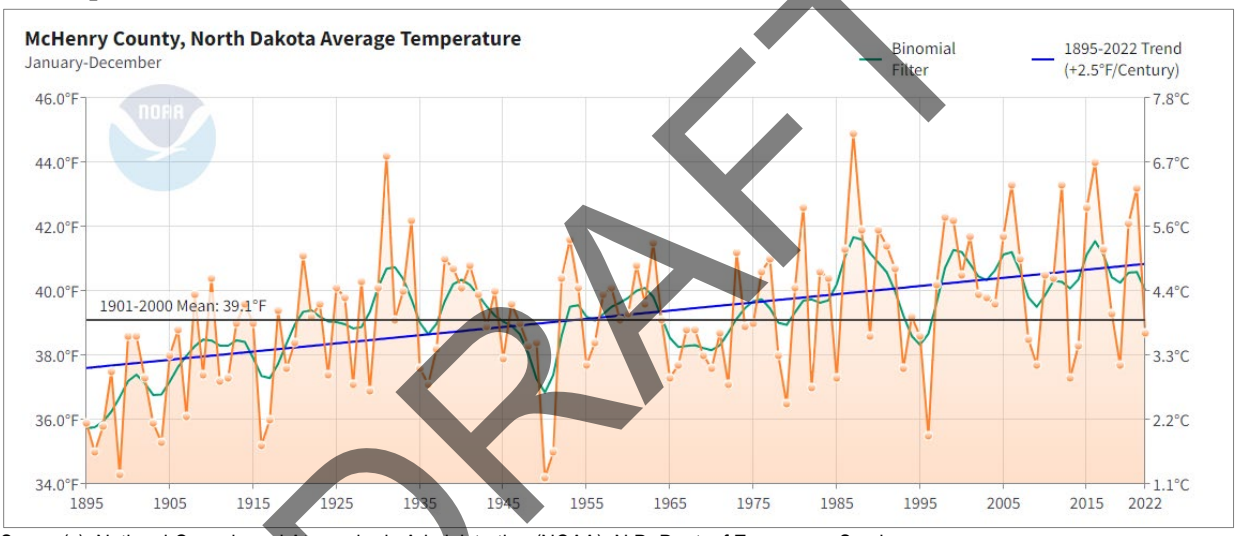
Jan 1916, 19 Jan 1996, and 15 Feb 1936. The statewide extremes of 121F (Steele ND) and -60F (Parshall ND) were set on 6 July 1936 and 15 February 1936, respectively.

The dark blue line indicates the daily maximum and minimum temperatures from January 1 through December 31, 2023. Note that day-to-day and week-to-week temperatures are also highly variable. Source(s): NOAA Online Weather Data at https://sercc.com/noaa-online-weather/

McHenry County, North Dakota Extreme Interannual to Multi-Decadal Variability in Temperature

The graph below shows the **annual temperature** pattern for McHenry 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.

Figure 5.2.2.a. McHenry County, North Dakota Extreme Interannual to Multi-Decadal Variability in Temperature



Source(s): National Oceanic and Atmospheric Administration (NOAA); N.D. Dept. of Emergency Services

Note the frequent changes from warmer to colder years, the more patterns of changes that occur over a period of few years or a few decades, and the subtle but steady warming trend of around 2.5F per century, which is identical to the statewide trend.

Figure 5.2.2.b. Central ND Extreme Interannual to Multi-Decadal Variability in Precipitation

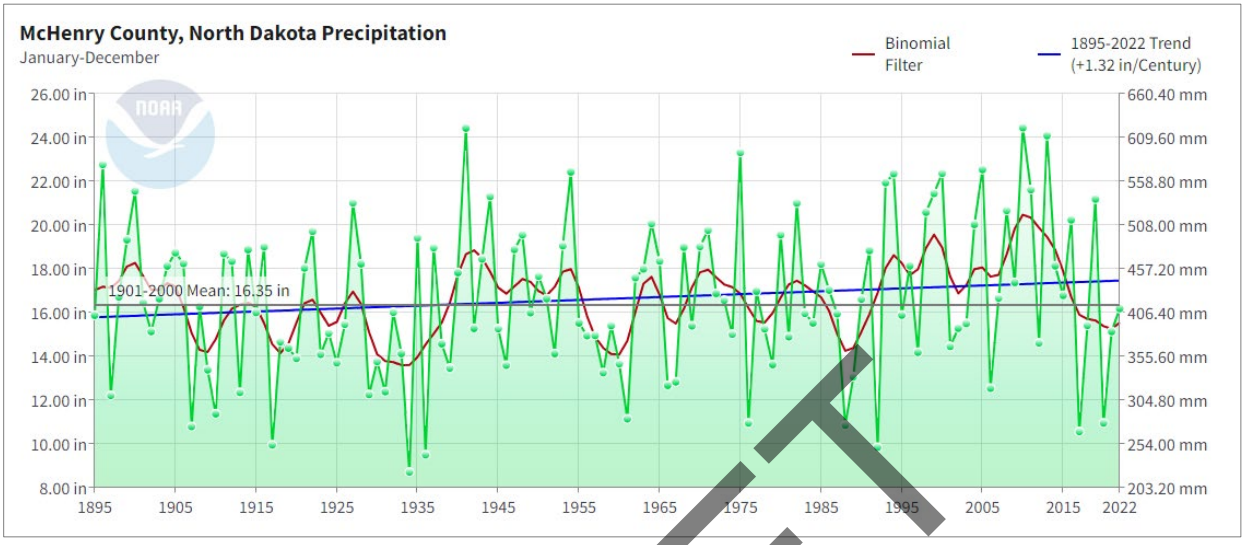
The graph below shows the **annual precipitation** pattern for McHenry County, and covers the long-term Period-of-Record, which extends back through 1885 and includes all available climate data from stations located within or near the county.

Central ND Extreme Interannual to Multi-Decadal Variability in Precipitation

Again, one can see the frequent changes from much drier to much wetter years, the patterns of changes that occur over a period of few years or a few decades, and the subtle but steady trend for increasing precipitation of around 1.32 inches per century, which is 0.15 inches per century faster than the statewide

average. NOAA Climate at a Glance, at https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/county.

Figure 5.2.2.b. Central ND Extreme Interannual to Multi-Decadal Variability in Precipitation



Source(s): National Oceanic and Atmospheric Administration (NOAA); N.D. Dept. of Emergency Services

5.3. Potential Changes in North Dakota Weather and Climate

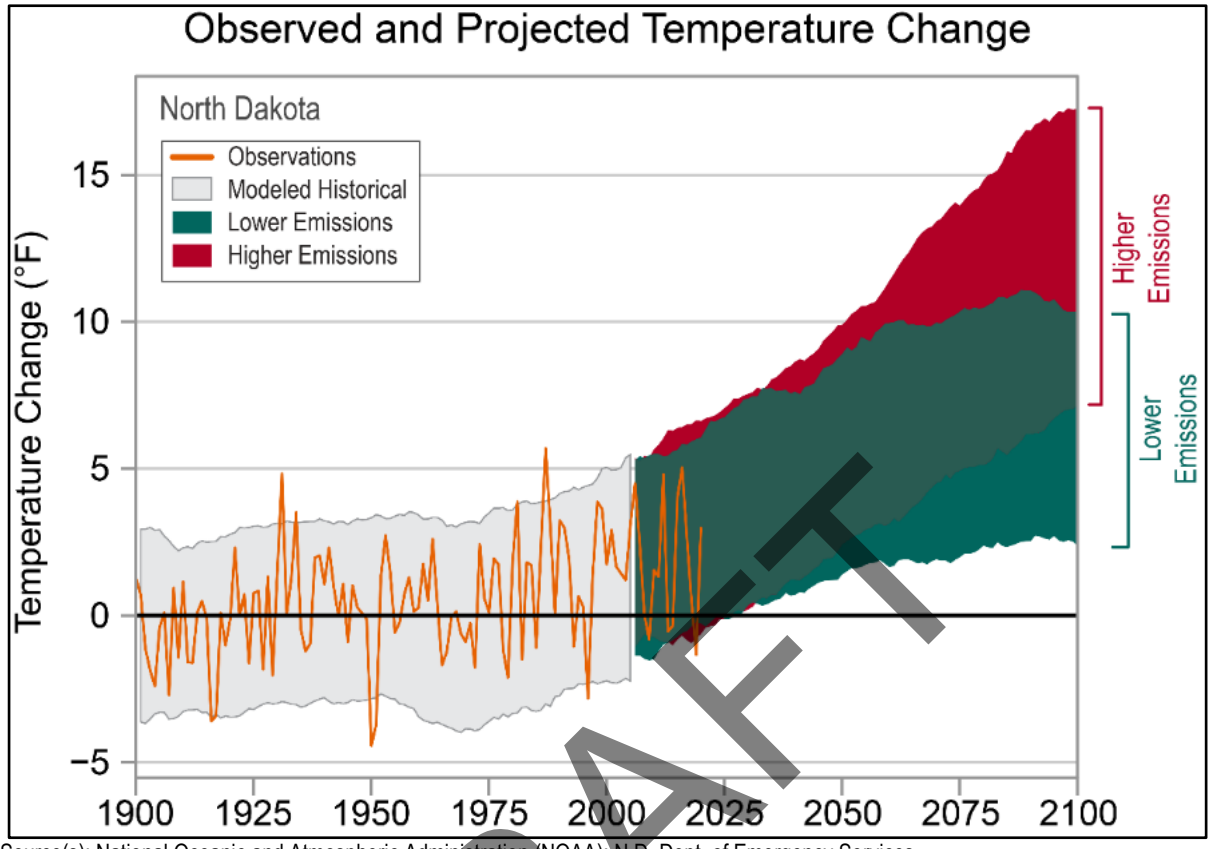
As discussed in section 5.2., temperatures across North Dakota, the Northern Great Plains Region, and across much of the globe have been increasing at a slow but quite variable rate throughout the 20th century and the beginning of the 21st century. National and global rates of increase are similar at 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 2.5F (1.39C) per century, North Dakota's statewide average *rate of* annual temperature increase is *one of* the fastest *(tied for 6th highest)* in the contiguous United States and is driven primarily by warming winter temperatures - *especially by warming wintertime low temperatures*. And McHenry County mirrors that high rate of increase.

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 5.3 – Observed and Projected Temperature Change Across North Dakota



Source(s): National Oceanic and Atmospheric Administration (NOAA); N.D. Dept. of Emergency Services
https://statesummaries.ncics.org/chapter/nd/

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 NCA*5,* information included in the 2024-2029 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP), *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:

Figure 5.3: 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: CISESS and NOAA NCEI.

- 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.

5.4. 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 N.D. Enhanced Mitigation Mission Area Operations Plan (MAOP), the expected impact of climate change on the 14 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 (stats?), while rural fire departments across ND are largely staffed by volunteers (percentage?). 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. **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 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 and certain vector-borne diseases such as 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.

8. **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.

9. **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.

10. **Criminal Attack Hazard.** There is no known direct connection between future climate conditions and the location, extent, intensity, or duration of specific criminal 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 threats.

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, and sink holes. Both Drought and Heavy Precipitation events are projected to occur more frequently, which is expected to contribute to an increased frequency of 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. **Terrorist or Nation-State Attack Hazard.** 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 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.

15. **Transportation Incident**. 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. These conditions may strain existing emergency response services and require increased sheltering capacities.

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.

6. McHenry County, North Dakota, Mitigation Strategy

Mitigation Purpose, Goals, and Projects

The McHenry County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan includes a mitigation strategy consisting of six goals and specific mitigation projects for each incorporated jurisdiction based on the risk assessment developed at Plan Update Committee and jurisdictional meetings.

All natural hazards and man-made threats were considered, and mitigation projects were formulated based on the potential or previous effects of hazards, the high probability of hazard or threat occurrences, the vulnerability of jurisdictions to hazards, and hazards each project can mitigate. The problem statement for McHenry County, North Dakota, which assisted in formulating specific mitigation actions to reduce the impacts of hazards, is shown before the mitigation actions.

The following are the seven goals that were reviewed, updated, and approved:

Goal 1: Strengthen and expand administrative and technical capabilities.

Goal 2: Strengthen and expand education and outreach capabilities.

Goal 3: Strengthen and expand financial capabilities.

Goal 4: Strengthen and expand planning and regulatory capabilities.

Goal 5: Reduce and/or eliminate the impacts of, and vulnerabilities to, natural hazards and man-made threats.

Goal 6: Improve the resiliency of critical facilities and infrastructure.

Goal 7: Provide places of refuge and early warnings for the public and vulnerable populations to take protective action during hazardous incidents.

A total of 25 projects were identified. Of the 25 identified projects, two projects are specific to the cities of. The remaining projects address the county and all incorporated jurisdictions and unincorporated jurisdictions.

Mitigation Project Development

The Plan Update Committee identified the following characteristics of each mitigation project and is included each project profile:

- Description/benefit
- Hazard(s) addressed
- Affected jurisdiction
- Project status
- Priority
- Responsible agency
- Partners
- Timeframe for completion
- Cost
- Funding Source(s)

Scoring and Prioritization

The Steering Committee also scored and ranked projects based on a FEMA process – STAPLEE – that allows a community to understand the support for a project; the potential costs in dollars, time and expertise; environmental impact; and the benefit of the project. The specific words in the acronym STAPLEE are social, technical, administrative, political, legal, economic, and environmental.

Each project was scored using a one to five (1 to 5) scoring.

- A score of one (1) indicated a project is ineffective, not feasible and/or too costly
- A score of five (5) indicated the project was highly effective, feasible and/or a higher benefit compared to cost.
- A score of three (3) was neutral.

Each mitigation project included in the plan is valuable as it addresses needs specific to McHenry County and its jurisdictions. Due to a variety of constraints, not all projects can be implemented simultaneously and must be prioritized with the most critical projects being emphasized for implementation in the near term. However, the prioritization of each project can change over time to respond to changes in a community and to take advantage of resources that become available.

The Steering Committee prioritized each mitigation project on a low, medium, high, and very high designation based on scoring of the documentation, past experiences and professional judgment, and what projects are technically feasible to accomplish is based on the capabilities of all jurisdictions.

Table 6.1 summarizes the projects by priority by jurisdiction.

Table 6.1 – Prioritization of Mitigation Projects by Incorporated Jurisdiction

	Project Number by Prioritization			
Jurisdiction	Low	Medium	High	Very High
McHenry County				
City of Anamoose				
City of Balfour				
City of Bergen				
City of Deering				
City of Drake				
City of Granville				
City of Karlsruhe				
City of Kief				
City of Towner				
City of Upham				
City of Velva				
City of Voltaire				

Projects with affected jurisdictions identified as 'McHenry County and Incorporated Jurisdictions' are shown in the table under McHenry County as these projects are assumed to be a county effort. Mitigation projects with jurisdictions specifically identified are represented under both the county and the respective jurisdiction(s) in the table.

Acronyms and Definitions

The acronyms and definitions used in the responsible agency and partners section of each mitigation projects profile are described in Table 6.2.

Table 6.2 – Acronyms and Definitions of Responsible Agencies and Partners for Mitigation Projects

Acronym/Definition	Entity
BOR	Bureau of Reclamation
CDBG	Community Development Block McHenry
City Councils	Cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, Voltaire
County Commission	McHenry County Commission
Emergency Management	McHenry County Emergency Management
Emergency Services	Ambulance, fire, law enforcement, special units
EPA	Environmental Protection Agency
Extension	NDSU Extension/McHenry County
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FSA	USDA - Farm Service Agency
Historical Society	State Historical Society of North Dakota
HUD	Housing and Urban Development
Media	Velva Area Voice, Minot Daily News, radio stations
Medical Service Providers	First District Health Unit, local medical clinics
NCDC	National Climatic Data Center
NDAC	N.D. Association of Counties
NDDES	N.D. Dept. of Emergency Services
NDDC	N.D. Dept. of Commerce
NDDH	N.D. Dept. of Health
NDDOT	N.D. Dept. of Transportation
NDLC	N.D. League of Cities
NDTOA	N.D. Townships Officers Association
NOAA	National Oceanic and Atmospheric Administration
NRCS	U.S.D.A. Natural Resources Conservation Service
NWS	National Weather Service
Planning & Zoning	Planning and Zoning Board, County Commission, City Councils
Public Health	First District Health Unit, McHenry County
Public Utilities	Cable: Midcontinent, N.D. Telephone Company, Souris River Telephone, Satellite/DirecTV Electricity: Ottertail Power Company, Verendrye Electric Cooperative Internet: Midcontinent, N.D. Telephone Company, Souris River Telephone Natural Gas: N/A Phone: AT&T, Verizon, Smart Talk/Trac Phones, Midcontinent, N.D. Telephone Company, Souris River Telephone Waste: Circle Sanitation, municipal garbage collection Water: All Seasons Water Users District, North Prairie Regional Water District, individual wells, municipal wells

Table 6.2 – Acronyms and Definitions of Responsible Agencies and Partners for Mitigation Projects – Continued

Acronym/Definition	Entity
Public Works	McHenry County Road Department/Public Works, public works for the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire.
Red Cross	American Red Cross
Regional Council	Souris Basin Planning Council
RD	U.S. Dept. of Agriculture – Rural Development
Social Services	McHenry County Social Services
SWC	N.D. State Water Commission
U.S.A.C.E.	United States Army Corps. of Engineers

Problem Statements

Problem statements provide a concise description of the vulnerabilities of the jurisdiction to threats and hazards that should be addressed through mitigation actions. Specific mitigation actions to reduce the impacts of hazards are identified for each jurisdiction and are found after the problem statement. The problem statements and jurisdiction-specific mitigation projects can be found in Chapter 8, Jurisdictions.

McHenry County, North Dakota

McHenry County, North Dakota, can be impacted by civil disturbance; criminal, terrorist, or nation/state attack; cyberattack; drought; fire (urban and wildland); flood (overland); geologic hazards; hazardous material release; infectious disease and pest infestations; severe summer weather; severe winter weather; space weather, and transportation incident. Flooding is an issue due to improper drainage and insufficient infrastructure such as the Towner and Velva underpasses and several county roads. The city of Balta is not enrolled in the National Flood Insurance Program. Severe summer weather and severe winter weather are frequent and impose property damage. Incorporated communities lack shelters with structural integrity to withstand natural hazards. Economic loss to the agriculture and livestock industry occurs on a frequency basis from natural hazards. The county has existing mitigation capabilities that need to be expanded and upgraded. The county relies on outside sources for funding and to accomplish large-scale mitigation projects.

Improvement and expansion of existing mitigation capabilities; upgrading of existing and installation of new sirens, equipment, and communications; installation of generators at critical facilities and infrastructure; enforcement of building codes; construction of storm shelters, improve drainage and upgrading of critical facilities and infrastructure are a priority for the county.

McHenry County Project AT-1: Expand Administrative and Technical Mitigation Capabilities.

Description/Benefit	Expand administrative and technical mitigation capabilities to improve county readiness and preparedness. Administration • Update mutual aid agreements on a continuous basis. Special attention should be paid to public schools for sheltering purposes, McHenry County Sheriff's Office due to no city police departments, Minot AFB, McHenry County Countywide MOU, Intracounty MOUs Staff • Continue Floodplain Administrator and Planning and Zoning Administrator Education. Explore grant writing options through Souris Basin Planning Council. Technical • Install solar-powered electronic fire index signs – See McHenry County Project AT-4 • Install permanent generators – See McHenry County Project AT-7 • Install and/or expand directional signage for emergency services and for truck/hazmat routes wherever missing or needed – ordinances may be necessary. **Some incorporated cities need truck route signage expansion and/or upgrade. South-facing signs become sun-bleached and need replacement often.** • Achieve StormReady Certification - https://www.weather.gov/stormready/become - 10/19/23 • Install faraday cages/shields at digital/technological infrastructure systems at critical facilities and infrastructure
Hazard/Threat Addressed	All
Affected Jurisdictions	McHenry County and Incorporated Jurisdictions
Project Status	New/Ongoing and Continue
Priority	High
Responsible Agency(ies)	City Councils, County Commission, Emergency Services
Partners	Emergency Management, Extension Service, Medical Service Providers, Planning & Zoning
Completion Timeframe	1 to 3 years. Any education is always ongoing. | Cost: Project-specific
Funding Source(s)	See Table AT-1.1

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
5	5	5	5	5	3	4	32

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element	Process for Integration
Capital Improvement Fund McHenry County LEOP & Mitigation Plan McHenry County THIRA	Capability Assessment, Hazard History, Risk Assessment	Solicit project scope of work. Pursue grant funding or use local funds.

Table AT-1.1 – McHenry County, North Dakota, Mitigation Project AT-1 Funding Source(s)

Project Item	Funding Source(s)
Mutual Aid Agreements	Emergency Management Budget
Floodplain/Planning & Zoning Education	County Auditor's Budget
Solar-powered fire index sign	U.S. Forest Service Fire Index Sign Grant (50/50 split)
Permanent and Portable Generators	FEMA's BRIC or HMGP grant programs (75/25 split). Department of Homeland Security's Homeland Security Grant Program (100 percent federal funding)
StormReady Certification	Emergency Management Staff Time
Directional Signage/Truck Route	9-1-1 Budget
Faraday Cages/Shields	State and Local Cybersecurity Grant

McHenry County Project AT-2: Adopt and Enforce Building Codes.

Description/Benefit	Improve administrative and technical, and planning and regulatory capabilities through establishment of a building code enforcement contract from an outside source, establishment of a county position or education of existing county departments, to enforcement of building codes. Building codes can be enforced to increase structural integrity of new structures or renovation of existing. Building codes can be strengthened to increase the structural integrity to withstand high wind events during severe summer weather and snow loads during severe winter weather. Building codes can also be strengthened to encourage radon-resistant building techniques.		
Hazard/Threat Addressed	All Natural Hazards and Man-Made Threats		
Affected Jurisdiction(s)	McHenry County and Incorporated Jurisdictions		
Project Status	New/Ongoing and Continue		
Priority	Medium/High		
Responsible Agency(ies)	City Councils, County Commission, Planning & Zoning		
Partners	N.D. Planning and Zoning Authority, Public Health		
Completion Timeframe	Ongoing	Cost	Project-specific
Funding Source(s)	Permitting and local fees, public partnerships. City and County Budgets/General Funds.		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
3	3	4	2	5	3	5	25

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element	Process for Integration
Planning and Zoning Ordinances McHenry County LEOP & Mitigation Plan McHenry County THIRA	Capability Assessment, Hazard History, Risk Assessment	Adoption of building codes by city councils and county commission. Incorporated cities and McHenry County all budget a portion to pay for ongoing research and development.

McHenry County Project AT-3: Upgrade and/or Expand Emergency Alerting and/or Outdoor Early Warning System(s).

Description/Benefit	Coverage of current outdoor early warning system/sirens does provide coverage to an adequate geographic expanse of the county. Upgrade existing manually-activated sirens to dispatch-activated sirens. There are no existing outdoor early warning sirens for the county outside incorporated cities. Purchase NOAA weather radios for rural communities and unincorporated jurisdictions. • **Upgrade:** City of Anamoose (1), City of Deering (1), City of Drake (1), City of Granville (1), City of Karlsruhe (1), City of Kief (1), City of Towner (fire hall), City of Upham (1), City of Velva (3) • **New:** City of Towner Rodeo Grounds, Buffalo Lodge Lake and George Lake Camping/Recreational Areas • **NOAA Weather Radios:** Townships; Cities of Balfour, Bergen, Voltaire; Unincorporated Bantry • **County-Wide Reverse 9-1-1/Early Warning System**		
Hazard/Threat Addressed	Flood, Hazardous Material Release, Severe Summer Weather, Wildland Fire (All)		
Affected Jurisdiction(s)	McHenry County and Incorporated Jurisdictions		
Project Status	Ongoing and Continue		
Priority	Medium/High		
Responsible Agency(ies)	City Council(s), Emergency Management, Emergency Services		
Partners	County Commission, FEMA, NDDES, NWS		
Completion Timeframe	2 to 3 years. Always ongoing and sirens need upgrading and radios need replacing.	Cost	Siren: Up to $20,000 per siren Reverse 9-1-1: $500 annually
Funding Source(s)	9-1-1 fund. State Homeland Security Grant Program. FEMA's BRIC and HMGP.		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
5	5	5	5	5	4	4	33

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element	Process for Integration
Capital Improvement Plan McHenry County LEOP & Mitigation Plan McHenry County THIRA	Capability Assessment, Hazard History, Risk Assessment	Develop specifications. Received EHP approval. Pursue grant funding or budget independently. Approval by county commission/City Council(s).

McHenry County Project AT-4: Install Digital Signage at Strategic Locations.

Description/Benefit	Improve public awareness and education of current weather and road conditions, and communication of the North Dakota Fire Danger Index. The fire danger index from the state provides an indication of rural fire potential for grasslands, and its ability to spread. The signs can also be used for community messaging/alerts and speed zones. The following locations have been suggested by McHenry County and mitigation committee members: • **McHenry County:** Midway near George Lake (digital), The Denbigh Experimental Forest • City of Granville on U.S. Highway 2 • City of Towner on U.S. Highway 2 Existing Locations • **City of Anamoose:** Main St. adjacent to fire hall • **City of Granville:** Main Avenue across from the fire hall • **City of Upham:** At J. Clark Salyer Refuge Headquarters • **City of Velva:** Velva Golf Course
Hazard/Threat Addressed	Hazardous Material Release, Severe Summer Weather, Severe Winter Weather, Urban Fire/Structure Collapse, Wildland Fire, Transportation Incident (all)
Affected Jurisdiction(s)	McHenry County and Incorporated Jurisdictions
Project Status	Ongoing and Continue
Priority	Medium
Responsible Agency(ies)	Fire Departments, McHenry County Sheriff's Office
Partners	City Council(s), County Commission, NDDOT, Public Works, USFS, NDFS, Emergency Management
Completion Timeframe	3 to 5 years — Cost: Dependent on project specifications
Funding Source(s)	U.S. Forest Service Fire Index Sign Grant – check if digital is acceptable

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
5	5	5	5	5	3	4	32

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element	Process for Integration
Capital Improvement Plan McHenry County LEOP & Mitigation Plan McHenry County THIRA	Capability Assessment, Hazard History, Risk Assessment	Research scope by fire departments. Present findings at LEPC to make a recommendation to the county commission.

McHenry County Project AT-5: Upgrade Existing or Purchase New Equipment and Infrastructure.

Description/Benefit	Purchase and/or install upgraded equipment for ambulance, fire and law enforcement. Improve administrative and technical capabilities of emergency services to mitigation the impact of hazards. A focus of emergency services should be to upgrade equipment to be GIS/GPS capable. • **McHenry County Road Department:** Snow removal equipment • **McHenry County Sheriff's Office:** Off-road vehicles • **Anamoose Fire Protection District.:** SCBAs, bunker gear, pumper truck • **EMS Services:** New ambulances, where necessary • **Drake Fire Dept./Fire Prot. Dist.:** • **Deering Fire Prot. Dist.:** • **Granville, City of:** Pumps and snow equipment • **Granville Fire Dept.:** New fire hall, new grass rig, SCBAs • **Karlsruhe Fire Prot. Dist.:** Bruck truck, SCBAs • **Towner Fire Dept./Fire Prot. Dist.:** New fire hall (in progress at the time of this plan update), SCBAs • **Upham, City of:** Equipment and supplies for pest control/mosquito fogging, snow removal equipment • **Upham Fire Prot. Dist.:** Tank truck, SCBAs, turnout gear • **Velva Fire Dept./Fire Prot. Dist:** New fire hall (city purchased new site as of this plan update)		
Hazard/Threat Addressed	All Natural Hazards and Man-Made Threats		
Affected Jurisdiction(s)	McHenry County and Incorporated Jurisdictions		
Project Status	Ongoing and Continue		
Priority	High		
Responsible Agency(ies)	Each individual entity listed above.		
Partners	City Councils, County Commission		
Completion Timeframe	Ongoing	Cost	Project-specific
Funding Source(s)	Local general funds (county, cities, emergency services). CDBG, FEMA, HUD, Public Utilities, RD, USFS, AFG.		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
5	5	5	5	5	2	3	30

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element	Process for Integration
McHenry County LEOP McHenry County Mitigation Plan McHenry County THIRA	Capability Assessment, Hazard History, Risk Assessment	Review each respective entity. Budget or apply for grant funding. Approval by board, or county commission, and/or city councils.

McHenry County Project AT-6: Create and Implement Recruitment Measures to Attract Volunteers/Personnel for Emergency Services.

Description/Benefit	Volunteerism for emergency services in rural areas is shrinking. Ambulance services are 24/7 responsibilities and fire departments do not have the continuing education like EMS.		
Hazard/Threat Addressed	Fire (Urban and Wildland)/All Natural Hazards and Man-Made Threats		
Affected Jurisdiction(s)	McHenry County and Incorporated Jurisdictions		
Project Status	New		
Priority	Very High		
Responsible Agency(ies)	Each individual emergency service and/or district based in McHenry County		
Partners	City Councils, County Commission, Emergency Services, N.D. Fire Marshal's Office, NDHHS		
Completion Timeframe	Ongoing	Cost	Project-specific
Funding Source(s)	Emergency services budgets		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
5	5	4	5	5	2	5	31

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element	Process for Integration
McHenry County LEOP McHenry County Mitigation Plan McHenry County THIRA	Capability Assessment, Hazard History, Risk Assessment	Review each respective entity. Budget or apply for grant funding. Approval by board, or county commission, and/or city councils.

McHenry County Project AT-7: Install New and/or Upgrade Existing Permanent or Portable Generators to Establish Backup Power Sources at Critical Facilities and Infrastructure.

Description/Benefit	Upgrade existing generators or install new generators to establish permanent source of backup power to maintain continued operation of the following critical facilities and infrastructure. The generator at the Souris Valley Care Center is the only existing permanent generator that will need to be upgraded. Install New • **McHenry County:** McHenry County Courthouse, First District Health Unit/McHenry County; county shops • **City of Anamoose:** Lift station, public school, (installed permanent at fire hall in summer 2023) • **City of Deering:** Permanent needed for the fire hall, one portable for the city's lift station • **City of Granville:** TGU Public School • **City of Karlsruhe:** Fire hall, lift station, and water treatment plant • **City of Towner:** Permanent generators for Towner Ambulance Hall and Towner City Hall (for sheltering purposes), Towner Fire Hall, TGU Public School, Towner Water Treatment Plant, lift stations. Portable generators are needed for the city. • **City of Upham:** Fire Hall, water treatment plant, and lift station. • **City of Velva:** Permanent for master lift station - portable for four other lift stations; Permanent generators for Ambulance/Fire Hall, Public School, Water Treatment Plant, Souris Valley Care Center (assisted living side)
Hazard/Threat Addressed	Flood, Severe Summer Weather, Severe Winter Weather (All)
Affected Jurisdiction(s)	McHenry County and Incorporated Jurisdictions
Project Status	Ongoing and Continue
Priority	High
Responsible Agency(ies)	Commission, City Council(s), Em. Mgmt., Em. Services, Public Works, Medical Service Providers, Public Utilities
Partners	Public Utilities, Public Works
Completion Timeframe	Ongoing. Generators have useful life of 19 years. / Cost: Project-specific
Funding Source(s)	FEMA's BRIC or HMGP. State Homeland Security Grant Program. Emergency Services Budgets. Public Utilities.

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
5	5	5	5	5	3	3	31

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element Utilized	Process for Integration
McHenry County LEOP & Mitigation Plan McHenry County THIRA	Capability Assessment, Hazard History, Risk Assessment	Review by emergency services, cities, or county. Budget or apply for grant funding and approve for execution.

McHenry County Project AT-8: Establish Written Storm Water System/Drainage Ditch Maintenance System to Reduce and/or Eliminate Occurrences of Overland Flooding.

Description/Benefit	Create drainage ditch/storm water maintenance system to control flow of runoff to eliminate blocked roads, maintain access for city/county residents and emergency services, and maintain continuous operation of public infrastructure. Establishment of a system will assist in reimbursement from state and federal sources for expenses incurred during emergency events. **The county road department, incorporated cities, and organized townships already have a schedule for maintaining storm water systems/drainage ditches but needs to be converted to a written document for continuity purposes.** • City of Balfour: Poor storm water drainage on both sides of U.S. Highway 52 • City of Bergen: Enhance natural drainage systems • City of Towner: Towner underpass • City of Upham: Ground saturation issues which has impacted streets and utilities • City of Velva: Velva underpass		
Hazard/Threat Addressed	Drought, Flood (Overland), Infectious Disease, Severe Summer Weather, Severe Winter Weather, Wildland Fire		
Affected Jurisdiction(s)	McHenry County and Incorporated Jursidictions		
Project Status	Ongoing and Continue		
Priority	High		
Responsible Agency(ies)	City Councils, County Commission, Public Works		
Partners	Emergency Services, DWR, NDHHS, Public Health		
Completion Timeframe	1 year	Cost	Staff-time
Funding Source(s)	Highway Department Budget/Public Works		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
5	5	5	5	5	5	5	35

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element Utilized	Process for Integration
Capital Improvement Plans McHenry County LEOP McHenry County Mitigation Plan McHenry County THIRA	Capability Assessment, Hazard History, Risk Assessment	Development of system by county and city public works, and organized townships. Approval and adoption by city council, county commission, township and water resource district board. Include as annex in local emergency operations plan.

McHenry County Project AT-9: Install Homeland Security Measures at Critical Facilities and Infrastructure.

Description/Benefit	The McHenry County Courthouse, emergency services buildings, public schools, critical facilities, and utility and transportation infrastructure are vulnerable to adversarial threats. Installation of (but not limited to) access control measures, alarm systems, cybersecurity enhancements, door alarms, door locks, enhanced lighting, security fencing, motion-detecting systems, security camera surveillance systems, and threat-proof building materials are needed to mitigate adversarial threats. • **Access Control Systems (Bollards):** McHenry County Courthouse (southeast entrance), Souris Valley Care Center, public schools, city hall, fire/ambulance halls, FDHU Office • **Alarm Systems:** Souris Valley Care Center, public schools, fire halls, FDHU Office • **Cybersecurity Enhancements:** McHenry County Courthouse, public schools, city halls, Souris Valley Care Center • **Door Access Control Systems:** McHenry County Courthouse (southeast entrance), city halls, fire/ambulance halls (Velva Fire Hall has fob access), FDHU Office • **Security Camera Surveillance Systems (existing and/or upgrade):** McHenry County Courthouse (southeast entrance), Souris Valley Care Center, public schools, city hall, fire/ambulance halls, FDHU Office • **Security Fencing:** Velva Public School (needs front only) and all remaining public schools, City of Velva/Souris Valley Care Center water storage tanks, City of Anamoose water storage tanks, City of Upham water storage tanks, Tier II Sites • **Security Lighting:** McHenry County Courthouse (southeast entrance), Souris Valley Care Center, public schools, city hall, fire/ambulance halls, FDHU Office • **Threat-Proof Doors and Windows:** McHenry County Courthouse (southeast entrance), Souris Valley Care Center, public schools, city hall, fire/ambulance halls, FDHU Office		
Hazard/Threat Addressed	Civil Disturbance; Criminal, Terrorist, or Nation/State Attack, Fire (Urban), Transportation Incident (All)		
Affected Jurisdiction(s)	McHenry County and Incorporated Jurisdictions		
Project Status	New		
Priority	Very High		
Responsible Agency(ies)	Commission, City Council(s), Emergency Mgmt., Emergency Services, Public Works, Medical Service Providers, Public Utilities		
Partners	Dept. Homeland Security, NDDES, private contractors		
Completion Timeframe	Ongoing	Cost	Project-specific
Funding Source(s)	State Homeland Security Grant Program. Local budgets.		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
5	5	5	4	5	3	4	31

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element Utilized	Process for Integration
McHenry County LEOP & Mitigation Plan McHenry County THIRA	Capability Assessment, Hazard History, Risk Assessment	Develop scope of work and procure bids/quotes. Apply for grant funding. Select contractor. Receive EHP approval. Execute.

McHenry County Project AT-10: Support the N.D. Dept. of Water Resources Risk Mapping, Analysis, and Planning (RISK MAP).

Description/Benefit	The N.D. Dept. of Water Resources received funding from the Federal Emergency Management Agency (FEMA) to produce new and/or update flood maps for McHenry County and incorporated jurisdictions. Workshops began Fall 2017. Lack of participation will result in no opportunity to map unmapped areas or share risk knowledge and update existing maps.		
Hazard/Threat Addressed	Drought, Flood (Overland), Infectious Disease, Severe Summer Weather, Severe Winter Weather		
Affected Jurisdiction(s)	McHenry County and Incorporated Jurisdictions		
Project Status	New		
Priority	Very High		
Responsible Agency(ies)	DWR		
Partners	County Commission, City Council(s), Emergency Management, Emergency Services		
Completion Timeframe	End of 2025	Cost	Staff-time
Funding Source(s)	**The N.D. Dept. of Water Resources received a federal grant resulting in no local cost share.**		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
5	5	5	5	5	5	5	35

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element Utilized	Process for Integration
McHenry County LEOP McHenry County Mitigation Plan McHenry County THIRA	Capability Assessment, Hazard History, Risk Assessment	Follow direction from the N.D. Dept. of Water Resources.

McHenry County Project AT-11: Update Memorandums of Understanding (MOUs) between McHenry County and Incorporated Jurisdictions and the Minot Air Force Base (AFB) Annually.

Description/Benefit	The Minot Air Force Base (AFB) has existing memorandums of understanding (MOUs) with McHenry County and incorporated jurisdictions. This project aims to formalize that relationship and ensure the MOUs are updated annually or when necessary. McHenry County has 38 missile sites. No inhabited structures are allowed within 4,000 feet of each site.		
Hazard/Threat Addressed	All Natural Hazards and Man-Made Threats		
Affected Jurisdiction(s)	McHenry County and Incorporated Jurisdictions		
Project Status	New/Ongoing and Continue (new to the mitigation plan, but has always been completed)		
Priority	Very High		
Responsible Agency(ies)	Minot AFB. McHenry County and Incorporated Jurisdictions.		
Partners	County Commission, City Council(s), Emergency Management, Emergency Services		
Completion Timeframe	Ongoing and Continue	Cost	Staff-time
Funding Source(s)	**Minot AFB. McHenry County and Incorporated Jurisdictions.**		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
5	5	5	5	5	5	5	35

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element Utilized	Process for Integration
Minot AFB Plans McHenry County LEOP McHenry County Mitigation Plan McHenry County THIRA	Capability Assessment, Hazard History, Risk Assessment	Follow direction from the N.D. Dept. of Water Resources.

McHenry County Project EO-1: Conduct Education and Outreach to Improve Household Disaster Resiliency, Readiness, and Preparedness.

Description/Benefit	Continued education and outreach to keep households and vulnerable populations ready in case of a disaster using websites, social media, local media, utility inserts, mailings, etc. Develop new websites or communication outlets where necessary. Special attention paid to maintaining and further developing severe weather awareness campaign, 'Are You Prepared' information, shelter-in-place pamphlets, fire prevention, school safety, storm spotters' program, Tier II, among others. Additional attention should be given to flooding, hazardous materials, severe weather, fire, truck routes, and safe routes to school. • **Apps:** Drake-Anamoose Public School, Souris Valley Care Center, City of Velva, Velva Public School • **Calling Trees:** Brown Township, Souris Valley Care Center employees • **Existing websites:** McHenry County, City of Deering, City of Granville, City of Towner, City of Velva, public schools, FDHU • **Existing social media:** Face pages for McHenry County Emergency Service, Drake-Anamoose Public School, TGU Public Schools, Towner; TGU Public School, Granville, City of Towner; City of Granville; City of Upham; McHenry County Sheriff's Office, Velva Ambulance and Fire; Anamoose Fire Dept., Drake Fire Dept., Upham Fire Dept., Souris Valley Care Center, NDSU Extension/McHenry County • **Develop new:** Pursue additional social media platforms, where appropriate. • Specific attention should be paid to the cities of Balfour, Bergen, and Kief. • **Information should be translated into Spanish and Afrikaans for migrant/seasonal workers** • **A public notice should be sent in the fall for a countywide clearing of ditches.**		
Hazard/Threat Addressed	All Natural Hazards and Man-Made Threats		
Affected Jurisdiction(s)	McHenry County and Incorporated Jurisdictions		
Project Status	Ongoing and Continue/New		
Priority	Very High		
Responsible Agency(ies)	County Commission, City Council(s), Emergency Management, Emergency Services, Public Health, Public Schools		
Partners	Extension, Media, Medical Services Providers, Public Utilities		
Completion Timeframe	Forever ongoing. **See following page.**	Cost	$1,000 to 3,000 annually
Funding Source(s)	Local general funds. FDHU, McHenry County. NDSU Extension/McHenry County. National Weather Service.		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
5	5	5	5	5	5	5	35

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element	Process for Integration
McHenry County LEOP McHenry County Mitigation Plan & THIRA	Capability Assessment, Hazard History, Risk Assessment	LEPC selects appropriate content at its first meeting each year. Identify schedule during the IPP Workshop.

McHenry County Project EO-1: List of Education and Outreach Resources for Natural Hazards

- **Dam Failure –** There are dam structures in McHenry County, North Dakota, and therefore the risk to dam failure is constant. The N.D. Dept. of Water Resources has developed Dam Safety Standards: https://www.swc.nd.gov/pdfs/home_page/draft_nd_dam_safety_standards_policy_reg_05_2023.pdf

  The water board for each county in McHenry County, North Dakota, should review the safety standards and its first meeting of every year before flood season is expected to begin.

- **Drought –** Droughts occur in McHenry County, North Dakota, as variations in precipitation is an expected climatic pattern. The Federal Emergency Management Agency has information on drought available at: https://www.ready.gov/drought.

  The NDSU Extension/ McHenry County should disseminate Drought information every spring prior to the summer season.

- **Fire (Wildland) –** The frequency and intensity of wildland fires has increased in McHenry County, North Dakota. The Federal Emergency Management Agency has information on wildland fires available at: https://www.ready.gov/wildfires

  The fire chiefs of each fire district in McHenry County, North Dakota, should conduct an education and outreach presentation in conjunction with information discussed at the LEPC at its first fire department meeting of each year before fire season begins.

- **Flood –** Presidential Disaster Declarations from flooding have occurred in McHenry County, North Dakota, in 2009, 2010, 2011, 2013, 2019, 2020, 2022, and 2023. The Federal Emergency Management Agency has information on Flooding available at: https://www.ready.gov/floods

  Each water resource district board and emergency management office in McHenry County, North Dakota, should review flood ordinances annually to identify any changes needed for implemented at the county and city level. The water resource district board should also publish an annual article in the local newspaper or social media on the importance and effectiveness of the National Flood Insurance Program (NFIP).

- **Geologic Hazards –** All of North Dakota is in EPA Radon Zone 1. Therefore, all counties in the state are vulnerable to this hazard, and all homes have a high potential to test for elevated radon levels. A radon fact sheet is available through the N.D. Dept. of Emergency Services: https://deq.nd.gov/wm/radon/

  Each emergency management office in McHenry County, North Dakota, should publish an annual article in the local newspaper or social media about the risk to radon and can include information from the FactSheet provided by the N.D. Dept. of Emergency Services.

- **Severe Summer Weather –** Severe Summer Weather is a climatic pattern expected annually in McHenry County, North Dakota. Extreme heat is most impactful on older Americans. The Federal Emergency Management Agency has information on extreme heat available at:
    - https://www.ready.gov/heat
    - https://www.ready.gov/thunderstorms-lightning
    - https://www.ready.gov/tornadoes

  Each emergency management office in McHenry County, North Dakota, should publish an annual article in the local newspaper or social media about the risk to extreme heat in the spring prior to the start of summer.

- **Severe Winter Weather –** Severe Winter Weather is a climatic pattern expected annually in McHenry County, North Dakota. Extreme cold/wind chill is most impactful on older Americans and individuals with limited income/means. According to Headwaters Economics' Neighborhoods at Risk Economic Profile System, the largest change in the share of single mother families in poverty occurred in McHenry County, ND, between 2010 and 2021, which went from 1.3% to 4.6%. The Federal Emergency Management Agency has information on Severe Winter Weather available at: https://www.ready.gov/winter-weather

  Each emergency management office in McHenry County, North Dakota, should publish an annual article in the local newspaper or social media about the dangers of extreme cold/wind chill each fall prior to the start of winter.

- **Space Weather –** McHenry County, North Dakota, cannot control the Sun but can conduct education and outreach regarding Space Weather. The National Oceanic and Atmospheric Administration operates a Space Weather Prediction Center and have information available at: https://www.swpc.noaa.gov/

  Each emergency management office in McHenry County, North Dakota, should contact the Space Weather Prediction Center and request information that can be used for education and outreach to the public regarding Space Weather.

McHenry County Project EO-2: Increase Awareness of Methods for Prevention of Infectious Disease & Pest Infestations.

Description/Benefit	Make the public aware of the risk of infectious diseases and methods for prevention in animals, people, and plants to reduce and/or eliminate economic impacts. Methods should focus on young and elderly populations (vulnerable and all populations), handwashing, influenza preparedness, and strategies used in agriculture-based economies such as pesticides, fungicides, herbicides and insecticides.		
Hazard/Threat Addressed	Infectious Disease and Pest Infestations (All)		
Affected Jurisdiction(s)	McHenry County and Incorporated Jurisdictions		
Project Status	New/Ongoing and Continue		
Priority	High		
Responsible Agency(ies)	Emergency Management, Emergency Services, Extension, Public Health, Weed Board, public information officers		
Partners	Extension, Dept. of Natural Resources, FSA, NDDA/State Veterinarian, NDDH, Medical Services Providers, RD, Stockmen's Association, USDA		
Completion Timeframe	Ongoing	Cost	Project-specific
Funding Source(s)	LRDHU – McHenry County Public Health education and outreach line items in their annual budget.		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
5	5	5	5	5	4	5	34

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element	Process for Integration
Public Health (all plans) McHenry County LEOP McHenry County Mitigation Plan McHenry County THIRA	Capability Assessment, Hazard History, Risk Assessment	Development by Public Health/respective agency. Approval by county commission, city council(s) and emergency management. Distribute.

McHenry County Project EO-3: Increase Awareness of Drought Tolerant Practices and Soil Conservation Methods in Farming and Ranching, and Incorporated Jurisdictions.

Description/Benefit	Make the public aware of crop programs, drought tolerant practices, and soil conversation methods in farming and ranching, and incorporated jurisdiction. Educating the public on rationing/restrictions on livestock feed and water usage. Prevent loss of crops and livestock during drought. Information for municipalities should focus on water conservation practices or rationing. Use media, workshops, and literature to inform the public. **A public awareness campaign for water conservation or water rationing can increase awareness of drought.** **NDSU Extension/McHenry County should collaborate with McHenry County Emergency Management's drought education and outreach strategy.** **NDSU Extension/McHenry County indicated the need for a second NDAWN Station in Northern McHenry County. The county extension agent identified two potential locations – Gilmore or Layton Townships.**		
Hazard/Threat Addressed	Drought, Fire (Wildland), Severe Summer Weather, Severe Winter Weather		
Affected Jurisdiction(s)	McHenry County and Incorporated Jurisdictions		
Project Status	Ongoing and continue		
Priority	High		
Responsible Agency(ies)	FSA, NDSU Extension/McHenry County, NRCS, USDA		
Partners	Emergency Management, Media		
Completion Timeframe	Ongoing	Cost	Project-specific. NDAWN is $20,000.
Funding Source(s)	FSA. NDSU Extension/McHenry County – has line items for drought education and $6,000.00 for NDAWN local match. NRCS.		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
5	5	5	5	5	5	5	35

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element	Process for Integration
Bovine Emergency Response Plan (BERP) Drought Management Plan (State of North Dakota) McHenry County LEOP& Mitigation Plan McHenry County THIRA	Capability Assessment, Hazard/Threat History, Risk Assessment	Development by FSA, NDSU Extension, and NRCS. Approval by county commission, city council(s) and emergency management. Distribute.

McHenry County Project EO-4: Conduct Continuous Preventative Education to Increase Awareness of Cyberattack Threats.

Description/Benefit	Make the public aware of risk of cyberattacks such as Advanced Persistent Threats, Distributed Denial of Service, Doxing, Media Threats, Password Phishing Attacks, Socially Engineered Malware, and Unpatched Software. **Specific attention should be paid to the framework developed and included in the K20W Initiative. Specific information should be developed for incorporated cities to protect utility infrastructure (i.e., SCADA Systems, etc.). The cities of Towner and Upham have SCADA for its water meters. Rural water districts and electric cooperatives have digital systems.** **Specific education opportunities should be made available to staff at the McHenry County Courthouse, Souris Valley Care Center, Anamoose Public School, Drake Public School, TGU Public Schools in Granville and Towner, FDHU**		
Hazard/Threat Addressed	Cyberattack		
Affected Jurisdiction(s)	McHenry County and Incorporated Jurisdictions		
Project Status	New		
Priority	Very High		
Responsible Agency(ies)	McHenry County and incorporated cities in partnership with NRG and NDIT. ND Public Instruction for public schools. Sanford and Good Samaritan Society for Souris Valley Care Center.		
Partners	County Commission, City Council(s), Emergency Management, Emergency Services		
Completion Timeframe	Ongoing	Cost	Project-specific
Funding Source(s)	State Cybersecurity Grant Program. City and County general funds.		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
5	5	5	5	5	4	5	34

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element	Process for Integration
McHenry County LEOP McHenry County Mitigation Plan McHenry County THIRA	Capability Assessment, Hazard History, Risk Assessment	Development by McHenry County Office of Emergency Management, NDIT, NRG, and public schools. Approval by county commission, city council(s), emergency management, school board. Distribute.

McHenry County Project EO-5: Assist in the Annual Update of First District Health Unit's Strategic Plan.

Description/Benefit	The strategic plan for First District Health Unit in Minot is required to be updated on an annual basis. McHenry County should assist in this update, where possible.		
Hazard/Threat Addressed	Infectious Disease (All)		
Affected Jurisdiction(s)	McHenry County and Incorporated Jurisdictions		
Project Status	New		
Priority	High		
Responsible Agency(ies)	First District Health Unit FDHU, McHenry County/Public Health		
Partners	Emergency Management, Emergency Services, Medical Services Providers		
Completion Timeframe	Ongoing	Cost	Staff time and printing
Funding Source(s)	First District Health Unit FDHU, McHenry County. Local general funds.		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
5	5	5	5	5	5	5	35

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element	Process for Integration
FDHU/Public Health (all plans) McHenry County LEOP McHenry County Shelter and Mass Care Plan McHenry County THIRA	Capability Assessment, Hazard History, Risk Assessment	Development by First District Health Unit FDHU, McHenry County. Approval by board and emergency management. Distribute.

McHenry County Project EO-6: Conduct Education and Outreach on Fire Safety and Prevention, Burn Restrictions, State Fire Indexes, and Regional/State Burning Regulations and Restrictions.

Description/Benefit	Make the public aware of methods to remain safe from risk of urban fire and wildland fire and potential prevention techniques. Urban fire education and outreach should focus on smoke alarms (battery checks or installation of new alarms, where needed), escape plans, reunification procedures, etc.) Keep areas around buildings and structures clear of grass, overgrown vegetation, and debris. Specific attention should be paid to property owners in city limits with substantial vegetation to reduce fuels for wildland fires. **Evaluate and/or create defensible space around structures to include removing debris accumulation with special attention given to Tier II locations. Promote Firewise Safety practices during the local fire departments' annual Fire Safety Prevention Week in October and should be reviewed annually by the LEPC.** Educate the public on burn restrictions and state fire indexes. Reduce the risk of fire hazard from outdoor burning by residents and provide means of communication. **Explore surface water access options for fire suppression.** **https://ndresponse.gov/burn-ban-restrictions-fire-danger-maps**		
Hazard/Threat Addressed	Drought, Fire (Urban & Wildland), Hazard Material Release, Severe Summer Weather, Severe Winter Weather		
Affected Jurisdiction(s)	McHenry County and Incorporated Jurisdictions		
Project Status	Ongoing and Continue/New (new to the mitigation plan, but has always been executed by fire departments)		
Priority	Very High		
Responsible Agency(ies)	All Fire Departments/Districts, ND Forest Service, ND Firefighter's Association (NDFA)		
Partners	City Council(s), County Commission, Emergency Management, Extension, NDDES, Public Schools, State Fire Marshal's Office,		
Completion Timeframe	Ongoing	Cost	$0 for a local PSA; $1,000 to $3,000/week for substantial outreach
Funding Source(s)	Fire Department's Fire Prevention Week line item. Emergency Management Budget.		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
5	5	5	5	5	5	5	35

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element	Process for Integration
McHenry County LEOP McHenry County Mitigation Plan McHenry County THIRA	Capability Assessment, Hazard History, Risk Assessment	Development by Emergency Management and Emergency Services. Approval by county commission (burn restrictions). Distribute.

McHenry County Project EO-6: Conduct Hazardous Material Release (HAZMAT) Education.

Description/Benefit	Make the public aware of the risk of hazardous material releases from vehicle transportation, pipelines, the railroad, and Tier II Sites. Work with CP Railway, BNSF Railroad, Enerbase, North14 Agronomy, CF Industries, ADM, DMG, Dakota Agronomy, Arthur Companies, • McHenry County has 76 Tier II Sites. • Individual fuel and propane providers. • Minot AFB has underground wires and cables.		
Hazard/Threat Addressed	Drought, Fire (Urban & Wildland), Hazard Material Release, Severe Summer Weather, Severe Winter Weather		
Affected Jurisdiction(s)	McHenry County and Incorporated Jurisdictions		
Project Status	Ongoing and Continue/New (new to the mitigation plan, but has always been executed by fire departments and is a combination of several projects from the previous plan)		
Priority	Very High		
Responsible Agency(ies)	All Fire Departments/Districts, Tier II Sites, Railroad, NDDOT		
Partners	City Council(s), County Commission, Emergency Management, Extension, NDDES		
Completion Timeframe	Ongoing	Cost	$0 for a local PSA; $1,000 to $3,000/week for substantial outreach
Funding Source(s)	Emergency Management Budget. Fire Department Budget.		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
3	4	5	2	3	5	5	27

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element	Process for Integration
McHenry County LEOP McHenry County Mitigation Plan McHenry County THIRA	Capability Assessment, Hazard History, Risk Assessment	Development by Emergency Management and Emergency Services. Approval by county commission (burn restrictions). Distribute.

McHenry County F-1: Expand Existing or Implement New Financial Mitigation Capabilities.

Description/Benefit	Expand financial mitigation capabilities to generate funds for completion of mitigation projects. • Create and implement impact fees for new development. • Restructure and improve building permit fees to be a percentage of project cost. • Establish Capital Improvement Fund/Plan, where possible. • Restructure and increase utility fees (water, sewer) based on projected future infrastructure maintenance costs and necessary capital improvements. • Research additional revenue generators such as an electricity utility fee, wheel tax, etc. • Expand role of local economic development to generate more revenue through grant funding, loans funds, community endowment, etc. The city of Anamoose has a community endowment fund. • Gaming revenue. • Create revenue stream and allocate resources to invest in equipment and emergency services capabilities. • **Pursue new grant opportunities, where possible.**		
Hazard/Threat Addressed	All Natural Hazards and Man-Made Threats		
Affected Jurisdiction(s)	McHenry County and Incorporated Jurisdictions		
Project Status	New/Ongoing and Continue		
Priority	Very High		
Responsible Agency(ies)	City Councils, County Commission		
Partners	Emergency Management, Emergency Services, FEMA, NDACo, NDLC, Planning & Zoning, Public Utilities		
Completion Timeframe	Ongoing	Cost	Staff-time
Funding Source(s)	City and County Budgets and related staff time.		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
3	5	5	2	4	5	5	29

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element	Process for Integration
Planning Commission	Capability Assessment, Hazard History, Risk Assessment	Research effectiveness. Approval and adoption by county commission and city councils.

McHenry County F-2: Utilize Community Disaster Resilience Zone.

Description/Benefit	The Community Disaster Resilience Zones Act was signed into law by President Joe Biden on December 20, 2022. The Act amends the Robert T. Stafford Disaster Relief and Emergency Assistance Act and requires FEMA to utilize a natural hazard risk assessment index to identify census tracts which are most at risk from the effects of natural hazards and climate change. Community Disaster Resilience Zones (CDRZ) will build disaster resilience across the nation by driving federal, public, and private resources to the most at-risk and in-need jurisdictions. The Act will also enable communities to strengthen their community resilience by working with a range of all levels of governmental and private sector partners. **Community Disaster Resilience Zones**: https://rb.gy/kdiww1 https://www.congress.gov/bill/117th-congress/senate-bill/3875/text Potential Projects: NDAWN (N.D. All Weather Network) **Station in Northern McHenry County. Two potential locations Gilmore or Layton Townships. Currently there is no soil moisture probe, which results in difficulty in predicting ground-level conditions for NASA and NOAA. Pre-fabricated tornado shelters.**		
Hazard/Threat Addressed	All Natural Hazards and Man-Made Threats		
Affected Jurisdiction(s)	McHenry County and Incorporated Jurisdictions		
Project Status	New		
Priority	Very High		
Responsible Agency(ies)	City Councils, County Commission		
Partners	Emergency Management, Emergency Services, FEMA, NDACo, NDLC, Planning & Zoning		
Completion Timeframe	Ongoing	Cost	NDAWN Station: $20,000 initial with $1,500 yearly maintenance
Funding Source(s)	FEMA's Community Disaster Resilience Zones Act. Local budgets for the local cost share.		

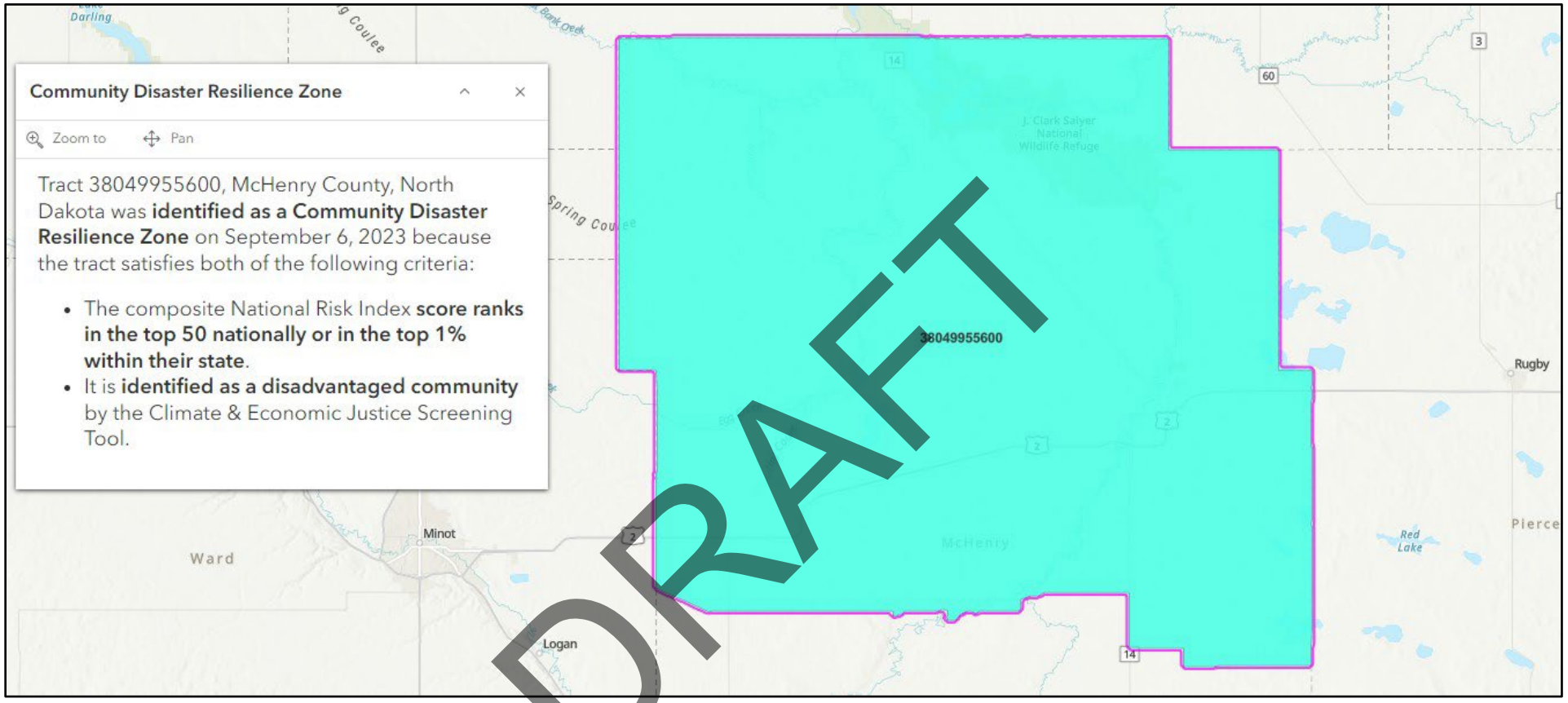
Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
5	5	5	5	5	5	5	35

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element	Process for Integration
Planning Commission	Capability Assessment, Hazard History, Risk Assessment	Research effectiveness. Approval and adoption by county commission and city councils.

Figure F-2 – McHenry County, North Dakota, Community Disaster Resilience Zone



Source(s): Federal Emergency Management Agency (FEMA)

McHenry County Project PR-1: Assure McHenry County, North Dakota, has FEMA-Approved Mitigation Plan.

Description/Benefit	Continuous assessment of vulnerabilities to the county and incorporated jurisdiction, and update of hazards and impacts, monitoring of mitigation project implementation and progress. **Update plan on a continuing basis between plan update grant applications. See Chapter 10 and Appendix 8 of this plan.**		
Hazard/Threat Addressed	All		
Affected Jurisdiction(s)	McHenry County and Incorporated Jurisdictions		
Project Status	Ongoing and Continue		
Priority	Very High		
Responsible Agency(ies)	County Commission, Emergency Management		
Partners	County Highway Dept., Emergency Services, Extension Service, Planning & Zoning, Public Health, SWC, Water District		
Completion Timeframe	Recurring every 4 to 5 years	Cost	$25,000 to $35,000 (update of plan)
Funding Source(s)	FEMA's HMGP or BRIC Grant program. Budget for project cost in Emergency Management Budget.		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
5	5	5	5	5	5	5	35

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element	Process for Integration
Hazard Mitigation Plan (all other existing mechanisms)	All elements	Adoption by county commission and city councils. Approval NDDES and FEMA.

McHenry County PR-2: Update/Expand Existing and/or Create New Planning and Regulatory Capabilities to Address Existing, New, and Future Development.

Description/Benefit	Build the planning and regulatory capability of McHenry County and incorporated jurisdictions by updating existing and/or expand and create new plans, policies, and ordinances. To ensure new and existing structures adhere to building standards to withstand impacts from hazards. Energy development (oil and gas) in the western portion of the state may lead to economic and population growth. **Specific research should be conducted to address abandoned/blighted properties, comprehensive planning, crew camps, drought management, land use plans, flood ordinances and management, storm water management, and zoning.** A list of plans, policies, codes and ordinances needing to be updated or created for McHenry County are found in Chapter 7, Capability Assessment, and for incorporated jurisdictions are found in the jurisdictions respective profile in Chapter 8, Jurisdictions.		
Hazard/Threat Addressed	All Natural Hazards and Man-Made Threats		
Affected Jurisdiction(s)	McHenry County and Incorporated Jurisdictions		
Project Status	Ongoing and Continue		
Priority	High		
Responsible Agency(ies)	City Councils, County Commission, Planning & Zoning		
Partners	Emergency Management, Emergency Services, NDACo, NDDES, NDLC, Public Works, RD		
Completion Timeframe	Ongoing	Cost	$0 to $10,000 and/or Staff-time
Funding Source(s)	Local general funds. Incorporated jurisdiction budgets. Grants, where applicable.		

Values: 1 is low (negative impact and/or too costly) – Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
5	5	5	4	4	5	5	33

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element	Process for Integration
All	Capability Assessment, Hazard History, Risk Assessment	Approval and adoption by county commission and city councils

McHenry County/City PR-3: Enroll the city of Deering and Karlsruhe Township in National Flood Insurance Program (NFIP).

Description/Benefit	Ensure economic resiliency. Residents with property at risk would be insured. Ensure continuous review and updating or implementation of flood ordinances and flood control measures.		
Hazard/Threat Addressed	Flood (overland and riverine), Severe Summer Weather, Severe Winter Weather		
Affected Jurisdiction(s)	City of Deering. Karlsruhe Township.		
Project Status	Ongoing and Continue		
Priority	High		
Responsible Agency(ies)	City of Deering. Karlsruhe Township.		
Partners	Emergency Management, County Commission, Planning & Zoning, DWR, Water Resource Board		
Completion Timeframe	2 years	Cost	Free (local administrative costs will apply)
Funding Source(s)	General Fund.		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
4	5	5	4	5	3	5	31

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element Utilized	Process for Integration
Flood Ordinances McHenry County LEOP, Flood Annex McHenry County Mitigation Plan McHenry County THIRA National Flood Insurance Program (NFIP)	Capability Assessment, Hazard History, Risk Assessment, Flood Statistics	Apply to NFIP through DWR. Approval and adoption by City Council.

McHenry County PR-4: Encourage Jurisdictions to Review Local Flood Ordinances to Meet or Exceed Minimum Federal and State Requirements, Comply with the NFIP (Once Enrolled), and Enroll in the Community Rating System (CRS).

Description/Benefit	To ensure McHenry County and incorporated jurisdictions meet or exceed the NFIP to prepare for enrollment in the NFIP.		
Hazard/Threat Addressed	Flood (overland and riverine), Severe Summer Weather, Severe Winter Weather		
Affected Jurisdiction(s)	McHenry County and the cities of Anamoose, Drake, Karlsruhe, Towner, Upham, and Velva, and the townships of Deep River, Lebanon, Newport, Velva, Villard, Willow Creek		
Project Status	Ongoing and continue		
Priority	High		
Responsible Agency(ies)	County Commission, City Councils, Emergency Management, Planning & Zoning		
Partners	Emergency Services, NDACo, NDDES, NDLC, DWR		
Completion Timeframe	Ongoing	Cost	$0 to $1,000 / staff time
Funding Source(s)	Incorporated Jurisdiction General Funds. Emergency Management Budget. DWR. FEMA.		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
5	5	5	5	5	5	5	35

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element Utilized	Process for Integration
Flood Ordinances McHenry County LEOP, Flood Annex McHenry County Mitigation Plan McHenry County THIRA National Flood Insurance Program (NFIP)	Capability Assessment, Hazard History, Risk Assessment	Approval and adoption by county commission and city councils

McHenry County PR-5: Create Post-Disaster Debris Management Plan and Update on an Annual Basis.

Description/Benefit	Provide temporary staging site for disposal of waste from structures to improve resiliency and recovery efforts, and maintain quality of life. **Establishment of a management plan increases disaster reimbursement from FEMA by five percent.** **Potential staging sites identified during the planning process are as follows:** • City of Anamoose landfill • City of Granville's city-owned property next to the landfill • City of Towner's old horse racetrack adjacent to the rodeo grounds and airport • City of Velva Tree Dump/inert landfill		
Hazard/Threat Addressed	All		
Affected Jurisdiction(s)	McHenry County and Incorporated Jurisdictions		
Project Status	Ongoing and Continue		
Priority	High		
Responsible Agency(ies)	County Commission, City Council(s), Emergency Management, Planning & Zoning, Public Works		
Partners	NDACo, NDDES, NDLC, Public Health, Public Utilities, Water Resource District		
Completion Timeframe	1 year. Annual review.	Cost	Up to $2,000.00 for administrative costs
Funding Source(s)	Emergency Management and Highway/Road Department Budgets.		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
5	5	5	5	5	5	5	35

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element	Process for Integration
McHenry County LEOP (Appendix) McHenry County Mitigation Plan McHenry County THIRA Planning Commission	Capability Assessment, Hazard History, Risk Assessment	Organize planning committee and create plan. Approval and adoption by county commission and city council(s). Update annually.

McHenry PR-6: Update Bovine Emergency Response Plan (BERP).

Description/Benefit	Gives first responders a standard operating procedure on how to mitigate issues pertaining bovine losses from natural hazards or man-made threats. The plan also assures public safety first and foremost, first responder safety, and animal well-being. McHenry County is self-proclaimed as the Cattle Capital of North Dakota and has the second largest livestock population by county in the state behind Morton County.		
Hazard/Threat Addressed	Civil Disturbance, Dam Failure, Drought, Fire (Wildland), Flood, Hazardous Material Release, Infectious Disease, Severe Summer Weather, Severe Summer Weather, Transportation Incident		
Affected Jurisdiction(s)	McHenry County and Incorporated Jurisdictions		
Project Status	New		
Priority	Medium/Low		
Responsible Agency	Extension, N.D. State Vet Office, local producers and/or veterinarians		
Partners	Emergency Management, Emergency Services, Weed Board, wrecker services		
Completion Timeframe	1 year	Cost	$75 to $100 per person. Staff time.
Funding Source	Central Grasslands Research Extension Center. N.D. Beef Commission. Local budgets.		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
5	5	4	5	3	5	5	32

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element	Process for Integration
McHenry County LEOP McHenry County Mitigation Plan McHenry County THIRA	Capability Assessment, Hazard History, Risk Assessment	Develop draft plan and formally adopt by county commission. Integrate into local emergency services response protocols.

McHenry County Project I-1: Assure Continued Monitoring and Maintenance of Eaton Dam, the Velva Levee, National Wildlife Refuge Dams, and All Other Dams in McHenry County.

Description/Benefit	To protect human life and property from dam failures. Eliminate possibility of a dam failure. The Velva Levee is part of the new Souris (Mouse) Riverbed and needs investments to mitigate future riverine flooding. • The Eaton Dam impedes the flow of the Souris (Mouse) River. • The Velva Levee impedes the flow of the Souris (Mouse) River for the city of Velva. • J. Clark Salyer National Wildlife Refuge has five main dikes with water control structures. **See Chapter 5.2, Dam Failure for a list of dams in McHenry County.**		
Hazard/Threat Addressed	Dam Failure (Flood, Severe Summer Weather, Severe Winter Weather)		
Affected Jurisdictions	City of Velva and greater McHenry County		
Project Status	Ongoing and Continue/New		
Priority	High		
Responsible Agency(ies)	McHenry County Water Resource District Board, Eaton Irrigation Board. U.S. Fish & Wildlife		
Partners	City of Velva, DWR, Emergency Management, Public Works, McHenry County Road Superintendent		
Completion Timeframe	Ongoing	Cost	To be determined
Funding Source(s)	McHenry County Water Resource District Board, Eaton Irrigation Board. U.S. Fish & Wildlife		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
5	5	5	5	5	5	5	35

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element Utilized	Process for Integration
McHenry County LEOP McHenry County Mitigation Plan McHenry County THIRA	Capability Assessment, Hazard History, Risk Assessment, dam failure statistics	Work with state agencies to incorporate monitoring and maintenance schedules into local planning mechanisms.

McHenry County Project I-2: Retrofit and/or Upgrade Bridges and Culverts, Raise Road Grades to withstand Natural Hazards and Man-Made Threats, and/or Install New or Expand Signage to Prevent Blockage and Maintain Access for Emergency Services.

Description/Benefit	Increase resiliency of bridges, culverts, and roads to maintain transportation to assure economic vitality and access for emergency services. The county is removing bridges and replacing them with box culverts. **A detailed description of each bridge, culvert, road, and sign is shown on the following page.**		
Hazard/Threat Addressed	Drought, Flood (overland and riverine), Hazardous Material Release, Severe Summer Weather, Severe Winter Weather, Wildland Fire (All)		
Affected Jurisdiction(s)	McHenry County and Incorporated Jurisdictions		
Project Status	New/Ongoing and continue		
Priority	High		
Responsible Agency(ies)	County Commission, City Council(s), County Road Dept., FAS, Water Resource Board, Townships		
Partners	Emergency Management, Emergency Services, FEMA, NDDOT, Planning & Zoning		
Completion Timeframe	Ongoing	Cost	Project-specific
Funding Source(s)	FHWA, FRA and NDDOT. FEMA Hazard Mitigation, Section 406. Local Highway/Road Budget.		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
5	5	4	4	5	2	3	28

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element	Process for Integration
Capital Improvement Plan Comprehensive Plan McHenry County LEOP & Mitigation Plan McHenry County THIRA N.D. Dept. of Transportation State Transportation Improvement Plan (STIP)	Capability Assessment, Hazard History, Risk Assessment	Approval and adoption by county commission and city councils

McHenry County Project I-2: Retrofit and/or Upgrade Bridges and Culverts, Raise Road Grades, and Install New or Expand Signage to withstand Natural Hazards and Man-Made Threats, and Prevent Blockage to Maintain Access for Emergency Services.

Blocked Roads
- Salyer Road/6th Avenue
- U.S. Highway 52 near the Mouse River

Bridges
- Bridge in Karlsruhe Township – closed in 2023 due to functionally obsolete
- Bridge on 80th St. and 7th Ave just west of the city of Upham
-

Culverts
- City of Anamoose: Ave H West and 3rd St.
- City of Balfour: Culvert on Main St. collapses from the weight of the county maintainer
- City of Deering: Culvert under McHenry County Highway 1 (Main St.)
- Cities of Kief and Upham

Road Grade Raises
- Cottonwood Lake Township (32nd St.)

Signage
- Solar-Powered Flashing Stop Sign at intersection of McHenry County Highway 1 (Main St.) and 2nd Ave and/or enhanced speed limit signage in the city of Deering
- Intersection of U.S. Highway 52 and N.D. Highway 14 in the city of Anamoose – need signage on U.S. Highway 52 traffic due to change in elevation
- 12th Ave N at 80th St. North – flashing stop signs and rumble strips

Underpass
- Towner Underpass: Retrofit to reduce/eliminate occurrences of overland flooding
- Velva Underpass: Retrofit to reduce/eliminate occurrences of overland flooding

Miscellaneous
- City of Balfour: Main St. is at different elevation when crossing the railroad = rough road and needs retrofitting/upgrading

McHenry County Project I-3: Construct New Storm Shelters/Community Safe Rooms or Retrofit Existing Structures to Expand Sheltering Capacity to Reduce and/or Eliminate the Risk to Vulnerable Populations and the Public.

Description/Benefit	Provide safe area of refuge for permanent residents and temporary populations and seasonal/recreational populations from severe weather. Reduce/eliminate loss of life from hazards and man-made threats. Upgrade existing shelters to be fully ADA compliant and pet-friendly. Construct new storm shelters/community safe rooms in jurisdictions currently lacking a storm shelter/safe room. More information on community shelters can be found through the following link: https://www.fema.gov/media-library/assets/documents/5090 **Upgrade:** McHenry County Courthouse; TGU Public School, Towner; TGU Public School, Granville; Velva Public School; Anamoose Fire Hall (generator installed in 2023); City of Karlsruhe Catholic Church; Camp Bentley west of the city of Drake; City of Velva has block buildings at community pool and campground – should upgrade to pre-fabricated structure; Cedar Lodge in the city of Velva (15 camp sites); Velva Glass and Auto (six camp sites) on U.S. Highway 52 near the C-store **Pre-Fabricated Tornado Shelter:** McHenry County: Buffalo Lodge Lake north of Granville, recreation area(s) at George Lake; City of Anamoose near the public school and low-income housing and city park (four camp sites); City of Balfour; City of Drake on northwest side of Drake Public School grounds near low-income housing; City of Deering on the west side near the mobile home park; City of Kief city park/city owned lot; City of Towner city park (has six camp sites); City of Upham city park (has six camp sites)		
Hazard/Threat Addressed	All Natural Hazards and Man-Made Threats		
Affected Jurisdiction(s)	McHenry County and Incorporated Jurisdictions		
Project Status	New/Ongoing and Continue		
Priority	Very High		
Responsible Agency(ies)	Emergency Management, Emergency Services, City Councils, County Commission		
Partners	NDDES, Red Cross, Social Services, local landowners		
Completion Timeframe	5+ years for new shelters. Ongoing for all existing.	Cost	$75,000.00 to $150,000.00 for pre-fabricated
Funding Source(s)	FEMA's Building Resilient Infrastructure and Communities (BRIC) or Hazard Mitigation Grant Program (HMGP).		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
5	4	4	4	4	3	3	28

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element	Process for Integration
McHenry County LEOP McHenry County Mitigation Plan McHenry County THIRA	Capability Assessment, Hazard History, Risk Assessment	Develop/identify the scope. Approval by county commission and city councils. Pursue grant funding or budget locally. Install.

McHenry County Project I-4: Assist Incorporated Jurisdictions in Conducting Engineering Studies to Develop Scope of Work (SOW) to Retrofit Drinking/Potable Water Systems, Sanitary Sewer/Lagoon Systems, and Stormwater Systems.

Description/Benefit	There are incorporated jurisdictions in McHenry County, primarily smaller jurisdictions with less than 250 people, that need investment in their drinking/potable water, sanitary sewer/lagoon, and stormwater systems. Project scoping is needed to determine the extent of retrofits and/or upgrades. • **City of Anamoose:** Sanitary sewer/lagoon system • **City of Balfour:** Stormwater drainage issues on both sides of U.S. Highway 52 • **City of Karlsruhe:** Sanitary sewer/lagoon system • **City of Kief:** Stormwater system has culverts that are undersized and become blocked during heavy precipitation events • **City of Towner:** See Chapter 8.9 • **City of Upham:** See Chapter 8.10 • **City of Velva:** See Chapter 8.11		
Hazard/Threat Addressed	Drought, Flooding (overland), Infectious Disease & Pest Infestations, Severe Summer Weather, Severe Winter Weather		
Affected Jurisdictions	McHenry County and the cities of Anamoose, Balfour, Karlsruhe, Kief, Towner, Upham, and Velva		
Project Status	New		
Priority	High		
Responsible Agency	City Council(s), County Commission		
Partners	DWR, Emergency Management, Public Health, Public Works, NDDEQ		
Completion Timeframe	3 years	Cost	TBD
Funding Source	FEMA's Building Resilient Infrastructure and Communities (BRIC) or Hazard Mitigation Grant Program (HMGP).		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
5	5	5	5	5	1	1	27

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element	Process for Integration
Capital Improvement Plan McHenry Comprehensive Plan McHenry County LEOP McHenry County Mitigation Plan & THIRA	Capability Assessment, Hazard/Threat History, Risk Assessment	Conduct engineering study or identify scope of work. Approval by city council. Pursue funding options. Execute.

7. Mitigation Capability

Capability for mitigation is divided into four categories: Administrative and Technical, Education and Outreach, Financial, and Planning and Regulatory. Chapter 7.1 provides an assessment of the mitigation capabilities of Pierce County, North Dakota, and incorporated jurisdictions.

- Table 7.1.1 highlights **administrative and technical** capabilities.
- Table 7.1.2 highlights **education and outreach** capabilities.
- Table 7.1.3 highlights **financial** capabilities.
- Table 7.1.4 highlights **planning and regulatory** capabilities.
- Table 7.1.5 shows the **utilization of planning mechanisms** in Pierce County, North Dakota, by natural hazard/man-made threat and mitigation project.

Sources for mitigation funding are shown in Chapter 7.2, Mitigation Funding Sources.

Current planning mechanisms, and the process for integration of the mitigation plan into planning mechanisms, are discussed after Table 7.1.4 and before Table 7.1.5. The process to integrate the mitigation plan into existing planning mechanisms for each jurisdiction is shown in the respective jurisdiction profile in Chapter 8, Jurisdictions following the mitigation capability assessment. Information in the tables is outlined as follows:

1. Boxes checked with an "X" indicate the jurisdiction possesses the capability; while boxes left blank indicate the jurisdiction is lacking the capability.
2. An asterisk (*) indicates a capability that can be obtained through the county, contracted services, or an outside entity.
3. A ^ denotes a mitigation capability in progress.

Narratives following each table detail the capabilities of Pierce County, North Dakota, and incorporated jurisdictions are found in Chapter 7.1, Mitigation Capability Assessment. Information on the capabilities of each jurisdiction was gathered at committee meetings, and jurisdictional workshops, and interviews during the planning process. **Bolded narratives identify mitigation projects.**

Each identified resource in the four mitigation capability categories can be used to implement mitigation strategies and access funding for projects. A definition of each mitigation capability category is provided.

- **Administrative and Technical:** Identification of administrative and technical capabilities, which includes staff and their skills and tools for mitigation planning to implement specific mitigation actions.

- **Education and Outreach:** Identification of education and outreach programs, and methods already in place to implement mitigation activities and communicate hazard-related information.

- **Financial:** Identification of access to or eligibility to use funding resources for hazard mitigation for jurisdictions.

- **Planning and Regulatory:** Jurisdictional plans, policies, codes, and ordinances adopted and in place that prevent and reduce the impacts of hazards.

7.1 McHenry County, North Dakota, Mitigation Capability Assessment

- Boxes checked with an "X" indicate the presence of the capability.
- Boxes left blank indicate the jurisdiction is lacking the capability.
- Boxes marked with an asterisk (*) indicate a capability that can be obtained through the county, contracted services, or an outside entity.
- Narratives following each table detail the capabilities of McHenry County, North Dakota. The numbering in the tables corresponds to the number in the narrative.

Note: *It should be noted that the mitigation capabilities of McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire are shown in combined tables. This method allows the county and incorporated jurisdictions to compare capabilities to encourage collaborative mitigation efforts.*

Table 7.1.1 shows the administrative and technical capabilities of McHenry County, North Dakota, and The Planning Area. A box marked with an "X" indicates the jurisdiction has or has access to the administrative or technical capability for mitigation. An asterisk (*) denotes an administrative and technical capability that can be obtained through the county for incorporated jurisdictions, or contracted services or an outside entity for the county.

Administration

1. McHenry County, North Dakota, has an active county commission. The cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire have active city councils.
2. McHenry County, North Dakota, has an active Local Emergency Planning Committee (LEPC). The cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire are served by the county LEPC.
3. McHenry County, North Dakota, has an active mitigation planning committee. The cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire are served by this committee through the county LEPC.
4. McHenry County, North Dakota, and incorporated jurisdictions have mutual aid agreements in place. Contact the McHenry County Emergency Management for a full list of MOUs in McHenry County. **The mutual aid agreements between emergency services (ambulance, fire, and law enforcement) should be reviewed/updated on an annual basis. McHenry County has an MOU with Minot Air Force Base.**
5. **McHenry County, North Dakota, has staff capable of mitigation activities. County staff includes the auditor's office, economic development director, emergency management, extension office, tax equalization, public health, recorder's office, and the sheriff's office. The auditors, city council members, and emergency services personnel for incorporated cities are capable of mitigation activities. Additional staff capable of mitigation activities in the cities of Granville, Towner, Upham, and Velva include the public works directors. The superintendents at each public school in the county are also capable of mitigation activities.**

6. McHenry County, North Dakota, does not have a park board. The cities of Anamoose, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, and Velva have park boards. The cities of Balfour, Bergen, and Voltaire do not have park boards.
7. The McHenry County, North Dakota, Commission serves as the planning commission for the county. The city councils for the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire serve as the planning commission.
8. McHenry County, North Dakota, has a zoning administrator. The cities of Anamoose, Deering, Drake, Granville, Karlsruhe, Towner, Upham, and Velva have zoning administrators. The cities of Balfour, Bergen, and Voltaire do not have zoning administrators.
9. The McHenry County, North Dakota, Commission serves as the zoning board for McHenry County. The city councils for the cities of Anamoose, Deering, Drake, Granville, Karlsruhe, Towner, Upham, and Velva serve as the zoning board. The cities of Balfour, Bergen, and Voltaire do not have a zoning board.
10. First District Health Unit, McHenry County, provides public health services to McHenry County and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire.
11. The McHenry County, North Dakota, Water Resource District Board provides services to McHenry County and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire..
12. The McHenry County, North Dakota, Weed Board provides services to McHenry County and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire.

Staff

1. McHenry County, North Dakota, has a part-time 9-1-1 coordinator that serves McHenry County and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire.
2. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire do not have a local chief building inspector. Inspection services are available through the state of North Dakota.
3. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire receive civil engineering services on a contract and/or on an as-needed basis.
4. McHenry County, North Dakota, Planning and Zoning Administrator serves as the community planner for McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire. McHenry County, North Dakota, also has the option to contract with an outside entity for supplemental community planning services.
5. McHenry County, North Dakota, has part-time emergency management. The cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire. receive emergency management services through McHenry County, North Dakota.
6. McHenry County, North Dakota, receives ambulance, fire, hazardous material, and law enforcement from the following entities:

- Ambulance: Bottineau Ambulance Service, Upham Substation; Harvey Ambulance; Rugby Ambulance; Towner Ambulance Service, and Velva Ambulance
- Fire: Deering Fire Department, Drake Fire Department/Fire Protection District, Granville Fire Protection District, Karlsruhe Fire Protection District, Towner Fire Department/Fire Protection District, Upham Fire Protection District, Velva Fire Department/Fire Protection District
- Hazardous Material: Minot Regional Hazardous Material Response Team
- Law Enforcement: McHenry County, North Dakota, Sheriff's Office

7. The McHenry County, North Dakota, Auditor serves as the floodplain administrator for McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire.
8. McHenry County, North Dakota, does not have a geographic information system (GIS) coordinator. The state of North Dakota provides GIS services to McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire.
9. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire have staff with grant writing and administration capability through their respective auditor and/or other city/county staff.
10. McHenry County, North Dakota, has administrative and technical support for public health through First District Health Unit (FDHU), McHenry County. Regional Emergency Preparedness and Response staff and Environmental Health services similar are also available through FDHU.
11. The McHenry County, North Dakota, Road Department serves as the public works department for McHenry County, North Dakota, incorporated jurisdictions. The cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire have their own public works departments, but work closely with McHenry County, North Dakota Road Department.
12. The McHenry County, North Dakota, Sheriff's Office provides law enforcement to the county and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire.

Technical

1. The McHenry County, North Dakota, Sheriff's office has GIS/GPS capabilities. **Emergency services in McHenry County, North Dakota, and incorporated jurisdictions have GIS/GPS capabilities through the Computer Aided Dispatch (CAD) system administered through state radio. Emergency services personnel use app-based services on their mobile devices.**
2. McHenry County, North Dakota, and the cities of Anamoose, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, and Velva have manually-activated emergency sirens as the manual option is available on existing sirens in the county.
3. The manually-activated sirens in McHenry County, North Dakota, at the cities of Anamoose, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, and Velva have manually-activated emergency sirens are also activated by portable or mobile radios.
4. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire do not have fire breaks.
5. McHenry County, North Dakota, has manual fire index signs located in the city of Anamoose on Main St. adjacent to the fire hall, the city of Granville on Main Avenue across from the fire hall, the

city of Upham at J. Clark Salyer Refuge Headquarters, and the city of Velva at the Velva Golf Course.

6. The ISO ratings for fire departments in McHenry County, North Dakota, are shown in Table 7.1.1.
7. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire do not have Firewise Certification.
8. McHenry County, North Dakota, and incorporated jurisdictions have the following permanent generators:
   - City of Anamoose: Anamoose Public School, fire hall, and North Prairie Rural Water District operations building.
   - City of Velva: Souris Valley Care Center
9. McHenry County, North Dakota, and incorporated jurisdictions have the following portable generators:
   - Granville Fire Dept: Two (2) portable generators
10. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire conduct infrastructure maintenance does not have HAZUS Analysis.
11. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire conduct infrastructure maintenance programs on an as-needed basis.
12. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire.
13. have street signs for navigation by emergency services.
14. McHenry County, North Dakota, Emergency Management receives hazard data from the McHenry County Sheriff's Office, North Dakota State Radio, incorporated cities, and volunteer emergency services.
15. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire have StormReady Certification as of October 2023.
16. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire utilize the state Everbridge system for early warning systems/services

Table 7.1.1 – McHenry County, North Dakota, Administrative and Technical Capabilities

Administrative and Technical Mitigation Capability		McHenry County	City of Anamoose	City of Balfour	City of Bergen	City of Deering	City of Drake	City of Granville	City of Karlsruhe	City of Kief	City of Towner	City of Upham	City of Velva	City of Voltaire
Administration														
1	County/City Council or Commission	X	X	X	X	X	X	X	X	X	X	X	X	X
2	Local Emergency Planning Committee	X	*	*	*	*	*	*	*	*	X	*	*	*
3	Mitigation Planning Committee	X	*	*	*	*	*	*	*	*	X	*	*	*
4	Mutual Aid Agreements	X	*	*	*	*	*	*	*	*	X	*	*	*
5	Other Staff for Administration	X	*	*	*	*	*	*	*	*	X	*	*	*
6	Park Board	X	X			X	X	X	X	X	X	X	X	
7	Planning Commission	X	*	*	*	*	*	*	*	*	*	*	X	*
8	Planning and Zoning Administrator	X	X			X	X	X	X	X	X	X	X	
9	Planning and Zoning Board	X	X			X	X	X	X	X	X	X	X	
10	Public Health Board	X	*	*	*	*	*	*	*	*	*	*	*	*
11	Water Resource Board	X	*	*	*	*	*	*	*	*	*	*	*	*
12	Weed Board	X	*	*	*	*	*	*	*	*	*	*	*	*
Staff														
1	911 Coordinator/Director and User Board	X	*	*	*	*	*	*	*	*	X	*	*	*
2	Chief Building Official/Inspector/Board	*	*	*	*	*	*	*	*	*	*	*	*	*
3	Civil Engineer	*	*	*	*	*	*	*	*	*	*	*	*	*
4	Community Planner/Planning Services	X	*	*	*	*	*	*	*	*	*	*	*	*
5	Emergency Management	X	*	*	*	*	*	*	*	*	*	*	*	*
6	Emergency Services (ambulance, police, fire)	X	X*	*	*	X*	X*	X*	X*	*	X*	X*	X*	*
7	Floodplain Administrator	X	*	*	*	*	*	*	*	*	*	*	*	*
8	GIS Coordinator	X	*	*	*	*	*	*	*	*	*	*	*	*
9	Grant Writing Staff	X	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*

*Denotes administrative and technical capability that can be obtained through the county, contracted services, or an outside entity.

Table 7.11 – McHenry County, North Dakota, Administrative and Technical Capabilities – Continued

	Administrative and Technical Mitigation Capability	McHenry County	City of Anamoose	City of Balfour	City of Bergen	City of Deering	City of Drake	City of Granville	City of Karlsruhe	City of Kief	City of Towner	City of Upham	City of Velva	City of Voltaire
Staff														
10	Public Health	X	*	*	*	*	*	*	*	*	*	*	*	*
11	Public Works and/or Highway Department	X	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*
12	Sheriff	X	*	*	*	*	*	*	*	*	*	*	*	*
Technical														
1	Emergency Services GIS/GPS capable	X	X	*	*	X	X	X	X	X	X	X	X	*
2	Emergency Siren (manually-activated)	X	1			1	1	1	1	1	1	1	3	
3	Emergency Siren (radio-activated)	X	1			1	1	1	1	1	1	1	3	
4	Fire Break													
5	Fire Index Sign	X	X					X				X	X	
6	Fire ISO Rating													
7	Firewise Certification													
8	Generator (permanent)		3										X	
9	Generator (portable)							2						
10	HAZUS Analysis													
11	Infrastructure Maintenance Programs	X	X	X	X	X	X	X	X	X	X	X	X	X
12	Navigation Signs for Emergency Services	X	X	X	X	X	X	X	X	X	X	X	X	X
13	Reporting of Data to Emergency Manager	X	X	X	X	X	X	X	X	X	X	X	X	X
14	StormReady Certification	X	*	*	*	*	*	*	*	*	X	*	*	*
15	Warning Systems/Services	X	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*

*Denotes administrative and technical capability that can be obtained through the county, contracted services, or an outside entity.

Education and Outreach

Table 7.1.2 shows the education and outreach capabilities of McHenry County, North Dakota, and The Planning Area. A box marked with an "X" indicates the jurisdiction has or has access to the education and outreach capability for mitigation. An asterisk (*) denotes an education and outreach capability that can be obtained through the county for incorporated jurisdictions, or contracted services or an outside entity for the county.

1. McHenry County, North Dakota, and incorporated jurisdictions have events where education and outreach are conducted. These events include but are not limited to school reunions, the 4th of July parade in the city of Towner, the city of Drake annual threshing show, Drake Fire Department Valentine's Day Dance and annual 'Meet the First Responders' event, the Velva Fire Department's annual 'Meet the First Responders' in the city park, and the Upham Fire Department's pancake breakfast fundraiser and an annual poker tournament. First District Health Unit, McHenry County also conducts events where education and outreach are conducted. McHenry County, North Dakota, does not have a county fair.
2. McHenry County, North Dakota, has a part-time emergency manager that conducts education and outreach with county officials, volunteer emergency services and the public, and training and exercises with volunteer emergency services. The county also participates in the statewide annual tornado drill, severe winter weather awareness week, and severe summer weather awareness week.
3. The McHenry County Sheriff's Office, McHenry County Road Department, Anamoose Fire Protection District, Drake Fire Department/Fire Protection District, Deering Fire Protection District, Granville Fire Department, Karlsruhe Fire Protection District, Towner Fire Department/Fire Protection District, Towner Fire Department/Fire Protection District, Upham Fire Protection District, and Velva Fire Department/Fire Protection District provide education and outreach to residents of McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire.
4. Non-profit organizations and citizen groups in McHenry County, North Dakota, providing education and outreach include, but are not limited to auxiliaries, church groups, Boy Scouts, Girl Scouts and 4-H.The Towner Community Club is a 5019(c)3 that working on community projects throughout the city of Towner.
5. No other entities providing education and outreach in McHenry County, North Dakota, were identified.
6. BNSF Railroad, CP Railway, Enerbase, North 14 Agronomy, CP Industries, ADM, DMG, Dakota Agronomy, Arthur Companies, Enbridge Pipeline Alliance Pipeline, and private elevators provide education and outreach in McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire.
7. The McHenry County, North Dakota, Local Emergency Planning Committee (LEPC) is a public-private partnership providing education and outreach to residents of McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire.
8. Fire Prevention Week and D.A.R.E. are school programs providing education and outreach to public schools by fire departments and the sheriff's office in McHenry County, North Dakota. Public schools also educate public school children through various safety programs such as handwashing with the assistance of First District Health Unit, McHenry County.

9. McHenry County, North Dakota, Emergency Management maintains a Facebook page with natural hazard and man-made threat education and outreach. The following Facebook pages exist in McHenry County: Drake-Anamoose Public School, TGU Public Schools, Towner; TGU Public School, Granville, City of Towner; City of Granville; City of Upham; McHenry County Sheriff's Office, Velva Ambulance and Fire; Anamoose Fire Dept., Drake Fire Dept., Upham Fire Dept., Souris Valley Care Center, NDSU Extension/McHenry County. The Drake-Anamoose Public School, Velva Public School, Souris Valley Care Center, and the City of Velva have apps.
10. McHenry County, North Dakota, and the cities of Deering, Granville, Towner, and Velva have websites with natura hazard and man-made threat education and outreach. The cities of Balfour, Bergen, Karlsruhe, Kief, and Voltaire do not have websites. The Anamoose-Drake Public School; Drake-Anamoose Public School; TGU Public School, Granville; TGU Public School, Towner; and Velva Public School have websites that can be used for education and outreach of natural hazards and man-made threats.

Table 7.1.2 – McHenry County, North Dakota, Education and Outreach Capabilities

	Education and Outreach Mitigation Capability	McHenry County	City of Anamoose	City of Balfour	City of Bergen	City of Deering	City of Drake	City of Granville	City of Karlsruhe	City of Kief	City of Towner	City of Upham	City of Velva	City of Voltaire
1	County/City Events or Gatherings	X	*	*	*	*	X	X	*	*	X	X	X	*
2	County Emergency Management	X	*	*	*	*	*	*	*	*	*	*	*	*
3	Entities Providing Public Education	X	X	*	*	X	X	X	*	*	X	X	X	*
4	Non-Profit Organizations/Citizen Groups	X	*	*	*	*	*	*	*	*	*	*	*	*
5	Other													
6	Private Entities	*	*	*	*	*	*	*	*	*	*	*	*	*
7	Public-Private Partnerships	X	*	*	*	*	*	*	*	*	*	*	*	*
8	School Programs	X	X	*	*	*	X	X	*	*	X	X	X	*
9	Social Media Applications and Websites	X	X	*	*	X	X	X	*	*	X	X	X	*
10	Website with Natural Hazard and Man-Made Threat Education & Outreach	X	X	*	*	X	X	X	*	*	X	*	X	*

*Denotes education and outreach mitigation capability available to the jurisdiction through the county, contracted services, or an outside entity.

Financial

1. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire have the authority to levy taxes for specific purposes.
2. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire have building permits and zoning permits.
3. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire do not have written capital improvement plans or existing funds.
4. The Community Development Block Grant (CDBG) has been used for funding various projects in McHenry County, North Dakota. Contact Souris Basin Planning Council for more information – 701-255-1982.
5. The city of Anamoose has a community endowment fund. McHenry County, North Dakota, and the cities of Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire do not have community endowment funds.
6. All Seasons Water Users District and North Prairie Regional Water District provide drinking/potable water to residents of rural McHenry County, North Dakota, and the cities of Anamoose, Balfour, Deering, Drake and remaining incorporated jurisdictions and charge drinking/potable water utility fees. The cities of Drake, Deering, Granville, Towner, Upham, and Velva have their own municipal wells and drinking/potable water systems and charge drinking/potable water utility fees. The cities of Bergen and Voltaire utilize individual wells and therefore do not have water utility fees.
7. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire pay electric utility fees to their electricity provider.
8. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire qualify for grant funding through FEMA because McHenry County, North Dakota, has an approved multi-hazard mitigation plan.
9. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire can utilize general obligation bonds and special tax bonds, if warranted.
10. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire do not have impact fees for new and future development.
11. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, do not have any “Other” financial mitigation capabilities such as a road district, street maintenance or wheel tax.
12. No private entities or activities were identified.
13. Property taxes are the primary source of revenue for McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire.
14. McHenry County, North Dakota, and the cities of Anamoose, Deering, Drake, Granville, Karlsruhe, Towner, Upham, and Velva charge sanitary sewer utility fees. The cities of Balfour, Bergen, Kief,

and Voltaire utilize septic systems for sanitary sewer service and therefore do not have sanitary sewer utility fees.

15. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire are eligible to apply for and receive funding from various programs from the state of North Dakota.
16. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire do not have storm water utility fees.
17. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire do not have a street maintenance fee.

In addition to the financial capabilities of McHenry County, North Dakota, and The Planning Area in Table 7.1.3, the following local, regional, state and federal entities can be used to obtain funding for mitigation.

- Ambulance Districts;
- Electric Cooperatives;
- Extension Service;
- Federal Emergency Management Agency (FEMA);
- Fire Districts;
- N.D. Dept. of Public Health;
- N.D. Dept. of Emergency Services;
- Park Districts;
- School Districts;
- Townships, and
- Utility providers.

Table 7.1.3 – McHenry County, North Dakota, Financial Capabilities

	Financial Mitigation Capability	McHenry County	City of Anamoose	City of Balfour	City of Bergen	City of Deering	City of Drake	City of Granville	City of Karlsruhe	City of Kief	City of Towner	City of Upham	City of Velva	City of Voltaire
1	Authority to Levy Taxes for Specific Purposes (sales tax or special assessments)	X	X	X	X	X	X	X	X	X	X	X	X	X
2	Building Permits/Zoning Permits	X	X	X	X	X	X	X	X	X	X	X	X	X
3	Capital Improvements Fund/Plan													
4	Community Development Block Grant (CDBG)													
5	Community Endowment Fund		X											
6	Drinking/Potable Water Utility Fee	X	*			*	X	X	X	*	X	X	X	
7	Electric Utility Fee	X	X	X	X	X	X	X	X	X	X	X	X	X
8	Federal Emergency Management (FEMA) Funding/Grant Programs	X	X	X	X	X	X	X	X	X	X	X	X	X
9	General Obligation Bond/Special Tax Bond	X	X	X	X	X	X	X	X	X	X	X	X	X
10	Grant Programs (Other)	X	X	X	X	X	X	X	X	X	X	X	X	X
11	Impact Fees for New and Future Development													
12	Other													
13	Private Entities or Activities													
14	Property Tax	X	X	X	X	X	X	X	X	X	X	X	X	X
15	Sanitary Sewer Utility Fee		X			X	X	X			X	X	X	
16	State Funding Programs	X	X	X	X	X	X	X	X	X	X	X	X	X
17	Storm Water Utility Fee													
18	Street Maintenance Fee													

*Denotes financial mitigation capability obtained through the county, contracted services, or an outside entity.

Table 7.1.4 shows the planning and regulatory capabilities of McHenry County, North Dakota, and The Planning Area. Boxes marked with an "X" indicate the jurisdiction has the planning and regulatory capability. An asterisk (*) indicates a capability that can be obtained through the county, contracted services, or an outside entity.

Planning and Regulatory

1. McHenry County, North Dakota, and the cities of Anamoose, Deering, Drake, Granville, Karlsruhe, Towner, Upham, and Velva have abandoned building nuisance ordinances. The cities of Balfour, Bergen, Kief, and Voltaire do not have abandoned building nuisance ordinances.
2. McHenry County, North Dakota, does not have building codes but is in the process of developing and implementing building codes. As of January 1, 2023, incorporated jurisdictions in McHenry County, North Dakota, follow the state building codes. The State of North Dakota updates its building codes every two years. Effective January 1, 2023, the North Dakota State Building Code consists of the 2021 International Building Code (IBC), International Residential Code (IRC), International Mechanical Code (IMC), International Fuel Gas Code (IFGC), International Energy Conservation Code, and the International Existing Building Code as published by the International Code Council (ICC).
3. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire have building permits and zoning permits.
4. The McHenry County, North Dakota, Commission, and the emergency management department work together and issue burn restrictions annually. The cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire follow the county burn restrictions.
5. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire do not have written capital improvement plans or existing funds.
6. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire do not have a local chief building inspector. Inspection services are available through the state of North Dakota.
7. McHenry County, North Dakota, as a commercial animal feed operation ordinance CAFO. The plan includes the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire.
8. McHenry County, North Dakota, has a community wildfire protection plan. The plan includes the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire.
9. McHenry County, North Dakota, has a comprehensive plan.
10. McHenry County, North Dakota, has a continuity of operations plan in its local emergency operations plan that also applies to the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire. However, it is not a written document.
11. McHenry County, North Dakota, has a security handbook/plan for its courthouse in the city of Towner, North Dakota, the county seat. The handbook/plan includes the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire.

12. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire. do not have crew camp ordinances.
13. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire do not have a drought management plan.
14. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire have easements for flowage and drainage of water.
15. McHenry County, North Dakota, has an economic development board that maintains an economic development plan that covers the entire county. The city of Anamoose has a jobs development authority has a plan that serves has an economic development strategy, but not an official plan.
16. McHenry County, North Dakota, is included in the emergency action plans for the Eaton Dam impedes the flow of the Souris (Mouse) River, Velva Levee, J. Clark Salyer National Wildlife Refuge has five main dikes with water control structures.
17. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire are included in the state of North Dakota's emergency operations plan.
18. McHenry County, North Dakota, has an evacuation and shelter plan through its emergency management office. The plan includes the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire
19. McHenry County, North Dakota, and has Digital Flood Insurance Rate Maps (DFIRMs) through the Federal Emergency Management Agency (FEMA) with assistance of the N.D. Dept. of Emergency Servies (NDDES). These maps apply to incorporated jurisdictions in McHenry County, North Dakota, where necessary.
20. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire do not have a flood insurance study.
21. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire have a flood operations/management plan as part of the McHenry County, North Dakota, Local Emergency Operations Plan.
22. McHenry County, North Dakota, and the cities of Anamoose, Drake, Karlsruhe, Towner, Upham, and Velva, and the townships of Deep River, Lebanon, Newport, Velva, Villard, Willow Creek have flood ordinances.
23. McHenry County, North Dakota, and the cities of Anamoose, Drake, Karlsruhe, Towner, Upham, and Velva, and the townships of Deep River, Lebanon, Newport, Velva, Villard, Willow Creek have a flood risk management feasibility study.
24. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire do not have grain bin ordinances.
25. McHenry County, North Dakota, has a multi-jurisdictional multi-hazard mitigation plan. The plan includes the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire.
26. McHenry County, North Dakota, has a hazardous materials flow study through the N.D. Dept. of Emergency Services.

27. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire are included in this plan do not have impact fees for new and future development.
28. McHenry County, North Dakota, has a land use plan in its comprehensive plan. The cities of Anamoose, Bergen, are included in the county's comprehensive plan and do not have a land use plan.
29. McHenry County, North Dakota, has a local emergency operations plan (LEOP). The plan applies to Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire.
30. **McHenry County, North Dakota, is enrolled and participates in the National Flood Insurance Program (NFIP). The cities of Anamoose, Drake, Karlsruhe, Towner, Upham, and Velva, and the townships of Deep River, Lebanon, Newport, Velva, Villard, Willow Creek are enrolled and participate in the NFIP.**
31. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva do not have a noise control ordinance.
32. McHenry County, North Dakota, has a pandemic influenza response plan through First District Health Unit, McHenry County. The cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire are included in this plan.
33. The McHenry County, North Dakota, Commission serves as the planning commission for the county. The city councils for the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire serve as the respective planning commission.
34. McHenry County, North Dakota, has a point of dispensing plan through First District Health Unit, McHenry County. The cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire are included in this plan.
35. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire do not have a rural development guide.
36. McHenry County, North Dakota, has a shelter and mass care plan through McHenry County Emergency Management. The cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire are included in this plan.
37. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire do not have site plan review requirements.
38. **McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire do not have written storm water management plans.**
39. McHenry County, North Dakota, does not have a written strategic plan. The city of Anamoose has a written strategic plan through its jobs development authority (JDA).
40. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire do not have subdivision ordinances.
41. McHenry County, North Dakota, and the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire do not have a transportation plan. However, the county and cities are included in the state transportation plan.
42. North Prairie Regional Water Restrict has a water conservation plan that includes rural areas of McHenry County, North Dakota, and the cities of Anamoose, Balfour, Deering, Kief

43. The cities of Deering, Drake, Granville, Towner, and Velva have zoning independent from McHenry County, North Dakota.
44.
45. The cities of Anamoose, Balfour, Bergen, Karlsruhe, Kief, do not have zoning.

Table 7.1.4 – McHenry County, North Dakota, Planning and Regulatory Capabilities

	Planning and Regulatory Mitigation Capability	McHenry County	City of Anamoose	City of Balfour	City of Bergen	City of Deering	City of Drake	City of Granville	City of Karlsruhe	City of Kief	City of Towner	City of Upham	City of Velva	City of Voltaire
1	Abandoned Building/Nuisance Ordinance													
2	Building Codes													
3	Building Permits/Zoning Permits	X	X	X	X	X	X	X	X	X	X	X	X	X
4	Burn Restrictions (Bans)	X	*	*	*	*	*	*	*	*	*	*	*	*
5	Capital Improvement Fund/Plan													
6	Chief Building Official/Inspector/Board	*	*	*	*	*	*	*	*	*	*	*	*	*
7	Community Animal Feed Operation (CAFO) Ordinance	X	*	*	*	*	*	*	*	*	*	*	*	*
8	Community Wildfire Protection Plan	X	*	*	*	*	*	*	*	*	*	*	*	*
9	Comprehensive Plan	X	*	*	*	*	*	*	*	*	*	*	*	*
10	Continuity of Operations Plan in LEOP													
11	Courthouse Security Handbook	X	*	*	*	*	*	*	*	*	*	*	*	*
12	Crew Camp Ordinance	X	*	*	*	*	*	*	*	*	*	*	*	*
13	Drought Management Plan													
14	Easements	X	X	X	X	X	X	X	X	X	X	X	X	X
15	Economic Development Plan		X											
16	Emergency Action Plan (Dams)	*											*	
17	Emergency Operations Plan (State)	*	*	*	*	*	*	*	*	*	*	*	*	*
18	Evacuation and Shelter Plan	X	*	*	*	*	*	*	*	*	*	*	*	*
19	FEMA Flood Map	*	*	*	*	*	*	*	*	*	*	*	*	*
20	Flood Insurance Study													
21	Flood Operations/Management Plan	X	*	*	*	*	*	*	*	*	*	*	*	*
22	Flood Ordinance	X	X				X		X		X	X	X	

*Denotes planning and regulatory mitigation capability obtained through the county, contracted services, or an outside entity.

^ Denotes planning and regulatory mitigation capability in progress.

Table 7.1.4 – McHenry County, North Dakota, Planning and Regulatory Capabilities – Continued

	Planning and Regulatory Mitigation Capability	McHenry County	City of Anamoose	City of Balfour	City of Bergen	City of Deering	City of Drake	City of Granville	City of Karlsruhe	City of Kief	City of Towner	City of Upham	City of Velva	City of Voltaire
23	Flood Risk Management Feasibility Study													
24	Grain Bin Ordinance													
25	Hazard Mitigation Plan	X	*	*	*	*	*	*	*	*	*	*	*	*
26	Hazardous Material Flow Study	*	*	*	*	*	*	*	*	*	*	*	*	*
27	Impact Fees													
28	Land Use Plan	X	*	*	*	*	*	*	*	*	*	*	*	*
29	Local Emergency Operations Plan (LEOP)	X	*	*	*	*	*	*	*	*	*	*	*	*
30	National Flood Insurance Program (NFIP)	X	X				X		X		X			
31	Noise Control Ordinance													
32	Pandemic Influenza Response Plan	X*	*	*	*	*	*	*	*	*	*	*	*	*
33	Planning Commission	X	X	X	X	X	X	X	X	X	X	X	X	X
34	Point of Dispensing (POD) Plan	X*	*	*	*	*	*	*	*	*	*	*	*	*
35	Rural Development Guide													
36	Shelter and Mass Care Plan	X	*	*	*	*	*	*	*	*	*	*	*	*
37	Site Plan Review Requirements													
38	Storm Water Management Plan													
39	Strategic Plan		X											
40	Subdivision Ordinance													
41	Transportation Plan	*	*	*	*	*	*	*	*	*	*	*	*	*
42	Water Conservation Plan	*	*	*	*	*	*	*	*	*	*	*	*	*
43	Zoning	X	*	*	*	X	X	X		*	X	*	X	*

*Denotes planning and regulatory mitigation capability obtained through the county, contracted services, or an outside entity.

^ Denotes planning and regulatory mitigation capability in progress.

Supplemental Planning and Regulatory Capabilities

Strategic plans for jurisdictions aside from incorporated cities such as townships can be used for mitigation purposes. In addition to strategic plans, townships that have zoning in place, including a zoning commission and a zoning administrator, can use zoning for mitigation purposes. In McHenry County, North Dakota, all townships have relinquished zoning authority to McHenry County.

Integration of Mitigation Plan into Planning Mechanisms

To integrate the requirements of the mitigation plan into jurisdiction-specific planning mechanisms, such as comprehensive or capital improvement plans, incorporated cities will need to identify their current planning mechanisms, which elements of the mitigation plan to incorporate, and the method for doing so. The tables shown above in this chapter identify the current planning mechanisms for McHenry County, North Dakota, and incorporated jurisdictions. Details regarding these planning mechanisms are discussed for the counties in this chapter, but are shown in Chapter 8, Jurisdictions.

The jurisdiction profiles in Chapter 8 will also supplement existing jurisdiction-specific plans for incorporated jurisdictions in McHenry County, North Dakota. The cities have and will continue to participate in county-wide planning initiatives such as the local emergency operations plan by providing risk assessment data or consider mitigation plan goals and mitigation strategies when updating zoning or implementing subdivision ordinances. Current planning mechanisms, the mitigation plan elements incorporated and the method for incorporation are discussed after each mitigation project in Chapter 6, Mitigation Strategy and Chapter 8, Jurisdictions.

- The city of Anamoose, North Dakota, is pursuing advanced assistance/project scoping for retrofitting/upgrading of its wastewater lagoon system. The auditor and city council members attended meetings during the planning process and learned of funding opportunities through FEMA if a catastrophic failure was professionally modeled.

- McHenry County, North Dakota, the cities of the cities of Anamoose, Drake, Karlsruhe, Towner, Upham, and Velva, and the townships of Deep River, Lebanon, Newport, Velva, Villard, Willow Creek used information in the multi-jurisdictional multi-hazard mitigation plan to update their flood ordinances.

- The cities of Deering and Karlsruhe Townships are incorporating information from the multi-hazard mitigation plan into their efforts to enroll in the National Flood Insurance Program (NFIP).

- The McHenry County, North Dakota, Water Resource District Board integrated the multi-hazard mitigation plan into its capital improvement plan/projects list to address changes in priorities with the Velva Levee and the fie dikes with water control structures in J. Clark Salyer Nation Wildlife Refuge.

Table 7.1.5 on the following page illustrates the utilization of planning mechanisms in McHenry County by natural hazard and/or man-made threat and projects addressed.

Table 7.1.5 – Utilization of Planning Mechanisms in McHenry County, North Dakota

Planning Mechanism	Civil Disturbance	Criminal, Terrorist, or Nation-State Attack	Cyberattack	Dam Failure	Drought	Fire: Urban/ Structure	Fire: Wildland/Rural	Flood	Geologic Hazards	HAZMAT	Infectious Disease & Pest Infestations	Severe Summer Weather	Severe Winter Weather	Space Weather	Transportation Incident	Projects Addressed
Abandoned Bldg./Nuisance Ord.	X	X	X	X	X	X	X	X		X	X	X	X		X	PR-2
Building Codes	X	X	X		X	X	X	X	X	X	X	X	X			AT-1, AT-2, PR2
Building Permits	X	X	X	X	X	X	X	X	X	X	X	X	X			AT-1, PR-2,
Burn Bans	X	X			X		X		X	X		X			X	AT-1
Capital Improvement Fund/Plan	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	PR-2, I-1, I-2
Chief Building Official/Inspector/Board				X	X	X	X	X	X	X	X	X	X			AT-1, AT-2
Commercial Animal Feed Operation (CAFO) Ordinance	X	X			X	X		X		X	X	X	X			PR-2
Community Wildfire Prot. Plan	X	X			X		X		X			X				PR-2
Comprehensive Plan	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	PR-2, I-1, I-2
Continuity of Operations Plan	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	PR-2
Crew Camp Ordinance					X	X	X	X		X	X	X	X		X	PR-2
Drought Management Plan					X	X	X			X		X				EO-3, PR-2
Easements				X	X	X	X	X		X	X	X	X		X	AT-1, PR-2
Economic Development Plan				X	X	X	X	X		X	X	X	X		X	PR-2
Emergency Action Plans (Dam)		X		X	X	X	X	X	X	X	X	X	X		X	I-1
Emergency Operations Plan (State)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	All PR projects
Evacuation and Shelter Plan				X	X	X	X	X		X	X	X	X		X	PR-2
FEMA Flood Map								X				X	X			PR-3, PR-4
Flood Insurance Study								X				X	X			PR-2, PR-3, PR-4
Flood Ops./Management Plan				X				X				X	X			PR-2, PR-3, PR-4

Table 7.1.5 – Utilization of Planning Mechanisms in McHenry County, North Dakota – Continued

Planning Mechanism	Civil Disturbance	Criminal, Terrorist, or Nation-State Attack	Cyberattack	Dam Failure	Drought	Fire: Urban/ Structure	Fire: Wildland/Rural	Flood	Geologic Hazards	HAZMAT	Infectious Disease & Pest Infestations	Severe Summer Weather	Severe Winter Weather	Space Weather	Transportation	Projects Addressed
Flood Ordinance								X				X	X			PR-2, PR-3, PR-4
Flood Risk Mgmt. Feasibility Study				X				X				X	X			PR-2, PR-3, PR-4
Grain Bin Ordinance	X	X	X	X	X	X	X	X		X	X	X	X		X	AT-1, PR-2
Hazard Mitigation Plan	X	X	X	X	X	X	X	X		X	X	X	X		X	PR-1
Hazardous Material Flow Study	X	X	X				X	X		X		X	X		X	PR-2
Impact Fees	X	X	X	X	X	X	X	X		X	X	X	X		X	F-1
Land Use Plan	X	X	X	X	X	X	X	X		X	X	X	X		X	PR-2
Local Emergency Ops. Plan	X	X	X	X	X	X	X	X		X	X	X	X		X	EO-4, PR-2, I-2
National Flood Insurance Program (NFIP)								X				X	X			PR-3, PR-4
Noise Control Ordinance						X				X		X	X		X	AT-1, PR-2
Pandemic Influenza Resp. Plan											X		X			EO-2, PR-2
Planning Commission	X	X	X	X	X	X	X	X		X	X	X	X		X	AT-1
Point of Dispensing (POD) Plan					X	X		X			X	X	X		X	EO-2, PR-2
Rural Development Guide	X	X		X	X	X	X	X	X	X	X	X	X		X	
Shelter and Mass Care Plan	X	X	X	X	X	X	X	X		X	X	X	X		X	EO-2, PR-2
Site Plan Review Requirements	X	X	X	X	X	X	X	X		X	X	X	X		X	AT-1, PR-2
Storm Water Management Plan								X				X	X			AT-8, PR-2
Strategic Plan	X	X	X	X	X	X	X	X		X	X	X	X		X	PR-2
Subdivision Ordinance						X	X	X		X	X	X	X		X	AT-1, PR-2
Transportation Plan	X	X	X			X		X		X		X	X		X	PR-2
Water Conservation Plan	X	X	X		X	X	X					X	X			PR-2
Zoning	X	X	X	X	X	X	X	X		X	X	X	X		X	PR-2

7.2 Mitigation Funding Sources

Funding sources from mitigation can come from a variety of resources. The following funding sources for the Federal Emergency Management Agency (FEMA) and other outlets are outlined below. These sources can fund and administer mitigation projects in addition to the local capabilities of the county and city jurisdictions. In addition to the financial capabilities of Pierce County, North Dakota, the following local, regional, state, and federal entities can be used to obtain funding for mitigation.

- Ambulance Districts;
- Electric Cooperatives;
- Extension Service;
- Federal Emergency Management Agency (FEMA);
- Fire Districts;
- N.D. Dept. of Public Health;
- N.D. Dept. of Emergency Services;
- Park Districts;
- School Districts;
- Townships, and
- Utility providers.

FEMA Funding Sources

Building Resilient Infrastructure and Communities (BRIC) Grant Program. The BRIC program, Formerly Pre-Disaster Mitigation (PDM) Grant Program), is an annually funded, nationwide, competitive grant program. No disaster declaration is required. Federal funds will cover 75 percent of a project's cost up to $3 million. As with the HMGP and FMA, a FEMA-approved local Hazard Mitigation Plan is required to be approved for funding under the BRIC program.

BRIC supports states, local communities, tribes, and territories as they undertake hazard mitigation projects, reducing the risks they face from disasters and natural hazards. BRIC funds are distributed from FEMA to the state. For more information, visit https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities

Hazard Mitigation Grant Program (HMGP). The HMGP is a post-disaster mitigation program. It is made available to states by FEMA after each Federal disaster declaration. The HMGP can provide up to 75 percent funding for hazard mitigation measures. The HMGP can be used to fund cost-effective projects that will protect public or private property in an area covered by a federal disaster declaration or that will reduce the likely damage from future disasters. Examples of projects include acquisition and demolition of structures in hazard prone areas, flood-proofing, or elevation upgrades to reduce future damage, minor structural improvements, and development of state or local standards. Projects must fit into an overall mitigation strategy for the area identified as part of a local planning effort. All applicants must have a FEMA-approved Multi-Jurisdictional Multi-Hazard Mitigation Plan (this plan).

Applicants who are eligible for the HMGP are state and local governments, certain nonprofit organizations or institutions that perform essential government services, and Indian tribes and authorized tribal organizations. Individuals or homeowners cannot apply directly for the HMGP; a local government must apply on their behalf.

Flood Mitigation Assistance (FMA) Program. The FMA combines the previous Repetitive Flood Claims and Severe Repetitive Loss Grants into one grant program. FMA provides funding to assist states and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the National Flood Insurance Program (NFIP). The FMA is funded annually; no federal disaster declaration is required. Only NFIP insured homes and businesses are eligible for mitigation in this program. Funding for FMA is very limited and, as with the HMGP, individuals cannot apply directly for the program. Applications must come from local governments or other eligible organizations. The federal cost share for an FMA project is 75 percent. At least 25 percent of the total eligible costs must be provided by a non-federal source. Of this 25 percent, no more than half can be provided as in-kind contributions from third parties. At minimum, a FEMA-approved local flood mitigation plan is required before a project can be approved. FMA funds are distributed from FEMA to the state.

Readiness, Response and Recovery Directorate, Fire Management Assistance Grant Program. This program provides grants to states, tribal governments and local governments for the mitigation, management and control of any fire burning on publicly (non-federal) or privately-owned forest or grassland that threatens such destruction as would constitute a major disaster. The grants are made in the form of cost sharing with the federal share being 75 percent of total eligible costs. Grant approvals are made within 1 to 72 hours from time of request.

Fire Prevention and Safety Grants. The Fire Prevention and Safety Grants (FP&S) are part of the Assistance to Firefighters Grants and are administered by FEMA. FP&S Grants support projects that enhance the safety of the public and firefighters from fire and related hazards. The primary goal is to target high-risk populations and reduce injury and prevent death. Eligibility includes fire departments, national, regional, state, and local organizations, Native American tribal organizations, and/or community organizations recognized for their experience and expertise in fire prevention and safety programs and activities. Private non-profit and public organizations are also eligible. Interested applicants are advised to check the website periodically for announcements of grant availability. More information: https://www.fema.gov/welcome-assistance-firefighters-grant-program

Other Mitigation Funding Sources

Grant funding is available from a variety of federal and state agencies for training, equipment, and hazard mitigation activities. Several of these programs are described below.

Building Blocks for Sustainable Communities. The EPA Office of Sustainable Communities sometimes offers grants to support activities that improve the quality of development and protect human health and the environment. When these grants are offered, they will always be announced on www.grants.gov

Community Development Block Grants (CDBG). The U.S. Dept. of Commerce administers the Community Development Block Grants (CDBG) program which are intended to provide low and moderate-income households with viable communities, including decent housing, as suitable living environment, and expanded economic opportunities. Eligible activities include community facilities and improvements, road and infrastructure, housing rehabilitation and preservation, development activities, public services, economic development, planning, and administration. Public improvements may include flood and drainage improvements. In limited instances, and during the times of "urgent need" (e.g., post disaster) as defined by the CDBG National Objectives, CDBG funding may be used to acquire a property

located in a floodplain that was severely damaged by a recent flood, demolish a structure severely damaged by an earthquake, or repair a public facility severely damaged by a hazard event. CDBG funds can be used to match FEMA grants. For more information, visit https://www.hud.gov/program_offices/comm_planning/CDBG

General Services Administration, Sale of Federal Surplus Persona Property. This program sells property no longer needed by the federal government. The program provides individuals, businesses, and organizations the opportunity to enter competitive bids for the purchase of a wide variety of personal property and equipment. Normally, there are no restrictions on property purchase. For more information, visit http://www.gsa.gov/portal/category/21045

Hazardous Materials Emergency Preparedness Grant (HMEP). The HMEP Grant funds are passed through to local emergency management offices and HAZMAT teams having functional and active LEPC groups. For more information, visit http://www.phmsa.dot.gov/hazmat/grants

National Oceanic and Atmospheric Administration (NOAA) Office of Education Grants. The Office of Education supports formal, informal, and non-formal education projects and programs through competitively awarded grants and cooperative agreements to a variety of education institutions and organizations in the United States. For more information, visit http://www.noaa.gov/office-education.grants

Natural Resources Conservation Service (NRCS) Environmental Quality Incentives Program (EQIP). The Environmental Quality Incentives, administered through the NRCS, is a cost-share program that provides financial and technical assistance to agricultural producers to plan and implement conservation practices that improve soil, water, plant, animal, air and related natural resources on agricultural land and non-industrial private forestland. Owners of land in agricultural or forest production or persons who are engaged in livestock, agricultural or forest production on eligible land and that have a natural resource concern on that land may apply to participate in EQIP. Eligible land includes cropland, rangeland, pastureland, non-industrial private forestland and other farm or ranch lands. EQIP is another funding mechanism for landowner fuel reduction projects. For more information, visit https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/eqip/

Program 15.228: Wildland Urban Interface Community and Rural Fire Assistance. This program is designed to implement the National Fire Plan and assist communities at risk from catastrophic wildland fires. The program provides grants, technical assistance, and training for community programs that develop local capability, including: Assessment and planning, mitigation activities, and community and homeowner education and action; hazardous fuels reduction activities, including the training, monitoring or maintenance associated with such hazardous fuels reduction activities, on federal land, or on adjacent nonfederal land for activities that mitigate the threat of catastrophic fire to communities and natural resources in high risk areas; and, enhancement of knowledge and fire protection capability of rural fire districts through assistance in education and training, protective clothing and equipment purchase, and mitigation methods on a cost share basis.

Secure Rural Schools and Community Self-Determination Act - Title III- County Funds. The Self-Determination Act has recently been reauthorized and now includes specific language regarding the Firewise Communities program. Counties seeking funding under Title III must use the funds to perform work under the Firewise Communities program. Counties applying for Title III funds to implement Firewise activities can assist in all aspects of a community's recognition process, including conducting or assisting with community assessments, helping the community create an action plan, assisting with an

annual Firewise Day, assisting with local wildfire mitigation projects, and communicating with the state liaison and the national program to ensure a smooth application process. Counties that previously used Title III funds for other wildfire preparation activities such as the Fire Safe Councils or similar would be able to carry out many of the same activities as they had before. However, with the new language, counties would be required to show that funds used for these activities were carried out under the Firewise Communities program. More information: https://tinyurl.com/67dthhg

Community Planning Assistance for Wildfire. Established in 2015 by Headwaters Economics and Wildfire Planning International, Community Planning Assistance for Wildfire (CPAW) works with communities to reduce wildfire risks through improved land use planning. CPAW is a grant-funded program providing communities with professional assistance from foresters, planners, economists, and wildfire risk modelers to integrate wildfire mitigation into the development planning process. All services and recommendations are site-specific and come at no cost to the community. More information: http://planningforwildfire.org/what-we-do/

Urban and Community Forestry (UCF) Program. A cooperative program of the U.S. Forest Service that focuses on the stewardship of urban natural resources. With 80 percent of the nation's population in urban areas, there are strong environmental, social, and economic cases to be made for the conservation of green spaces to guide growth and revitalize city centers and older suburbs. UCF responds to the needs of urban areas by maintaining, restoring, and improving urban forest ecosystems on more than 70 million acres. Through these efforts the program encourages and promotes the creation of healthier, more livable urban environments across the nation. These grant programs are focused on issues and landscapes of national importance and prioritized through state and regional assessments. More information: http://www.fs.fed.us/managing-land/urban-forests/ucf

Western Wildland Urban Interface Grants. The National Fire Plan (NFP) is a long-term strategy for reducing the effects of catastrophic wildfires throughout the nation. The Division of Forestry's NFP Program is implemented within the Division's Fire and Aviation Program through the existing USDA Forest Service, State & Private Forestry, and State Fire Assistance Program.

Congress has provided increased funding assistance to states through the U.S. Forest Service State and Private Forestry programs since 2001. The focus of much of this additional funding was mitigating risk in WUI areas. In the West, the State Fire Assistance funding is available and awarded through a competitive process with emphasis on hazard fuel reduction, information and education, and community and homeowner action. This portion of the National Fire Plan was developed to assist interface communities manage the unique hazards they find around them. Long-term solutions to interface challenges require informing and educating people who live in these areas about what they and their local organizations can do to mitigate these hazards.

The 10-Year Comprehensive Strategy focuses on assisting people and communities in the WUI to moderate the threat of catastrophic fire through the four broad goals of improving prevention and suppression, reducing hazardous fuels, restoring fire-adapted ecosystems, and promoting community assistance. The Western States Wildland Urban Interface Grant may be used to apply for financial assistance towards hazardous fuels and educational projects within the four goals of: improved prevention, reduction of hazardous fuels, restoration of fire-adapted ecosystems and promotion of community assistance. Information: https://www.westernforesters.org/wui-grants

U.S. Fish & Wildlife Service, Rural Fire Assistance Grants. Each year, the U.S. Fish & Wildlife Service (FWS) provides Rural Fire Assistance (RFA) grants to neighboring community fire departments

to enhance local wildfire protection, purchase equipment, and train volunteer firefighters. Service fire staff also assist directly with community projects. These efforts reduce the risk to human life and better permit FWS firefighters to interact and work with community fire organizations when fighting wildfires. The Department of the Interior (DOI) receives an appropriated budget each year for an RFA grant program. The maximum award per grant is $20,000. The DOI assistance program targets rural and volunteer fire departments that routinely help fight fire on or near DOI lands. More information: http://www.fws.gov/fire/living_with_fire/rural_fire_assistance.shtml

Fire Management Assistance Program. This program is authorized under Section 420 of the Stafford Act. It allows for the mitigation, management, and control of fires burning on publicly or privately-owned forest or grasslands that threaten destruction that would constitute a major disaster. More information: http://www.fema.gov/fire-management-assistance-grant-program

U.S. Department of Agriculture, Community Facilities Loans and Grants. Provides grants (and loans) to cities, counties, states, and other public entities to improve community facilities for essential services to rural residents. Projects can include fire and rescue services; funds have been provided to purchase fire-fighting equipment for rural areas. No match is required. More information: http://www.usda.gov/wps/portal/usda/usdahome?navid=GRANTS_LOANS

U.S. Department of Homeland Security. Enhances the ability of states, local and tribal jurisdictions, and other regional authorities in the preparation, prevention, and response to terrorist attacks and other disasters, by distributing grant funds. Localities can use grants for planning, equipment, training, and exercise needs. These grants include but are not limited to areas of Critical Infrastructure Protection Equipment and Training for First Responders, and Homeland Security Grants. More information: http://www.dhs.gov/

8.1 City of Anamoose, North Dakota

The following profile includes information specific to the city of Anamoose, North Dakota, for mitigation planning purposes. The information included is as follows:

- Profile and Inventory;
- Risk Assessment;
- Hazard Scoring Notes;
- Mitigation Projects, and
- Capabilities for Mitigation.

Integration into Planning Mechanisms

The process for integration of the mitigation plan into existing planning mechanisms is discussed at the bottom of each mitigation project in section 8.1.4, section 8.1.5 and in Chapter 6, Mitigation Strategy.

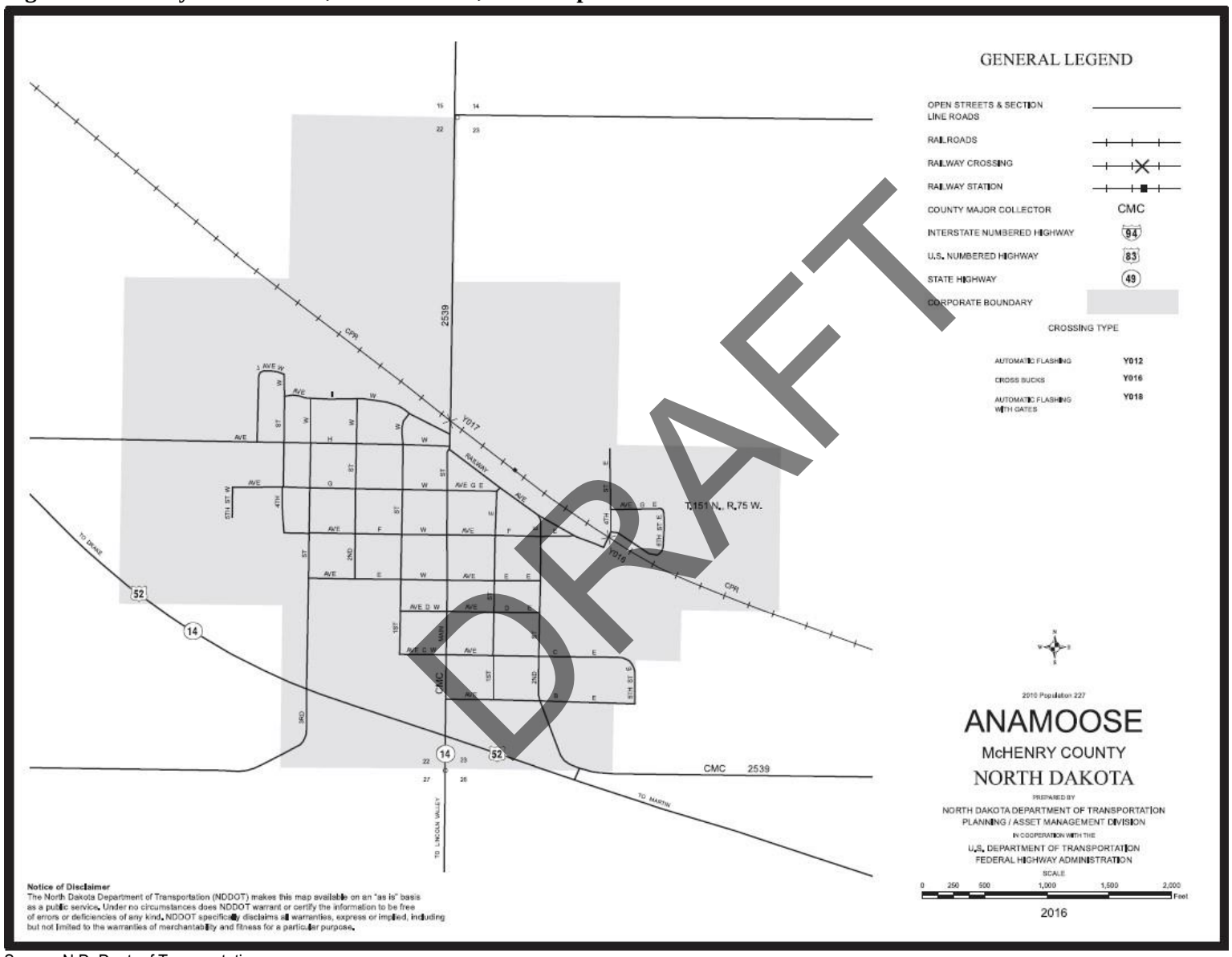
Plan Maintenance

Plan maintenance is shown in section 8.1.6.

Critical Facilities and Infrastructure

Figure 8.1.1 is a map of the city of Anamoose, North Dakota, provided by the N.D. Dept of Transportation.

Figure 8.1.1 – City of Anamoose, North Dakota, Base Map



Source: N.D. Dept. of Transportation

8.1.1 Profile and Inventory

The location, total population, vulnerable (underserved) populations, housing units and household size, businesses, critical facilities and infrastructure, new and future development, services, jurisdictional buildings, emergency response services and utilities are shown for the city of Anamoose, North Dakota. Detailed narratives follow each section heading to profile the city.

Detailed information on public buildings, services provided, emergency response services and utilities can be found in Chapter 3, Profile and Inventory.

Location

The city of Anamoose, North Dakota, is in north-central North Dakota, approximately 55 miles southeast of the city of Minot, North Dakota, the state's fourth largest city.

Population

Table 8.1.1 shows population trends for the city of Anamoose, North Dakota, from 1920 to 2020 per the 2020 U.S. Decennial Census, with an estimate for 2022. According to the 2020 U.S. Decennial Census, the city of Anamoose, North Dakota, contains 230 people, an increase of three people (1.3 percent) from 227 people in 2010.

Table 8.1.1 – 1920 to 2022 City of Anamoose, North Dakota, Population Trends and Projections

1920	1930	1940	1950	1960	1970	1980	1990	2000	2010	2020	*2022 est.*
563	495	478	542	503	401	355	277	282	227	230	*219*

Source(s): U.S. Decennial Census; American Community Survey, 5-Year Estimates

Vulnerable Populations

- Age. Per the 2018 to 2022 American Community Survey 5-Year Estimate, the population of the city of Anamoose, North Dakota, consists of 52 individuals under the age of 20 and 51 individuals aged 65 and older, representing 17.9 and 17.6 percent of the city's population, respectively.
- Daycare. There is one daycare, Little Raiders, in the city of Anamoose, North Dakota. The daycare is attached to the public school.
- Poverty. Per the 2018 to 2022 American Community Survey 5-Year Estimate, there are 50 individuals in the city of Anamoose, North Dakota, that lives below the poverty line, representing 17.2 percent of the city's population.
- Public Schools. The Anamoose-Drake Public School serves approximately 76 students grades K-12.
- Senior Housing Developments/Care Centers. There are no senior housing developments or care centers in the city of Anamoose, North Dakota. However, there is a low-income eightplex that is occupied primarily by older individuals.

Housing Units and Household Size

The 2018 to 2022 American Community Survey 5-Year Estimate shows there are 150 housing units in the city of Anamoose, North Dakota, consisting of 129 single-family homes, five multifamily homes, and 16 mobile homes.

The 2018 to 2022 American Community Survey 5-Year Estimate there are124 households in the city of Anamoose, North Dakota, resulting in an average household size of 2.34 people.

Businesses

Businesses in the city of Anamoose, North Dakota, include Heringer Lumber, First State Bank of Anamoose, KB Bar, Anamoose Café, Schmaltz's Green House, Hope Chest, VFW, Dakota Agronomy, Arthur Companies Elevator, and approximately 10 self-employed individuals working from home.

New and Future Development

New development in the city of Anamoose, North Dakota, over the last five years includes:

- The city received a grant from the USDA and gutted an old bank building and removed asbestos and other hazardous materials to position the building for a new business in 2017/2018. The project was coordinated by the Anamoose JDA.
- A modular home was moved in and placed on a vacant lot in 2022.
- A resident tore down an abandoned residential home and converted it to greenspace in 2020.
- A shop garage was constructed in 2023.
- The city auditor stated a handful of single-family homes have undergone renovations and/or additions over the last five years.

The following future development is planned or proposed in the city of Anamoose, North Dakota, includes:

- The Anamoose JDA owns two vacant buildings on Main St. and resident from the area is looking to open a pizza shop.
- The city of Anamoose is researching to reline their lagoon system.

Critical Facilities

- Anamoose City Hall (a room attached to the water treatment plant building owned by North Prairie Regional Water District)
- Anamoose City Shop
- Anamoose-Drake Public School
- Anamoose Fire Hall
- Anamoose Senior Center

Infrastructure

- The city of Anamoose, North Dakota, has a sanitary sewer system with one main lagoon cell, three secondary cells, and one lift station.

- The city of Anamoose, North Dakota, receives drinking/potable water from North Prairie Regional Water District.
- The city of Anamoose, North Dakota, has an inert landfill.
- U.S. Highway 52 and N.D. Highway 14 serve the city of Anamoose, North Dakota.

Emergency Response Services

- Harvey Ambulance Service provides ambulance services to the city of Anamoose, North Dakota, and surrounding rural areas.
- The Anamoose Fire Department/Rural Protection District provides fire protection services to the city of Anamoose, North Dakota, and surrounding rural areas.
- The McHenry County Sheriff's Office provides law enforcement services to the city of Anamoose, North Dakota.
- First District Health Unit, McHenry County is in the city of Towner, North Dakota, provides public health services to the city of Anamoose, North Dakota, and greater McHenry County.

Services and Utilities

- Circle Sanitation provides contracted garbage collection services to the city of Anamoose, North Dakota.
- The city of Anamoose, North Dakota, has an inert landfill.
- The city of Anamoose, North Dakota, has a sanitary sewer system with one main lagoon cell, three secondary cells, and one lift station.
- The city of Anamoose, North Dakota, has a storm water system consisting of culverts and drainage ditches.
- The Mouse River Journal is the official newspaper of the city of Anamoose, North Dakota.
- The city of Anamoose, North Dakota, receives drinking/potable water from North Prairie Regional Water District.
- Electricity is provided by Otter Tail Power Company in the city of Anamoose, North Dakota.
- Natural gas is not available in the city of Anamoose, North Dakota.
- Fuel oil and propane are used as an alternative heating source and are provided by companies chosen by the individual consumer in Anamoose, North Dakota.
- Midcontinent and N.D. Telephone Company (NDTC) provides internet, phone, and TV to the city of Anamoose, North Dakota, and surrounding rural area.

8.1.2 Risk Assessment and Hazard Scoring Notes

Table 8.1.1 summarizes the risk assessment scoring of the city of Anamoose, North Dakota. The risk assessment and hazard scoring notes for each hazard specific to the city are shown in Table 8.1.2. Risk assessment notes for impact, frequency, likelihood, and vulnerability ubiquitous for jurisdictions in McHenry County are found in Chapter 5, Threat and Hazard Identification Assessment in each respective hazard profile.

Table 8.1.1 – City of Anamoose, North Dakota, Jurisdiction Risk Assessment Scoring Summary

Risk Assessment			**Jurisdiction:**	**City of Anamoose, North Dakota**		
Hazard/Threat	Impact	Frequency	Likelihood	Vulnerability	Capabilities	**Total**
Civil Disturbance	4	2	2	2	1	**9**
Criminal, Terrorist, or Nation-State Attack	5	2	2	2	1	**10**
Cyberattack	5	3	4	3	2	**13**
Dam Failure	NA	NA	NA	NA	NA	**NA**
Drought	5	4	5	4	3	**15**
Fire – Urban/Structure Collapse	5	4	5	4	3	**15**
Fire – Wildland (including Rural)	5	4	5	4	3	**15**
Flood	2	2	2	2	4	**4**
Geologic Hazards	5	2	3	2	4	**7**
Hazardous Material Release	5	3	4	4	3	**13**
Infectious Disease & Pest Infestations	5	5	5	4	2	**17**
Severe Summer Weather	5	5	5	3	3	**15**
Severe Winter Weather	5	5	5	3	3	**15**
Space Weather	5	1	2	5	3	**10**
Transportation Incident	5	5	5	4	2	**17**

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 8.1.2 – City of Anamoose, North Dakota, Jurisdiction Risk Assessment

	Civil Disturbance	
Impact	• Blocked Roads • Business/Government Interruptions • Delayed Emergency Response • Financial Hardship/Strain (public)	• HAZMAT Release • Human Injury/Death • Loss of Communication Systems • Property Damage (Structure) • Property Damage (Vehicle)
Frequency	• Never an occurrence of a major incident	• DAPL protesters were not active in the city
Likelihood	More Likely • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 & CP Railroad Infrastructure	Less Likely • Small town with no major regional/state attractions • Sparse population
Vulnerability	More Vulnerable • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 & CP Railroad Infrastructure • Energy pipelines proximate to the city	Less Vulnerable • Small town with no major regional/state attractions • Sparse population • McHenry County Sheriff's Office

Table 8.1.2 – City of Anamoose, North Dakota, Jurisdiction Risk Assessment – Continued

	Criminal, Terrorist, Nation-State Attack	
Impact	• Blocked Roads • Business/Government Interruptions • Delayed Emergency Response • Disease Outbreak/Mass Infections • Financial Hardship/Strain (public) • HAZMAT Release • Human Injury/Death	• Infrastructure Degradation • Loss of Communication Systems • Mass Casualties/Fatalities • Property Damage (Structure) • Property Damage (Vehicle) • **City's drinking/potable water system could be contaminated**
Frequency	• **Never an occurrence in city limits**	
Likelihood	More Likely • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 & CP Railroad Infrastructure	Less Likely • Small town with no major regional/state attractions • Sparse population
Vulnerability	More Vulnerable • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 & CP Railroad Infrastructure • Energy pipelines proximate to the city	Less Vulnerable • Small town with no major regional/state attractions • Sparse population • McHenry County Sheriff's Office

Table 8.1.2 – City of Anamoose, North Dakota, Jurisdiction Risk Assessment – Continued

	Cyberattack	
Impact	• Business Interruptions • Delayed Emergency Response • Financial Hardship/Strain (public) • Government Interruptions • HAZMAT Release • Human Injury/Death	• Identity Theft – loss of wages and/or assets • Infrastructure Degradation • Loss of Communication Systems • Loss of Digital/Technological Systems • Loss of Power/Electricity Outage • School Closure
Frequency	• Never an occurrence of a major attack • Annual incidents of phishing and spam email at the public school	
Likelihood	More Likely • Small town with lack of technological infrastructure to defend against cyberattack	Less Likely • Lack of major state or national financial institutions
Vulnerability	More Vulnerable • Small town with lack of technological infrastructure to defend against cyberattack • Elderly population relying largely on landlines for communication purposes, remote medical care, and equipment monitoring • Anamoose-Drake Public School	Less Vulnerable • Lack of major state or national financial institutions • No natural gas service to the city

Table 8.1.2 – City of Anamoose, North Dakota, Jurisdiction Risk Assessment – Continued

	Drought	
Impact	• Crop Loss • Loss of Economy • Loss of Livestock • Loss of Wildlife Habitat (decreased wildlife populations) • Increase in Wildland Fire Potential • Water quality compromised from stock dams	• Diminished soil health • Negative impact on mental health of producers and fire responders – "community impact" • Local producers forced to sell off herds which can last for several years • Population loss as people moved away due to loss of economy
Frequency	• Fall of 1980 was dry • Severe drought in 1961/1962, 1988/1989 to 1991/1992 • Some dry conditions each year lasting a couple weeks in length	• In 2013 and 2014, dry conditions were present from June to October with little rain • **Lack of adequate snowfall spring of 2015, 2021, 2023/2024** • Severe drought conditions winter 2020/2021 • Exceptional drought spring and summer 2021
Likelihood	<u>More Likely</u> • Dry/wet cycle every 10 years • Climatic patterns will result in an eventual drought of significance • Lack of precipitation	<u>Less Likely</u> • Heavy precipitation in winter (snow pack) and summer (rainfall)
Vulnerability	<u>More Vulnerable</u> • Loss of economy from decreased wildlife & hunting • Agriculture economy • Elderly population • Flat terrain/open topography contributes to conditions • Pastureland adjacent to structures and city limits • Drake-Anamoose Public School • **Lack of water tower due to regional water service**	<u>Less Vulnerable</u> • Anamoose Fire Department • Financial assistance programs made available by the state and federal government • McHenry County Burn Restriction Ordinance • Fire Index monitoring and mapping from NDDES • Advanced communications such as internet and TV • North Prairie Regional Water District - **Lack of water tower due to regional water service**

Table 8.1.2 – City of Anamoose, North Dakota, Jurisdiction Risk Assessment – Continued

	Fire – Urban Fire/Structure Collapse	
Impact	• Building Collapse • Delayed Emergency Response • Evacuation (Localized) • Explosion	• Human Injury/Death • Increased Fire Potential • **Property damage on a significant scale if impacting downtown structures and other critical facilities or infrastructure in the city due to their close physical proximity**
Frequency	• Average of one structure fire annually • Structures fires consist of incidents at shops and houses.	
Likelihood	More Likely • Has not adopted state building codes and lacks enforcement • Age of structures – some dilapidated • Elderly populations • Increased use of electrical heaters • Outdated electric wiring and heating systems • U.S. Highway 52 and CP Railroad – traffic contributes to incidents	Less Likely • Better building standards and maintenance of structures • Smoke detectors in public buildings and private homes/businesses • Well-equipped fire department with trained volunteers
Vulnerability	More Vulnerable • Has not adopted state building codes and lacks enforcement • **Anamoose Fire Department has trained volunteers and equipment, but are not adequate** • Age of structures – some dilapidated • Elderly populations • Increased use of electric heaters • Outdated electrical wiring and heating systems • **Inadequate supply of water for fire suppression** • **Anamoose Public School has fire monitoring system** • U.S. Highway 52 and CP Railroad – traffic contributes to incidents	Less Vulnerable • Better building standards and maintenance of structures • Smoke detectors in public buildings and private homes/businesses • **No natural gas service to the city**

Table 8.1.2 – City of Anamoose, North Dakota, Jurisdiction Risk Assessment – Continued

	Fire – Rural & Wildland	
Impact	• Building Collapse • Crop Loss • Delayed Emergency Response • Downed Power Lines • Evacuation (Localized) • Explosion • Increased Wildland Fire Potential • Loss of Power/Electricity Outage	• **Loss of Livestock** • **Loss of Wildlife Habitat** • **Mass Casualties** • **Property Damage (Structure & Vehicle)** • **Losses could be on a significant scale if impacting a major producer or farmstead** • **Loss of farm equipment and assets**
Frequency	• Average of 10 wildland fires annually • Leroy Miller fire – individual sustained burns and died 2-3 weeks later	
Likelihood	More Likely • Agricultural burn-off • High winds annually and dry conditions – when present • Pastureland adjacent to structures and city limits • City is surrounding by crop land • Severe summer weather with significant lightning • CP Railroad Infrastructure – produces sparks that cause fires	Less Likely • Removal of CRP near city limits • Summer and winter weather with heavy precipitation • **Lack of wildland-urban interface**
Vulnerability	More Vulnerable • **Anamoose Fire Department has trained volunteers and equipment, but are not adequate** • Agricultural burn-off • High winds annually and dry conditions – when present • Pastureland adjacent to structures and city limits • Severe summer weather with significant lightning • **Lack of fire breaks around city limits** • CP Railroad Infrastructure – produces sparks that cause fires	Less Vulnerable • Removal of CRP near city limits • Summer and winter weather with heavy precipitation • MOUs with neighboring fire departments • McHenry County Burn Restriction Ordinance • **Lack of wildland-urban interface**

Table 8.1.2 – City of Anamoose, North Dakota, Jurisdiction Risk Assessment – Continued

	Flood	
Impact	• Blocked Roads • Delayed Emergency Response • Flooding (Highway & Structure) • Human Injury/Death • Property Damage	
Frequency	• Some ground seepage causing flooding in basements • One privately owned lot on 300 block of 2nd St. E experiences standing water	
Likelihood	More Likely • **Overland flooding frequent in the spring due to rapid snow melt but only during high precipitation years** • **Culverts in city limits are too high – results in standing water** • **Inadequate storm water system in the city – needs retrofitting/upgrading** • **Surrounding soils consisting of mostly blue clay in and around the city – contributes to overland due to slow drainage**	Less Likely • Dry conditions/drought and low precipitation • City located at a high elevation
Vulnerability	More Vulnerable • **Overland flooding frequent in the spring due to** rapid snow melt but only during high • **Surrounding soils consisting of mostly blue clay in and around the city – contributes to overland due to slow drainage** • **Inadequate storm water system in the city – needs retrofitting/upgrading** • **City and fire department lacks equipment to move water (when needed)**	Less Vulnerable • Dry conditions/drought and low precipitation • City has rented equipment to move water in the past • City located at a high elevation

Table 8.1.2 – City of Anamoose, North Dakota, Jurisdiction Risk Assessment – Continued

	Geologic Hazards	
Impact	• Blocked Roads • Delayed Emergency Response • Human Injury/Death • Infrastructure Degradation	• Loss of Economy • Loss of Power/Electricity Outage • Property Damage • Utility Outage/Shortage
Frequency	• No occurrences of geologic hazards other than radon in the city of Anamoose	
Likelihood	More Likely • **All N.D. Counties in EPA Radon Zone I**	Less Likely • No Abandoned Mine Lands located near city limits • City located at a high elevation – no landslide or subsidence issues
Vulnerability	More Vulnerable • **All N.D. Counties in EPA Radon Zone I**	Less Vulnerable • No Abandoned Mine Lands located near city limits • City located at a high elevation – no landslide or subsidence issues

Table 8.1.2 – City of Anamoose, North Dakota, Jurisdiction Risk Assessment – Continued

	Hazardous Material Release	
Impact	• Blocked Roads • Business & Government Interruptions • Delayed Emergency Response • Environmental Degradation • Evacuation (localized) • Explosion • Human Injury/Death	• Increased Fire Potential • Loss of Economy (business activity) • Loss of Power and/or Drinking/Potable Water • Property Damage
Frequency	• Never an occurrence in city limits • Incidents on U.S. Highway 52 or involving the railroad every 3 to 4 years	• **Incident of a chemical warehouse blew down from severe weather causing a release** • **Incident of a fertilizer truck burning up**
Likelihood	More Likely • **Transportation of chemicals by truck through city limits** • **Storage of chemicals/fertilizers in city limits and on farmsteads in large tanks near city limits** • **Propane/heating fuels stored by residents in city limits** • **U.S. Highway 52, N.D. Highway 14, and CP Railroad**	Less Likely • Private companies have HAZMAT certifications • Tier II Federal Requirements
Vulnerability	More Vulnerable • **Transportation of chemicals by truck through city limits – restricted from parking in city limits** • **Storage of chemicals/fertilizers in city limits and on farmsteads in large tanks near city limits** • **Propane/heating fuels stored by residents in city limits** • **Anamoose Fire Department has trained volunteers and equipment, but are not adequate** • **U.S. Highway 52, N.D. Highway 14, and CP Railroad**	Less Vulnerable • Private companies have HAZMAT certifications • Tier II Federal Requirements • City on rural water and is not at risk to contamination of drinking/potable water if a HAZMAT incident occurred • Minot Regional HAZMAT Team

Table 8.1.2 – City of Anamoose, North Dakota, Jurisdiction Risk Assessment – Continued

	Infectious Disease & Pest Infestations	
Impact	• Crop Loss • Human Injury/Death • Livestock Injury/Death • Loss of Economy • Mass Casualties/Fatalities	• Strain on local medical resources (ambulance or clinic) • Loss of Drinking/Potable Water • **Financial cost to public health resources** • Loss of medical staff due to sickness • School Closure
Frequency	• Annual occurrences of death, primarily among the elderly • Occurrence of disease - 1 in 3 for people annually • Annual occurrences of influenza cases in the local population	• **The COVID-19 pandemic of 2020 resulted in mass quarantine and sheltering of the local population and temporary closure of businesses resulting in unmeasured economic losses.**
Likelihood	More Likely • Agriculture economy • Growing elderly population • Small population of children without immunization • Transporting of animals across state lines • Dependent on weather for animals and crops • U.S. Highway 52 & CP Railroad Infrastructure	Less Likely • Advanced communications such as internet and tv • Public health and employment regulations for public facilities • Federal health guidelines at public employers • First District Health Unit, McHenry County education and outreach • FSA and NDSU Extension/McHenry County education and outreach
Vulnerability	More Vulnerable • Agriculture economy • Growing elderly population • Small population of children without immunization • Transporting of animals across state lines • Dependent on weather for animals and crops • U.S. Highway 52 & CP Railroad Infrastructure • Low-income housing is primarily occupied by elderly individuals	Less Vulnerable • Anamoose Fire Department has trained volunteers and equipment • Advanced communications such as internet and tv • Public health and employment regulations for public facilities Immunizations & medications of local population

Table 8.1.2 – City of Anamoose, North Dakota, Jurisdiction Risk Assessment – Continued

	Severe Summer Weather	
Impact	• Blocked Roads • Downed Trees • Evacuation (Localized) • Human Injury/Death – heat exhaustion • Infrastructure Degradation • Livestock Injury/Death • Loss of Crops	• Loss of Power/Downed Power Lines • **Property Damage – repair of roofing, siding and drainage systems for homes** • **Damage to electrical equipment from lightning** • Shelter-in-place • Vehicle Damage • City residents pumping water from property
Frequency	• Annual occurrences of hail, extreme heat, lightning, heavy rain, high wind • Seven to 10 significant storms producing damage to trees and property annually	• **Some city residents (those with basements) pumping water from their properties during June 2023** • **Straight-line windstorm producing significant property in 2017** • **2020 straight line winds**
Likelihood	• Climatic patterns will result in numerous annual occurrences of the hazard	
Vulnerability	<u>More Vulnerable</u> • Aging infrastructure (roads and electrical systems) • Agriculture Economy • High elderly population • **Inadequate storm water system in the city – needs retrofitting/upgrading** • **Surrounding soils consisting of mostly blue clay in and around the city – contributes to overland due to slow drainage** • **City and fire department lacks equipment to move water** • **Anamoose Fire Department has trained volunteers and equipment, but are not adequate** • **Low-income housing is primarily occupied by elderly individuals** • **City park has camping sites**	<u>Less Vulnerable</u> • Advanced warning and notification such as internet and TV • **One outdoor emergency siren at the Anamoose Fire Hall** • **City located at a high elevation and does not have drainage or overland flooding issues** • **No storm shelter** • North Prairie Regional Water District - **Lack of water tower due to regional water service**

Table 8.1.2 – City of Anamoose, North Dakota, Jurisdiction Risk Assessment – Continued

	Severe Winter Weather	
Impact	• Blocked Roads: McHenry County 1 on west side of city near the drainage ditch/mobile home court/culvert under highway • Evacuation (Localized) • Human Injury/Death – wind chill • Loss of Crops	• Loss of Livestock • Loss of Power/Downed Power Lines • Property Damage – repair of roofing, siding and drainage systems for homes • Shelter-in-place • Vehicle Damage
Frequency	• Climatic patterns will result in numerous annual occurrences of the hazard • **Ice Storm of 1997** • **Winter of 2022/2023 – records snowfall**	• **Christmas Storm 2016** **Significant blizzards in 2009, 2010, 2011, and 2013 – resulting in large-scale overland flooding**
Likelihood	• Climatic patterns will result in numerous annual occurrences of the hazard	
Vulnerability	More Vulnerable • Aging infrastructure (roads and electrical systems) • Agriculture Economy • High elderly population • **Inadequate storm water system in the city – needs retrofitting/upgrading** • **Surrounding soils consisting of mostly blue clay in and around the city – contributes to overland due to slow drainage** • **City and fire department lacks equipment to move water** • **Anamoose Fire Department has trained volunteers and equipment, but are not adequate** • **Low-income housing is primarily occupied by elderly individuals and lack sheltering capabilities** • **Anamoose Public School**	Less Vulnerable • Advanced warning and notification such as internet and TV • **One outdoor emergency siren at the Anamoose Fire Hall** • **City located at a high elevation and does not have drainage or overland flooding issues** • **No storm shelter** • **4 exits out of town for evacuation purposes** • North Prairie Regional Water District - **Lack of water tower due to regional water service**

Table 8.1.2 – City of Anamoose, North Dakota, Jurisdiction Risk Assessment – Continued

	Space Weather	
Impact	• Government Interruptions • Infrastructure Degradation • Loss of Communication Systems • Loss of Digital/Technological Systems • Loss/Overcrowded Medical Facilities	• Loss of Power/Electricity Outage • Public Distress/Social Discord • School Closure • Loss of operation of the city hall and fire hall, etc. • Loss/outage of medical devices at private residences
Frequency	• Never a recorded occurrence in McHenry County or North Dakota	
Likelihood	• Dependent on solar activity and the 11-year solar cycle • Likely to occur once every 500 years per the 2018 N.D. Enhanced Mitigation MAOP	
Vulnerability	<u>More Vulnerable</u> • Advanced communication systems (internet, TV, etc.) • Agriculture economy • All critical facilities and infrastructure that require electricity for operation • CP Railroad • Pipelines proximate to city limits	<u>Less Vulnerable</u> • Local food production/households with gardens

Table 8.1.2 – City of Anamoose, North Dakota, Jurisdiction Risk Assessment – Continued

	Transportation Incident	
Impact	• **Blocked roads from inadequate road clearing or incidents** • Business Interruptions • Delayed Emergency Response • Human Injury/Death • Increased Fire Potential • Loss of Transportation/Accessibility – incident blocks access	• Mass Casualties/Fatalities • HAZMAT Release • Livestock Loss • Property Damage • **Could be catastrophic if involving a school bus filled with children and a truck carrying hazardous materials – kids in Anamoose attend either Glenburn or Surrey resulting in a higher volume of bus traffic**
Frequency	• Very high frequency of incidents involving vehicles running the stop sign at the intersection of U.S. Highway 52 and N.D. Highway 14	
Likelihood	More Likely • Intoxicated drivers • High truck traffic from agriculture-related business • U.S. Highway 52, N.D. Highway 14, CP Railroad infrastructure • Lack of proper 'controls' at intersection of U.S. Highway 52 and N.D. Highway 14	Less Likely • Adequate traffic control signage/stop signs in city limits • No commercial passenger airport
Vulnerability	More Vulnerable • Distracted drivers • Intoxicated drivers • High truck traffic from agriculture-related traffic • U.S. Highway 52, N.D. Highway 14, CP Railroad infrastructure • Lack of proper 'controls' at intersection of U.S. Highway 52 and N.D. Highway 14	Less Vulnerable • Adequate traffic control signage/stop signs in city limits • No commercial passenger airport

8.1.3 Mitigation Strategy

The McHenry County, N.D., Multi-Jurisdictional Multi-Hazard Plan Update includes a mitigation strategy consisting of seven goals in Chapter 6. The following problem statement and mitigation projects address the mitigation needs of the city of Anamoose, North Dakota. It should be noted that some mitigation projects that pertain to all jurisdictions are included to encourage county-wide collaboration.

Problem Statement

The city of Anamoose, North Dakota, can be impacted by civil disturbance; criminal, terrorist, or nation/state attack; cyberattack; drought; fire (urban and wildland); flood (overland); geologic hazards; hazardous material release; infectious disease and pest infestations; severe summer weather; severe winter weather; space weather, and transportation incident. The city lacks permanent and/or portable backup generators for the lift station but has backup generators at the Anamoose Public School, fire hall, and North Prairie Rural Water District operations building. The city has an outdoor early warning siren. There is inadequate storm shelter capacity, especially for low-income residents. Local emergency services need upgraded equipment and lack adequate volunteers.

The city lacks funding for mitigation projects. With little to no capabilities to accomplish major projects independently, the city is dependent on outside sources for mitigation.

Retrofitting/upgrading of the sanitary sewer wastewater system, installation of backup power sources for the lift station, upgrade and/or expand storm sheltering capabilities, and education and outreach are a priority for the city.

City of Anamoose, North Dakota Mitigation Priority Expansion/Update

The 2024 McHenry County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan reflects a change in mitigation priority for the city of Anamoose, North Dakota, that includes pursuing grant funding to implementation of necessary sanitary sewer and/or wastewater lagoon system retrofits/upgrades.

City of Anamoose Project 1: Pursue Grant Funding for Implementation of Sanitary Sewer and/or Wastewater Lagoon System Retrofits/Upgrades Identified in City of Anamoose, North Dakota, Sewer Improvements Engineering Report.

Description/Benefit	The city of Anamoose has an engineering contract with Moore Engineering. Options include rehabilitation of the existing sanitary sewer system or rehabilitation of the lagoon.		
Hazard/Threat Addressed	Drought, Flooding (overland), Infectious Disease & Pest Infestations, Severe Summer Weather, Severe Winter Weather		
Affected Jurisdictions	City of Anamoose and greater McHenry County		
Project Status	New		
Priority	Very High		
Responsible Agency	Anamoose City Council		
Partners	DWR, Emergency Management, NDDEQ, Public Health, Public Works, private contractors		
Completion Timeframe	3 years	Cost	$950,300.00 to $1,430,000.00
Funding Source	FEMA's Building Resilient Infrastructure and Communities (BRIC) or Hazard Mitigation Grant Program (HMGP).		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element	Process for Integration
Capital Improvement Plan McHenry County LEOP McHenry County Mitigation Plan & THIRA	Capability Assessment, Hazard/Threat History, Risk Assessment, Anamoose Jurisdictional Workshop	Finalize engineering study and identify preferred scope of work. Approval by city council. Pursue funding options. Execute.

8.1.4 Mitigation Capability Assessment

Capability for mitigation is divided into four categories: administrative and technical, education and outreach, financial, and planning and regulatory. Each identified resource in the four categories can be used to implement mitigation strategies and access funding for projects. **Tables comparing the mitigation capabilities of the city of Anamoose, North Dakota, with all other jurisdictions in McHenry County can be found below and in Chapter 7, County Mitigation Capability Assessment.**

- Administrative and Technical: Identification of administrative and technical capabilities, which include: staff, their skills and tools for mitigation planning to implement specific mitigation actions.
- Education and Outreach: Identification of education and outreach programs, and methods already in place to implement mitigation activities and communicate hazard-related information.
- Financial: Identification of access to or eligibility to use funding resources for hazard mitigation for jurisdictions.
- Planning and Regulatory: Jurisdictional plans, policies, codes, and ordinances adopted and in place that prevent and reduce the impacts of natural hazards and man-made threats.

City of Anamoose, North Dakota, Mitigation Capabilities Summary

The following mitigation capabilities were identified as commonplace among all natural hazards and man-made threats upon completion of the risk assessment for the city of Anamoose, North Dakota. More detailed information about the mitigation capabilities of the city of Anamoose in relation to McHenry County and all other incorporated jurisdictions can be found in Chapter 7, Mitigation Capability Assessment.

2018 & 2023 N.D. Enhanced Mitigation MAOP	MOUs
Advanced Communications: Internet & TV	N.D. Dept. of Emergency Services (NNDES)
Emergency siren(s)/early warning systems	NDDES Fire Index Monitoring
McHenry County Commission	NDDOT State Transportation Plan & State Shop
McHenry Comprehensive Plan	NDSU/McHenry County Extension
McHenry County Courthouse	Anamoose Auditor and Public Works
McHenry County Emergency Management	Anamoose City Council
McHenry County LEOP	Anamoose Community Center
McHenry County Public Health	Anamoose Fire Hall
McHenry County Sheriff's Office	Anamoose Fire Department/Protection District

8.1.5 Integration of Mitigation Plan into Planning Mechanisms

Integration of the plan into current planning mechanisms is critical in mitigation to communicate the needs of each jurisdiction to achieve an all-inclusive mitigation strategy. The process for integration of the mitigation plan is included after each mitigation project, which shows the planning mechanism utilized, the plan element used for integration and the process for integration.

8.1.6 Plan Maintenance

An important aspect of any usable plan is the maintenance and upkeep of the document. At any given time, planning, risk analysis, updating the situation assessment, research, coordinating, disaster response or other activity is occurring. Plan maintenance ensures the plan will remain useful in the county for many years. A mitigation action progress report form to conduct plan maintenance is in Chapter 10 of this plan.

8.2 City of Balfour, North Dakota

The following profile includes information specific to the city of Balfour, North Dakota, for mitigation planning purposes. The information included is as follows:

- Profile and Inventory;
- Risk Assessment;
- Hazard Scoring Notes;
- Mitigation Projects, and
- Capabilities for Mitigation.

Integration into Planning Mechanisms

The process for integration of the mitigation plan into existing planning mechanisms is discussed at the bottom of each mitigation project in section 8.2.4, section 8.2.5 and in Chapter 6, Mitigation Strategy.

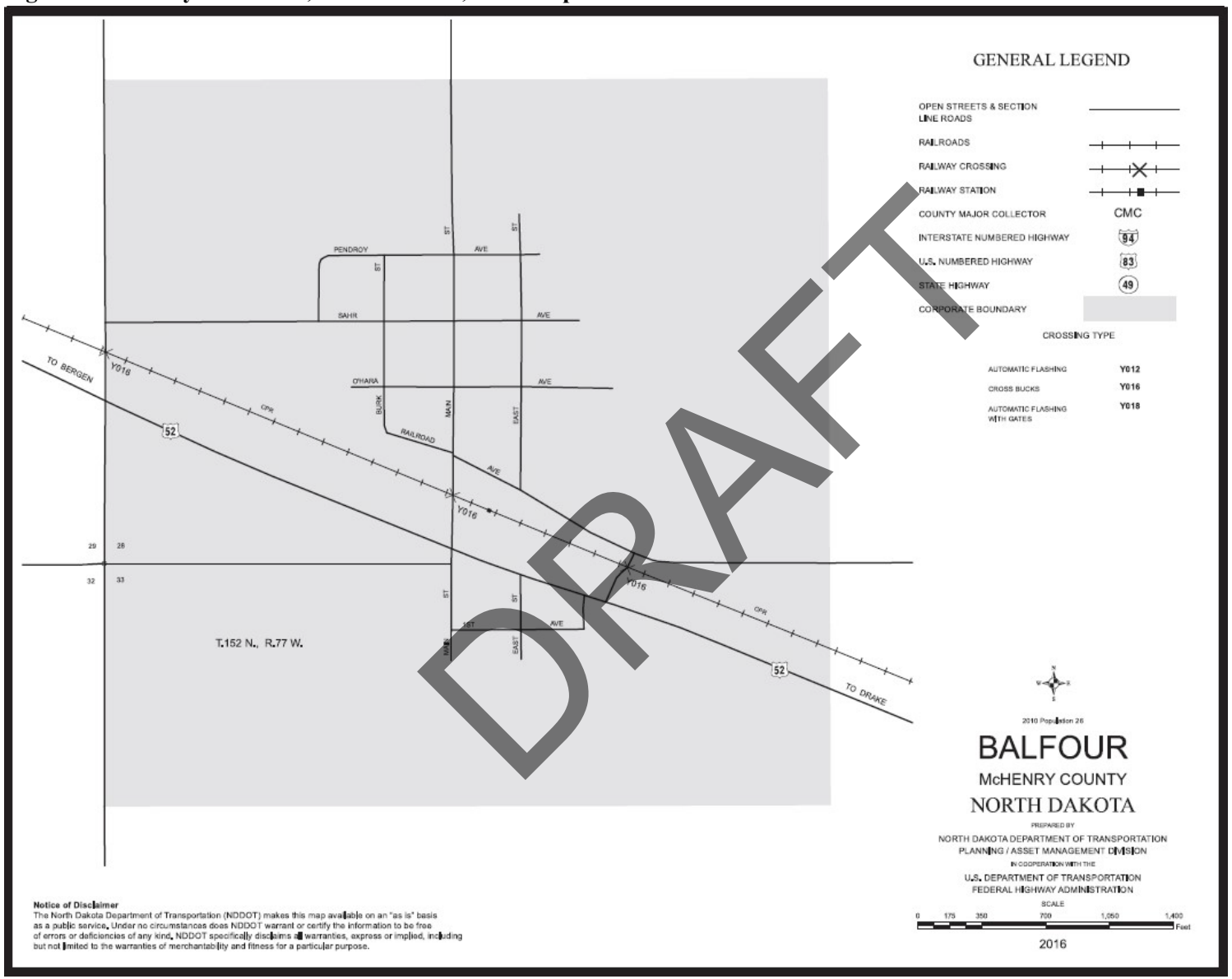
Plan Maintenance

Plan maintenance is shown in section 8.2.6.

Critical Facilities and Infrastructure

Figure 8.2.1 is a map of the city of Balfour, North Dakota, provided by the N.D. Dept of Transportation.

Figure 8.2.1 – City of Balfour, North Dakota, Base Map



Source: N.D. Dept. of Transportation

8.2.1 Profile and Inventory

The location, total population, vulnerable (underserved) populations, housing units and household size, businesses, critical facilities and infrastructure, new and future development, services, jurisdictional buildings, emergency response services and utilities are shown for the city of Balfour, North Dakota. Detailed narratives follow each section heading to profile the city.

Detailed information on public buildings, services provided, emergency response services and utilities can be found in Chapter 3, Profile and Inventory.

Location

The city of Balfour, North Dakota, is in north-central North Dakota, approximately 42 miles southeast of the city of Minot, North Dakota, the state's fourth largest city.

Population

Table 8.2.1 shows population trends for the city of Balfour, North Dakota, from 1920 to 2020 per the 2020 U.S. Decennial Census, with an estimate for 2022. According to the 2020 U.S. Decennial Census, the city of Balfour, North Dakota, contains 20 people, a decrease of six people (25.0 percent) from 26 people in 2010.

Table 8.2.1 – 1920 to 2022 City of Balfour, North Dakota, Population Trends and Projections

1920	1930	1940	1950	1960	1970	1980	1990	2000	2010	2020	*2022 est.*
322	197	193	162	159	93	51	33	20	26	20	*15*

Source(s): U.S. Decennial Census; American Community Survey, 5-Year Estimates

Vulnerable Populations

- Age. Per the 2018 to 2022 American Community Survey 5-Year Estimate, the population of the city of Balfour, North Dakota, consists of no individuals under the age of 20 and three individuals aged 65 and older, representing zero and 23.1 percent of the city's population, respectively.
- Daycare. There are no daycares in the city of Balfour, North Dakota.
- Poverty. Per the 2018 to 2022 American Community Survey 5-Year Estimate, there are two individuals in the city of Balfour, North Dakota, that live below the poverty line, representing 15.4 percent of the city's population.
- Public Schools. The is not a public school in the city of Balfour, North Dakota.
- Senior Housing Developments/Care Centers. There are no senior housing developments or care centers in the city of Balfour, North Dakota.

Housing Units and Household Size

The 2018 to 2022 American Community Survey 5-Year Estimate shows there are 14 housing units in the city of Balfour, North Dakota, consisting of all single-family homes.

The 2018 to 2022 American Community Survey 5-Year Estimate there are eight households in the city of Balfour, North Dakota, resulting in an average household size of 1.63 people.

Businesses

The only business in the city of Balfour, North Dakota, is a café.

New and Future Development

New development in the city of Balfour, North Dakota, over the last five years includes:

- Removal of abandoned/blight structures.

There are no future developments planned or proposed in the city of Balfour, North Dakota.

Critical Facilities

- Balfour City Hall (a room attached to the water treatment plant building owned by North Prairie Regional Water District)
- Balfour City Shop
- Balfour-Drake Public School
- Balfour Fire Hall
- Balfour Senior Center

Infrastructure

- The city of Balfour, North Dakota, has a sanitary sewer system with one main lagoon cell, and three secondary cells, and no lift stations due to the system being gravity-fed.
- The city of Balfour, North Dakota, receives drinking/potable water from North Prairie Regional Water District.
- The city of Balfour, North Dakota, has an inert landfill.
- U.S. Highway 52 serves the city of Balfour, North Dakota.

Emergency Response Services

- Velva Ambulance Service provides ambulance services to the city of Balfour, North Dakota, and surrounding rural areas.
- The Drake Fire Department/Rural Protection District provides fire protection services to the city of Balfour, North Dakota, and surrounding rural areas.
- The McHenry County Sheriff's Office provides law enforcement services to the city of Balfour, North Dakota.
- First District Health Unit, McHenry County is in the city of Towner, North Dakota, provides public health services to the city of Balfour, North Dakota, and greater McHenry County.

Services and Utilities

- Circle Sanitation provides contracted garbage collection services to the city of Balfour, North Dakota.

- The city of Balfour, North Dakota, has an inert landfill.
- The city of Balfour, North Dakota, has a sanitary sewer system with one main lagoon cell, and three secondary cells, and no lift stations due to the system being gravity-fed.
- The city of Balfour, North Dakota, has a storm water system consisting of culverts and drainage ditches.
- The Mouse River Journal is the official newspaper of the city of Balfour, North Dakota.
- The city of Balfour, North Dakota, receives drinking/potable water from North Prairie Regional Water District.
- Electricity is provided by Otter Tail Power Company in the city of Balfour, North Dakota.
- Natural gas is not available in the city of Balfour, North Dakota.
- Fuel oil and propane are used as an alternative heating source and are provided by companies chosen by the individual consumer in Balfour, North Dakota.
- Midcontinent and Souris River Telephone (SRT) provides internet, phone, and TV to the city of Balfour, North Dakota, and surrounding rural area.

8.2.2 Risk Assessment and Hazard Scoring Notes

Table 8.2.1 summarizes the risk assessment scoring of the city of Balfour, North Dakota. The risk assessment and hazard scoring notes for each hazard specific to the city are shown in Table 8.2.2. Risk assessment notes for impact, frequency, likelihood, and vulnerability ubiquitous for jurisdictions in McHenry County are found in Chapter 5, Threat and Hazard Identification Assessment in each respective hazard profile.

Table 8.2.1 – City of Balfour, North Dakota, Jurisdiction Risk Assessment Scoring Summary

Risk Assessment			**Jurisdiction:**	**City of Balfour, North Dakota**		
Hazard/Threat	Impact	Frequency	Likelihood	Vulnerability	Capabilities	**Total**
Civil Disturbance	4	1	1	1	1	**6**
Criminal, Terrorist, or Nation-State Attack	2	2	1	1	1	**5**
Cyberattack	3	1	1	2	2	**5**
Dam Failure	*NA*	*NA*	*NA*	*NA*	*NA*	***NA***
Drought	4	3	4	4	1	**14**
Fire – Urban/Structure Collapse	4	2	3	4	1	**12**
Fire – Wildland (including Rural)	5	2	3	4	1	**13**
Flood	4	2	2	4	1	**11**
Geologic Hazards	4	1	1	2	1	**7**
Hazardous Material Release	5	2	3	4	1	**13**
Infectious Disease & Pest Infestations	5	5	5	2	1	**16**
Severe Summer Weather	5	5	5	3	1	**1**
Severe Winter Weather	5	5	5	3	1	**17**
Space Weather	2	1	2	2	1	**6**
Transportation Incident	5	2	2	4	1	**12**

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 8.2.2 – City of Balfour, North Dakota, Jurisdiction Risk Assessment

	Civil Disturbance	
Impact	• Blocked Roads • Business/Government Interruptions • Delayed Emergency Response • Financial Hardship/Strain (public)	• HAZMAT Release • Human Injury/Death • Loss of Communication Systems • Property Damage (Structure) • Property Damage (Vehicle)
Frequency	• Never an occurrence of a major incident	• DAPL protesters were not active in the city
Likelihood	More Likely • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 & CP Railroad Infrastructure	Less Likely • Small town with no major regional/state attractions • Sparse population
Vulnerability	More Vulnerable • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 & CP Railroad Infrastructure	Less Vulnerable • Small town with no major regional/state attractions • Sparse population • McHenry County Sheriff's Office

Table 8.2.2 – City of Balfour, North Dakota, Jurisdiction Risk Assessment – Continued

	Criminal, Terrorist, Nation-State Attack	
Impact	• Blocked Roads • Business/Government Interruptions • Delayed Emergency Response • Disease Outbreak/Mass Infections • Financial Hardship/Strain (public) • HAZMAT Release • Human Injury/Death	• Infrastructure Degradation • Loss of Communication Systems • Mass Casualties/Fatalities • Property Damage (Structure) • Property Damage (Vehicle) • **City's drinking/potable water system could be contaminated**
Frequency	• **Never an occurrence in city limits**	
Likelihood	More Likely • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 & CP Railroad Infrastructure	Less Likely • Small town with no major regional/state attractions • Sparse population
Vulnerability	More Vulnerable • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 & CP Railroad Infrastructure	Less Vulnerable • Small town with no major regional/state attractions • Sparse population • No pipelines in proximity to the city • McHenry County Sheriff's Office

Table 8.2.2 – City of Balfour, North Dakota, Jurisdiction Risk Assessment – Continued

	Cyberattack	
Impact	• Business Interruptions • Delayed Emergency Response • Financial Hardship/Strain (public) • Government Interruptions • HAZMAT Release • Human Injury/Death	• Identity Theft – loss of wages and/or assets • Infrastructure Degradation • Loss of Communication Systems • Loss of Digital/Technological Systems • Loss of Power/Electricity Outage • School Closure
Frequency	• Never an occurrence of a major attack	
Likelihood	More Likely • Small town with lack of technological infrastructure to defend against cyberattack	Less Likely • Lack of major state or national financial institutions
Vulnerability	More Vulnerable • Small town with lack of technological infrastructure to defend against cyberattack • Elderly population relying largely on landlines for communication purposes, remote medical care, and equipment monitoring	Less Vulnerable • Lack of major state or national financial institutions • No natural gas service to the city

Table 8.2.2 – City of Balfour, North Dakota, Jurisdiction Risk Assessment – Continued

	Drought	
Impact	• Crop Loss • Loss of Economy • Loss of Livestock • Loss of Wildlife Habitat (decreased wildlife populations) • Increase in Wildland Fire Potential • Water quality compromised from stock dams	• Diminished soil health • Negative impact on mental health of producers and fire responders – "community impact" • Local producers forced to sell off herds which can last for several years • Population loss as people moved away due to loss of economy
Frequency	• Fall of 1980 was dry • Severe drought in 1961/1962, 1988/1989 to 1991/1992 • Some dry conditions each year lasting a couple weeks in length	• In 2013 and 2014, dry conditions were present from June to October with little rain • **Lack of adequate snowfall spring of 2015, 2021, 2023/2024** • Severe drought conditions winter 2020/2021 • Exceptional drought spring and summer 2021
Likelihood	More Likely • Dry/wet cycle every 10 years • Climatic patterns will result in an eventual drought of significance • Lack of precipitation	Less Likely • Heavy precipitation in winter (snow pack) and summer (rainfall)
Vulnerability	More Vulnerable • Loss of economy from decreased wildlife & hunting • Agriculture economy • Elderly population • Flat terrain/open topography contributes to conditions • Pastureland adjacent to structures and city limits	Less Vulnerable • Drake Fire Department • Financial assistance programs made available by the state and federal government • McHenry County Burn Restriction Ordinance • Fire Index monitoring and mapping from NDDES • Advanced communications such as internet and TV

Table 8.2.2 – City of Balfour, North Dakota, Jurisdiction Risk Assessment – Continued

	Fire – Urban Fire/Structure Collapse	
Impact	• Building Collapse • Delayed Emergency Response • Evacuation (Localized) • Explosion	• Human Injury/Death • Increased Fire Potential • **Property damage on a significant scale if impacting downtown structures and other critical facilities or infrastructure in the city due to their close physical proximity**
Frequency	• Single-family home fire in 2004 • Single-family home fire in 2008 – started in the rafters of the garage by the kitchen • Mobile home fire in 2017/2018 in the middle of winter	
Likelihood	More Likely • Age of structures – numerous abandoned/dilapidated buildings • Elderly populations • Increased drug use • Increased use of electric heaters • Outdated electric wiring in older homes and structures • Outdated heating systems • U.S. Highway 52 & CP Railroad Infrastructure	Less Likely • Has no adopted state building codes • Better building standards and maintenance of structures • Smoke detectors in public buildings and private homes/businesses
Vulnerability	More Vulnerable • Adopted state building codes but lack enforcement • Age of structures • Elderly populations • Increased drug use • Increased use of electric heaters • Outdated electric wiring in older homes and structures • Outdated heating systems • U.S. Highway 52 & CP Railroad Infrastructure	Less Vulnerable • Drake Fire Department has trained volunteers and adequate equipment • Better building standards and maintenance of structures • Smoke detectors in public buildings and private homes/businesses • **No natural gas service to the city**

Table 8.2.2 – City of Balfour, North Dakota, Jurisdiction Risk Assessment – Continued

	Fire – Rural & Wildland	
Impact	• Building Collapse • Crop Loss • Delayed Emergency Response • Downed Power Lines • Evacuation (Localized) • Explosion • Increased Wildland Fire Potential • Loss of Power/Electricity Outage	• **Loss of Livestock** • **Loss of Wildlife Habitat** • **Mass Casualties** • **Property Damage (Structure & Vehicle)** • **Losses could be on a significant scale if impacting a major producer or farmstead** • **Loss of farm equipment and assets**
Frequency	• Wildland fire threatened city limits in 1998 • Wildland fire northwest of the city threatened city limits in 2009 • Balfour Fire Dept said wildland fires have occurred mostly northwest of city limits	
Likelihood	More Likely • Agricultural burn-off • High winds annually and dry conditions – when present • Pastureland adjacent to structures and city limits • City is surrounding by crop land • Severe summer weather with significant lightning • U.S. Highway 52 & CP Railroad Infrastructure	Less Likely • Removal of CRP near city limits • Summer and winter weather with heavy precipitation
Vulnerability	More Vulnerable • Agricultural burn-off • High winds annually and dry conditions – when present • Pastureland adjacent to structures and city limits • Severe summer weather with significant lightning • **Lack of fire breaks around city limits** • U.S. Highway 52 & CP Railroad Infrastructure	Less Vulnerable • Drake Fire Department has trained volunteers and equipment • **Adequate staffing coverage/resources of fire department** • Removal of CRP near city limits • Summer and winter weather with heavy precipitation • MOUs with neighboring fire departments • McHenry County Burn Restriction Ordinance

Table 8.2.2 – City of Balfour, North Dakota, Jurisdiction Risk Assessment – Continued

	Flood	
Impact	• Blocked Roads • Delayed Emergency Response • Flooding (Highway & Structure) • Human Injury/Death • Property Damage	
Frequency	• **No occurrences of overland flooding**	
Likelihood	More Likely • Lack of adequate storm water system in the city	Less Likely • Dry conditions/drought and low precipitation
Vulnerability	More Vulnerable • Lack of adequate storm water system in the city	Less Vulnerable • Dry conditions/drought and low precipitation

Table 8.2.2 – City of Balfour, North Dakota, Jurisdiction Risk Assessment – Continued

	Geologic Hazards	
Impact	• Blocked Roads • Delayed Emergency Response • Human Injury/Death • Infrastructure Degradation	• Loss of Economy • Loss of Power/Electricity Outage • Property Damage • Utility Outage/Shortage
Frequency	• No occurrences of geologic hazards other than radon in the city of Balfour	
Likelihood	More Likely • **All N.D. Counties in EPA Radon Zone I**	Less Likely • No Abandoned Mine Lands located near city limits
Vulnerability	More Vulnerable • **All N.D. Counties in EPA Radon Zone I**	Less Vulnerable • No Abandoned Mine Lands located near city limits

Table 8.2.2 – City of Balfour, North Dakota, Jurisdiction Risk Assessment – Continued

	Hazardous Material Release	
Impact	• Blocked Roads • Business & Government Interruptions • Delayed Emergency Response • Environmental Degradation • Evacuation (localized) • Explosion • Human Injury/Death	• Increased Fire Potential • Loss of Economy (business activity) • Loss of Power and/or Drinking/Potable Water • Property Damage
Frequency	• Never an occurrence in city limits	
Likelihood	More Likely • Transportation of chemicals by truck through city limits – restricted from parking in city limits • Storage of chemicals/fertilizers in city limits and on farmsteads in large tanks near city limits • Propane and other heating fuels stored by residents in city limits • U.S. Highway 52 & CP Railroad Infrastructure	Less Likely • Private companies have HAZMAT certifications • Tier II Federal Requirements
Vulnerability	More Vulnerable • Transportation of chemicals by truck through city limits – restricted from parking in city limits • Storage of chemicals/fertilizers in city limits and on farmsteads in large tanks near city limits • U.S. Highway 52 & CP Railroad Infrastructure	Less Vulnerable • Drake Fire Department has trained volunteers and equipment • Private companies have HAZMAT certifications • Tier II Federal Requirements

Table 8.2.2 – City of Balfour, North Dakota, Jurisdiction Risk Assessment – Continued

	Infectious Disease & Pest Infestations	
Impact	• Crop Loss • Human Injury/Death • Livestock Injury/Death • Loss of Economy • Mass Casualties/Fatalities	• Strain on local medical resources (ambulance or clinic) • Loss of Drinking/Potable Water • **Financial cost to public health resources** • Loss of medical staff due to sickness • School Closure
Frequency	• Annual occurrences of death, primarily among the elderly • Occurrence of disease - 1 in 3 for people annually • Annual occurrences of influenza cases in the local population	• **The COVID-19 pandemic of 2020 resulted in mass quarantine and sheltering of the local population and temporary closure of businesses resulting in unmeasured economic losses.**
Likelihood	More Likely • Agriculture economy • Growing elderly population • Small population of children without immunization • Transporting of animals across state lines • Dependent on weather for animals and crops • U.S. Highway 52 & CP Railroad Infrastructure	Less Likely • Advanced communications such as internet and tv • Public health and employment regulations for public facilities • Federal health guidelines at public employers • First District Health Unit, McHenry County education and outreach • FSA and NDSU Extension/McHenry County education and outreach
Vulnerability	More Vulnerable • Agriculture economy • Growing elderly population • Small population of children without immunization • Transporting of animals across state lines • Dependent on weather for animals and crops • U.S. Highway 52 & CP Railroad Infrastructure	Less Vulnerable • Drake Fire Department has trained volunteers and equipment • Advanced communications such as internet and tv • Public health and employment regulations for public facilities Immunizations & medications of local population

Table 8.2.2 – City of Balfour, North Dakota, Jurisdiction Risk Assessment – Continued

	Severe Summer Weather	
Impact	• Blocked Roads • Downed Trees • Evacuation (Localized) • Human Injury/Death – heat exhaustion • Infrastructure Degradation • Livestock Injury/Death • Loss of Crops	• Loss of Power/Downed Power Lines • **Property Damage – repair of roofing, siding and drainage systems for homes** • **Damage to electrical equipment from lightning** • Shelter-in-place • Vehicle Damage • City residents pumping water from property
Frequency	• Annual occurrences of hail, extreme heat, lightning, heavy rain, high wind • Seven to 10 significant storms producing damage to trees and property annually	• **Straight-line windstorm producing significant property in 2017**
Likelihood	• Climatic patterns will result in numerous annual occurrences of the hazard	
Vulnerability	<u>More Vulnerable</u> • Aging infrastructure (roads and electrical systems) • Agriculture Economy • High elderly population • **City lacks a tornado shelter** • **Lack of NOAA weather radios**	<u>Less Vulnerable</u> • Drake Fire Department has trained volunteers and equipment • Advanced warning and notification such as internet and TV • **Lack of public school**

Table 8.2.2 – City of Balfour, North Dakota, Jurisdiction Risk Assessment – Continued

	Severe Winter Weather	
Impact	• Blocked Roads: McHenry County 1 on the west side of the city near the drainage ditch/mobile home court/culvert under the highway • Evacuation (Localized) • Human Injury/Death – wind chill • Loss of Crops • Loss of Livestock	• Loss of Power/Downed Power Lines • Property Damage – repair of roofing, siding and drainage systems for homes • Shelter-in-place • Vehicle Damage
Frequency	• Climatic patterns will result in numerous annual occurrences of the hazard • Ice Storm of 1997 • Significant blizzards in 2009, 2010, 2011, and 2013 – resulting in large-scale overland flooding	• Christmas Storm 2016 • Winter of 2022/2023 – records snowfall
Likelihood	• Climatic patterns will result in numerous annual occurrences of the hazard	
Vulnerability	<u>More Vulnerable</u> • Aging infrastructure (roads and electrical systems) • Agriculture Economy • High elderly population	<u>Less Vulnerable</u> • Drake Fire Department has trained volunteers and equipment • Advanced warning and notification such as internet and TV • **One outdoor emergency siren** • **Lack of public school**

Table 8.2.2 – City of Balfour, North Dakota, Jurisdiction Risk Assessment – Continued

	Space Weather	
Impact	• Government Interruptions • Infrastructure Degradation • Loss of Communication Systems • Loss of Digital/Technological Systems • Loss/Overcrowded Medical Facilities	• Loss of Power/Electricity Outage • Public Distress/Social Discord • School Closure • Loss of operation of the city hall and fire hall, etc. • Loss/outage of medical devices at private residences
Frequency	• Never a recorded occurrence in McHenry County or North Dakota	
Likelihood	• Dependent on solar activity and the 11-year solar cycle • Likely to occur once every 500 years per the 2018 N.D. Enhanced Mitigation MAOP	
Vulnerability	More Vulnerable • Advanced communication systems (internet, TV, etc.) • Agriculture economy • All critical facilities and infrastructure that require electricity for operation • CP Railroad Infrastructure	Less Vulnerable • Local food production/households with gardens

Table 8.2.2 – City of Balfour, North Dakota, Jurisdiction Risk Assessment – Continued

	Transportation Incident	
Impact	• **Blocked roads from inadequate road clearing or incidents** • Business Interruptions • Delayed Emergency Response • Human Injury/Death • Increased Fire Potential • Loss of Transportation/Accessibility – incident blocks access	• Mass Casualties/Fatalities • HAZMAT Release • Livestock Loss • Property Damage
Frequency		
Likelihood	More Likely • Intoxicated drivers • High truck traffic from agriculture-related business • U.S. Highway 52 & CP Railroad Infrastructure	Less Likely • Adequate traffic control signage/stop signs in city limits • No commercial passenger airport
Vulnerability	More Vulnerable • Distracted drivers • Intoxicated drivers • High truck traffic from agriculture-related traffic • U.S. Highway 52 & CP Railroad Infrastructure	Less Vulnerable • Adequate traffic control signage/stop signs in city limits • No commercial passenger airport

8.2.3 Mitigation Strategy

The McHenry County, N.D., Multi-Jurisdictional Multi-Hazard Plan Update includes a mitigation strategy consisting of seven goals in Chapter 6. The following problem statement and mitigation projects address the mitigation needs of the city of Balfour, North Dakota. It should be noted that some mitigation projects that pertain to all jurisdictions are included to encourage county-wide collaboration.

Problem Statement

The city of Balfour, North Dakota, can be impacted by civil disturbance; criminal, terrorist, or nation/state attack; cyberattack; drought; fire (urban and wildland); flood (overland); geologic hazards; hazardous material release; infectious disease and pest infestations; severe summer weather; severe winter weather; space weather, and transportation incident. City residents utilize individual wells for drinking/potable water and septic systems for sanitary sewer service. The city lacks a storm shelter and NOAA weather radios.

The city lacks funding for mitigation projects. With little to no capabilities to accomplish major projects independently, the city is dependent on outside sources for mitigation.

Establishment of a storm shelter, purchasing of NOAA weather radios, and education and outreach are a priority for the city.

8.2.4 Mitigation Capability Assessment

Capability for mitigation is divided into four categories: administrative and technical, education and outreach, financial, and planning and regulatory. Each identified resource in the four categories can be used to implement mitigation strategies and access funding for projects. **Tables comparing the mitigation capabilities of the city of Balfour, North Dakota, with all other jurisdictions in McHenry County can be found below and in Chapter 7, County Mitigation Capability Assessment.**

- Administrative and Technical: Identification of administrative and technical capabilities, which include: staff, their skills and tools for mitigation planning to implement specific mitigation actions.
- Education and Outreach: Identification of education and outreach programs, and methods already in place to implement mitigation activities and communicate hazard-related information.
- Financial: Identification of access to or eligibility to use funding resources for hazard mitigation for jurisdictions.
- Planning and Regulatory: Jurisdictional plans, policies, codes, and ordinances adopted and in place that prevent and reduce the impacts of natural hazards and man-made threats.

City of Balfour, North Dakota, Mitigation Capabilities Summary

The following mitigation capabilities were identified as commonplace among all natural hazards and man-made threats upon completion of the risk assessment for the city of Balfour, North Dakota. More detailed information about the mitigation capabilities of the city of Balfour in relation to McHenry County and all other incorporated jurisdictions can be found in Chapter 7, Mitigation Capability Assessment.

2018 & 2023 N.D. Enhanced Mitigation MAOP	McHenry County Public Health
Advanced Communications: Internet & TV	McHenry County Sheriff's Office & MOUs
Emergency siren(s)/early warning systems	N.D. Dept. of Emergency Services (NNDES)
McHenry County Commission	NDDES Fire Index Monitoring
McHenry Comprehensive Plan	NDDOT State Transportation Plan & State Shop
McHenry County Courthouse	NDSU/McHenry County Extension
McHenry County Emergency Management	Balfour Auditor and City Council
McHenry County LEOP	Drake Fire Department/Protection District

8.2.5 Integration of Mitigation Plan into Planning Mechanisms

Integration of the plan into current planning mechanisms is critical in mitigation to communicate the needs of each jurisdiction to achieve an all-inclusive mitigation strategy. The process for integration of the mitigation plan is included after each mitigation project, which shows the planning mechanism utilized, the plan element used for integration and the process for integration.

8.2.6 Plan Maintenance

An important aspect of any usable plan is the maintenance and upkeep of the document. At any given time, planning, risk analysis, updating the situation assessment, research, coordinating, disaster response or other activity is occurring. Plan maintenance ensures the plan will remain useful in the county for many years. A mitigation action progress report form to conduct plan maintenance is in Chapter 10 of this plan.

8.3 City of Bergen, North Dakota

The following profile includes information specific to the city of Bergen, North Dakota, for mitigation planning purposes. The information included is as follows:

- Profile and Inventory;
- Risk Assessment;
- Hazard Scoring Notes;
- Mitigation Projects, and
- Capabilities for Mitigation.

Integration into Planning Mechanisms

The process for integration of the mitigation plan into existing planning mechanisms is discussed at the bottom of each mitigation project in section 8.3.4, section 8.3.5 and in Chapter 6, Mitigation Strategy.

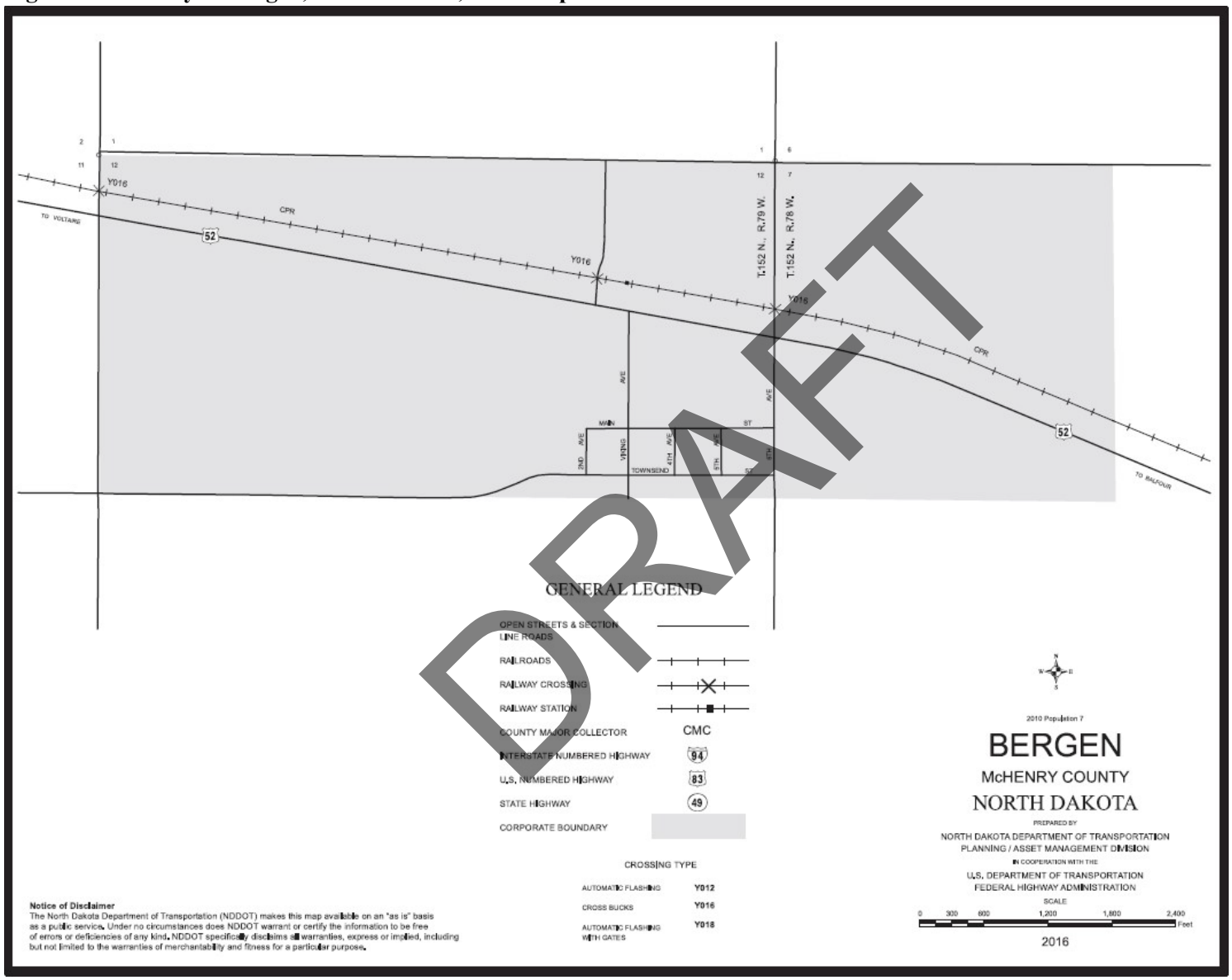
Plan Maintenance

Plan maintenance is shown in section 8.3.6.

Critical Facilities and Infrastructure

Figure 8.3.1 is a map of the city of Bergen, North Dakota, provided by the N.D. Dept of Transportation.

Figure 8.3.1 – City of Bergen, North Dakota, Base Map



Source: N.D. Dept. of Transportation

8.3.1 Profile and Inventory

The location, total population, vulnerable (underserved) populations, housing units and household size, businesses, critical facilities and infrastructure, new and future development, services, jurisdictional buildings, emergency response services and utilities are shown for the city of Bergen, North Dakota. Detailed narratives follow each section heading to profile the city.

Detailed information on public buildings, services provided, emergency response services and utilities can be found in Chapter 3, Profile and Inventory.

Location

The city of Bergen, North Dakota, is in north-central North Dakota, approximately 31 miles southeast of the city of Minot, North Dakota, the state's fourth largest city.

Population

Table 8.3.1 shows population trends for the city of Bergen, North Dakota, from 1920 to 2020 per the 2020 U.S. Decennial Census, with an estimate for 2022. According to the 2020 U.S. Decennial Census, the city of Bergen, North Dakota, contains 10 people, an increase of three people (42.9 percent) from seven people in 2010.

Table 8.3.1 – 1920 to 2022 City of Bergen, North Dakota, Population Trends and Projections

1920	1930	1940	1950	1960	1970	1980	1990	2000	2010	2020	*2022 est.*
--	98	67	51	52	24	24	15	11	7	10	*12*

Source(s): U.S. Decennial Census; American Community Survey, 5-Year Estimates

Vulnerable Populations

- Age. Per the 2018 to 2022 American Community Survey 5-Year Estimate, the population of the city of Bergen, North Dakota, consists of no individuals under the age of 20 and no individuals aged 65 and older. **According to the city of Bergen Auditor, there are five individuals aged 65 and older in the city of Bergen, North Dakota.**
- Daycare. There are no daycares in the city of Bergen, North Dakota.
- Poverty. Per the 2018 to 2022 American Community Survey 5-Year Estimate, there are no individuals in the city of Bergen, North Dakota.
- Public Schools. There is not a public school in the city of Bergen, North Dakota.
- Senior Housing Developments/Care Centers. There are no senior housing developments or care centers in the city of Bergen, North Dakota.

Housing Units and Household Size

The 2018 to 2022 American Community Survey 5-Year Estimate shows there are three housing units in the city of Bergen, North Dakota, consisting of all single-family homes. **According to the city of Bergen Auditor, there are 10 housing units in the city of Bergen, North Dakota.**

The 2018 to 2022 American Community Survey 5-Year Estimate there are three households in the city of Bergen, North Dakota, resulting in an average household size of 1.59 people. **According to the city of Bergen Auditor, the average household size is 1.33 people in the city of Bergen, North Dakota.**

Businesses

There are no businesses in the city of Bergen, North Dakota.

New and Future Development

New development in the city of Bergen, North Dakota, over the last five years includes:

- Removal of abandoned/blighted structures.

There are no future developments planned or proposed in the city of Bergen, North Dakota.

Critical Facilities

- There are no critical facilities in the city of Bergen, North Dakota.

Infrastructure

- All residents in the city of Bergen, North Dakota, utilize septic systems.
- All residents in the city of Bergen, North Dakota, receive drinking/potable water from individual wells.
- U.S. Highway 52 serves the city of Bergen, North Dakota.

Emergency Response Services

- Harvey Ambulance Service provides ambulance services to the city of Bergen, North Dakota, and surrounding rural areas.
- The Velva Fire Department/Rural Protection District provides fire protection services to the city of Bergen, North Dakota, and surrounding rural areas.
- The McHenry County Sheriff's Office provides law enforcement services to the city of Bergen, North Dakota.
- First District Health Unit, McHenry County is in the city of Towner, North Dakota, provides public health services to the city of Bergen, North Dakota, and greater McHenry County.

Services and Utilities

- Circle Sanitation provides contracted garbage collection services to the city of Bergen, North Dakota.
- The city of Bergen, North Dakota, does not have an inert landfill.
- All residents in the city of Bergen, North Dakota, utilize septic systems.
- All residents in the city of Bergen, North Dakota, receive drinking/potable water individual wells.
- The city of Bergen, North Dakota, has a storm water system consisting of culverts and drainage ditches.

- The Velva Voice is the official newspaper of the city of Bergen, North Dakota. The city also receives the Minot Daily News and Velva Voice.
- Electricity is provided by Otter Tail Power Company in the city of Bergen, North Dakota.
- Natural gas is not available in the city of Bergen, North Dakota.
- Fuel oil and propane are used as an alternative heating source and are provided by companies chosen by the individual consumer in Bergen, North Dakota.
- Souris River Telephone (SRT) provides internet, phone, and TV to the city of Bergen, North Dakota, and surrounding rural area.

8.3.2 Risk Assessment and Hazard Scoring Notes

Table 8.3.1 summarizes the risk assessment scoring of the city of Bergen, North Dakota. The risk assessment and hazard scoring notes for each hazard specific to the city are shown in Table 8.3.2. Risk assessment notes for impact, frequency, likelihood, and vulnerability ubiquitous for jurisdictions in McHenry County are found in Chapter 5, Threat and Hazard Identification Assessment in each respective hazard profile.

Table 8.3.1 – City of Bergen, North Dakota, Jurisdiction Risk Assessment Scoring Summary

Risk Assessment			**Jurisdiction:**	**City of Bergen, North Dakota**		
Hazard/Threat	Impact	Frequency	Likelihood	Vulnerability	Capabilities	**Total**
Civil Disturbance	4	1	1	1	1	**6**
Criminal, Terrorist, or Nation-State Attack	2	2	1	1	1	**5**
Cyberattack	3	1	1	2	2	**5**
Dam Failure	*NA*	*NA*	*NA*	*NA*	*NA*	***NA***
Drought	4	3	4	4	1	**14**
Fire – Urban/Structure Collapse	5	2	3	4	1	**13**
Fire – Wildland (including Rural)	5	2	3	4	1	**13**
Flood	3	2	2	2	1	**8**
Geologic Hazards	4	1	1	2	1	**7**
Hazardous Material Release	5	2	2	2	1	**7**
Infectious Disease & Pest Infestations	5	5	5	2	1	**16**
Severe Summer Weather	5	5	5	2	1	**16**
Severe Winter Weather	5	5	5	2	1	**16**
Space Weather	2	1	2	2	1	**6**
Transportation Incident	3	2	2	2	1	**8**

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 8.3.2 – City of Bergen, North Dakota, Jurisdiction Risk Assessment

	Civil Disturbance	
Impact	• Blocked Roads • Business/Government Interruptions • Delayed Emergency Response • Financial Hardship/Strain (public)	• HAZMAT Release • Human Injury/Death • Loss of Communication Systems • Property Damage (Structure) • Property Damage (Vehicle)
Frequency	• Never an occurrence of a major incident	• DAPL protesters were not active in the city
Likelihood	More Likely • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 & CP Railroad Infrastructure	Less Likely • Small town with no major regional/state attractions • Sparse population
Vulnerability	More Vulnerable • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 & CP Railroad Infrastructure	Less Vulnerable • Small town with no major regional/state attractions • Sparse population • McHenry County Sheriff's Office

Table 8.3.2 – City of Bergen, North Dakota, Jurisdiction Risk Assessment – Continued

	Criminal, Terrorist, Nation-State Attack	
Impact	• Blocked Roads • Business/Government Interruptions • Delayed Emergency Response • Disease Outbreak/Mass Infections • Financial Hardship/Strain (public) • HAZMAT Release • Human Injury/Death	• Infrastructure Degradation • Loss of Communication Systems • Mass Casualties/Fatalities • Property Damage (Structure) • Property Damage (Vehicle)
Frequency	• **Never an occurrence in city limits**	
Likelihood	More Likely • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 & CP Railroad Infrastructure • Minot AFB and Missile Silos in proximity to city limits	Less Likely • Small town with no major regional/state attractions • Sparse population
Vulnerability	More Vulnerable • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 & CP Railroad Infrastructure	Less Vulnerable • Small town with no major regional/state attractions • Sparse population • McHenry County Sheriff's Office

Table 8.3.2 – City of Bergen, North Dakota, Jurisdiction Risk Assessment – Continued

	Cyberattack	
Impact	• Business Interruptions • Delayed Emergency Response • Financial Hardship/Strain (public) • Government Interruptions • HAZMAT Release • Human Injury/Death	• Identity Theft – loss of wages and/or assets • Infrastructure Degradation • Loss of Communication Systems • Loss of Digital/Technological Systems • Loss of Power/Electricity Outage • School Closure
Frequency	• Never an occurrence of a major attack	
Likelihood	More Likely • Small town with lack of technological infrastructure to defend against cyberattack	Less Likely • Lack of major state or national financial institutions
Vulnerability	More Vulnerable • Small town with lack of technological infrastructure to defend against cyberattack • Elderly population relying largely on landlines for communication purposes, remote medical care, and equipment monitoring	Less Vulnerable • Lack of major state or national financial institutions • No natural gas service to the city

Table 8.3.2 – City of Bergen, North Dakota, Jurisdiction Risk Assessment – Continued

	Drought	
Impact	• Crop Loss • Loss of Economy • Loss of Livestock • Loss of Wildlife Habitat (decreased wildlife populations) • Increase in Wildland Fire Potential • Water quality compromised from stock dams	• Diminished soil health • Negative impact on mental health of producers and fire responders – "community impact" • Local producers forced to sell off herds which can last for several years • Population loss as people moved away due to loss of economy
Frequency	• Fall of 1980 was dry • Severe drought in 1961/1962, 1988/1989 to 1991/1992 • Some dry conditions each year lasting a couple weeks in length	• In 2013 and 2014, dry conditions were present from June to October with little rain • **Lack of adequate snowfall spring of 2015, 2021, 2023/2024** • Severe drought conditions winter 2020/2021 • Exceptional drought spring and summer 2021
Likelihood	More Likely • Dry/wet cycle every 10 years • Climatic patterns will result in an eventual drought of significance • Lack of precipitation	Less Likely • Heavy precipitation in winter (snow pack) and summer (rainfall)
Vulnerability	More Vulnerable • Loss of economy from decreased wildlife & hunting • Agriculture economy • Elderly population • Flat terrain/open topography contributes to conditions • Pastureland adjacent to structures and city limits • City residents utilize individual wells for drinking/potable water	Less Vulnerable • Velva Fire Department • Financial assistance programs made available by the state and federal government • McHenry County Burn Restriction Ordinance • Fire Index monitoring and mapping from NDDES • Advanced communications such as internet and TV

Table 8.3.2 – City of Bergen, North Dakota, Jurisdiction Risk Assessment – Continued

	Fire – Urban Fire/Structure Collapse	
Impact	• Building Collapse • Delayed Emergency Response • Evacuation (Localized) • Explosion	• Human Injury/Death • Increased Fire Potential • **Property damage on a significant scale if impacting downtown structures and other critical facilities or infrastructure in the city due to their close physical proximity**
Frequency	• Single-family home fire in 2004 • Single-family home fire in 2008 – started in the rafters of the garage by the kitchen • Mobile home fire in 2017/2018 in the middle of winter	
Likelihood	<u>More Likely</u> • Age of structures – some abandoned • Elderly populations • Increased drug use • Increased use of electric heaters • Outdated electric wiring in older homes and structures • Outdated heating systems	<u>Less Likely</u> • Has not adopted state building codes • Better building standards and maintenance of structures • Smoke detectors in public buildings and private homes/businesses
Vulnerability	<u>More Vulnerable</u> • Adopted state building codes but lack enforcement • Age of structures • Elderly populations • Increased drug use • Increased use of electric heaters • Outdated electric wiring in older homes and structures • Outdated heating systems • U.S. Highway 52 & CP Railroad Infrastructure	<u>Less Vulnerable</u> • Velva Fire Department has trained volunteers and adequate equipment • Better building standards and maintenance of structures • Smoke detectors in public buildings and private homes/businesses

Table 8.3.2 – City of Bergen, North Dakota, Jurisdiction Risk Assessment – Continued

	Fire – Rural & Wildland	
Impact	• Building Collapse • Crop Loss • Delayed Emergency Response • Downed Power Lines • Evacuation (Localized) • Explosion • Increased Wildland Fire Potential • Loss of Power/Electricity Outage	• **Loss of Livestock** • **Loss of Wildlife Habitat** • **Mass Casualties** • **Property Damage (Structure & Vehicle)** • **Losses could be on a significant scale if impacting a major producer or farmstead** • **Loss of farm equipment and assets**
Frequency	• No incidents of wildland fire threatening city limits	
Likelihood	More Likely • Agricultural burn-off • High winds annually and dry conditions – when present • Pastureland adjacent to structures and city limits • City is surrounding by crop land • Severe summer weather with significant lightning	Less Likely • Removal of CRP near city limits • Summer and winter weather with heavy precipitation
Vulnerability	More Vulnerable • Agricultural burn-off • High winds annually and dry conditions – when present • Pastureland adjacent to structures and city limits • Severe summer weather with significant lightning • **Lack of fire breaks around city limits** • U.S. Highway 52 & CP Railroad Infrastructure	Less Vulnerable • Velva Fire Department has trained volunteers and equipment • Removal of CRP near city limits • Summer and winter weather with heavy precipitation • MOUs with neighboring fire departments • McHenry County Burn Restriction Ordinance

Table 8.3.2 – City of Bergen, North Dakota, Jurisdiction Risk Assessment – Continued

	Flood
Impact	• Blocked Roads • Delayed Emergency Response • Flooding (Highway & Structure) • Human Injury/Death • Property Damage
Frequency	• **No occurrences of major overland flooding.**
Likelihood	More Likely • Surrounding soils consisting of mostly blue clay in and around the city – contributes to overland due to slow drainage • Some low spots in city limits Less Likely • Dry conditions/drought and low precipitation
Vulnerability	More Vulnerable • Surrounding soils consisting of mostly blue clay in and around the city – contributes to overland due to slow drainage • Some low spots in city limits Less Vulnerable • Dry conditions/drought and low precipitation

Table 8.3.2 – City of Bergen, North Dakota, Jurisdiction Risk Assessment – Continued

	Geologic Hazards	
Impact	• Blocked Roads • Delayed Emergency Response • Human Injury/Death • Infrastructure Degradation	• Loss of Economy • Loss of Power/Electricity Outage • Property Damage • Utility Outage/Shortage
Frequency	• No occurrences of geologic hazards other than radon in the city of Bergen	
Likelihood	More Likely • **All N.D. Counties in EPA Radon Zone I**	Less Likely • No Abandoned Mine Lands located near city limits
Vulnerability	More Vulnerable • **All N.D. Counties in EPA Radon Zone I**	Less Vulnerable • No Abandoned Mine Lands located near city limits

Table 8.3.2 – City of Bergen, North Dakota, Jurisdiction Risk Assessment – Continued

	Hazardous Material Release	
Impact	• Blocked Roads • Business & Government Interruptions • Delayed Emergency Response • Environmental Degradation • Evacuation (localized) • Explosion • Human Injury/Death	• Increased Fire Potential • Loss of Economy (business activity) • Loss of Power and/or Drinking/Potable Water • Property Damage
Frequency	• Never an occurrence in city limits	
Likelihood	More Likely • Storage of chemicals/fertilizers in city limits and on farmsteads in large tanks near city limits • U.S. Highway 52 & CP Railroad Infrastructure	Less Likely • Private companies have HAZMAT certifications • Tier II Federal Requirements
Vulnerability	More Vulnerable • Storage of chemicals/fertilizers in city limits and on farmsteads in large tanks near city limits • U.S. Highway 52 & CP Railroad Infrastructure	Less Vulnerable • Velva Fire Department has trained volunteers and equipment • Private companies have HAZMAT certifications • Tier II Federal Requirements

Table 8.3.2 – City of Bergen, North Dakota, Jurisdiction Risk Assessment – Continued

	Infectious Disease & Pest Infestations	
Impact	• Crop Loss • Human Injury/Death • Livestock Injury/Death • Loss of Economy • Mass Casualties/Fatalities	• Strain on local medical resources (ambulance or clinic) • Loss of Drinking/Potable Water • **Financial cost to public health resources** • Loss of medical staff due to sickness • School Closure
Frequency	• Annual occurrences of death, primarily among the elderly • Occurrence of disease - 1 in 3 for people annually • Annual occurrences of influenza cases in the local population	• **The COVID-19 pandemic of 2020 resulted in mass quarantine and sheltering of the local population and temporary closure of businesses resulting in unmeasured economic losses.**
Likelihood	More Likely • Agriculture economy • Growing elderly population • Small population of children without immunization • Transporting of animals across state lines • Dependent on weather for animals and crops • U.S. Highway 52 & CP Railroad Infrastructure	Less Likely • Advanced communications such as internet and tv • Public health and employment regulations for public facilities • Federal health guidelines at public employers • First District Health Unit, McHenry County education and outreach • FSA and NDSU Extension/McHenry County education and outreach
Vulnerability	More Vulnerable • Agriculture economy • Growing elderly population • Small population of children without immunization • Transporting of animals across state lines • Dependent on weather for animals and crops • U.S. Highway 52 & CP Railroad Infrastructure	Less Vulnerable • Velva Fire Department has trained volunteers and equipment • Advanced communications such as internet and tv • Public health and employment regulations for public facilities Immunizations & medications of local population

Table 8.3.2 – City of Bergen, North Dakota, Jurisdiction Risk Assessment – Continued

	Severe Summer Weather	
Impact	• Blocked Roads • Downed Trees • Evacuation (Localized) • Human Injury/Death – heat exhaustion • Infrastructure Degradation • Livestock Injury/Death • Loss of Crops	• Loss of Power/Downed Power Lines • **Property Damage – repair of roofing, siding and drainage systems for homes** • **Damage to electrical equipment from lightning** • Shelter-in-place • Vehicle Damage
Frequency	• Annual occurrences of hail, extreme heat, lightning, heavy rain, high wind • Seven to 10 significant storms producing damage to trees and property annually	• **Straight-line windstorm producing significant property in 2017**
Likelihood	• Climatic patterns will result in numerous annual occurrences of the hazard	
Vulnerability	<u>More Vulnerable</u> • Aging infrastructure (roads and electrical systems) • Agriculture Economy • High elderly population • **City lacks a tornado shelter** • **Lack of NOAA weather radios**	<u>Less Vulnerable</u> • Velva Fire Department has trained volunteers and equipment • Advanced warning and notification such as internet and TV • **Lack of public school**

Table 8.3.2 – City of Bergen, North Dakota, Jurisdiction Risk Assessment – Continued

	Severe Winter Weather	
Impact	• Blocked Roads: McHenry County 1 on the west side of the city near the drainage ditch/mobile home court/culvert under the highway • Evacuation (Localized) • Human Injury/Death – wind chill • Loss of Crops • Loss of Livestock	• Loss of Power/Downed Power Lines • Property Damage – repair of roofing, siding and drainage systems for homes • Shelter-in-place • Vehicle Damage
Frequency	• Climatic patterns will result in numerous annual occurrences of the hazard • Ice Storm of 1997 • Significant blizzards in 2009, 2010, 2011, and 2013 – resulting in large-scale overland flooding	• Christmas Storm 2016 • Winter of 2022/2023 – records snowfall
Likelihood	• Climatic patterns will result in numerous annual occurrences of the hazard	
Vulnerability	<u>More Vulnerable</u> • Aging infrastructure (roads and electrical systems) • Agriculture Economy • High elderly population	<u>Less Vulnerable</u> • Velva Fire Department has trained volunteers and equipment • Advanced warning and notification such as internet and TV

Table 8.3.2 – City of Bergen, North Dakota, Jurisdiction Risk Assessment – Continued

	Space Weather	
Impact	• Government Interruptions • Infrastructure Degradation • Loss of Communication Systems • Loss of Digital/Technological Systems • Loss/Overcrowded Medical Facilities	• Loss of Power/Electricity Outage • Public Distress/Social Discord • School Closure • Loss of operation of the city hall and fire hall, etc. • Loss/outage of medical devices at private residences
Frequency	• Never a recorded occurrence in McHenry County or North Dakota	
Likelihood	• Dependent on solar activity and the 11-year solar cycle • Likely to occur once every 500 years per the 2018 N.D. Enhanced Mitigation MAOP	
Vulnerability	<u>More Vulnerable</u> • Advanced communication systems (internet, TV, etc.) • Agriculture economy • All critical facilities and infrastructure that require electricity for operation • CP Railroad Infrastructure	<u>Less Vulnerable</u> • Local food production/households with gardens

Table 8.3.2 – City of Bergen, North Dakota, Jurisdiction Risk Assessment – Continued

	Transportation Incident	
Impact	• **Blocked roads from inadequate road clearing or incidents** • Business Interruptions • Delayed Emergency Response • Human Injury/Death • Increased Fire Potential	• Loss of Transportation/Accessibility – incident blocks access • Mass Casualties/Fatalities • HAZMAT Release • Livestock Loss • Property Damage
Frequency	• Never an occurrence of a major incident in city limits	
Likelihood	More Likely • Intoxicated drivers • High truck traffic from agriculture-related business • U.S. Highway 52 and CP Railroad Infrastructure	Less Likely • Adequate traffic control signage/stop signs in city limits • No commercial passenger airport
Vulnerability	More Vulnerable • Distracted drivers • Intoxicated drivers • High truck traffic from agriculture-related traffic • Intoxicated drivers • High truck traffic from agriculture-related business • U.S. Highway 52 and CP Railroad Infrastructure	Less Vulnerable • Adequate traffic control signage/stop signs in city limits • No commercial passenger airport

8.3.3 Mitigation Strategy

The McHenry County, N.D., Multi-Jurisdictional Multi-Hazard Plan Update includes a mitigation strategy consisting of seven goals in Chapter 6. The following problem statement and mitigation projects address the mitigation needs of the city of Bergen, North Dakota. It should be noted that some mitigation projects that pertain to all jurisdictions are included to encourage county-wide collaboration.

Problem Statement

The city of Bergen, North Dakota, can be impacted by civil disturbance; criminal, terrorist, or nation/state attack; cyberattack; drought; fire (urban and wildland); flood (overland); geologic hazards; hazardous material release; infectious disease and pest infestations; severe summer weather; severe winter weather; space weather, and transportation incident. City residents utilize individual wells for drinking/potable water and septic systems for sanitary sewer service. The city lacks a storm shelter and NOAA weather radios.

The city lacks funding for mitigation projects. With little to no capabilities to accomplish major projects independently, the city is dependent on outside sources for mitigation.

Establishment of a storm shelter, purchasing of NOAA weather radios, and education and outreach are a priority for the city.

Mitigation projects go here once completed.

8.3.4 Mitigation Capability Assessment

Capability for mitigation is divided into four categories: administrative and technical, education and outreach, financial, and planning and regulatory. Each identified resource in the four categories can be used to implement mitigation strategies and access funding for projects. **Tables comparing the mitigation capabilities of the city of Bergen, North Dakota, with all other jurisdictions in McHenry County can be found below and in Chapter 7, County Mitigation Capability Assessment.**

- Administrative and Technical: Identification of administrative and technical capabilities, which include: staff, their skills and tools for mitigation planning to implement specific mitigation actions.
- Education and Outreach: Identification of education and outreach programs, and methods already in place to implement mitigation activities and communicate hazard-related information.
- Financial: Identification of access to or eligibility to use funding resources for hazard mitigation for jurisdictions.
- Planning and Regulatory: Jurisdictional plans, policies, codes, and ordinances adopted and in place that prevent and reduce the impacts of natural hazards and man-made threats.

City of Bergen, North Dakota, Mitigation Capabilities Summary

The following mitigation capabilities were identified as commonplace among all natural hazards and man-made threats upon completion of the risk assessment for the city of Bergen, North Dakota. More detailed information about the mitigation capabilities of the city of Bergen in relation to McHenry County and all other incorporated jurisdictions can be found in Chapter 7, Mitigation Capability Assessment.

2018 & 2023 N.D. Enhanced Mitigation MAOP	McHenry County Public Health
Advanced Communications: Internet & TV	McHenry County Sheriff's Office & MOUs
Emergency siren(s)/early warning systems	N.D. Dept. of Emergency Services (NNDES)
McHenry County Commission	NDDES Fire Index Monitoring
McHenry Comprehensive Plan	NDDOT State Transportation Plan & State Shop
McHenry County Courthouse	NDSU/McHenry County Extension
McHenry County Emergency Management	Bergen Auditor and City Council
McHenry County LEOP	Velva Fire Department/Protection District

8.3.5 Integration of Mitigation Plan into Planning Mechanisms

Integration of the plan into current planning mechanisms is critical in mitigation to communicate the needs of each jurisdiction to achieve an all-inclusive mitigation strategy. The process for integration of the mitigation plan is included after each mitigation project, which shows the planning mechanism utilized, the plan element used for integration and the process for integration.

8.3.6 Plan Maintenance

An important aspect of any usable plan is the maintenance and upkeep of the document. At any given time, planning, risk analysis, updating the situation assessment, research, coordinating, disaster response or other activity is occurring. Plan maintenance ensures the plan will remain useful in the county for many years. A mitigation action progress report form to conduct plan maintenance is in Chapter 10 of this plan.

8.4 City of Deering, North Dakota

The following profile includes information specific to the city of Deering, North Dakota, for mitigation planning purposes. The information included is as follows:

- Profile and Inventory;
- Risk Assessment;
- Hazard Scoring Notes;
- Mitigation Projects, and
- Capabilities for Mitigation.

Integration into Planning Mechanisms

The process for integration of the mitigation plan into existing planning mechanisms is discussed at the bottom of each mitigation project in section 8.4.4, section 8.4.5 and in Chapter 6, Mitigation Strategy.

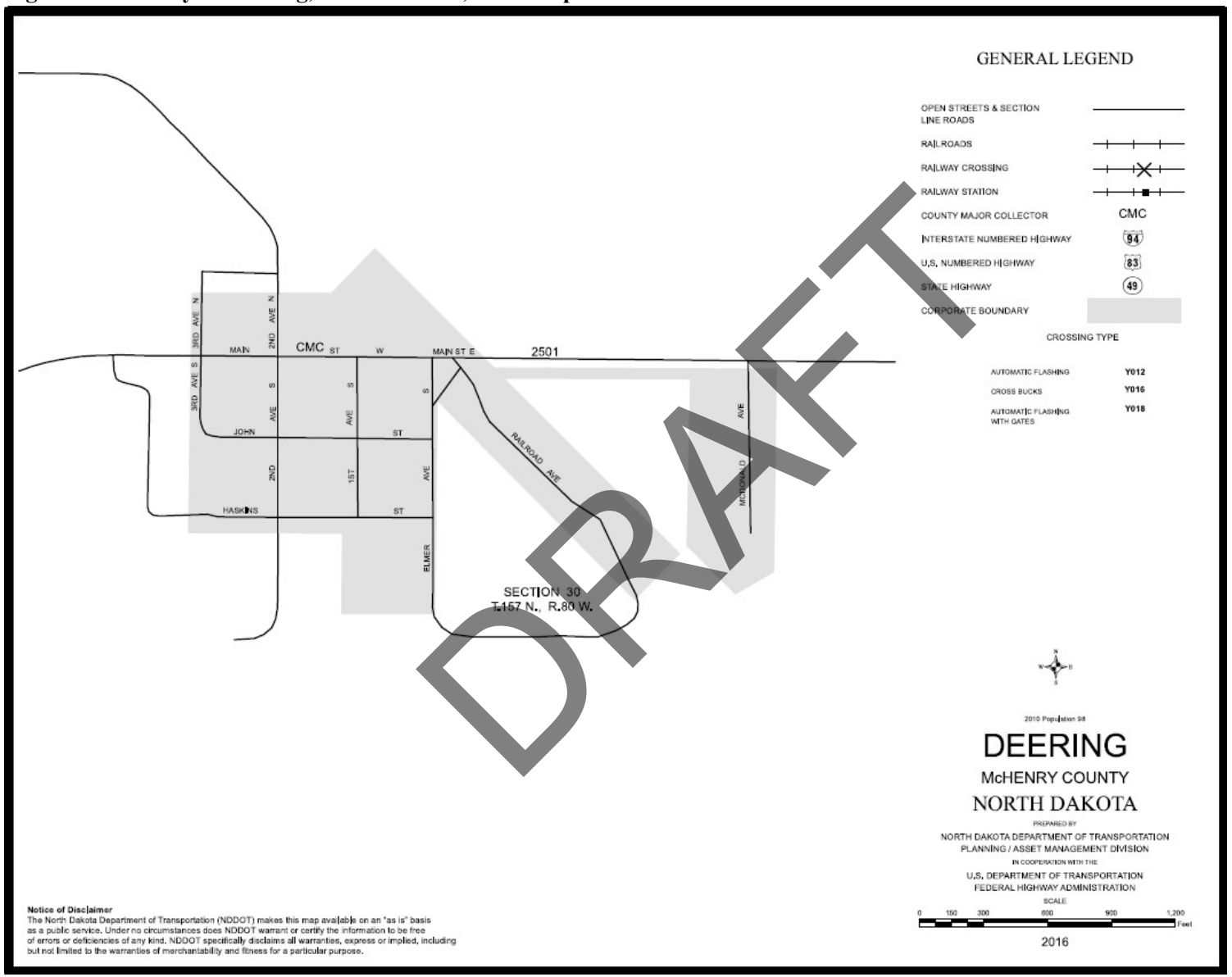
Plan Maintenance

Plan maintenance is shown in section 8.4.6.

Critical Facilities and Infrastructure

Figure 8.4.1 is a map of the city of Deering, North Dakota, provided by the N.D. Dept of Transportation.

Figure 8.4.1 – City of Deering, North Dakota, Base Map



Source: N.D. Dept. of Transportation

8.4.1 Profile and Inventory

The location, total population, vulnerable (underserved) populations, housing units and household size, businesses, critical facilities and infrastructure, new and future development, services, jurisdictional buildings, emergency response services and utilities are shown for the city of Deering, North Dakota. Detailed narratives follow each section heading to profile the city.

Detailed information on public buildings, services provided, emergency response services and utilities can be found in Chapter 3, Profile and Inventory.

Location

The city of Deering, North Dakota, is in north-central North Dakota, approximately 12 miles east of the Minot Air Force Base (AFB).

Population

Table 8.4.1 shows population trends for the city of Deering, North Dakota, from 1920 to 2020 per the 2020 U.S. Decennial Census, with an estimate for 2022. According to the 2020 U.S. Decennial Census, the city of Deering, North Dakota, contains 94 people, a decrease of four people (4.1 percent) from 98 people in 2010.

Table 8.4.1 – 1920 to 2022 City of Deering, North Dakota, Population Trends and Projections

1920	1930	1940	1950	1960	1970	1980	1990	2000	2010	2020	*2022 est.*
142	192	140	136	117	75	85	99	118	98	94	*91*

Source(s): U.S. Decennial Census; American Community Survey, 5-Year Estimates

Vulnerable Populations

- Age. Per the 2018 to 2022 American Community Survey 5-Year Estimate, the population of the city of Deering, North Dakota, consists of 32 individuals under the aged of 20 and six individuals aged 65 and older, representing 31.4 and 5.9 percent of the city's population, respectively..
- Daycare. There are no daycares in the city of Deering, North Dakota.
- Poverty. Per the 2018 to 2022 American Community Survey 5-Year Estimate, there are four individuals in the city of Deering, North Dakota, that lives below the poverty line, representing 3.9 percent of the city's population.
- Public Schools. The original public school in the city of Deering, North Dakota, closed in the 1970s. The former school has never been retrofitted or adapted to any new uses. The newer school (located on the north side of the city) that replaced the original school building was built in 1960s and closed in the 1990s.
- Senior Housing Developments/Care Centers. There are no senior housing developments or care centers in the city of Deering, North Dakota.

Housing Units and Household Size

The 2018 to 2022 American Community Survey 5-Year Estimate shows there are 44 housing units in the city of Deering, North Dakota, consisting of 30 single-family homes, no multifamily homes, and 14 mobile homes.

The 2018 to 2022 American Community Survey 5-Year Estimate there are 41 households in the city of Deering, North Dakota, resulting in an average household size of 2.49 people.

Businesses

Businesses in the city of Deering, North Dakota, include Olson's Auto Repair, Pete's Pub N' Grub, and Pioneer Metal Sales.

New and Future Development

New development in the city of Deering, North Dakota, over the last five years includes:

- The rural fire department expanded their fire hall in 2020.
- Pioneer Metal Sales expanded their business with the construction of a new building in 2020.

The following future development is planned or proposed in the city of Deering, North Dakota, includes:

- The original public school, repurposed as the VFW, is being demolished after asbestos removal sometime in late 2024.
- Pioneer Metal Sales is planning to expand its operation again in the next five years.

Critical Facilities

- Deering Community Center
- Deering Fire Hall
- Deering City Shop (McHenry County Shop - where the county stores its maintainer)
- Minot Air Force Base (AFB) Doppler Radar is 11 miles east of the city of Deering.

Infrastructure

- The city of Deering, North Dakota, has a sanitary sewer system with two lagoon cells and no lift stations due to the system being gravity-fed.
- The city of Deering, North Dakota, receives drinking/potable water from North Prairie Regional Water District.
- The city of Deering, North Dakota, does not have inert landfill.
- McHenry County Road 8 and 23 and serve the city of Deering, North Dakota.
- Verizon Wireless has a cellular tower one mile east of the city of Deering, North Dakota.

Emergency Response Services

- The Minot and Glenburn Ambulance Services provides ambulance service to the city of Deering, North Dakota, and surrounding rural areas.

- The Deering Fire Department/Rural Protection District provides fire protection services to the city of Deering, North Dakota, and surrounding rural areas.
- The McHenry County Sheriff's Office provides law enforcement services to the city of Deering, North Dakota.
- First District Health Unit, McHenry County is in the city of Towner, North Dakota, provides public health services to the city of Deering, North Dakota, and greater McHenry County.

Services and Utilities

- Circle Sanitation provides contracted garbage collection services to the city of Deering, North Dakota.
- The city of Deering, North Dakota, does not have an inert landfill.
- The city of Deering, North Dakota, has a sanitary sewer system with two lagoon cells and no lift stations due to the system being gravity-fed.
- The city of Deering, North Dakota, has a storm water system consisting of culverts and drainage ditches.
- The Mouse River Journal is the official newspaper of the city of Deering, North Dakota.
- The city of Deering, North Dakota, receives drinking/potable water from North Prairie Regional Water District.
- Electricity is provided by Otter Tail Power Company in the city of Deering, North Dakota.
- Natural gas is not available in the city of Deering, North Dakota.
- Fuel oil and propane are used as an alternative heating source and are provided by companies chosen by the individual consumer in Deering, North Dakota.
- Souris River Telephone provides internet, phone, and TV to the city of Deering, North Dakota, and surrounding rural area.

8.4.2 Risk Assessment and Hazard Scoring Notes

Table 8.4.1 summarizes the risk assessment scoring of the city of Deering, North Dakota. The risk assessment and hazard scoring notes for each hazard specific to the city are shown in Table 8.4.2. Risk assessment notes for impact, frequency, likelihood, and vulnerability ubiquitous for jurisdictions in McHenry County are found in Chapter 5, Threat and Hazard Identification Assessment in each respective hazard profile.

Table 8.4.1 – City of Deering, North Dakota, Jurisdiction Risk Assessment Scoring Summary

Risk Assessment			**Jurisdiction:**	**City of Deering, North Dakota**		
Hazard/Threat	Impact	Frequency	Likelihood	Vulnerability	Capabilities	**Total**
Civil Disturbance	5	1	2	5	4	**9**
Criminal, Terrorist, or Nation-State Attack	5	1	2	5	4	**9**
Cyberattack	5	1	2	3	2	**9**
Dam Failure	*NA*	*NA*	*NA*	*NA*	*NA*	***NA***
Drought	5	4	5	5	1	**18**
Fire – Urban/Structure Collapse	4	3	2	3	3	**9**
Fire – Wildland (including Rural)	5	4	5	5	2	**17**
Flood	3	3	5	4	2	**12**
Geologic Hazards	5	2	2	2	4	**7**
Hazardous Material Release	5	1	2	2	4	**6**
Infectious Disease & Pest Infestations						
Severe Summer Weather	5	5	5	4	5	**14**
Severe Winter Weather	5	5	5	4	5	**14**
Space Weather	5	1	2	4	3	**7**
Transportation Incident	5	4	4	3	3	**13**

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 8.4.2 – City of Deering, North Dakota, Jurisdiction Risk Assessment

	Civil Disturbance	
Impact	• Blocked Roads • Business/Government Interruptions • Delayed Emergency Response • Financial Hardship/Strain (public)	• HAZMAT Release • Human Injury/Death • Loss of Communication Systems • Property Damage (Structure) • Property Damage (Vehicle)
Frequency	• Never an occurrence of a major incident	• DAPL protesters were not active in the city
Likelihood	More Likely • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 & BNSF Railroad Infrastructure	Less Likely • Small town with no major regional/state attractions • Sparse population
Vulnerability	More Vulnerable • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 & BNSF Railroad Infrastructure • Proximity to the city of Minot, the state's fourth largest city, and the Minot Air Force Base (AFB), and missile silos	Less Vulnerable • Small town with no major regional/state attractions • Sparse population • No pipelines in proximity to the city • McHenry County Sheriff's office

Table 8.4.2 – City of Deering, North Dakota, Jurisdiction Risk Assessment – Continued

	Criminal, Terrorist, Nation-State Attack	
Impact	• Blocked Roads • Business/Government Interruptions • Delayed Emergency Response • Disease Outbreak/Mass Infections • Financial Hardship/Strain (public) • HAZMAT Release • Human Injury/Death	• Infrastructure Degradation • Loss of Communication Systems • Mass Casualties/Fatalities • Property Damage (Structure) • Property Damage (Vehicle) • **City's drinking/potable water system could be contaminated**
Frequency	• **Never an occurrence in city limits**	
Likelihood	More Likely • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 & BNSF Railroad Infrastructure • Minot AFB and Missile Silos in proximity to city limits	Less Likely • Small town with no major regional/state attractions • Sparse population • McHenry County Sheriff's office
Vulnerability	More Vulnerable • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 & BNSF Railroad Infrastructure • Proximity to the city of Minot, the state's fourth largest city, and the Minot Air Force Base (AFB), and missile silos	Less Vulnerable • Small town with no major regional/state attractions • Sparse population • No pipelines in proximity to the city

Table 8.4.2 – City of Deering, North Dakota, Jurisdiction Risk Assessment – Continued

	Cyberattack	
Impact	• Business Interruptions • Delayed Emergency Response • Financial Hardship/Strain (public) • Government Interruptions • HAZMAT Release • Human Injury/Death	• Identity Theft – loss of wages and/or assets • Infrastructure Degradation • Loss of Communication Systems • Loss of Digital/Technological Systems • Loss of Power/Electricity Outage • School Closure
Frequency	• Never an occurrence of a major attack	•
Likelihood	More Likely • Small town with lack of technological infrastructure to defend against cyberattack	Less Likely • Lack of major state or national financial institutions
Vulnerability	More Vulnerable • Small town with lack of technological infrastructure to defend against cyberattack • Elderly population relying largely on landlines for communication purposes, remote medical care, and equipment monitoring	Less Vulnerable • Lack of major state or national financial institutions • No natural gas service to the city

Table 8.4.2 – City of Deering, North Dakota, Jurisdiction Risk Assessment – Continued

	Drought	
Impact	• Crop Loss • Loss of Economy • Loss of Livestock • Loss of Wildlife Habitat (decreased wildlife populations) • Increase in Wildland Fire Potential • Water quality compromised from stock dams	• Diminished soil health • Negative impact on mental health of producers and fire responders – "community impact" • Local producers forced to sell off herds which can last for several years • Population loss as people moved away due to loss of economy
Frequency	• Fall of 1980 was dry • Severe drought in 1961/1962, 1988/1989 to 1991/1992 • Some dry conditions each year lasting a couple weeks in length	• In 2013 and 2014, dry conditions were present from June to October with little rain • **Lack of adequate snowfall spring of 2015, 2021, 2023/2024** • Severe drought conditions winter 2020/2021 • Exceptional drought spring and summer 2021
Likelihood	More Likely • Dry/wet cycle every 10 years • Climatic patterns will result in an eventual drought of significance • Lack of precipitation	Less Likely • Heavy precipitation in winter (snow pack) and summer (rainfall)
Vulnerability	More Vulnerable • Loss of economy from decreased wildlife & hunting • Agriculture economy • Elderly population • Flat terrain/open topography contributes to conditions • Pastureland adjacent to structures and city limits •	Less Vulnerable • Deering Fire Department • Financial assistance programs made available by the state and federal government • McHenry County Burn Restriction Ordinance • Fire Index monitoring and mapping from NDDES • Advanced communications such as internet and TV

Table 8.4.2 – City of Deering, North Dakota, Jurisdiction Risk Assessment – Continued

	Fire – Urban Fire/Structure Collapse	
Impact	• Building Collapse • Delayed Emergency Response • Evacuation (Localized) • Explosion	• Human Injury/Death • Increased Fire Potential • **Property damage on a significant scale if impacting downtown structures and other critical facilities or infrastructure in the city due to their close physical proximity**
Frequency	• Single-family home fire in 2004 • Single-family home fire in 2008 – started in the rafters of the garage by the kitchen • Mobile home fire in 2017/2018 in the middle of winter	
Likelihood	More Likely • Adopted state building codes but lack enforcement • Age of structures – some abandoned • Elderly populations • Increased drug use • Increased use of electric heaters • Outdated electric wiring in older homes and structures • Outdated heating systems • **Most city residents use coal, propane, or wood for heating**	Less Likely • Adopted state building codes but lack enforcement • Better building standards and maintenance of structures • Smoke detectors in public buildings and private homes/businesses • Well-equipped fire department with trained volunteers • No railroad infrastructure

Vulnerability	More Vulnerable • Adopted state building codes but lack enforcement • Age of structures • Elderly populations • Increased drug use • Increased use of electric heaters • Outdated electric wiring in older homes and structures • Outdated heating systems • **Most city residents use coal, propane, or wood for heating** • **Prolonged response times due to limited fire staff during the daytime**	Less Vulnerable • Deering Fire Department has trained volunteers and adequate equipment • Better building standards and maintenance of structures • Smoke detectors in public buildings and private homes/businesses • **No natural gas service to the city** • No railroad infrastructure

Table 8.4.2 – City of Deering, North Dakota, Jurisdiction Risk Assessment – Continued

	Fire – Rural & Wildland	
Impact	• Building Collapse • Crop Loss • Delayed Emergency Response • Downed Power Lines • Evacuation (Localized) • Explosion • Increased Wildland Fire Potential • Loss of Power/Electricity Outage	• **Loss of Livestock** • **Loss of Wildlife Habitat** • **Mass Casualties** • **Property Damage (Structure & Vehicle)** • **Losses could be on a significant scale if impacting a major producer or farmstead** • **Loss of farm equipment and assets**
Frequency	• Wildland fire threatened city limits in 1998 • Wildland fire northwest of the city threatened city limits in 2009 • Deering Fire Dept said wildland fires have occurred mostly northwest of city limits	
Likelihood	More Likely • Agricultural burn-off • High winds annually and dry conditions – when present • Pastureland adjacent to structures and city limits • City is surrounding by crop land • Severe summer weather with significant lightning • Shelterbelts on the west side of the city and north of city limits • Sloughs that can be dry on the south and southeast side of the city • **Little Deep Creek is occasionally dry – is a wildland fire hazard during dry periods/drought years – estimated to be dry 8 out of 10 years**	Less Likely • Removal of CRP near city limits • Summer and winter weather with heavy precipitation • No railroad infrastructure • **Gravel pit operation and gravel road north of city limits act as fire breaks**

Vulnerability	More Vulnerable • Agricultural burn-off • High winds annually and dry conditions – when present • Pastureland adjacent to structures and city limits • Severe summer weather with significant lightning • **Lack of fire breaks around city limits** • Shelterbelts on the west side of the city and north of city limits • Sloughs that can be dry on the south and southeast side of the city • **Little Deep Creek is occasionally dry – is a wildland fire hazard during dry periods/drought years – estimated to be dry 8 out of 10 years**	Less Vulnerable • Deering Fire Department has trained volunteers and equipment • **Adequate staffing coverage/resources of fire department** • Removal of CRP near city limits • Summer and winter weather with heavy precipitation • MOUs with neighboring fire departments • McHenry County Burn Restriction Ordinance • No railroad infrastructure • **Gravel pit operation and gravel road north of city limits act as fire breaks**

Table 8.4.2 – City of Deering, North Dakota, Jurisdiction Risk Assessment – Continued

	Flood	
Impact	• Blocked Roads • Delayed Emergency Response • Flooding (Highway & Structure)	• Human Injury/Death • Property Damage
Frequency	• **Significant overland flooding occurs every 15 years in the drainage ditches on the west side of the city, and north of city limits** • **City experienced significant flooding in 2010 and 2011**	• **Surrounding soils consisting of mostly blue clay in and around the city – contributes to overland due to slow drainage** • **Overland flooding frequent in the spring due to rapid snow melt but only during high precipitation years**
Likelihood	More Likely • **Overland flooding frequent in the spring due to rapid snow melt but only during high precipitation years Excess vegetation in drainage ditch parallel to shelterbelt north of city limits** • **Drainage ditch east of city mobile home park drains slough of the city to the north** • **Standing water problem stop at southwest corner of the intersection of McHenry County Road 1 and 3rd Ave s – part of the drainage ditch on the east side of the mobile home park and can cross over 3rd Ave S and threatens single-family home**	Less Likely • Dry conditions/drought and low precipitation More Likely • **Culverts in city limits are too high = standing water** • **Inadequate storm water system in the city – needs retrofitting/upgrading Surrounding soils consisting of mostly blue clay in and around the city**

Vulnerability	More Vulnerable • **Overland flooding frequent in the spring due to** rapid snow melt but only during high • Excess vegetation in drainage ditch parallel to shelterbelt north of city limits • **Drainage ditch east of city mobile home park drains slough of the city to the north** • **Standing water problem stop at southwest corner of the intersection of McHenry County Road 1 and 3rd Ave s – part of the drainage ditch on the east side of the mobile home park** • **Culverts in city limits are too high = standing water** • **Surrounding soils consisting of mostly blue clay in and around the city**	Less Vulnerable • Dry conditions/drought and low precipitation • City has rented equipment to move water in the past More Vulnerable • **Inadequate storm water system in the city – needs retrofitting/upgrading** • **City and fire department lacks equipment to move water (when needed)** • **Shelterbelts on west side and north of city limits reduces ground blizzard conditions in the city and reduces accumulation of snow, but storm snow (water) that contributes to spring overland flooding**

Table 8.4.2 – City of Deering, North Dakota, Jurisdiction Risk Assessment – Continued

	Geologic Hazards	
Impact	• Blocked Roads • Delayed Emergency Response • Human Injury/Death • Infrastructure Degradation	• Loss of Economy • Loss of Power/Electricity Outage • Property Damage • Utility Outage/Shortage
Frequency	• No occurrences of geologic hazards other than radon in the city of Deering	
Likelihood	More Likely • **All N.D. Counties in EPA Radon Zone I**	Less Likely • No Abandoned Mine Lands located near city limits
Vulnerability	More Vulnerable • **All N.D. Counties in EPA Radon Zone I**	Less Vulnerable • No Abandoned Mine Lands located near city limits

Table 8.4.2 – City of Deering, North Dakota, Jurisdiction Risk Assessment – Continued

	Hazardous Material Release	
Impact	• Blocked Roads • Business & Government Interruptions • Delayed Emergency Response • Environmental Degradation • Evacuation (localized) • Explosion • Human Injury/Death	• Increased Fire Potential • Loss of Economy (business activity) • Loss of Power and/or Drinking/Potable Water • Property Damage
Frequency	• Never an occurrence in city limits	
Likelihood	More Likely • **Transportation of chemicals by truck through city limits – restricted from parking in city limits** • **Storage of chemicals/fertilizers in city limits and on farmsteads in large tanks near city limits** • **Enbridge Natural gas pipeline approximately one-mile north of the city (pipeline is estimated at 6 to 8 inches in diameter and is completely buried)** • **Propane and other heating fuels stored by residents in city limits** • **Anhydrous tank at elevator** • **Agritec Fertilizer Plant – sells agricultural chemicals for spraying, insecticide, etc.**	Less Likely • Private companies have HAZMAT certifications • Tier II Federal Requirements • No railroad infrastructure

Vulnerability	More Vulnerable • **Transportation of chemicals by truck through city limits – restricted from parking in city limits** • **Storage of chemicals/fertilizers in city limits and on farmsteads in large tanks near city limits** • **Enbridge Natural gas pipeline approximately one-mile north of the city (pipeline is estimated at 6 to 8 inches in diameter and is completely buried)** • **Propane and other heating fuels stored by residents in city limits** • **Agritec Fertilizer Plant – sells agricultural chemicals for spraying, insecticide, etc.**	Less Vulnerable • Deering Fire Department has trained volunteers and equipment • Private companies have HAZMAT certifications • Tier II Federal Requirements • No railroad infrastructure • City on rural water and is not at risk to contamination of drinking/potable water if a HAZMAT incident occurred • Enbridge has emergency response capabilities for pipeline incidents • Minot Regional HAZMAT Team • Deering Fire Department has mutual aid with Minot Air Force Base (AFB)

Table 8.4.2 – City of Deering, North Dakota, Jurisdiction Risk Assessment – Continued

	Infectious Disease & Pest Infestations	
Impact	• Crop Loss • Human Injury/Death • Livestock Injury/Death • Loss of Economy • Mass Casualties/Fatalities	• Strain on local medical resources (ambulance or clinic) • Loss of Drinking/Potable Water • **Financial cost to public health resources** • Loss of medical staff due to sickness • School Closure
Frequency	• Annual occurrences of death, primarily among the elderly • Occurrence of disease - 1 in 3 for people annually • Annual occurrences of influenza cases in the local population	• **The COVID-19 pandemic of 2020 resulted in mass quarantine and sheltering of the local population and temporary closure of businesses resulting in unmeasured economic losses.**
Likelihood	More Likely • Agriculture economy • Growing elderly population • Small population of children without immunization • Transporting of animals across state lines • Dependent on weather for animals and crops • U.S. Highway 52 & BNSF Railroad Infrastructure	Less Likely • Advanced communications such as internet and tv • Public health and employment regulations for public facilities • Federal health guidelines at public employers • First District Health Unit, McHenry County education and outreach • FSA and NDSU Extension/McHenry County education and outreach
Vulnerability	More Vulnerable • Agriculture economy • Growing elderly population • Small population of children without immunization • Transporting of animals across state lines • Dependent on weather for animals and crops • U.S. Highway 52 & BNSF Railroad Infrastructure	Less Vulnerable • Deering Fire Department has trained volunteers and equipment • Advanced communications such as internet and tv • Public health and employment regulations for public facilities Immunizations & medications of local population

Table 8.4.2 – City of Deering, North Dakota, Jurisdiction Risk Assessment – Continued

	Severe Summer Weather	
Impact	• Blocked Roads • Downed Trees • Evacuation (Localized) • Human Injury/Death – heat exhaustion • Infrastructure Degradation • Livestock Injury/Death • Loss of Crops	• Loss of Power/Downed Power Lines • **Property Damage – repair of roofing, siding and drainage systems for homes** • **Damage to electrical equipment from lightning** • Shelter-in-place • Vehicle Damage • City residents pumping water from property
Frequency	• Annual occurrences of hail, extreme heat, lightning, heavy rain, high wind • Seven to 10 significant storms producing damage to trees and property annually	• **Some city residents (those with basements) pumping water from their properties during June 2023** • **Straight-line windstorm producing significant property in 2017**
Likelihood	• Climatic patterns will result in numerous annual occurrences of the hazard	

Vulnerability	More Vulnerable • Aging infrastructure (roads and electrical systems) • Agriculture Economy • High elderly population • **City lacks a tornado shelter** • Excess vegetation in drainage ditch parallel to shelterbelt north of city limits • **Drainage ditch east of city mobile home park drains slough of the city to the north** • **Standing water problem stop at southwest corner of the intersection of McHenry County Road 1 and 3rd Ave s – part of the drainage ditch on the east side of the mobile home park** • **Culverts in city limits are too high = standing water** • **Surrounding soils consisting of mostly blue clay in and around the city** • **Inadequate storm water system in the city – needs retrofitting/upgrading** • **City and fire department lacks equipment to move water (when needed)**	Less Vulnerable • Deering Fire Department has trained volunteers and equipment • Advanced warning and notification such as internet and TV • **One outdoor emergency siren at the Deering Fire Hall that can be activated by phone, radio (remotely) or manually** • **Lack of public school**

Table 8.4.2 – City of Deering, North Dakota, Jurisdiction Risk Assessment – Continued

	Severe Winter Weather	
Impact	• Blocked Roads: McHenry County 1 on the west side of the city near the drainage ditch/mobile home court/culvert under the highway • Evacuation (Localized) • Human Injury/Death – wind chill • Loss of Crops • Loss of Livestock	• Loss of Power/Downed Power Lines • Property Damage – repair of roofing, siding and drainage systems for homes • Shelter-in-place • Vehicle Damage
Frequency	• Climatic patterns will result in numerous annual occurrences of the hazard • **Ice Storm of 1997** • **Winter of 2022/2023 – records snowfall** • **Christmas Storm 2016** • **Significant blizzards in 2009, 2010, 2011, and 2013 – resulting in large-scale overland flooding**	
Likelihood	• Climatic patterns will result in numerous annual occurrences of the hazard	

Vulnerability	More Vulnerable • Aging infrastructure (roads and electrical systems) • Agriculture Economy • High elderly population • Excess vegetation in drainage ditch parallel to shelterbelt north of city limits • **Drainage ditch east of city mobile home park drains slough of the city to the north** • **Standing water problem stop at southwest corner of the intersection of McHenry County Road 1 and 3rd Ave s – part of the drainage ditch on the east side of the mobile home park** • **Culverts in city limits are too high = standing water** • **Surrounding soils consisting of mostly blue clay in and around the city** • **Inadequate storm water system in the city – needs retrofitting/upgrading** • **City and fire department lacks equipment to move water (when needed)**	Less Vulnerable • Deering Fire Department has trained volunteers and equipment • Advanced warning and notification such as internet and TV • **One outdoor emergency siren at the Deering Fire Hall that can be activated by phone, radio (remotely) or manually** • **Lack of public school** • **North Prairie Regional Water District installed a smaller-than-typical water main (new materials) in 2016 to serve the city is resilient to impacts from freezing and thawing** • **Shelterbelts on west side and north of city limits reduces ground blizzard conditions in the city and reduces accumulation of snow** • Minot Air Force Base (AFB) Doppler Radar is 11 miles east of the city of Deering which results in rapid clearing by the military of the roadways to maintain access

Table 8.4.2 – City of Deering, North Dakota, Jurisdiction Risk Assessment – Continued

	Space Weather	
Impact	• Government Interruptions • Infrastructure Degradation • Loss of Communication Systems • Loss of Digital/Technological Systems • Loss/Overcrowded Medical Facilities	• Loss of Power/Electricity Outage • Public Distress/Social Discord • School Closure • Loss of operation of the city hall and fire hall, etc. • Loss/outage of medical devices at private residences
Frequency	• Never a recorded occurrence in McHenry County or North Dakota	
Likelihood	• Dependent on solar activity and the 11-year solar cycle • Likely to occur once every 500 years per the 2018 N.D. Enhanced Mitigation MAOP	
Vulnerability	<u>More Vulnerable</u> • Advanced communication systems (internet, TV, etc.) • Agriculture economy • All critical facilities and infrastructure that require electricity for operation	<u>Less Vulnerable</u> • Local food production/households with gardens

Table 8.4.2 – City of Deering, North Dakota, Jurisdiction Risk Assessment – Continued

	Transportation Incident	
Impact	• **Blocked roads** • Business Interruptions • Delayed Emergency Response • Human Injury/Death • Increased Fire Potential & HAZMAT Release • Loss of Transportation/Accessibility	• Mass Casualties/Fatalities • Livestock Loss • Property Damage • **Could be catastrophic if involving a school bus filled with children and a truck carrying hazardous materials – kids in Deering attend either Glenburn or Surrey resulting in a higher volume of bus traffic**
Frequency	• Incident involving a gravel truck and car two miles south of Deering – intersection of Ward County Road 8 and 23 • Several incidents at intersection of Ward County Road 8 and 23 over the years due to drivers not honoring the yield sign controlling east-west traffic	• Several incidents on Ward County 8 involving people rolling their cars due to icy conditions, and just general auto accidents
Likelihood	More Likely • Intoxicated drivers • High truck traffic from agriculture-related business • Agricultural aerial sprayer based in the city • Agritec/Miller Farms Airstrip (privately-owned) • Minot AFB utilizes the privately-owned airstrip for training	Less Likely • Adequate traffic control signage/stop signs in city limits • City installed four-way stop signage at intersection of McHenry County 1 (Main Ave) and 2nd Ave • No commercial passenger airport • City not located directly on any state or federal highway • No railroad infrastructure
Vulnerability	More Vulnerable • Distracted drivers • Intoxicated drivers • High truck traffic from agriculture-related traffic • Agritec/Miller Farms Airstrip • Minot AFB utilizes the privately-owned airstrip for training • Four-way stop sign installed by the city at intersection of McHenry County 1 (Main St.) and 2nd Ave • General traffic does not follow speed limits and does not honor four-way stop signage at McHenry County 1 (Main St.) and 2nd Ave	Less Vulnerable • Adequate traffic control signage/stop signs in city limits • No commercial passenger airport • City not located directly on any state or federal highway • No railroad infrastructure • City installed four-way stop signage at intersection of McHenry County 1 (Main Ave) and 2nd Ave

8.4.3 Mitigation Strategy

The McHenry County, N.D., Multi-Jurisdictional Multi-Hazard Plan Update includes a mitigation strategy consisting of seven goals in Chapter 6. The following problem statement and mitigation projects address the mitigation needs of the city of Deering, North Dakota. It should be noted that some mitigation projects that pertain to all jurisdictions are included to encourage county-wide collaboration.

Problem Statement

The city of Deering, North Dakota, can be impacted by civil disturbance; criminal, terrorist, or nation/state attack; cyberattack; drought; fire (urban and wildland); flood (overland); geologic hazards; hazardous material release; infectious disease and pest infestations; severe summer weather; severe winter weather; space weather, and transportation incident. Overland flooding in the city due to an inadequate storm water system and undersized culvert under McHenry County Highway 1 (Main St.) resulting in blocking of the road. The city is vulnerable to drought and wildland fire due to Little Deep Creek, a large slough to the northwest that contains large amounts of fuel for wildland fire during dry conditions. In addition, there are overgrown shelter belts/vegetated areas on the north and west sides of the city. There are also sloughs on the south and southeast side of the city that provide fuel for wildland fires. The city lacks permanent and/or portable backup generators for the fire hall and lift stations. There is inadequate storm shelter capacity near the mobile home park on the city's west side.

The city lacks funding for mitigation projects. With little to no capabilities to accomplish major projects independently, the city is dependent on outside sources for mitigation.

Removal of wildland fire fuels, installation of a fire break, retrofitting/upgrading of the storm water system, installation of generators for backup power, upgrade and expand storm shelters, upgrade of traffic control signage, and education and outreach are a priority for the city.

City of Deering Project 1: Install Fire Breaks.

Description/Benefit	The city is vulnerable to drought and wildland fire due to Little Deep Creek, a large slough to the northwest that contains large amounts of fuel for wildland fire during dry conditions. In addition, there are overgrown shelter belts/vegetated areas on the north and west sides of the city.		
Hazard/Threat Addressed	Drought, Fire (Wildland), Severe Summer Weather		
Affected Jurisdiction(s)	City of Deering		
Project Status	New		
Priority	Very High		
Responsible Agency	City Councils, Planning & Zoning		
Partners	**Private Landowners.** County Commission, County Highway Dept., Emergency Management, Emergency Services, NDAC, NDLC, N.D. Firefighter's Association, NRCS		
Completion Timeframe	1 to 3 years	Cost	Project-specific
Funding Source	City or fire department budget. FEMA's Building Resilient Infrastructure and Communities (BRIC) Grant Program.		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element	Process for Integration
McHenry County LEOP McHenry County Mitigation Plan McHenry County THIRA	Capability Assessment, Hazard History, Risk Assessment	Approval by county commission and city councils.

City of Deering Project 2: Reduce and/or Remove Overgrown Vegetation and Wildland Fire Fuels.

Description/Benefit	Plan and install fire breaks around city limits, or critical facilities and infrastructure, to reduce/eliminate the risk to wildland fires, and losses to people and property. The city of Deering should focus on Partnerships should be established with local landowners. The city is vulnerable to wildland fire due to Little Deep Creek, a large slough to the northwest that contains large amounts of fuel for wildland fire during dry conditions. In addition, there are overgrown shelter belts/vegetated areas on the north and west sides of the city. There are also sloughs on the south and southeast side of the city that provide fuel for wildland fires.		
Hazard/Threat Addressed	Drought, Fire (Wildland), Severe Summer Weather, Severe Winter WEather		
Affected Jurisdiction(s)	City of Deering		
Project Status	New		
Priority	Very High		
Responsible Agency	City Councils, Planning & Zoning		
Partners	**Private Landowners.** County Commission, County Highway Dept., Emergency Management, Emergency Services, NDAC, NDLC, N.D. Firefighter's Association, NRCS		
Completion Timeframe	1 to 3 years	Cost	Project-specific
Funding Source	City or fire department budget. FEMA's Building Resilient Infrastructure and Communities (BRIC) Grant Program.		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element	Process for Integration
McHenry County LEOP McHenry County Mitigation Plan McHenry County THIRA	Capability Assessment, Hazard History, Risk Assessment	Identify scope and work with landowner(s) and fire department. Approval by county commission and city councils.

8.4.4 Mitigation Capability Assessment

Capability for mitigation is divided into four categories: administrative and technical, education and outreach, financial, and planning and regulatory. Each identified resource in the four categories can be used to implement mitigation strategies and access funding for projects. **Tables comparing the mitigation capabilities of the city of Deering, North Dakota, with all other jurisdictions in McHenry County can be found below and in Chapter 7, County Mitigation Capability Assessment.**

- Administrative and Technical: Identification of administrative and technical capabilities, which include: staff, their skills and tools for mitigation planning to implement specific mitigation actions.
- Education and Outreach: Identification of education and outreach programs, and methods already in place to implement mitigation activities and communicate hazard-related information.
- Financial: Identification of access to or eligibility to use funding resources for hazard mitigation for jurisdictions.
- Planning and Regulatory: Jurisdictional plans, policies, codes, and ordinances adopted and in place that prevent and reduce the impacts of natural hazards and man-made threats.

City of Deering, North Dakota, Mitigation Capabilities Summary

The following mitigation capabilities were identified as commonplace among all natural hazards and man-made threats upon completion of the risk assessment for the city of Deering, North Dakota. More detailed information about the mitigation capabilities of the city of Deering in relation to McHenry County and all other incorporated jurisdictions can be found in Chapter 7, Mitigation Capability Assessment.

2018 & 2023 N.D. Enhanced Mitigation MAOP	N.D. Dept. of Emergency Services (NNDES)
Advanced Communications: Internet & TV	NDDES Fire Index Monitoring
Emergency siren(s)/early warning systems	NDDOT State Transportation Plan & State Shop
McHenry County Commission	NDSU/McHenry County Extension
McHenry Comprehensive Plan	Deering Auditor and Public Works
McHenry County Courthouse	Deering City Council
McHenry County Emergency Management	Deering Community Center
McHenry County LEOP	Deering Fire Hall
McHenry County Public Health	Deering Fire Department/Protection District
McHenry County Sheriff's Office	
Deering Zoning	Glenburn and Minot Ambulance Services
MOUs	Minot Air Force Base (AFB) – for road clearing

8.4.5 Integration of Mitigation Plan into Planning Mechanisms

Integration of the plan into current planning mechanisms is critical in mitigation to communicate the needs of each jurisdiction to achieve an all-inclusive mitigation strategy. The process for integration of the mitigation plan is included after each mitigation project, which shows the planning mechanism utilized, the plan element used for integration and the process for integration.

8.4.6 Plan Maintenance

An important aspect of any usable plan is the maintenance and upkeep of the document. At any given time, planning, risk analysis, updating the situation assessment, research, coordinating, disaster response or other activity is occurring. Plan maintenance ensures the plan will remain useful in the county for many years. A mitigation action progress report form to conduct plan maintenance is in Chapter 10 of this plan.

8.5 City of Drake, North Dakota

The following profile includes information specific to the city of Drake, North Dakota, for mitigation planning purposes. The information included is as follows:

- Profile and Inventory;
- Risk Assessment;
- Hazard Scoring Notes;
- Mitigation Projects, and
- Capabilities for Mitigation.

Integration into Planning Mechanisms

The process for integration of the mitigation plan into existing planning mechanisms is discussed at the bottom of each mitigation project in section 8.5.4, section 8.5.5 and in Chapter 6, Mitigation Strategy.

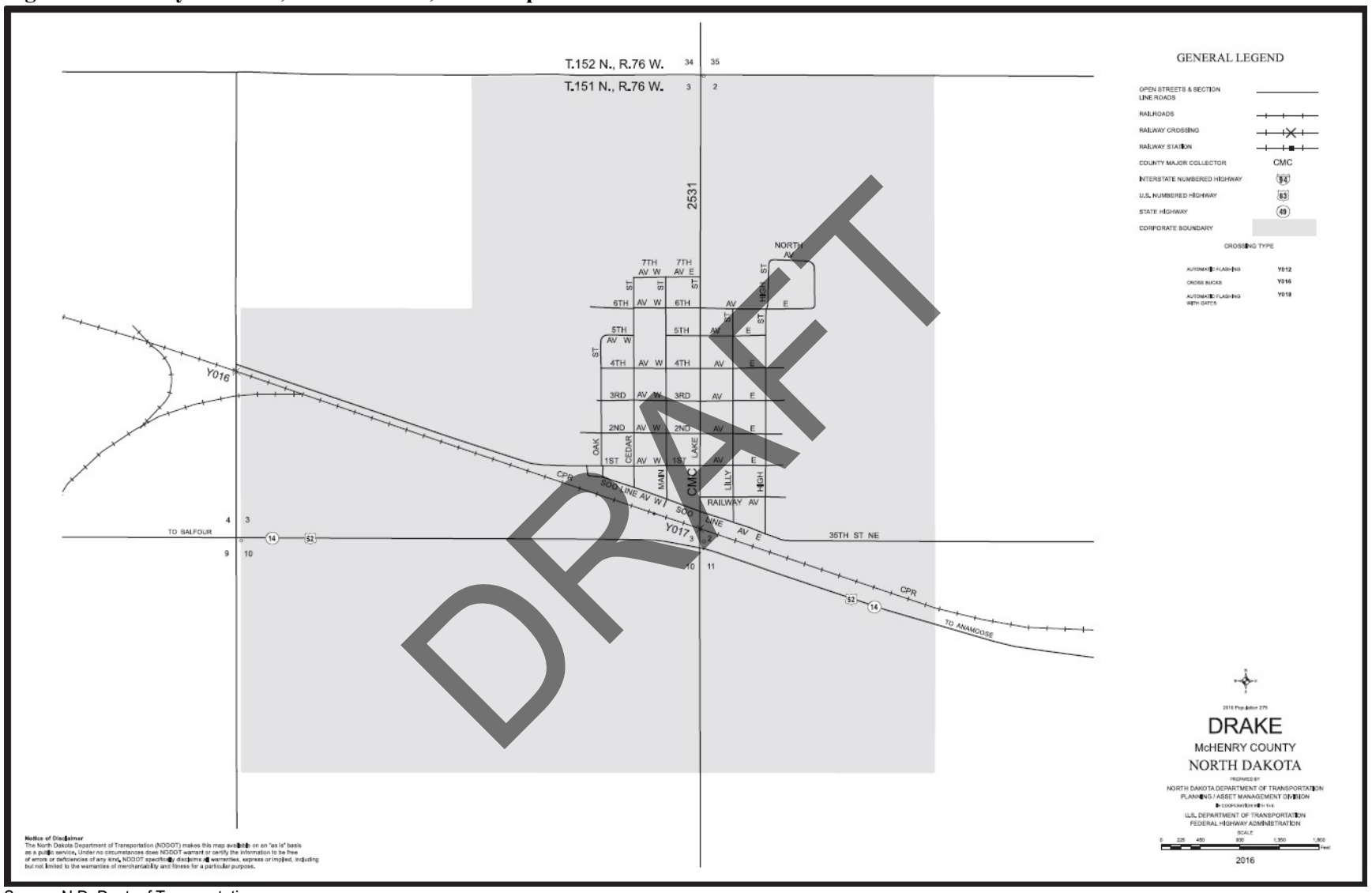
Plan Maintenance

Plan maintenance is shown in section 8.5.6.

Critical Facilities and Infrastructure

Figure 8.5.1 is a map of the city of Drake, North Dakota, provided by the N.D. Dept of Transportation.

Figure 8.5.1 – City of Drake, North Dakota, Base Map



Source: N.D. Dept. of Transportation

8.5.1 Profile and Inventory

The location, total population, vulnerable (underserved) populations, housing units and household size, businesses, critical facilities and infrastructure, new and future development, services, jurisdictional buildings, emergency response services and utilities are shown for the city of Drake, North Dakota. Detailed narratives follow each section heading to profile the city.

Detailed information on public buildings, services provided, emergency response services and utilities can be found in Chapter 3, Profile and Inventory.

Location

The city of Drake, North Dakota, is in north-central North Dakota, approximately 50 miles southeast of the city of Minot, North Dakota, the state's fourth largest city.

Population

Table 8.5.1 shows population trends for the city of Drake, North Dakota, from 1920 to 2020 per the 2020 U.S. Decennial Census, with an estimate for 2022. According to the 2020 U.S. Decennial Census, the city of Drake, North Dakota, contains 292 people, an increase of 17 people (6.2 percent) from 82 people in 2010.

Table 8.5.1 – 1920 to 2022 City of Drake, North Dakota, Population Trends and Projections

1920	1930	1940	1950	1960	1970	1980	1990	2000	2010	2020	*2022 est.*
517	644	654	831	752	636	479	631	322	275	292	*282*

Source(s): U.S. Decennial Census; American Community Survey, 5-Year Estimates

Vulnerable Populations

- Age. Per the 2018 to 2022 American Community Survey 5-Year Estimate, the population of the city of Drake, North Dakota, consists of 80 individuals under the age of 20 and 63 individuals aged 65 and older, representing 26.9 and 21.2 percent of the city's population, respectively.
- Daycare. There are no daycares in the city of Drake, North Dakota.
- Poverty. Per the 2018 to 2022 American Community Survey 5-Year Estimate, there are 79 individuals in the city of Drake, North Dakota, that lives below the poverty line, representing 26.6 percent of the city's population.
- Public Schools. The Drake Public School serves grades K-12. As of Fall 2023, the school has 76 students.
- Senior Housing Developments/Care Centers. There are no senior housing developments or care centers in the city of Drake, North Dakota. There are two low-income housing options in the city of Drake - fourplex and a sixplex – that primarily occupied by seniors.

Housing Units and Household Size

The 2018 to 2022 American Community Survey 5-Year Estimate shows there are 189 housing units in the city of Drake, North Dakota, consisting of 170 single-family homes, 12 multifamily homes, and seven mobile homes.

The 2018 to 2022 American Community Survey 5-Year Estimate there are 141 households in the city of Drake, North Dakota, resulting in an average household size of 2.11 people.

Businesses

Businesses in the city of Drake, North Dakota, Morris Bar, Bravera Bank, Drake Fresh Foods, Drake Clinic, U.S. Post Office, Enerbase, Zieggler Oil, Heilman Diesel Repair, Selensky Meats, and RV Enterprise.

New and Future Development

New development in the city of Drake, North Dakota, over the last five years includes:

- Approximately four structures have been demolished, three of which were single-family homes.
- One manufactured home has been brought into the city.
- The Drake Public School has replaced all windows and added air conditioning for all classrooms, and upgraded flooring to remove asbestos.

There no future developments planned or proposed in the city of Drake, North Dakota, at the time of this plan update.

Critical Facilities

- Drake Community Center/Senior Center
- Drake City Hall
- Drake Clinic
- Drake Fire Hall
- Drake Public School
- McHenry County Shop

Infrastructure

- The city of Drake, North Dakota, has a sanitary sewer system with two lagoon cells and one lift station.
- The city of Drake, North Dakota, receives drinking/potable water from its own municipal well and system.
- The city of Drake, North Dakota, has an inert landfill.
- U.S. Highway 52 serves the city of Drake, North Dakota.
- There is a missile base one half-mile north of town.
- AT&T and Verizon have cell towers south and west of city limits.

Emergency Response Services

- Harvey Ambulance Service provides ambulance service to the city of Drake, North Dakota, and surrounding rural areas.
- The Drake Fire Department/Rural Protection District provides fire protection services to the city of Drake, North Dakota, and surrounding rural areas.
- The McHenry County Sheriff's Office provides law enforcement services to the city of Drake, North Dakota.
- First District Health Unit, McHenry County is in the city of Towner, North Dakota, provides public health services to the city of Drake, North Dakota, and greater McHenry County.

Services and Utilities

- Circle Sanitation provides contracted garbage collection services to the city of Drake, North Dakota.
- The city of Drake, North Dakota, has an inert landfill.
- The city of Drake, North Dakota, has a sanitary sewer system with two lagoon cells and one lift station.
- The city of Drake, North Dakota, has a storm water system consisting of culverts and drainage ditches.
- The Mouse River Journal is the official newspaper of the city of Drake, North Dakota.
- The city of Drake, North Dakota, receives drinking/potable water from its own municipal well and system.
- Electricity is provided by Otter Tail Power Company in the city of Drake, North Dakota.
- Natural gas is not available in the city of Drake, North Dakota.
- Fuel oil and propane are used as an alternative heating source and are provided by companies chosen by the individual consumer in Drake, North Dakota.
- Midcontinent, N.D. Telephone Company, and Souris River Telephone (SRT) provides internet, phone, and TV to the city of Drake, North Dakota, and surrounding rural area.

8.5.2 Risk Assessment and Hazard Scoring Notes

Table 8.5.1 summarizes the risk assessment scoring of the city of Drake, North Dakota. The risk assessment and hazard scoring notes for each hazard specific to the city are shown in Table 8.5.2. Risk assessment notes for impact, frequency, likelihood and vulnerability ubiquitous for jurisdictions in McHenry County are found in Chapter 5, Threat and Hazard Identification Assessment in each respective hazard profile.

Table 8.5.1 – City of Drake, North Dakota, Jurisdiction Risk Assessment Scoring Summary

Risk Assessment			**Jurisdiction:**	**City of Drake, North Dakota**		
Hazard/Threat	Impact	Frequency	Likelihood	Vulnerability	Capabilities	**Total**
Civil Disturbance	4	2	3	3	2	**10**
Criminal, Terrorist, or Nation-State Attack	4	2	3	3	2	**10**
Cyberattack	5	3	4	3	2	**13**
Dam Failure	*NA*	*NA*	*NA*	*NA*	*NA*	***NA***
Drought	5	4	5	5	1	**18**
Fire – Urban/Structure Collapse	5	2	3	2	3	**9**
Fire – Wildland (including Rural)	5	5	5	3	3	**15**
Flood	2	2	2	2	4	**4**
Geologic Hazards	5	2	2	2	4	**7**
Hazardous Material Release	5	2	4	5	2	**14**
Infectious Disease & Pest Infestations	5	5	5	4	3	**16**
Severe Summer Weather	5	5	5	3	4	**14**
Severe Winter Weather	5	5	5	3	4	**14**
Space Weather	5	1	2	5	3	**8**
Transportation Incident	5	3	4	4	2	**14**

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 8.5.2 – City of Drake, North Dakota, Jurisdiction Risk Assessment

	Civil Disturbance	
Impact	• Blocked Roads • Business/Government Interruptions • Delayed Emergency Response • Financial Hardship/Strain (public)	• HAZMAT Release • Human Injury/Death • Loss of Communication Systems • Property Damage (Structure) • Property Damage (Vehicle)
Frequency	• In the 1970s, school board members decided to ban books and burned them in the school's furnace.	• DAPL protesters were not active in the city
Likelihood	More Likely • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 & CP Railroad Infrastructure • Missile sites locate one-half mile north of city limits	Less Likely • Small town with no major regional/state attractions • Sparse population
Vulnerability	More Vulnerable • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 & CP Railroad Infrastructure • Missile sites locate one-half mile north of city limits • Energy pipeline proximate to city limits • Drake Public School • Prolonged response time for law enforcement – no Sheriff's Office deputies living in the city	Less Vulnerable • Small town with no major regional/state attractions • Sparse population • McHenry County Sheriff's Office

Table 8.5.2 – City of Drake, North Dakota, Jurisdiction Risk Assessment – Continued

	Criminal, Terrorist, Nation-State Attack	
Impact	• Blocked Roads • Business/Government Interruptions • Delayed Emergency Response • Disease Outbreak/Mass Infections • Financial Hardship/Strain (public) • HAZMAT Release • Human Injury/Death	• Infrastructure Degradation • Loss of Communication Systems • Mass Casualties/Fatalities • Property Damage (Structure) • Property Damage (Vehicle) • **City's drinking/potable water system could be contaminated**
Frequency	• **In 2009,** • **Look in county profile and bring it forward**	
Likelihood	More Likely • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 & CP Railroad Infrastructure • Missile sites locate one-half mile north of city limits •	Less Likely • Small town with no major regional/state attractions • Sparse population
Vulnerability	More Vulnerable • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 & CP Railroad Infrastructure • Missile sites locate one-half mile north of city limits • Energy pipeline proximate to city limits • Drake Public School • Prolonged response time for law enforcement – no Sheriff's Office deputies living in the city • City has municipal well and provides its own drinking water	Less Vulnerable • Small town with no major regional/state attractions • Sparse population • McHenry County Sheriff's Office

Table 8.5.2 – City of Drake, North Dakota, Jurisdiction Risk Assessment – Continued

	Cyberattack	
Impact	• Business Interruptions • Delayed Emergency Response • Financial Hardship/Strain (public) • Government Interruptions • HAZMAT Release • Human Injury/Death	• Identity Theft – loss of wages and/or assets • Infrastructure Degradation • Loss of Communication Systems • Loss of Digital/Technological Systems • Loss of Power/Electricity Outage • School Closure
Frequency	• Never an occurrence of a major attack	
Likelihood	More Likely • Small town with lack of technological infrastructure to defend against cyberattack	Less Likely • Lack of major state or national financial institutions
Vulnerability	More Vulnerable • Small town with lack of technological infrastructure to defend against cyberattack • Elderly population relying largely on landlines for communication purposes, remote medical care, and equipment monitoring • Energy pipeline proximate to city limits • Drake Public School	Less Vulnerable • Lack of major state or national financial institutions • No natural gas service to the city • NDIT provides a firewall for the public school

Table 8.5.2 – City of Drake, North Dakota, Jurisdiction Risk Assessment – Continued

	Drought	
Impact	• Crop Loss • Loss of Economy • Loss of Livestock • Loss of Wildlife Habitat (decreased wildlife populations) • Increase in Wildland Fire Potential • Water quality compromised from stock dams	• Diminished soil health • Negative impact on mental health of producers and fire responders – "community impact" • Local producers forced to sell off herds which can last for several years • Population loss as people moved away due to loss of economy
Frequency	• Fall of 1980 was dry • Severe drought in 1961/1962, 1988/1989 to 1991/1992 • Some dry conditions each year lasting a couple weeks in length	• In 2013 and 2014, dry conditions were present from June to October with little rain • **Lack of adequate snowfall spring of 2015, 2021, 2023/2024** • Severe drought conditions winter 2020/2021 • Exceptional drought spring and summer 2021
Likelihood	<u>More Likely</u> • Dry/wet cycle every 10 years • Climatic patterns will result in an eventual drought of significance • Lack of precipitation	<u>Less Likely</u> • Heavy precipitation in winter (snow pack) and summer (rainfall)
Vulnerability	<u>More Vulnerable</u> • Loss of economy from decreased wildlife & hunting • Agriculture economy • Elderly population • Flat terrain/open topography contributes to conditions • Pastureland adjacent to structures and city limits • City has municipal well and provides its own drinking water	<u>Less Vulnerable</u> • Drake Fire Department • Financial assistance programs made available by the state and federal government • McHenry County Burn Restriction Ordinance • Fire Index monitoring and mapping from NDDES • Advanced communications such as internet and TV

Table 8.5.2 – City of Drake, North Dakota, Jurisdiction Risk Assessment – Continued

	Fire – Urban Fire/Structure Collapse	
Impact	• Building Collapse • Delayed Emergency Response • Evacuation (Localized) • Explosion	• Human Injury/Death • Increased Fire Potential • **Property damage on a significant scale if impacting downtown structures and other critical facilities or infrastructure in the city due to their close physical proximity**
Frequency	• An abandoned building on Main St burned down in 2009 and was replaced with the new fire hall • The movie theater burned down in 1964 • Two car dealerships burned down in separate incidents in the 1960s	• The lumber yard and the silver bar burned down in 1981
Likelihood	More Likely • Adopted state building codes but lack enforcement • Age of structures – some abandoned • Elderly populations • Increased drug use • Increased use of electric heaters • Outdated electric wiring in older homes and structures • Outdated heating systems • **CP Railroad Infrastructure**	Less Likely • Adopted state building codes but lack enforcement • Better building standards and maintenance of structures • Smoke detectors in public buildings and private homes/businesses • Well-equipped fire department with trained volunteers
Vulnerability	More Vulnerable • Adopted state building codes but lack enforcement • Age of structures • Elderly populations • Increased drug use • Increased use of electric heaters • Outdated electric wiring in older homes and structures • Outdated heating systems • **CP Railroad Infrastructure** • **Drake Public School has a fire monitoring system**	Less Vulnerable • Drake Fire Department has trained volunteers and adequate equipment • Better building standards and maintenance of structures • Smoke detectors in public buildings and private homes/businesses • **No natural gas service to the city**

Table 8.5.2 – City of Drake, North Dakota, Jurisdiction Risk Assessment – Continued

	Fire – Rural & Wildland	
Impact	• Building Collapse • Crop Loss • Delayed Emergency Response • Downed Power Lines • Evacuation (Localized) • Explosion • Increased Wildland Fire Potential • Loss of Power/Electricity Outage	• **Loss of Livestock** • **Loss of Wildlife Habitat** • **Mass Casualties** • **Property Damage (Structure & Vehicle)** • **Losses could be on a significant scale if impacting a major producer or farmstead** • **Loss of farm equipment and assets**
Frequency	• Approximately five to 10 wildland fire incidents annually, depending on drought conditions	
Likelihood	More Likely • Agricultural burn-off • High winds annually and dry conditions – when present • Pastureland adjacent to structures and city limits • City is surrounding by crop land • Severe summer weather with significant lightning • **CP Railroad Infrastructure** • **Traffic on U.S. Highway 52 can contribute to incidents**	Less Likely • Removal of CRP near city limits • Summer and winter weather with heavy precipitation
Vulnerability	More Vulnerable • Agricultural burn-off • High winds annually and dry conditions – when present • Pastureland adjacent to structures and city limits • Severe summer weather with significant lightning • **Lack of fire breaks around city limits** • **CP Railroad Infrastructure** • **Traffic on U.S. Highway 52 can contribute to incidents** • **Area of thick vegetation south of city limits** • **Cattails and vegetation on U.S. Highway 52** • **Ag equipment fires can cause incidents**	Less Vulnerable • Drake Fire Department has trained volunteers and equipment • **Adequate staffing coverage/resources of fire department** • Removal of CRP near city limits • Summer and winter weather with heavy precipitation • MOUs with neighboring fire departments • McHenry County Burn Restriction Ordinance

Table 8.5.2 – City of Drake, North Dakota, Jurisdiction Risk Assessment – Continued

	Flood	
Impact	• Blocked Roads • Delayed Emergency Response • Flooding (Highway & Structure) • Human Injury/Death • Property Damage	
Frequency	• **The city of Drake does not have overland flooding issues due to its location on top of a hill/high elevation** • **Some ground seepage causing basement flooding**	• **Wintering River caused flooding three miles west of city limits on Camp Bentley**
Likelihood	More Likely • **Surrounding soils consisting of mostly blue clay in and around the city – contributes to overland due to slow drainage in areas around city limits**	Less Likely • Dry conditions/drought and low precipitation • **City located at a high elevation**
Vulnerability	More Vulnerable • **Surrounding soils consisting of mostly blue clay in and around the city – contributes to overland due to slow drainage in areas around city limits** • **Wintering River**	Less Vulnerable • Dry conditions/drought and low precipitation • **City located at a high elevation**

Table 8.5.2 – City of Drake, North Dakota, Jurisdiction Risk Assessment – Continued

	Geologic Hazards	
Impact	• Blocked Roads • Delayed Emergency Response • Human Injury/Death • Infrastructure Degradation	• Loss of Economy • Loss of Power/Electricity Outage • Property Damage • Utility Outage/Shortage
Frequency	• No occurrences of geologic hazards other than radon in the city of Drake	
Likelihood	More Likely • **All N.D. Counties in EPA Radon Zone I**	Less Likely • No Abandoned Mine Lands located near city limits • City located at a high elevation
Vulnerability	More Vulnerable • **All N.D. Counties in EPA Radon Zone I**	Less Vulnerable • No Abandoned Mine Lands located near city limits • City located at a high elevation

Table 8.5.2 – City of Drake, North Dakota, Jurisdiction Risk Assessment – Continued

	Hazardous Material Release	
Impact	• Blocked Roads • Business & Government Interruptions • Delayed Emergency Response • Environmental Degradation • Evacuation (localized) • Explosion	• Human Injury/Death • Increased Fire Potential • Loss of Economy (business activity) • Loss of Power and/or Drinking/Potable Water • Property Damage • School Closure
Frequency	• An individual was filling a propane tank on a truck at the filling station and pulled away with the hose still attached causing a release	
Likelihood	More Likely • **Transportation of chemicals by truck through city limits – restricted from parking in city limits** • **Storage of chemicals/fertilizers in city limits and on farmsteads in large tanks near city limits** • **Two propane filling stations in the city of Drake – one is obsolete** • **Enerbase has two propane tanks and an anhydrous filling station** • **CP Railroad Infrastructure & U.S. Highway 52**	Less Likely • Private companies have HAZMAT certifications • Tier II Federal Requirements

Vulnerability	More Vulnerable • **Transportation of chemicals by truck through city limits – restricted from parking in city limits** • **Storage of chemicals/fertilizers in city limits and on farmsteads in large tanks near city limits** • **Propane/heating fuels stored by residents in city limits** • **Two propane filling stations in the city of Drake – one is obsolete** • **Enerbase has two propane tanks and an anhydrous filling station** • **CP Railroad Infrastructure & U.S. Highway 52** • City has municipal well	Less Vulnerable • Drake Fire Department has trained volunteers and equipment • Private companies have HAZMAT certifications • Tier II Federal Requirements

Table 8.5.2 – City of Drake, North Dakota, Jurisdiction Risk Assessment – Continued

	Infectious Disease & Pest Infestations	
Impact	• Crop Loss • Human Injury/Death • Livestock Injury/Death • Loss of Economy • Mass Casualties/Fatalities	• Strain on local medical resources (ambulance or clinic) • Loss of Drinking/Potable Water • **Financial cost to public health resources** • Loss of medical staff due to sickness • School Closure
Frequency	• Annual occurrences of death, primarily among the elderly • Occurrence of disease - 1 in 3 for people annually • Annual occurrences of influenza cases in the local population	• **The COVID-19 pandemic of 2020 resulted in mass quarantine and sheltering of the local population and temporary closure of businesses resulting in unmeasured economic losses.**
Likelihood	More Likely • Agriculture economy • Growing elderly population • Small population of children without immunization • Transporting of animals across state lines • Dependent on weather for animals and crops • U.S. Highway 52 & CP Railroad Infrastructure	Less Likely • Advanced communications such as internet and tv • Public health and employment regulations for public facilities • Federal health guidelines at public employers • First District Health Unit, McHenry County education and outreach • FSA and NDSU Extension/McHenry County education and outreach
Vulnerability	More Vulnerable • Agriculture economy • Growing elderly population • Small population of children without immunization • Transporting of animals across state lines • Dependent on weather for animals and crops • U.S. Highway 52 & CP Railroad Infrastructure • **Drake Public School** • **Low-income housing that is primarily occupied elderly individuals** • **Lack of a major medical facility**	Less Vulnerable • Drake Fire Department has trained volunteers and equipment • Advanced communications such as internet and tv • Public health and employment regulations for public facilities Immunizations & medications of local population • Presence of Drake Clinic – only open one day a week

Table 8.5.2 – City of Drake, North Dakota, Jurisdiction Risk Assessment – Continued

	Severe Summer Weather	
Impact	• Blocked Roads • Downed Trees • Evacuation (Localized) • Human Injury/Death – heat exhaustion • Infrastructure Degradation • Livestock Injury/Death • Loss of Crops	• Loss of Power/Downed Power Lines • **Property Damage – repair of roofing, siding and drainage systems for homes** • **Damage to electrical equipment from lightning** • Shelter-in-place • Vehicle Damage
Frequency	• Annual occurrences of hail, extreme heat, lightning, heavy rain, high wind • Seven to 10 significant storms producing damage to trees and property annually	• **Some city residents (those with basements) pumping water from their properties during heavy precipitation evnets** • **Straight-line windstorm producing significant property in 2017**
Likelihood	• Climatic patterns will result in numerous annual occurrences of the hazard	
Vulnerability	<u>More Vulnerable</u> • Aging infrastructure (roads and electrical systems) • Agriculture Economy • High elderly population • **Surrounding soils consisting of mostly blue clay in and around the city – contributes to overland due to slow drainage** • **City and fire department lacks equipment to move water (when needed)** • **Lower-income and vulnerable populations lacking basements/sheltering in their place of residence** • **Lack of official tornado shelter**	<u>Less Vulnerable</u> • Drake Fire Department has trained volunteers and equipment • Advanced warning and notification such as internet and TV • **One outdoor emergency siren** • **Drake Public School serves as the tornado shelter** • **Adequate storm water system in the city** • **City is located at a high elevation and does not have drainage or overland flood issues**

Table 8.5.2 – City of Drake, North Dakota, Jurisdiction Risk Assessment – Continued

	Severe Winter Weather	
Impact	• Blocked Roads: 35th St. NE east of city limits • Evacuation (Localized) • Human Injury/Death – wind chill • Loss of Crops	• Loss of Livestock • Loss of Power/Downed Power Lines • Property Damage – repair of roofing, siding and drainage systems for homes • Shelter-in-place • Vehicle Damage
Frequency	• Climatic patterns will result in numerous annual occurrences of the hazard • **Winter of 2022/2023 – records snowfall** • **Christmas Storm 2016**	• **Ice Storm of 1997** • **Significant blizzards in 2009, 2010, 2011, and 2013 – resulting in large-scale overland flooding**
Likelihood	• Climatic patterns will result in numerous annual occurrences of the hazard	
Vulnerability	More Vulnerable • Aging infrastructure (roads and electrical systems) • Agriculture Economy • High elderly population • **Surrounding soils consisting of mostly blue clay in and around the city – contributes to overland due to slow drainage** • **City is landlocked and vulnerable to drifting snow blocked access to city limits – lack of second access point** • **City sits at a high elevation** • **35th St. NE serves as the second access point for the city and becomes blocked regularly by drifting snow** • **Drake Public School**	Less Vulnerable • Drake Fire Department has trained volunteers and equipment • Advanced warning and notification such as internet and TV • **One outdoor emergency siren** • **Adequate storm water system in the city**

Table 8.5.2 – City of Drake, North Dakota, Jurisdiction Risk Assessment – Continued

	Space Weather	
Impact	• Government Interruptions • Infrastructure Degradation • Loss of Communication Systems • Loss of Digital/Technological Systems • Loss/Overcrowded Medical Facilities	• Loss of Power/Electricity Outage • Public Distress/Social Discord • School Closure • Loss of operation of the city hall and fire hall, etc. • Loss/outage of medical devices at private residences
Frequency	• Never a recorded occurrence in McHenry County or North Dakota	
Likelihood	• Dependent on solar activity and the 11-year solar cycle • Likely to occur once every 500 years per the 2018 N.D. Enhanced Mitigation MAOP	
Vulnerability	<u>More Vulnerable</u> • Advanced communication systems (internet, TV, etc.) • Agriculture economy • All critical facilities and infrastructure that require electricity for operation • CP Railroad Infrastructure • Energy pipeline proximate to city limits • Drake Public School	<u>Less Vulnerable</u> • Local food production/households with gardens

Table 8.5.2 – City of Drake, North Dakota, Jurisdiction Risk Assessment – Continued

	Transportation Incident	
Impact	• **Blocked roads from inadequate road clearing or incidents** • Business Interruptions • Delayed Emergency Response • Human Injury/Death • Increased Fire Potential • Loss of Transportation/Accessibility – incident blocks access	• Mass Casualties/Fatalities • HAZMAT Release • Livestock Loss • Property Damage • **Could be catastrophic if involving a school bus filled with children and a truck carrying hazardous materials**
Frequency	• An incident involving local kids right out of high school were partying – one vehicle was parked and the other approached fast and struck the vehicle killing three kids	
Likelihood	<u>More Likely</u> • Intoxicated drivers • High truck traffic from agriculture-related business • U.S. Highway 52 • CP Railroad Infrastructure	<u>Less Likely</u> • Adequate traffic control signage/stop signs in city limits • No commercial passenger airport
Vulnerability	<u>More Vulnerable</u> • Distracted drivers • Intoxicated drivers • High truck traffic from agriculture-related traffic • U.S. Highway 52 • CP Railroad Infrastructure • Old elevators located east and west of Lake St. blocks visibility of traffic on U.S. Highway 52	<u>Less Vulnerable</u> • Adequate traffic control signage/stop signs in city limits • No commercial passenger airport

8.5.3 Mitigation Strategy

The McHenry County, N.D., Multi-Jurisdictional Multi-Hazard Plan Update includes a mitigation strategy consisting of seven goals in Chapter 6. The following problem statement and mitigation projects address the mitigation needs of the city of Drake, North Dakota. It should be noted that some mitigation projects that pertain to all jurisdictions are included to encourage county-wide collaboration.

Problem Statement

The city of Drake, North Dakota, can be impacted by civil disturbance; criminal, terrorist, or nation/state attack; cyberattack; drought; fire (urban and wildland); flood (overland); geologic hazards; hazardous material release; infectious disease and pest infestations; severe summer weather; severe winter weather; space weather, and transportation incident. The city is located at a high elevation and does not experience any overland flood or drainage issues. The drinking/potable water system is fed by a municipal well and is vulnerable to drought. However, the city installed an upgraded water tower in 2014. The city lacks permanent and/or portable backup generators for the following critical facilities and infrastructure: Drake Ambulance/Fire Hall, Drake Public School, and the lift station. There is a high elderly and lower income population. The city does not have adequate storm shelter capacity. The outdoor early warning siren is updated.

The city lacks funding for mitigation projects. With little to no capabilities to accomplish major projects independently, the city is dependent on outside sources for mitigation.

Installation of backup power sources, installation and/or expansion of storm sheltering capabilities (specifically a prefabricated tornado shelter located on Drake Public School grounds), and education and outreach are a priority for the city.

8.5.4 Mitigation Capability Assessment

Capability for mitigation is divided into four categories: administrative and technical, education and outreach, financial, and planning and regulatory. Each identified resource in the four categories can be used to implement mitigation strategies and access funding for projects. **Tables comparing the mitigation capabilities of the city of Drake, North Dakota, with all other jurisdictions in McHenry County can be found below and in Chapter 7, County Mitigation Capability Assessment.**

- Administrative and Technical: Identification of administrative and technical capabilities, which include: staff, their skills and tools for mitigation planning to implement specific mitigation actions.
- Education and Outreach: Identification of education and outreach programs, and methods already in place to implement mitigation activities and communicate hazard-related information.
- Financial: Identification of access to or eligibility to use funding resources for hazard mitigation for jurisdictions.
- Planning and Regulatory: Jurisdictional plans, policies, codes, and ordinances adopted and in place that prevent and reduce the impacts of natural hazards and man-made threats.

City of Drake, North Dakota, Mitigation Capabilities Summary

The following mitigation capabilities were identified as commonplace among all natural hazards and man-made threats upon completion of the risk assessment for the city of Drake, North Dakota. More detailed information about the mitigation capabilities of the city of Drake in relation to McHenry County and all other incorporated jurisdictions can be found in Chapter 7, Mitigation Capability Assessment.

2018 & 2023 N.D. Enhanced Mitigation MAOP	N.D. Dept. of Emergency Services (NNDES)
Advanced Communications: Internet & TV	NDDES Fire Index Monitoring
Emergency siren(s)/early warning systems	NDDOT State Transportation Plan & State Shop
McHenry County Commission	NDSU/McHenry County Extension
McHenry Comprehensive Plan	Drake Auditor and Public Works
McHenry County Courthouse	Drake City Council
McHenry County Emergency Management	Drake Community Center/Senior Center
McHenry County LEOP	Drake Fire Hall & Fire Dept./Protection District
McHenry County Public Health	Drake Public School
McHenry County Sheriff's Office	Drake Zoning
MOUs	Harvey Ambulance Service

8.5.5 Integration of Mitigation Plan into Planning Mechanisms

Integration of the plan into current planning mechanisms is critical in mitigation to communicate the needs of each jurisdiction to achieve an all-inclusive mitigation strategy. The process for integration of the mitigation plan is included after each mitigation project, which shows the planning mechanism utilized, the plan element used for integration and the process for integration.

8.5.6 Plan Maintenance

An important aspect of any usable plan is the maintenance and upkeep of the document. At any given time, planning, risk analysis, updating the situation assessment, research, coordinating, disaster response or other activity is occurring. Plan maintenance ensures the plan will remain useful in the county for many years. A mitigation action progress report form to conduct plan maintenance is in Chapter 10 of this plan.

8.6 City of Granville, North Dakota

The following profile includes information specific to the city of Granville, North Dakota, for mitigation planning purposes. The information included is as follows:

- Profile and Inventory;
- Risk Assessment;
- Hazard Scoring Notes;
- Mitigation Projects, and
- Capabilities for Mitigation.

Integration into Planning Mechanisms

The process for integration of the mitigation plan into existing planning mechanisms is discussed at the bottom of each mitigation project in section 8.6.4, section 8.6.5 and in Chapter 6, Mitigation Strategy.

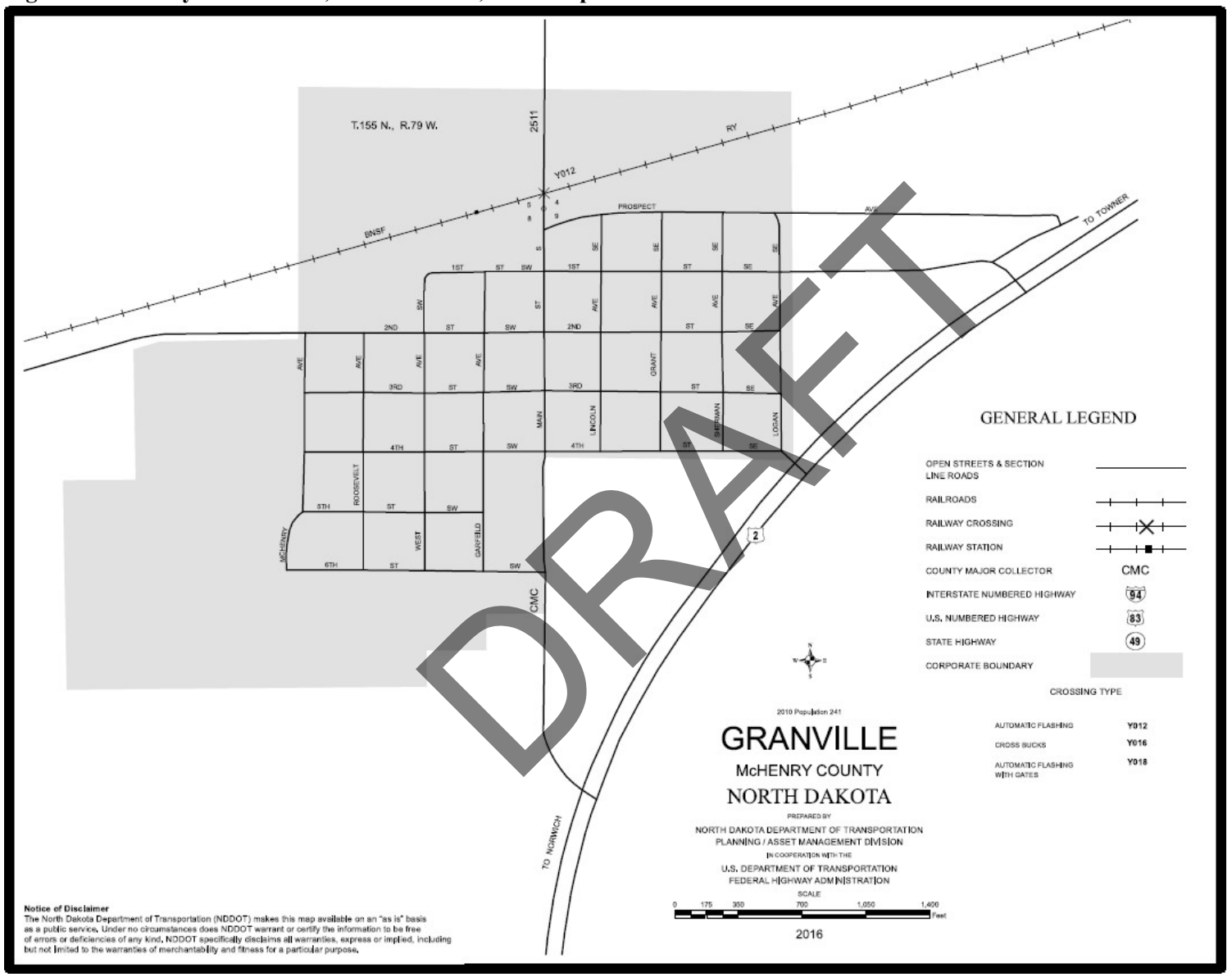
Plan Maintenance

Plan maintenance is shown in section 8.6.6.

Critical Facilities and Infrastructure

Figure 8.6.1 is a map of the city of Granville, North Dakota, provided by the N.D. Dept of Transportation.

Figure 8.6.1 – City of Granville, North Dakota, Base Map



Source: N.D. Dept. of Transportation

8.6.1 Profile and Inventory

The location, total population, vulnerable (underserved) populations, housing units and household size, businesses, critical facilities and infrastructure, new and future development, services, jurisdictional buildings, emergency response services and utilities are shown for the city of Granville, North Dakota. Detailed narratives follow each section heading to profile the city.

Detailed information on public buildings, services provided, emergency response services and utilities can be found in Chapter 3, Profile and Inventory.

Location

The city of Granville, North Dakota, is in north-central North Dakota on U.S. Highway 2 approximately 20 miles east of the city of Minot, North Dakota, the state's fourth largest city.

The city of Granville, North Dakota, is the county seat of McHenry County, North Dakota.

Population

Table 8.6.1 shows population trends for the city of Granville, North Dakota, from 1920 to 2020 per the 2020 U.S. Decennial Census, with an estimate for 2022. According to the 2020 U.S. Decennial Census, the city of Granville, North Dakota, contains 240 people, a decrease of one person (0.4 percent) from 241 people in 2010.

Table 8.6.1 – 1920 to 2022 City of Granville, North Dakota, Population Trends and Projections

1920	1930	1940	1950	1960	1970	1980	1990	2000	2010	2020	*2022 est.*
394	450	443	404	400	282	281	236	286	241	240	*230*

Source(s): U.S. Decennial Census; American Community Survey, 5-Year Estimates

Vulnerable Populations

Age. Per the 2018 to 2022 American Community Survey 5-Year Estimate, the population of the city of Granville, North Dakota, consists of 71 individuals under the age of 20 and 30 individuals aged 65 and older, representing 25.2 and 10.8 percent of the city's population, respectively.

Daycare. There are no daycares in the city of Granville, North Dakota.

Poverty. Per the 2018 to 2022 American Community Survey 5-Year Estimate, there are 27 individuals in the city of Granville, North Dakota, that live below the poverty line, representing 9.8 percent of the city's population. The auditor for the city of Granville stated that the estimates for poverty are low and do not reflect the true poverty level of the city.

Public Schools. The city is the location of TGU Public School, Granville serving approximately 130 students in grades K to 12 according to the TGU Public School, Granville, School Board.

Senior Housing Developments/Care Centers. There are no senior housing developments or care centers in the city of Granville, North Dakota.

Housing Units and Household Size

The 2018 to 2022 American Community Survey 5-Year Estimate shows there are 120 housing units in the city of Granville, North Dakota, consisting of 85 single-family homes, two multifamily homes, and 33 mobile homes.

The 2018 to 2022 American Community Survey 5-Year Estimate there are 109 households in the city of Granville, North Dakota, resulting in an average household size of 2.56 people.

Businesses

Businesses in the city of Granville, North Dakota, include R&R Meats, Memorial Diner, Thirsty Beaver, and The White Buffalo (bar and restaurant).

New and Future Development

The following new and future development has occurred in the city of Granville, North Dakota:

New development in the city of Granville, North Dakota, over the last five years includes:

- R&R Meats opened in Fall 2023.
- A massage parlor closed January 2024.

The following future development is planned or proposed in the city of Granville includes:

- The city is currently updating its zoning ordinances.
- A potential grocery store opening through R&R Meats.
- Granville Junkaholics, a business located just outside city limits, purchased an old gas station lot east of city limits on U.S. Highway 2 and is looking to open an antique and coffee shop.

Critical Facilities

- Granville City Hall
- Granville City Shop
- Granville Fire Hall
- McGillicuddy Community Center
- North Prairie Regional Water District pumphouse
- TGU Public School, Granville
- U.S. Post Office

Infrastructure

- The city of Granville, North Dakota, has a sanitary sewer system with three lagoon cells (active), one dead cell used for overflow, and one lift station.
- The city of Granville, North Dakota, has a drinking/potable system with a water treatment plant that is sourced North Prairie Regional Water District, and a water tower with a capacity of 75,000 gallons.

- The city of Granville, North Dakota, has an inert landfill (for trees/brushes and concrete). The concrete portion is being closed because it's at capacity.
- U.S. Highway 2 and N.D. Highway 41 serve the city of Granville, North Dakota.
- Burlington Northern-Santa Fe (BNSF) Railroad infrastructure traverses the city of Granville, North Dakota.

Emergency Response Services

- The Velva Area Ambulance provides ambulance service to the city of Granville, North Dakota, and surrounding rural areas.
- The Granville Fire Department/Rural Protection District provides fire protection services to the city of Granville, North Dakota, and surrounding rural areas.
- The McHenry County Sherriff's Office provides law enforcement services to the city of Granville, North Dakota.
- First District Health Unit, McHenry County is in the city of Granville, North Dakota, provides public health services to the city of Granville, North Dakota, and greater McHenry County.

Services and Utilities

- Circle Sanitation provides municipal garbage collection services to the city of Granville, North Dakota.
- The city of Granville, North Dakota, has an inert landfill.
- The city of Granville, North Dakota, has a sanitary sewer system with four lagoon cells and two lift stations. It is estimated that two or three single-family homes utilize septic tanks.
- The city of Granville, North Dakota, has a storm water system consisting of culverts and drainage ditches.
- The Mouse River Journal is the official newspaper of the city of Granville, North Dakota. The Granville Gazette is also used by the city of Granville, North Dakota.
- The city of Granville, North Dakota, has a drinking/potable system with a water treatment plant that is sourced North Prairie Regional Water District, and a water tower with a capacity of 75,000 gallons. Approximately three single-family homes in the city utilize a well for drinking/potable water.
- Electricity is provided by Otter Tail Power Company in the city of Granville, North Dakota.
- Natural gas is not available in the city of Granville, North Dakota.
- Fuel oil and propane are used as an alternative heating source and are provided by companies chosen by the individual consumer in Granville, North Dakota.
- Midcontinent and SRT provide internet, phone, and TV to the city of Granville, North Dakota, and surrounding rural area.

The city has an inactive outdoor emergency siren. Fire Hall needs a generator, so does the lift station and water tower and pumphouse.

8.6.2 Risk Assessment and Hazard Scoring Notes

Table 8.6.1 summarizes the risk assessment scoring of the city of Granville, North Dakota. The risk assessment and hazard scoring notes for each hazard specific to the city are shown in Table 8.6.2. Risk assessment notes for impact, frequency, likelihood and vulnerability ubiquitous for jurisdictions in McHenry County are found in Chapter 5, Threat and Hazard Identification Assessment in each respective hazard profile.

Table 8.6.1 – City of Granville, North Dakota, Jurisdiction Risk Assessment Scoring Summary

Risk Assessment			**Jurisdiction:**	**City of Granville, North Dakota**		
Hazard/Threat	Impact	Frequency	Likelihood	Vulnerability	Capabilities	**Total**
Civil Disturbance	4	5	4	5	2	**16**
Criminal, Terrorist, or Nation-State Attack	4	5	4	5	2	**16**
Cyberattack	5	3	5	2	2	**13**
Dam Failure	*NA*	*NA*	*NA*	*NA*	*NA*	***NA***
Drought	5	4	5	3	2	**15**
Fire – Urban/Structure Collapse	5	2	3	3	2	**11**
Fire – Wildland (including Rural)	5	4	5	4	2	**16**
Flood	2	3	4	2	2	**9**
Geologic Hazards	5	2	3	2	2	**10**
Hazardous Material Release	5	2	3	5	1	**14**
Infectious Disease & Pest Infestations	5	5	5	3	2	**16**
Severe Summer Weather	5	5	5	3	2	**16**
Severe Winter Weather	5	5	5	5	2	**18**
Space Weather	5	2	2	5	2	**13**
Transportation Incident	5	4	5	5	3	**16**

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 8.6.2 – City of Granville, North Dakota, Jurisdiction Risk Assessment

	Civil Disturbance	
Impact	• Blocked Roads • Business/Government Interruptions • Delayed Emergency Response • Financial Hardship/Strain (public)	• HAZMAT Release • Human Injury/Death • Loss of Communication Systems • Property Damage (Structure) • Property Damage (Vehicle)
Frequency	• Starting in 2023, a nefarious female individual in her late 40s has been harassing city officials/emergency services, residents, and videotaping minors at the public school and uploading videos onto public websites. The individual also goes to the public school and harasses administration.	• Teachers and staff at the public school give students rides home as children are afraid to walk home because of the nefarious female individual. • The nefarious female individual harasses U.S. Post Office workers and follows McHenry County Sheriff's Office personnel around with a camera recording basic law enforcement activities. • DAPL protesters were not active in the city
Likelihood	More Likely • Lack of local active/continuous law enforcement coverage • Enbridge Natural Gas Pipeline • BNSF Railway Infrastructure & U.S. Highway 2 • TGU Public School, Granville • The nefarious female individual	Less Likely • Small town with no major regional/state attractions • Sparse population • One McHenry County Sheriff's Office Deputy live in Granville
Vulnerability	More Vulnerable • Lack of local active/continuous law enforcement coverage • Enbridge Natural Gas Pipeline • BNSF Railway Infrastructure & U.S. Highway 2 • TGU Public School, Granville • The nefarious female individual • Proximity to the city of Minot, the state's fourth largest city, and the Minot Air Force Base (AFB), and missile silos • Proximity to Canada	Less Vulnerable • Small town with no major regional/state attractions • Sparse population • One McHenry County Sheriff's Office Deputy live in Granville

Table 8.6.2 – City of Granville, North Dakota, Jurisdiction Risk Assessment – Continued

	Criminal, Terrorist, Nation-State Attack	
Impact	• Blocked Roads • Business/Government Interruptions • Delayed Emergency Response • Disease Outbreak/Mass Infections • Financial Hardship/Strain (public) • HAZMAT Release • Human Injury/Death	• Infrastructure Degradation • Loss of Communication Systems • Mass Casualties/Fatalities • Property Damage (Structure) • Property Damage (Vehicle) • **City's drinking/potable water system could be contaminated**
Frequency	• Starting in 2023, a nefarious female individual in her late 40s has been harassing city officials/emergency services, residents, and videotaping minors at the public school and uploading videos onto public websites. The individual also goes to the public school and harasses administration.	• Teachers and staff at the public school give students rides home as children are afraid to walk home because of the nefarious female individual. • The nefarious female individual harasses U.S. Post Office workers and follows McHenry County Sheriff's Office personnel around with a camera recording basic law enforcement activities. • A male individual was intentionally starting wildland fires in 2022 • **No major incidents outside city limits**
Likelihood	More Likely • Lack of local active/continuous law enforcement coverage • Enbridge Natural Gas Pipeline • BNSF Railway Infrastructure & U.S. Highway 2 • TGU Public School, Granville • The nefarious female individual	Less Likely • Small town with no major regional/state attractions • Sparse population • One McHenry County Sheriff's Office Deputy live in Granville
Vulnerability	More Vulnerable • Lack of local active/continuous law enforcement coverage • Enbridge Natural Gas Pipeline • BNSF Railway Infrastructure & U.S. Highway 2 • TGU Public School, Granville • The nefarious female individual • Proximity to the city of Minot, the state's fourth largest city, and the Minot Air Force Base (AFB), and missile silos • Proximity to Canada	Less Vulnerable • Small town with no major regional/state attractions • Sparse population • One McHenry County Sheriff's Office Deputy live in Granville

Table 8.6.2 – City of Granville, North Dakota, Jurisdiction Risk Assessment – Continued

	Cyberattack	
Impact	• Business Interruptions • Delayed Emergency Response • Financial Hardship/Strain (public) • Government Interruptions • HAZMAT Release • Human Injury/Death • Identity Theft – loss of wages and/or assets	• Infrastructure Degradation • Loss of Communication Systems • Loss of Digital/Technological Systems • Loss of Power/Electricity Outage • School Closure
Frequency	• Never an occurrence of a major attack	• TGU Public School, Granville and the city of Granville Auditor's Office have received phishing emails and other SPAM
Likelihood	<u>More Likely</u> • Enbridge Natural Gas Pipeline • Small town with lack of technological infrastructure to defend against cyberattack • SRT has two communications buildings proximate to the city of Granville – one west and one east • TGU Public School, Granville • U.S. Post Office	<u>Less Likely</u> • Lack of major state or national financial institutions
Vulnerability	<u>More Vulnerable</u> • Enbridge Natural Gas Pipeline • Small town with lack of technological infrastructure to defend against cyberattack • SRT has two communications buildings proximate to the city of Granville – one west and one east • TGU Public School, Granville • Elderly population relying largely on landlines for communication purposes, remote medical care, and equipment monitoring • U.S. Post Office	<u>Less Vulnerable</u> • Lack of major state or national financial institutions • No natural gas service to the city • City of Granville has a firewall • TGU Public School, Granville has a firewall through NDIT

Table 8.6.2 – City of Granville, North Dakota, Jurisdiction Risk Assessment – Continued

	Drought	
Impact	• Crop Loss • Loss of Economy • Loss of Livestock • Loss of Wildlife Habitat (decreased wildlife populations) • Increase in Wildland Fire Potential • Water quality compromised from stock dams	• Diminished soil health • Negative impact on mental health of producers and fire responders – "community impact" • Local producers forced to sell off herds which can last for several years • Population loss as people moved away due to loss of economy
Frequency	• Fall of 1980 was dry • Severe drought in 1961/1962, 1988/1989 to 1991/1992 • Some dry conditions each year lasting a couple weeks in length	• In 2013 and 2014, dry conditions were present from June to October with little rain • **Lack of adequate snowfall spring of 2015, 2021, 2023/2024** • Severe drought conditions winter 2020/2021 • Exceptional drought spring and summer 2021
Likelihood	More Likely • Dry/wet cycle every 10 years • Climatic patterns will result in an eventual drought of significance • Lack of precipitation	Less Likely • Heavy precipitation in winter (snow pack) and summer (rainfall)
Vulnerability	More Vulnerable • Loss of economy from decreased wildlife & hunting • Agriculture economy • Elderly population • TGU Public School, Granville • Flat terrain/open topography contributes to conditions • Pastureland adjacent to structures and city limits • Approximately three single-family homes in the city utilize a well for drinking/potable water.	Less Vulnerable • Granville Fire Department • Financial assistance programs made available by the state and federal government • McHenry County Burn Restriction Ordinance • Fire Index monitoring and mapping from NDDES • Advanced communications such as internet and TV • North Prairie Regional Water District, and a water tower with a capacity of 75,000 gallons.

Table 8.6.2 – City of Granville, North Dakota, Jurisdiction Risk Assessment – Continued

	Fire – Urban Fire/Structure Collapse	
Impact	• Building Collapse • Delayed Emergency Response • Evacuation (Localized) • Explosion	• Human Injury/Death • Increase Fire Potential • **Property damage on a significant scale if impacting downtown structures and other critical facilities or infrastructure in the city**
Frequency	• Granville Fire Department receives on average one structure call each year • Two calls for structure fires in 2023	
Likelihood	More Likely • Has not adopted state building codes but lack enforcement • Age of structures • Elderly populations • Increased drug use • Increased use of electric heaters • Outdated electric wiring in older homes and structures • Outdated heating systems	Less Likely • Better building standards and maintenance of structures • Smoke detectors in public buildings and private homes/businesses • Well-equipped fire department with trained volunteers More Likely • **BNSF Railway Infrastructure traversing city limits**
Vulnerability	More Vulnerable • Has not adopted state building codes but lack enforcement • Age of structures • Elderly populations • Increased drug use • Increased use of electric heaters • Outdated electric wiring in older homes and structures • Outdated heating systems • **BNSF Railway Infrastructure traversing city limits** • **Prolonged response times due to limited fire staff during the daytime** • **Granville Fire Hall is undersized for current/modern firefighting equipment and for training of volunteers**	Less Vulnerable • Granville Fire Department has two portable generators • Better building standards and maintenance of structures • Smoke detectors in public buildings and private homes/businesses • **City has fire hydrants for fire suppression** • **No natural gas service to the city** • **The city has a 75,000-gallon water tower** More Vulnerable • **City hall/city shop/community center, fire hall, lift station, and TGU Public School do not have permanent generators**

Table 8.6.2 – City of Granville, North Dakota, Jurisdiction Risk Assessment – Continued

	Fire – Rural & Wildland	
Impact	• Building Collapse • Crop Loss • Delayed Emergency Response • Downed Power Lines • Evacuation (Localized) • Explosion • Increase Wildland Fire Potential • Loss of Power/Electricity Outage	• **Loss of Livestock** • **Loss of Wildlife Habitat** • **Mass Casualties** • **Property Damage (Structure & Vehicle)** • **Losses could be on a significant scale if impacting a major producer or farmstead** • **Loss of farm equipment and assets**
Frequency	• Granville Fire Department responds to an average of 10 to 12 wildland fires each year • A male individual was intentionally starting wildland fires in 2022	• Never an occurrence of a wildland fire threatening city limits
Likelihood	More Likely • Agricultural burn-off • High winds annually and dry conditions – when present • Pastureland adjacent to structures and city limits • Severe summer weather with significant lightning • **BNSF Railroad Infrastructure traversing city limits**	Less Likely • Removal of CRP near city limits • Summer and winter weather with heavy precipitation
Vulnerability	More Vulnerable • Agricultural burn-off • High winds annually and dry conditions – when present • Pastureland adjacent to structures and city limits • Severe summer weather with significant lightning • **Lack of fire breaks around city limits** • **BNSF Railway Infrastructure traversing city limits** • **City hall/city shop/community center, fire hall, lift station, and TGU Public School do not have permanent generators** • **Lack of outdoor early warning system – the siren is nonoperational, and repairs cannot be scheduled**	Less Vulnerable • Granville Fire Department has two portable generators • **Adequate staffing coverage/resources of fire department** • Removal of CRP near city limits • Summer and winter weather with heavy precipitation • MOUs with neighboring fire departments • McHenry County Burn Restriction Ordinance • **The city has a 75,000-gallon water tower** More Vulnerable • **Granville Fire Hall is undersized for current/modern firefighting equipment and for training of volunteers**

Table 8.6.2 – City of Granville, North Dakota, Jurisdiction Risk Assessment – Continued

	Flood	
Impact	• Blocked Roads • Delayed Emergency Response • Flooding (Highway & Structure) • Human Injury/Death	
Frequency	• The city's Main St. becomes inundated with overland flooding during heavy precipitation events and can become blocked for a few hours at a time due to slow drainage	• Surrounding soils consisting of shale and gravel (sandy soil) allow for immediate drainage of water during summer months
Likelihood	More Likely • Rapid change of seasons resulting in excessive snow melt • Inadequate stormwater drainage system on Main Avenue due to low-grade	Less Likely • Dry conditions/drought and low precipitation • Surrounding soils consisting of shale and gravel (sandy soil) allow for immediate drainage of water during summer months • **Adequate storm water system consisting of drainage ditches** • **The city's sanitary sewer system is built up and not vulnerable to overland flooding**
Vulnerability	More Vulnerable • Rapid change of seasons resulting in excessive snow melt • Inadequate stormwater drainage system on Main Avenue due to low-grade • TGU Public School, Granville • **City hall/city shop/community center, fire hall, lift station, and TGU Public School do not have permanent generators**	Less Vulnerable • Granville Fire Department has equipment to move water • Granville Fire Department has two portable generators Surrounding soils consisting of shale and gravel (sandy soil) allow for immediate drainage of water during summer months

Table 8.6.2 – City of Granville, North Dakota, Jurisdiction Risk Assessment – Continued

	Geologic Hazards	
Impact	• Blocked Roads • Delayed Emergency Response • Human Injury/Death • Infrastructure Degradation	• Loss of Economy • Loss of Power/Electricity Outage • Property Damage • Utility Outage/Shortage
Frequency	• No occurrences of geologic hazards other than radon in the city of Granville	
Likelihood	More Likely • **All N.D. Counties in EPA Radon Zone I**	Less Likely • No Abandoned Mine Lands located near city limits
Vulnerability	More Vulnerable • **All N.D. Counties in EPA Radon Zone I**	Less Vulnerable • No Abandoned Mine Lands located near city limits

Table 8.6.2 – City of Granville, North Dakota, Jurisdiction Risk Assessment – Continued

	Hazardous Material Release	
Impact	• Blocked Roads • Business & Government Interruptions • Delayed Emergency Response • Environmental Degradation • Evacuation (localized) • Explosion	• Human Injury/Death • Increased Fire Potential • Loss of Economy • Loss of Power and/or Potable Water • Property Damage • School Closure
Frequency	• No significant incidents involving airplanes, automobiles/cars, commercial truck traffic, recreational vehicles, or trains	• No BNSF train derailments in Granville city limits
Likelihood	More Likely • Transportation of chemicals by truck/railroad • Storage of chemicals/fertilizers in city limits and on farmsteads in large tanks near city limits • Propane is used as a heating source in city limits • Enbridge Natural Gas Pipeline	Less Likely • Private companies have HAZMAT certifications • Safety measures implemented BNSF Railroad • Tier II Federal Requirements More Likely • **U.S. Highway 2 and BNSF Railroad Infrastructure**
Vulnerability	More Vulnerable • Transportation of chemicals by truck/railroad • Storage of chemicals/fertilizers in city limits and on farmsteads in large tanks near city limits • Propane is used as a heating source with numerous tanks throughout city limits • **U.S. Highway 2 and BNSF Railroad Infrastructure traversing city limits** • **No hospital or medical clinic in city limits** • **Lack of outdoor early warning system – the siren is nonoperational, and repairs cannot be scheduled** • **Granville Fire Hall is undersized for current/modern firefighting equipment and for training of volunteers**	Less Vulnerable • Granville Fire Department has HAZMAT training • Private companies have HAZMAT certifications • Safety measures implemented BNSF Railroad • Tier II Federal Requirements • Courthouse or TGU Public School • Regional HAZMAT Team in Minot 45 minutes away • Granville Fire Department has two portable generators More Vulnerable • Lack of official truck route around city limits • Enbridge Natural Gas Pipeline

Table 8.6.2 – City of Granville, North Dakota, Jurisdiction Risk Assessment – Continued

	Infectious Disease & Pest Infestations	
Impact	• Crop Loss • Human Injury/Death • Livestock Injury/Death • Loss of Economy • Mass Casualties/Fatalities	• Strain on local medical resources (ambulance or clinic) • Loss of Drinking/Potable Water • **Financial cost to public health resources** • Loss of medical staff due to sickness • School Closure
Frequency	• Annual occurrences of death, primarily among the elderly • Occurrence of disease - 1 in 3 for people annually • Annual occurrences of influenza cases in the local population	• **The COVID-19 pandemic of 2020 resulted in mass quarantine and sheltering of the local population and temporary closure of businesses resulting in unmeasured economic losses.**
Likelihood	More Likely • Agriculture economy • Growing elderly population • Small population of children without immunization • TGU Public School, Granville • Transporting of animals across state lines • Dependent on weather for animals and crops • U.S. Highway 2 and BNSF Railroad	Less Likely • Advanced communications such as internet and tv • Public health and employment regulations for public facilities • Federal health guidelines at public employers • First District Health Unit, McHenry County education and outreach • FSA and NDSU Extension/McHenry County education and outreach
Vulnerability	More Vulnerable • Agriculture economy • Growing elderly population • Small population of children without immunization • TGU Public School • Transporting of animals across state lines • Dependent on weather for animals and crops • U.S. Highway 2 and BNSF Railroad • No hospital or medical clinic	Less Vulnerable • Advanced communications such as internet and tv • Public health and employment regulations for public facilities Immunizations & medications of local population • Minot Mobile Veterinarian Clinic • **City has a sanitary sewer system with lagoon cells – the system was retrofitted/upgraded in 2016/2017**

Table 8.6.2 – City of Granville, North Dakota, Jurisdiction Risk Assessment – Continued

	Severe Summer Weather	
Impact	• Blocked Roads – Granville Underpass • Downed Trees • Evacuation (Localized) • Human Injury/Death – heat exhaustion • Infrastructure Degradation • Livestock Injury/Death • Loss of Crops	• Loss of Power/Downed Power Lines • **Property Damage – repair of roofing, siding and drainage systems for homes** • **Damage to electrical equipment from lightning** • Shelter-in-place • Vehicle Damage
Frequenc	• Annual occurrences of hail, extreme heat, lightning, heavy rain, high wind • Two or three significant storms producing damage to trees and property annually	• Property damage from tornados/straight-line winds in summer 2017 and 2019 resulting in significant loss of trees
Likelihood	• Climatic patterns will result in numerous annual occurrences of the hazard	• Flat terrain/open topography contributes to wind conditions
Vulnerability	<u>More Vulnerable</u> • Has not adopted building codes • Aging infrastructure (roads and electrical systems) • Agriculture Economy • High elderly population • TGU Public School, Granville • Mobile homes • **U.S. Highway 2 and BNSF Railroad Infrastructure** • **No hospital or medical clinic in city limits** • **City hall/city shop/community center, fire hall, lift station, and TGU Public School do not have permanent generators**	<u>Less Vulnerable</u> • Advanced warning and notification such as internet and TV • Granville Fire Department • Granville Fire Department has two portable generators • **City has a sanitary sewer system with lagoon cells – the system was retrofitted/upgraded in 2016/2017** <u>More Vulnerable</u> • **Lack of outdoor early warning system – the siren is nonoperational, and repairs cannot be scheduled** • **City lacks an official storm shelter** • **Granville Fire Hall is undersized for current/modern firefighting equipment and for training of volunteers**

Table 8.6.2 – City of Granville, North Dakota, Jurisdiction Risk Assessment – Continued

	Severe Winter Weather	
Impact	• Blocked Roads: McHenry Ave • Evacuation (Localized) • Human Injury/Death – wind chill • Loss of Crops • Loss of Livestock • Loss of Power/Downed Power Lines	• Property Damage – repair of roofing, siding and drainage systems for homes • Shelter-in-place • Vehicle Damage • **City water mains have experienced breaking from freezing and thawing of the soil**
Frequency	• Annual occurrences of blizzard and wind events • Annual occurrences of blocked roads & power loss • Two or three significant blizzards producing damage to trees and property annually • Major blizzard in fall of 2015 • March 2017 snowstorm resulted in blocked roads • Major blizzard in fall of 2018 • Spring and fall snowstorms of 2019 • **Ice storm in 1997**	• **Ice Storm January 2021 and April 2022** • **A broken water main washed out a city street resulting in a car falling into in 2023** • **Several drinking/potable water main breaks annually causing outages of the system – the city does not know what materials the pipes are constructed from** • **Several sanitary sewer main breaks annually causing outages of the system.**
Likelihood	• Climatic patterns will result in numerous annual occurrences of the hazard	• Removal of shelter belts allows for more direction wind and increases severity of ground blizzard conditions and frequency of blocked roads
Vulnerability	More Vulnerable • Has not adopted building codes • Aging infrastructure (roads and electrical systems) • Agriculture Economy • High elderly population & TGU Public School, Granville • Mobile homes • **U.S. Highway 2 and BNSF Railroad Infrastructure** • **No hospital or medical clinic in city limits** • **City hall/city shop/community center, fire hall, lift station, and TGU Public School do not have permanent generators**	Less Vulnerable • Advanced warning and notification such as internet and TV • Granville Fire Department • Granville Fire Department has two portable generators • **City has a sanitary sewer system with lagoon cells – the system was retrofitted/upgraded in 2016/2017** More Vulnerable • **Lack of outdoor early warning system – the siren is nonoperational, and repairs cannot be scheduled** • **City lacks an official storm shelter** • **Granville Fire Hall is undersized for current/modern firefighting equipment and for training of volunteers**

Table 8.6.2 – City of Granville, North Dakota, Jurisdiction Risk Assessment – Continued

	Space Weather	
Impact	• Government Interruptions • Infrastructure Degradation • Loss of Communication Systems • Loss of Digital/Technological Systems • Loss/Overcrowded Medical Facilities	• Loss of Power/Electricity Outage • Public Distress/Social Discord • School Closure • Loss of operation of the city hall and fire hall, etc. • Loss/outage of medical devices at private residences
Frequency	• Never a recorded occurrence in McHenry County or North Dakota	
Likelihood	• Dependent on solar activity and the 11-year solar cycle • Likely to occur once every 500 years per the 2018 N.D. Enhanced Mitigation MAOP	
Vulnerability	<u>More Vulnerable</u> • Advanced communication systems (internet, TV, etc.) • Agriculture economy • All critical facilities and infrastructure that require electricity for operation • Enbridge Natural Gas Pipeline • TGU Public School, Granville • Granville Fire Hall	<u>Less Vulnerable</u> • Local food production/households with gardens

Table 8.6.2 – City of Granville, North Dakota, Jurisdiction Risk Assessment – Continued

	Transportation Incident	
Impact	• **Blocked roads from inadequate road clearing or incidents** • Business Interruptions • Delayed Emergency Response • Human Injury/Death • Increased Fire Potential • Loss of Transportation/Accessibility	• Mass Casualties/Fatalities • Delayed Emergency Response • HAZMAT Release • Livestock Loss • Property Damage • **Could be catastrophic if involving a school bus filled with children and/or a truck carrying hazardous materials**
Frequency	• Annual occurrences of multiple accidents involving cars and/or farm equipment on U.S. Highway 2 • Frequent incidents involving tipping of semi-trucks on U.S. Highway 2 east of city limits – can result in rupture of Enbridge Natural Gas Pipeline	• Granville Fire Department has responded to 14 transportation incidents in 2023 • No major incidents resulting in explosion, casualties/fatalities or property damage in city limits • N.D. Highway 41 and 12th Ave N (Main Ave) experience incidents annually
Likelihood	More Likely • Intoxicated drivers • High truck traffic from agriculture-related business • **U.S. Highway 2, N.D. Hwy 41, 12th Ave N (Main Ave)** • **BNSF Railroad – derailment of a train on east side of Granville can result in rupture of the Enbridge Natural Gas Pipeline** • **U.S. Highway 2 "Curve"**	Less Likely • Adequate traffic control signage/stop signs • No commercial passenger airport More Likely • Highway 2 east of city limits – can result in rupture of Enbridge Natural Gas Pipeline • Speeding traffic on 12th Ave N (Main Ave)
Vulnerability	More Vulnerable • Intoxicated drivers • High truck traffic from agriculture-related business • **U.S. Highway 2, N.D. Hwy 41, 12th Ave N (Main Ave)** • **BNSF Railroad – derailment of a train on east side of Granville can result in rupture of the Enbridge Natural Gas Pipeline** • Highway 2 east of city limits – can result in rupture of Enbridge Natural Gas Pipeline • Speeding traffic on 12th Ave N (Main Ave) • Lack of sidewalks/safe routes to schools	Less Vulnerable • Adequate traffic control signage/stop signs • No commercial passenger airport • Granville Fire Department • One McHenry County Sheriff's Office Deputy live in Granville More Vulnerable • **Lack of official truck route** • **Granville Fire Hall is undersized for current/modern firefighting equipment and for training of volunteers** • **U.S. Highway 2 "Curve"**

8.6.3 Mitigation Strategy

The McHenry County, N.D., Multi-Jurisdictional Multi-Hazard Plan Update includes a mitigation strategy consisting of seven goals in Chapter 6. The following problem statement and mitigation projects address the mitigation needs of the city of Granville, North Dakota. It should be noted that some mitigation projects that pertain to all jurisdictions are included to encourage county-wide collaboration.

Problem Statement

The city of Granville, North Dakota, can be impacted by civil disturbance; criminal, terrorist, or nation/state attack; cyberattack; drought; fire (urban and wildland); flood (overland); geologic hazards; hazardous material release; infectious disease and pest infestations; severe summer weather; severe winter weather; space weather, and transportation incident. The city's Main Avenue is impacted by overland flooding. The drinking/potable water and wastewater systems are impacted by severe winter weather as the systems are not below the frost line, resulting in numerous annual breaks causing utility outages. The stormwater drainage ditch system is impacted by heavy precipitation during severe summer weather events. The city lacks permanent and/or portable backup generators for the following critical facilities and infrastructure: Granville City Hall/City Shop/Community Center, fire hall, TGU Public School, and lift station. There is inadequate storm shelter capacity, and the outdoor early warning system is nonoperational. The Granville Fire Department Fire Hall is undersized for current/modern firefighting equipment and training of volunteers. The Enbridge Natural Gas Pipeline's right-of-way is shared with BNSF Railroad which can result in rupture of the pipeline causing a major hazardous material release and potential explosion.

The city lacks funding for mitigation projects. With little to no capabilities to accomplish major projects independently, the city is dependent on outside sources for mitigation.

Retrofit/upgrade of existing drinking/potable water, wastewater, and stormwater systems, installation of permanent backup power sources, retrofit/upgrade outdoor emergency siren, upgrade and expand storm shelters (specific attention paid to school-aged children), construction of a new fire hall, and expansion of education and outreach capabilities are a priority for the city.

City of Granville Project 1: Conduct Engineering Study to Identify Retrofits/Upgrades to the Drinking/Potable Water, Sanitary Sewer Wastewater/Lagoon, and Stormwater Systems.

Description/Benefit	The city's Main Avenue is impacted by overland flooding. The drinking/potable water and wastewater systems are impacted by severe winter weather as the systems are not below the frost line, resulting in numerous annual breaks causing utility outages. The stormwater drainage ditch system is impacted by heavy precipitation during severe summer weather events.		
Hazard/Threat Addressed	Drought, Flooding, Infectious Disease and Pest Infestations, Severe Summer Weather, Severe Winter Weather		
Affected Jurisdictions	City of Granville and greater McHenry County		
Project Status	Ongoing and Continue		
Priority	Very High		
Responsible Agency	Granville City Council, DWR		
Partners	Emergency Management, Public Works,		
Completion Timeframe	2 to 3 years	Cost	TBD
Funding Source	City of Granville. Hazard Mitigation Grant Program (HMGP).		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
5	5	4	5	5	3	3	30

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element	Process for Integration
Capital Improvement Plan Granville Comprehensive Plan	Capability Assessment, Hazard History, Risk Assessment, Granville Jurisdictional Meeting.	Approval by county commission and city council

8.6.4 Mitigation Capability Assessment

Capability for mitigation is divided into four categories: administrative and technical, education and outreach, financial, and planning and regulatory. Each identified resource in the four categories can be used to implement mitigation strategies and access funding for projects. **Tables comparing the mitigation capabilities of the city of Granville, North Dakota, with all other jurisdictions in McHenry County can be found below and in Chapter 7, County Mitigation Capability Assessment.**

- Administrative and Technical: Identification of administrative and technical capabilities, which include: staff, their skills and tools for mitigation planning to implement specific mitigation actions.

- Education and Outreach: Identification of education and outreach programs, and methods already in place to implement mitigation activities and communicate hazard-related information.

- Financial: Identification of access to or eligibility to use funding resources for hazard mitigation for jurisdictions.

- Planning and Regulatory: Jurisdictional plans, policies, codes, and ordinances adopted and in place that prevent and reduce the impacts of natural hazards and man-made threats.

City of Granville, North Dakota, Mitigation Capabilities Summary

The following mitigation capabilities were identified as commonplace among all natural hazards and man-made threats upon completion of the risk assessment for the city of Granville, North Dakota. More detailed information about the mitigation capabilities of the city of Granville in relation to McHenry County and all other incorporated jurisdictions can be found in Chapter 7, Mitigation Capability Assessment.

2018 & 2023 N.D. Enhanced Mitigation MAOP	NDDES Fire Index Monitoring
Advanced Communications: Internet & TV	NDDOT State Transportation Plan & State Shop
Emergency siren(s)/early warning systems	NDSU/McHenry County Extension
McHenry County Commission	TGU Public School, Granville
McHenry Comprehensive Plan	Granville Auditor's Office
McHenry County Courthouse	Granville City Council
McHenry County Emergency Management	Granville City Hall and City Shop
McHenry County LEOP	Granville Fire Department/Protection District
McHenry County Public Health	Granville Planning and Zoning and Zoning Ords.
McHenry County Sherriff's Office	Granville Public Works – seasonal and permanent
MOUs	U.S. Post Office
N.D. Dept. of Emergency Services (NNDES)	Wildland Fire Index Sign

8.6.5 Integration of Mitigation Plan into Planning Mechanisms

Integration of the plan into current planning mechanisms is critical in mitigation to communicate the needs of each jurisdiction to achieve an all-inclusive mitigation strategy. The process for integration of the mitigation plan is included after each mitigation project, which shows the planning mechanism utilized, the plan element used for integration and the process for integration.

8.6.6 Plan Maintenance

An important aspect of any usable plan is the maintenance and upkeep of the document. At any given time, planning, risk analysis, updating the situation assessment, research, coordinating, disaster response or other activity is occurring. Plan maintenance ensures the plan will remain useful in the county for many years. A mitigation action progress report form to conduct plan maintenance is in Chapter 10 of this plan.

8.7 City of Karlsruhe, North Dakota

The following profile includes information specific to the city of Karlsruhe, North Dakota, for mitigation planning purposes. The information included is as follows:

- Profile and Inventory;
- Risk Assessment;
- Hazard Scoring Notes;
- Mitigation Projects, and
- Capabilities for Mitigation.

Integration into Planning Mechanisms

The process for integration of the mitigation plan into existing planning mechanisms is discussed at the bottom of each mitigation project in section 8.7.4, section 8.7.5 and in Chapter 6, Mitigation Strategy.

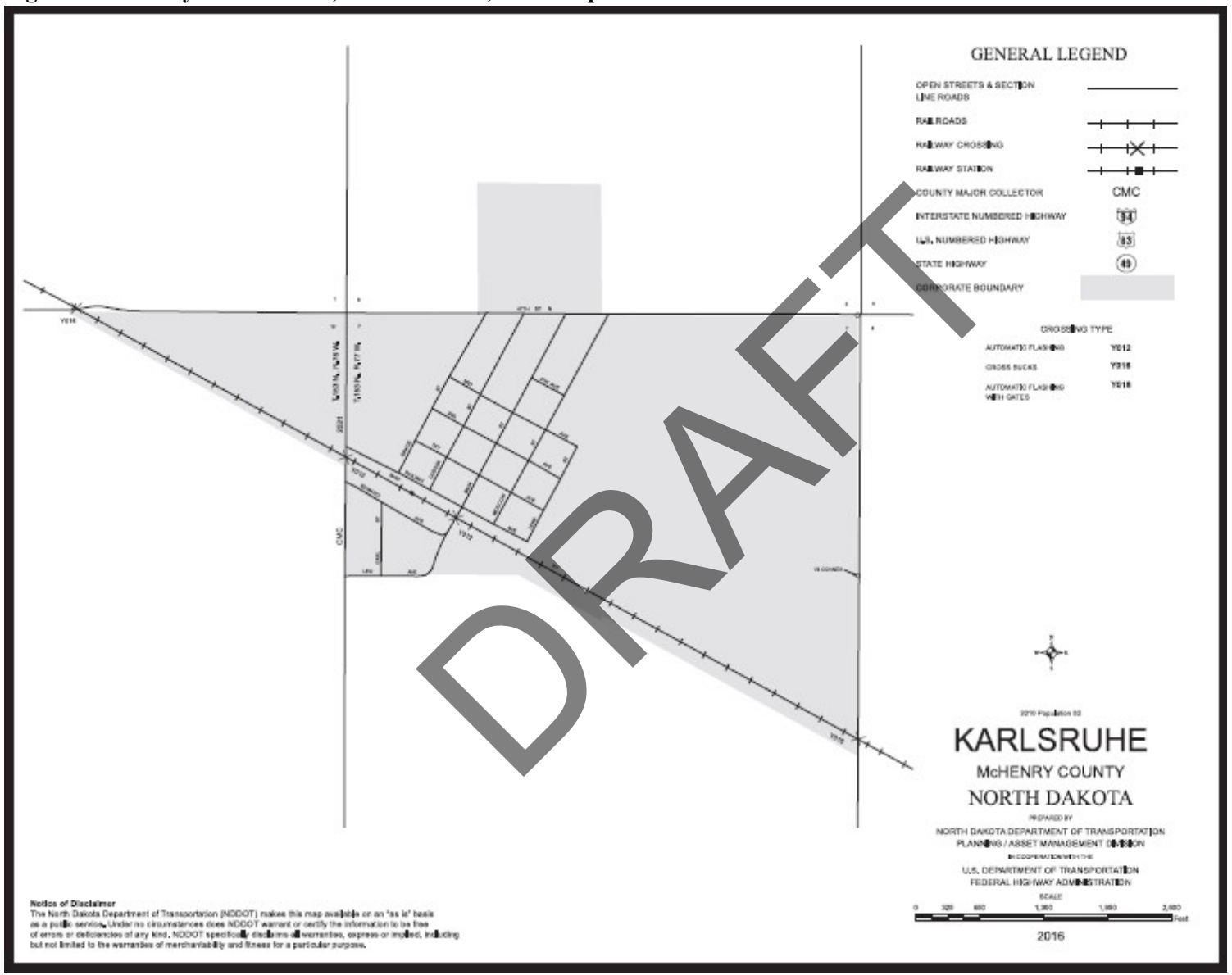
Plan Maintenance

Plan maintenance is shown in section 8.7.6.

Critical Facilities and Infrastructure

Figure 8.7.1 is a map of the city of Karlsruhe, North Dakota, provided by the N.D. Dept of Transportation.

Figure 8.7.1 – City of Karlsruhe, North Dakota, Base Map



Source: N.D. Dept. of Transportation

8.7.1 Profile and Inventory

The location, total population, vulnerable (underserved) populations, housing units and household size, businesses, critical facilities and infrastructure, new and future development, services, jurisdictional buildings, emergency response services and utilities are shown for the city of Karlsruhe, North Dakota. Detailed narratives follow each section heading to profile the city.

Detailed information on public buildings, services provided, emergency response services and utilities can be found in Chapter 3, Profile and Inventory.

Location

The city of Karlsruhe, North Dakota, is in north-central North Dakota, proximate to the intersection of U.S. Highway 52 and N.D. Highway 14 approximately 32 miles southeast of the city of Minot, North Dakota, the state's fourth largest city.

Population

Table 8.7.1 shows population trends for the city of Karlsruhe, North Dakota, from 1920 to 2020 per the 2020 U.S. Decennial Census, with an estimate for 2022. According to the 2020 U.S. Decennial Census, the city of Karlsruhe, North Dakota, contains 87 people, an increase of five people (6.1 percent) from 82 people in 2010.

Table 8.7.1 – 1920 to 2022 City of Karlsruhe, North Dakota, Population Trends and Projections

1920	1930	1940	1950	1960	1970	1980	1990	2000	2010	2020	*2022 est.*
--	258	289	282	221	172	164	143	119	82	87	*85*

Source(s): U.S. Decennial Census; American Community Survey, 5-Year Estimates

Vulnerable Populations

- Age. Per the 2018 to 2022 American Community Survey 5-Year Estimate, the population of the city of Karlsruhe, North Dakota, consists of no individuals under the age of 20 and 17 individuals aged 65 and older, representing zero and 31.5 percent of the city's population, respectively. **According to FDHU, McHenry County, the city of Karlsruhe has children and populations younger than aged 20 residing in city limits.**

- Daycare. There are no daycares in the city of Karlsruhe, North Dakota.

- Poverty. Per the 2018 to 2022 American Community Survey 5-Year Estimate, there are four individuals in the city of Karlsruhe, North Dakota, that lives below the poverty line, representing 7.4 percent of the city's population.

- Public Schools. The original public school in the city of Karlsruhe, North Dakota, closed in the 1970s. The former school has never been retrofitted or adapted to any new uses. The newer school (located on the north side of the city) that replaced the original school building was built in 1960s and closed in the 1990s.

- Senior Housing Developments/Care Centers. There are no senior housing developments or care centers in the city of Karlsruhe, North Dakota.

Housing Units and Household Size

The 2018 to 2022 American Community Survey 5-Year Estimate shows there are 10 housing units in the city of Karlsruhe, North Dakota, consisting of all single-family homes.

The 2018 to 2022 American Community Survey 5-Year Estimate there are 34 households in the city of Karlsruhe, North Dakota, resulting in an average household size of 1.59 people.

Businesses

Businesses in the city of Karlsruhe, North Dakota, include Olson's Auto Repair, Pete's Pub N' Grub, and Pioneer Metal Sales.

New and Future Development

New development in the city of Karlsruhe, North Dakota, over the last five years includes:

- The rural fire department expanded their fire hall in 2020.
- Pioneer Metal Sales expanded their business with the construction of a new building in 2020.

The following future development is planned or proposed in the city of Karlsruhe, North Dakota, includes:

- The original public school, repurposed as the VFW, is being demolished after asbestos removal sometime in late 2024.
- Pioneer Metal Sales is planning to expand its operation again in the next five years.

Critical Facilities

- Karlsruhe City Hall and City Shop
- Karlsruhe Fire Hall
- Karlsruhe Municipal Water Well and Water Treatment Plant
- U.S. Post Office

Infrastructure

- The city of Karlsruhe, North Dakota, has a sanitary sewer system with two lagoon cells and one lift station.
- The city of Karlsruhe, North Dakota, has a potable system with a water treatment plant that is sourced from groundwater, and two storage tanks in the water treatment plant building.
- The city of Karlsruhe, North Dakota, had an inert landfill, but it is no longer operating.
- U.S. Highway 52 and N.D Highway 14 serve the city of Karlsruhe, North Dakota.
- Burlington Northern-Santa Fe (BNSF) Railroad infrastructure traverses the city of Karlsruhe, North Dakota.

Emergency Response Services

- The Velva Ambulance provides ambulance service to the city of Karlsruhe, North Dakota, and surrounding rural areas.
- The Karlsruhe Fire Department/Rural Protection District provides fire protection services to the city of Karlsruhe, North Dakota, and surrounding rural areas.
- The McHenry County Sheriff's Office provides law enforcement services to the city of Karlsruhe, North Dakota.
- First District Health Unit, McHenry County is in the city of Towner, North Dakota, provides public health services to the city of Karlsruhe, North Dakota, and greater McHenry County.

Services and Utilities

- Circle Sanitation provides contracted garbage collection services to the city of Karlsruhe, North Dakota.
- The city of Karlsruhe, North Dakota, had an inert landfill, but it is no longer operating.
- The city of Karlsruhe, North Dakota, has a sanitary sewer system with two lagoon cells and one lift station.
- The city of Karlsruhe, North Dakota, has a storm water system consisting of culverts and drainage ditches.
- The Mouse River Journal is the official newspaper of the city of Karlsruhe, North Dakota.
- The city of Karlsruhe, North Dakota, has a drinking/potable system with a water treatment plant that is sourced from groundwater, and two storage tanks in the water treatment plant building.
- Electricity is provided by Otter Tail Power Company in the city of Karlsruhe, North Dakota.
- Natural gas is not available in the city of Karlsruhe, North Dakota.
- Fuel oil and propane are used as an alternative heating source and are provided by companies chosen by the individual consumer in Karlsruhe, North Dakota.
- SRT provides internet, phone, and TV to the city of Karlsruhe, North Dakota, and surrounding rural area.

8.7.2 Risk Assessment and Hazard Scoring Notes

Table 8.7.1 summarizes the risk assessment scoring of the city of Karlsruhe, North Dakota. The risk assessment and hazard scoring notes for each hazard specific to the city are shown in Table 8.7.2. Risk assessment notes for impact, frequency, likelihood and vulnerability ubiquitous for jurisdictions in McHenry County are found in Chapter 5, Threat and Hazard Identification Assessment in each respective hazard profile.

Table 8.7.1 – City of Karlsruhe, North Dakota, Jurisdiction Risk Assessment Scoring Summary

Risk Assessment			**Jurisdiction:**	**City of Karlsruhe, North Dakota**		
Hazard/Threat	Impact	Frequency	Likelihood	Vulnerability	Capabilities	**Total**
Civil Disturbance	1	1	1	2	2	**3**
Criminal, Terrorist, or Nation-State Attack	1	1	1	2	2	**3**
Cyberattack	3	1	2	2	1	**7**
Dam Failure	NA	NA	NA	NA	NA	**NA**
Drought	4	3	4	3	3	**11**
Fire – Urban/Structure Collapse						
Fire – Wildland (including Rural)						
Flood						
Geologic Hazards	4	2	2	2	2	**8**
Hazardous Material Release						
Infectious Disease & Pest Infestations	5	5	5	3	3	**15**
Severe Summer Weather	5	5	5	3	3	**15**
Severe Winter Weather	5	1	2	5	2	**11**
Space Weather	5	1	2	5	2	**11**
Transportation Incident						

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 8.7.2 – City of Karlsruhe, North Dakota, Jurisdiction Risk Assessment

	Civil Disturbance	
Impact	• Blocked Roads • Business/Government Interruptions • Delayed Emergency Response • Financial Hardship/Strain (public)	• HAZMAT Release • Human Injury/Death • Loss of Communication Systems • Property Damage (Structure) • Property Damage (Vehicle)
Frequency	• Never an occurrence of a major incident	• DAPL protesters were not active in the city
Likelihood	More Likely • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 & BNSF Railroad Infrastructure	Less Likely • Small town with no major regional/state attractions • Sparse population
Vulnerability	More Vulnerable • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 & BNSF Railroad Infrastructure • Proximity to the city of Minot, the state's fourth largest city, and the Minot Air Force Base (AFB), and missile silos	Less Vulnerable • Small town with no major regional/state attractions • Sparse population • No pipelines in proximity to the city • McHenry County Sheriff's office

Table 8.7.2 – City of Karlsruhe, North Dakota, Jurisdiction Risk Assessment – Continued

	Criminal, Terrorist, Nation-State Attack	
Impact	• Blocked Roads • Business/Government Interruptions • Delayed Emergency Response • Disease Outbreak/Mass Infections • Financial Hardship/Strain (public) • HAZMAT Release • Human Injury/Death	• Infrastructure Degradation • Loss of Communication Systems • Mass Casualties/Fatalities • Property Damage (Structure) • Property Damage (Vehicle) • **City's drinking/potable water system could be contaminated**
Frequency	• **Never an occurrence in city limits**	
Likelihood	More Likely • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 & BNSF Railroad Infrastructure • Minot AFB and Missile Silos in proximity to city limits	Less Likely • Small town with no major regional/state attractions • Sparse population • McHenry County Sheriff's office
Vulnerability	More Vulnerable • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 & BNSF Railroad Infrastructure • Proximity to the city of Minot, the state's fourth largest city, and the Minot Air Force Base (AFB), and missile silos	Less Vulnerable • Small town with no major regional/state attractions • Sparse population • No pipelines in proximity to the city

Table 8.7.2 – City of Karlsruhe, North Dakota, Jurisdiction Risk Assessment – Continued

	Cyberattack	
Impact	• Business Interruptions • Delayed Emergency Response • Financial Hardship/Strain (public) • Government Interruptions • HAZMAT Release • Human Injury/Death	• Identity Theft – loss of wages and/or assets • Infrastructure Degradation • Loss of Communication Systems • Loss of Digital/Technological Systems • Loss of Power/Electricity Outage • School Closure
Frequency	• Never an occurrence of a major attack	•
Likelihood	More Likely • Small town with lack of technological infrastructure to defend against cyberattack	Less Likely • Lack of major state or national financial institutions
Vulnerability	More Vulnerable • Small town with lack of technological infrastructure to defend against cyberattack • Elderly population relying largely on landlines for communication purposes, remote medical care, and equipment monitoring	Less Vulnerable • Lack of major state or national financial institutions • No natural gas service to the city

Table 8.7.2 – City of Karlsruhe, North Dakota, Jurisdiction Risk Assessment – Continued

	Drought	
Impact	• Crop Loss • Loss of Economy • Loss of Livestock • Loss of Wildlife Habitat (decreased wildlife populations) • Increase in Wildland Fire Potential • Water quality compromised from stock dams	• Diminished soil health • Negative impact on mental health of producers and fire responders – "community impact" • Local producers forced to sell off herds which can last for several years • Population loss as people moved away due to loss of economy
Frequency	• Fall of 1980 was dry • Severe drought in 1961/1962, 1988/1989 to 1991/1992 • Some dry conditions each year lasting a couple weeks in length	• In 2013 and 2014, dry conditions were present from June to October with little rain • **Lack of adequate snowfall spring of 2015, 2021, 2023/2024** • Severe drought conditions winter 2020/2021 • Exceptional drought spring and summer 2021
Likelihood	More Likely • Dry/wet cycle every 10 years • Climatic patterns will result in an eventual drought of significance • Lack of precipitation	Less Likely • Heavy precipitation in winter (snow pack) and summer (rainfall)
Vulnerability	More Vulnerable • Loss of economy from decreased wildlife & hunting • Agriculture economy • Elderly population • Flat terrain/open topography contributes to conditions • Pastureland adjacent to structures and city limits • **City has aquifer-fed municipal well for drinking/potable water and water treatment plant and a 50,000-gallon water tower**	Less Vulnerable • Karlsruhe Fire Department • Financial assistance programs made available by the state and federal government • McHenry County Burn Restriction Ordinance • Fire Index monitoring and mapping from NDDES • Advanced communications such as internet and TV • **City has aquifer-fed municipal well for drinking/potable water and water treatment plant and a 50,000-gallon water tower**

Table 8.7.2 – City of Karlsruhe, North Dakota, Jurisdiction Risk Assessment – Continued

	Fire – Urban Fire/Structure Collapse	
Impact	• Building Collapse • Delayed Emergency Response • Evacuation (Localized) • Explosion	• Human Injury/Death • Increase Fire Potential • **Property damage on a significant scale if impacting downtown structures and other critical facilities or infrastructure in the city**
Frequency	•	•
Likelihood	More Likely • Adopted state building codes but lack enforcement • Age of structures • Elderly populations • Increased drug use • Increased use of electric heaters • Outdated electric wiring in older homes and structures • Outdated heating systems • **BNSF Railroad Infrastructure traversing city limits**	Less Likely • Adopted state building codes but lack enforcement • Better building standards and maintenance of structures • Smoke detectors in public buildings and private homes/businesses • Well-equipped fire department with trained volunteers
Vulnerability	More Vulnerable • Adopted state building codes but lack enforcement • Age of structures • Elderly populations • Increased drug use • Increased use of electric heaters • Outdated electric wiring in older homes and structures • Outdated heating systems • **BNSF Railroad Infrastructure traversing city limits** • **Prolonged response times due to limited fire staff during the daytime**	Less Vulnerable • Karlsruhe Fire Department has trained volunteers and equipment • Better building standards and maintenance of structures • Smoke detectors in public buildings and private homes/businesses • **No natural gas service to the city**

Table 8.7.2 – City of Karlsruhe, North Dakota, Jurisdiction Risk Assessment – Continued

	Fire – Rural & Wildland	
Impact	• Building Collapse • Crop Loss • Delayed Emergency Response • Downed Power Lines • Evacuation (Localized) • Explosion • Increase Wildland Fire Potential • Loss of Power/Electricity Outage	• **Loss of Livestock** • **Loss of Wildlife Habitat** • **Mass Casualties** • **Property Damage (Structure & Vehicle)** • **Losses could be on a significant scale if impacting a major producer or farmstead** • **Loss of farm equipment and assets**
Frequency	• Never an occurrence of a wildland fire threatening city limits	
Likelihood	More Likely • Agricultural burn-off • High winds annually and dry conditions – when present • Pastureland adjacent to structures and city limits • Severe summer weather with significant lightning • **BNSF Railroad Infrastructure traversing city limits**	Less Likely • Removal of CRP near city limits • Summer and winter weather with heavy precipitation
Vulnerability	More Vulnerable • Agricultural burn-off • High winds annually and dry conditions – when present • Pastureland adjacent to structures and city limits • Severe summer weather with significant lightning • **Lack of fire breaks around city limits** • **BNSF Railroad Infrastructure traversing city limits**	Less Vulnerable • Karlsruhe Fire Department has trained volunteers and equipment • **Adequate staffing coverage/resources of fire department** • Removal of CRP near city limits • Summer and winter weather with heavy precipitation • MOUs with neighboring fire departments • McHenry County Burn Restriction Ordinance

Table 8.7.2 – City of Karlsruhe, North Dakota, Jurisdiction Risk Assessment – Continued

	Flood	
Impact	• Blocked Roads • Delayed Emergency Response • Flooding (Highway & Structure) • Human Injury/Death •	• **Flood waters can inundate the city's sanitary sewer system from overland flooding causing system outages**
Frequency	• Surrounding soils consisting of shale and gravel allow for immediate drainage of water during summer months • **Overland flooding frequent in the spring due to rapid snow melt**	
Likelihood	More Likely • Rapid change of seasons resulting in excessive snow melt	Less Likely • Dry conditions/drought and low precipitation • Surrounding soils consisting of shale and gravel allow for immediate drainage of water during summer months • **Proper storm water system in the city**
Vulnerability	More Vulnerable • Rapid change of seasons resulting in excessive snow melt	Less Vulnerable • **Elevation of the city is higher than surrounding area** • **City has equipment to move water** • **City wells not located in low-lying area of the city with no potential for an outage and/or contamination** • Surrounding sandy soils allow for immediate drainage of water during summer months

Table 8.7.2 – City of Karlsruhe, North Dakota, Jurisdiction Risk Assessment – Continued

	Geologic Hazards	
Impact	• Blocked Roads • Delayed Emergency Response • Human Injury/Death • Infrastructure Degradation	• Loss of Economy • Loss of Power/Electricity Outage • Property Damage • Utility Outage/Shortage
Frequency	• No occurrences of geologic hazards other than radon in the city of Karlsruhe	
Likelihood	More Likely • **All N.D. Counties in EPA Radon Zone I**	Less Likely • No Abandoned Mine Lands located near city limits
Vulnerability	More Vulnerable • **All N.D. Counties in EPA Radon Zone I**	Less Vulnerable • No Abandoned Mine Lands located near city limits

Table 8.7.2 – City of Karlsruhe, North Dakota, Jurisdiction Risk Assessment – Continued

	Hazardous Material Release	
Impact	• Blocked Roads • Delayed Emergency Response • Environmental Degradation • Evacuation (localized) • Explosion • Business & Government Interruptions Human Injury/Death	• Increased Fire Potential • Loss of Economy • Loss of Power and/or Potable Water • Property Damage • School Closure **Contamination of city water from a release may lead to utility outage/shortage**
Frequency	• No significant incidents involving airplanes, automobiles/cars, commercial truck traffic, recreational vehicles, or trains	No CP train derailments in Karlsruhe city limits
Likelihood	More Likely • Transportation of chemicals by truck and railroad through city limits • Storage of chemicals/fertilizers in city limits and on farmsteads in large tanks near city limits • **U.S. Highway 52 and CP Railroad Infrastructure traversing city limits**	Less Likely • Private companies have HAZMAT certifications • Safety measures implemented BNSF Railroad • Tier II Federal Requirements
Vulnerability	More Vulnerable • Transportation of chemicals by truck and railroad through city limits • Storage of chemicals/fertilizers in city limits and on farmsteads in large tanks near city limits • **U.S. Highway 52 and CP Railroad Infrastructure traversing city limits**	Less Vulnerable • Karlsruhe Fire Department has trained volunteers and equipment • Private companies have HAZMAT certifications • Safety measures implemented BNSF Railroad • Tier II Federal Requirements

Table 8.7.2 – City of Karlsruhe, North Dakota, Jurisdiction Risk Assessment – Continued

	Infectious Disease & Pest Infestations	
Impact	• Crop Loss • Human Injury/Death • Livestock Injury/Death • Loss of Economy • Mass Casualties/Fatalities	• Strain on local medical resources (ambulance or clinic) • Loss of Drinking/Potable Water • **Financial cost to public health resources** • Loss of medical staff due to sickness • School Closure
Frequency	• Annual occurrences of death, primarily among the elderly • Occurrence of disease - 1 in 3 for people annually • Annual occurrences of influenza cases in the local population	• **The COVID-19 pandemic of 2020 resulted in mass quarantine and sheltering of the local population and temporary closure of businesses resulting in unmeasured economic losses.**
Likelihood	More Likely • Agriculture economy • Growing elderly population • Small population of children without immunization • Transporting of animals across state lines • Dependent on weather for animals and crops • U.S. Highway 52 & BNSF Railroad Infrastructure	Less Likely • Advanced communications such as internet and tv • Public health and employment regulations for public facilities • Federal health guidelines at public employers • First District Health Unit, McHenry County education and outreach • FSA and NDSU Extension/McHenry County education and outreach
Vulnerability	More Vulnerable • Agriculture economy • Growing elderly population • Small population of children without immunization • Transporting of animals across state lines • Dependent on weather for animals and crops • U.S. Highway 52 & BNSF Railroad Infrastructure	Less Vulnerable • Karlsruhe Fire Department has trained volunteers and equipment • Advanced communications such as internet and tv • Public health and employment regulations for public facilities Immunizations & medications of local population

Table 8.7.2 – City of Karlsruhe, North Dakota, Jurisdiction Risk Assessment – Continued

	Severe Summer Weather	
Impact	• Blocked Roads – Karlsruhe Underpass • Downed Trees • Evacuation (Localized) • Human Injury/Death – heat exhaustion • Infrastructure Degradation • Livestock Injury/Death • Loss of Crops • Loss of Power/Downed Power Lines	• Loss of Power/Downed Power Lines • **Property Damage – repair of roofing, siding and drainage systems for homes** • **Damage to electrical equipment from lightning** • Shelter-in-place • Vehicle Damage • **Contamination of drinking/potable water system**
Frequency	• Annual occurrences of hail, extreme heat, lightning, heavy rain, high wind • Two or three significant storms producing damage to trees and property annually	
Likelihood	• Climatic patterns will result in numerous annual occurrences of the hazard	
Vulnerability	<u>More Vulnerable</u> • Aging infrastructure (roads and electrical systems) • Agriculture Economy • High elderly population • **U.S. Highway 52 & BNSF Railroad Infrastructure**	<u>Less Vulnerable</u> • Karlsruhe Fire Department has trained volunteers and equipment • Advanced warning and notification such as internet and TV • **One phone-and manually-activated outdoor emergency siren at the Karlsruhe Fire Hall**

Table 8.7.2 – City of Karlsruhe, North Dakota, Jurisdiction Risk Assessment – Continued

	Severe Summer Weather	
Impact	• Blocked Roads: Heritage Drive, Carmel Court, Briar Drive, roads in and around Souris Valley Care Center • Evacuation (Localized) • Human Injury/Death – wind chill • Loss of Crops • Loss of Livestock	• Loss of Power/Downed Power Lines • Property Damage – repair of roofing, siding and drainage systems for homes • Shelter-in-place • Vehicle Damage • **City water mains have experienced breaking from freezing and thawing of the soil**
Frequency	• Climatic patterns will result in numerous annual occurrences of the hazard	Removal of shelter belts allows for more direction wind and increases severity of ground blizzard conditions and frequency of blocked roads
Likelihood	• Climatic patterns will result in numerous annual occurrences of the hazard	
Vulnerability	<u>More Vulnerable</u> • Aging infrastructure (roads and electrical systems) • Agriculture Economy • High elderly population • **U.S. Highway 52 & BNSF Railroad Infrastructure Infrastructure**	<u>Less Vulnerable</u> • Karlsruhe Fire Department has trained volunteers and equipment • Advanced warning and notification such as internet and TV • **One phone-and manually-activated outdoor emergency siren at the Karlsruhe Fire Hall**

Table 8.7.2 – City of Karlsruhe, North Dakota, Jurisdiction Risk Assessment – Continued

	Space Weather	
Impact	• Government Interruptions • Infrastructure Degradation • Loss of Communication Systems • Loss of Digital/Technological Systems • Loss/Overcrowded Medical Facilities	• Loss of Power/Electricity Outage • Public Distress/Social Discord • School Closure • Loss of operation of the city hall and fire hall, etc. • Loss/outage of medical devices at private residences
Frequency	• Never a recorded occurrence in McHenry County or North Dakota	
Likelihood	• Dependent on solar activity and the 11-year solar cycle • Likely to occur once every 500 years per the 2018 N.D. Enhanced Mitigation MAOP	
Vulnerability	<u>More Vulnerable</u> • Advanced communication systems (internet, TV, etc.) • Agriculture economy • All critical facilities and infrastructure that require electricity for operation • BNSF Railroad	<u>Less Vulnerable</u> • Local food production/households with gardens

Table 8.7.2 – City of Karlsruhe, North Dakota, Jurisdiction Risk Assessment – Continued

	Transportation Incident	
Impact	• **Blocked roads from inadequate road clearing or incidents** • Business Interruptions • Delayed Emergency Response • Human Injury/Death • Increased Fire Potential • Loss of Transportation/Accessibility	• Mass Casualties/Fatalities • Delayed Emergency Response • HAZMAT Release • Livestock Loss • Property Damage • **Could be catastrophic if involving a school bus filled with children and a truck carrying hazardous materials**
Frequency	• Annual occurrences of multiple accidents involving cars and/or farm equipment on U.S. Highway 52 and N.D. Highway 14	
Likelihood	<u>More Likely</u> • Alliance Natural Gas Pipeline Pumphouse and Enbridge Oil Pipeline • Intoxicated drivers • High truck traffic from agriculture-related business • **U.S. Highway 52 & BNSF Railroad Infrastructure**	<u>Less Likely</u> • Adequate traffic control signage/stop signs • No commercial passenger airport • City not located directly on any state or federal highway
Vulnerability	<u>More Vulnerable</u> • Distracted drivers • Intoxicated drivers • High truck traffic from agriculture-related traffic • **U.S. Highway 52 & BNSF Railroad Infrastructure**	<u>Less Vulnerable</u> • Adequate traffic control signage/stop signs • No commercial passenger airport • City not located directly on any state or federal highway

8.7.3 Mitigation Strategy

The McHenry County, N.D., Multi-Jurisdictional Multi-Hazard Plan Update includes a mitigation strategy consisting of seven goals in Chapter 6. The following problem statement and mitigation projects address the mitigation needs of the city of Karlsruhe, North Dakota. It should be noted that some mitigation projects that pertain to all jurisdictions are included to encourage county-wide collaboration.

Problem Statement

The city of Karlsruhe, North Dakota, can be impacted by civil disturbance; criminal, terrorist, or nation/state attack; cyberattack; drought; fire (urban and wildland); flood (overland); geologic hazards; hazardous material release; infectious disease and pest infestations; severe summer weather; severe winter weather; space weather, and transportation incident. The city experienced a major flood in 2011 that resulted in a near failure of the temporary diking system. The drinking/potable water and sanitary sewer wastewater system is impacted by severe summer weather (heavy precipitation), which results in geologic hazards causing water mains and sewer pipes to break causing utility outages. The city lacks permanent and/or portable backup generators for the following critical facilities and infrastructure: Karlsruhe Ambulance/Fire Hall, Karlsruhe Public School, lift stations and the water treatment plant. There is inadequate storm shelter capacity and an outdated outdoor early warning system consisting of two manually-activated sirens. Local emergency services need upgraded equipment and facilities. The city has a large young population with 30.9 percent being under the age of 20. Approximately 3.4 percent of the population lives below the poverty line. It is estimated by the Karlsruhe City Council that 50 percent of the city's workforce commutes to Minot, North Dakota, for employment and has transitioned into a bedroom community.

The city lacks funding for mitigation projects. With little to no capabilities to accomplish major projects independently, the city is dependent on outside sources for mitigation.

Retrofitting/upgrading of existing infrastructure (Karlsruhe underpass, drinking/potable water, and sanitary sewer wastewater system), installation of permanent backup power sources, upgrade manually-activated outdoor emergency sirens and alerting notifications, upgrade and expand storm shelters (specific attention paid to people under the age of 20), expansion of planning and regulatory capabilities, and education and outreach are a priority for the city.

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8.7.4 Mitigation Capability Assessment

Capability for mitigation is divided into four categories: administrative and technical, education and outreach, financial, and planning and regulatory. Each identified resource in the four categories can be used to implement mitigation strategies and access funding for projects. **Tables comparing the mitigation capabilities of the city of Karlsruhe, North Dakota, with all other jurisdictions in McHenry County can be found below and in Chapter 7, County Mitigation Capability Assessment.**

- Administrative and Technical: Identification of administrative and technical capabilities, which include: staff, their skills and tools for mitigation planning to implement specific mitigation actions.

- Education and Outreach: Identification of education and outreach programs, and methods already in place to implement mitigation activities and communicate hazard-related information.

- Financial: Identification of access to or eligibility to use funding resources for hazard mitigation for jurisdictions.

- Planning and Regulatory: Jurisdictional plans, policies, codes, and ordinances adopted and in place that prevent and reduce the impacts of natural hazards and man-made threats.

City of Karlsruhe, North Dakota, Mitigation Capabilities Summary

The following mitigation capabilities were identified as commonplace among all natural hazards and man-made threats upon completion of the risk assessment for the city of Karlsruhe, North Dakota. More detailed information about the mitigation capabilities of the city of Karlsruhe in relation to McHenry County and all other incorporated jurisdictions can be found in Chapter 7, Mitigation Capability Assessment.

2018 & 2023 N.D. Enhanced Mitigation MAOP	N.D. Dept. of Emergency Services (NNDES)
Advanced Communications: Internet & TV	NDDES Fire Index Monitoring
Emergency siren(s)/early warning systems	NDDOT State Transportation Plan & State Shop
McHenry County Commission	NDSU/McHenry County Extension
McHenry Comprehensive Plan	Karlsruhe Auditor and Public Works
McHenry County Courthouse	Karlsruhe City Council
McHenry County Emergency Management	Karlsruhe City Hall and City Shop
McHenry County LEOP	Karlsruhe Fire Hall
McHenry County Public Health	Karlsruhe Fire Department/Protection District
McHenry County Sheriff's Office	Karlsruhe Municipal Well & Water Treatment Plant
McHenry County Zoning	Velva Ambulance
MOUs	U.S. Post Office

8.7.5 Integration of Mitigation Plan into Planning Mechanisms

Integration of the plan into current planning mechanisms is critical in mitigation to communicate the needs of each jurisdiction to achieve an all-inclusive mitigation strategy. The process for integration of the mitigation plan is included after each mitigation project, which shows the planning mechanism utilized, the plan element used for integration and the process for integration.

8.7.6 Plan Maintenance

An important aspect of any usable plan is the maintenance and upkeep of the document. At any given time, planning, risk analysis, updating the situation assessment, research, coordinating, disaster response or other activity is occurring. Plan maintenance ensures the plan will remain useful in the county for many years. A mitigation action progress report form to conduct plan maintenance is in Chapter 10 of this plan.

8.8 City of Kief, North Dakota

The following profile includes information specific to the city of Kief, North Dakota, for mitigation planning purposes. The information included is as follows:

- Profile and Inventory;
- Risk Assessment;
- Hazard Scoring Notes;
- Mitigation Projects, and
- Capabilities for Mitigation.

Integration into Planning Mechanisms

The process for integration of the mitigation plan into existing planning mechanisms is discussed at the bottom of each mitigation project in section 8.8.4, section 8.8.5 and in Chapter 6, Mitigation Strategy.

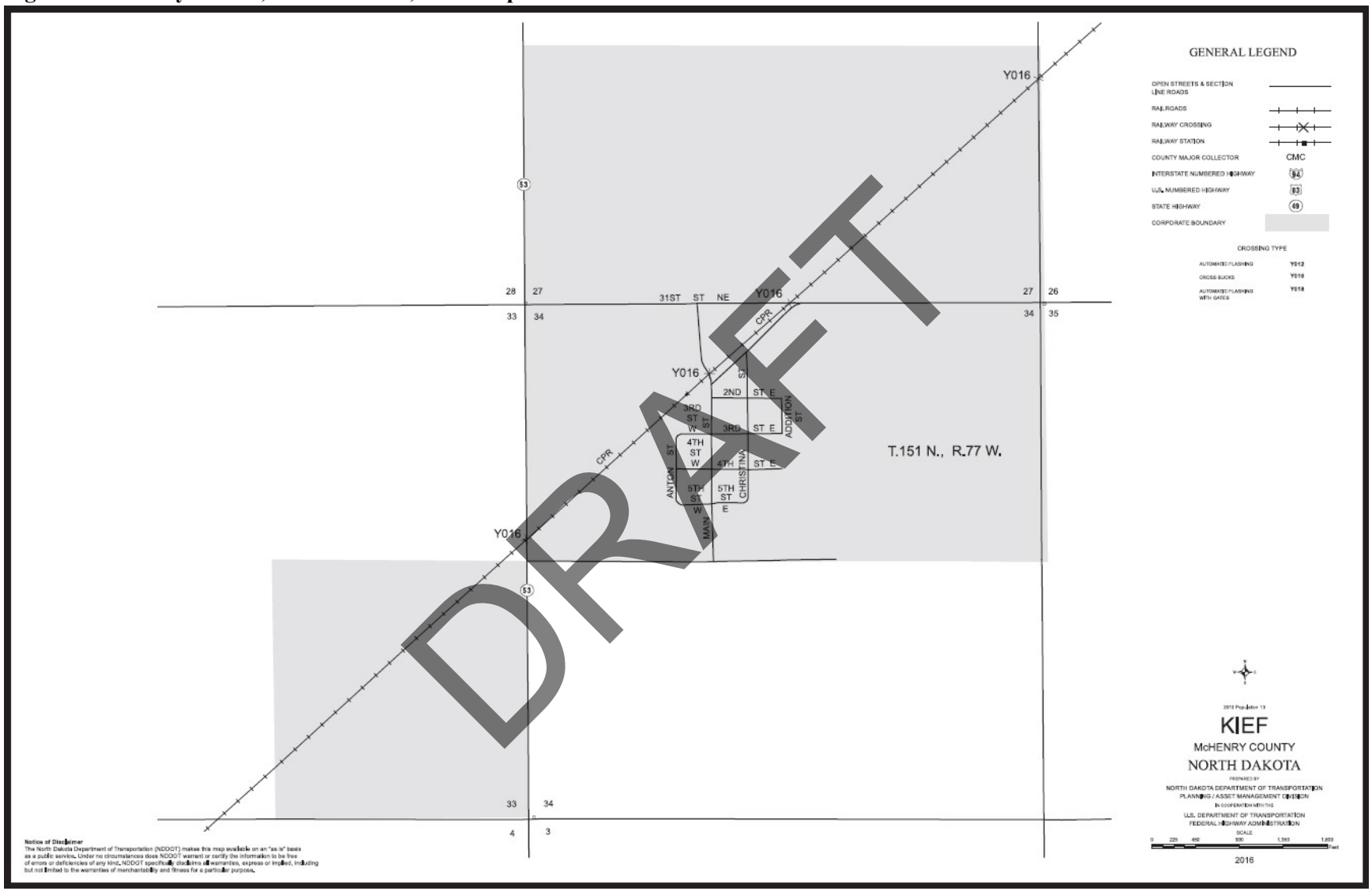
Plan Maintenance

Plan maintenance is shown in section 8.8.6.

Critical Facilities and Infrastructure

Figure 8.8.1 is a map of the city of Kief, North Dakota, provided by the N.D. Dept of Transportation.

Figure 8.8.1 – City of Kief, North Dakota, Base Map



Source: N.D. Dept. of Transportation

8.8.1 Profile and Inventory

The location, total population, vulnerable (underserved) populations, housing units and household size, businesses, critical facilities and infrastructure, new and future development, services, jurisdictional buildings, emergency response services and utilities are shown for the city of Kief, North Dakota. Detailed narratives follow each section heading to profile the city.

Detailed information on public buildings, services provided, emergency response services and utilities can be found in Chapter 3, Profile and Inventory.

Location

The city of Kief, North Dakota, is in north-central North Dakota, proximate to N.D. Highway 14 in south-central McHenry County, North Dakota.

Population

Table 8.8.1 shows population trends for the city of Kief, North Dakota, from 1920 to 2020 per the 2020 U.S. Decennial Census, with an estimate for 2022. According to the 2020 U.S. Decennial Census, the city of Kief, North Dakota, contains eight people, a decrease of five people (38.5 percent) from 13 people in 2010.

Table 8.8.1 – 1920 to 2022 City of Kief, North Dakota, Population Trends and Projections

1920	1930	1940	1950	1960	1970	1980	1990	2000	2010	2020	*2022 est.*
307	139	159	135	97	46	36	24	13	13	8	*7*

Source(s): U.S. Decennial Census; American Community Survey, 5-Year Estimates

Vulnerable Populations

- Age. Per the 2018 to 2022 American Community Survey 5-Year Estimate, the population of the city of Kief, North Dakota, consists of seven individuals under the age of 20 and no individuals aged 65 and older, representing 53.8and and zero percent of the city's population, respectively.
- Daycare. There are no daycares in the city of Kief, North Dakota.
- Poverty. Per the 2018 to 2022 American Community Survey 5-Year Estimate, there is one individual in the city of Kief, North Dakota, that lives below the poverty line, representing 7.7 percent of the city's population.
- Public Schools. There is not a public school in the city of Kief, North Dakota.
- Senior Housing Developments/Care Centers. There are no senior housing developments or care centers in the city of Kief, North Dakota.

Housing Units and Household Size

The 2018 to 2022 American Community Survey 5-Year Estimate shows there are 10 housing units in the city of Kief, North Dakota, consisting of all single-family homes.

The 2018 to 2022 American Community Survey 5-Year Estimate there are six households in the city of Kief, North Dakota, resulting in an average household size of 2.17 people.

Businesses

Businesses in the city of Kief, North Dakota, include Olson's Auto Repair, Pete's Pub N' Grub, and Pioneer Metal Sales.

New and Future Development

New development in the city of Kief, North Dakota, over the last five years includes:

- The rural fire department expanded their fire hall in 2020.
- Pioneer Metal Sales expanded their business with the construction of a new building in 2020.

The following future development is planned or proposed in the city of Kief, North Dakota, includes:

- The original public school, repurposed as the VFW, is being demolished after asbestos removal sometime in late 2024.
- Pioneer Metal Sales is planning to expand its operation again in the next five years.

Critical Facilities

- Kief City Hall and City Shop
- Kief Fire Hall
- Kief Municipal Water Well and Water Treatment Plant
- U.S. Post Office

Infrastructure

- The city of Kief, North Dakota, has a sanitary sewer system with two lagoon cells and one lift station.
- The city of Kief, North Dakota, has a drinking/potable system with a water treatment plant that is sourced from groundwater, and two storage tanks in the water treatment plant building.
- The city of Kief, North Dakota, had an inert landfill, but it is no longer operating.
- U.S. Highway 52 and N.D Highway 14 serve the city of Kief, North Dakota.
- Burlington Northern-Santa Fe (BNSF) Railroad infrastructure traverses the city of Kief, North Dakota.

Emergency Response Services

- The Velva Ambulance provides ambulance service to the city of Kief, North Dakota, and surrounding rural areas.
- The Kief Fire Department/Rural Protection District provides fire protection services to the city of Kief, North Dakota, and surrounding rural areas.
- The McHenry County Sheriff's Office provides law enforcement services to the city of Kief, North Dakota.

- First District Health Unit, McHenry County is in the city of Towner, North Dakota, provides public health services to the city of Kief, North Dakota, and greater McHenry County.

Services and Utilities

- Circle Sanitation provides contracted garbage collection services to the city of Kief, North Dakota.
- The city of Kief, North Dakota, had an inert landfill, but it is no longer operating.
- The city of Kief, North Dakota, has a sanitary sewer system with two lagoon cells and one lift station.
- The city of Kief, North Dakota, has a storm water system consisting of culverts and drainage ditches.
- The Mouse River Journal is the official newspaper of the city of Kief, North Dakota.
- The city of Kief, North Dakota, has a drinking/potable system with a water treatment plant that is sourced from groundwater, and two storage tanks in the water treatment plant building.
- Electricity is provided by Otter Tail Power Company in the city of Kief, North Dakota.
- Natural gas is not available in the city of Kief, North Dakota.
- Fuel oil and propane are used as an alternative heating source and are provided by companies chosen by the individual consumer in Kief, North Dakota.
- SRT provides internet, phone, and TV to the city of Kief, North Dakota, and surrounding rural area.

8.8.2 Risk Assessment and Hazard Scoring Notes

Table 8.8.1 summarizes the risk assessment scoring of the city of Kief, North Dakota. The risk assessment and hazard scoring notes for each hazard specific to the city are shown in Table 8.8.2. Risk assessment notes for impact, frequency, likelihood and vulnerability ubiquitous for jurisdictions in McHenry County are found in Chapter 5, Threat and Hazard Identification Assessment in each respective hazard profile.

Table 8.8.1 – City of Kief, North Dakota, Jurisdiction Risk Assessment Scoring Summary

Risk Assessment **Jurisdiction: City of Kief, North Dakota**

Hazard/Threat	Impact	Frequency	Likelihood	Vulnerability	Capabilities	**Total**
Civil Disturbance	4	1	1	3	1	**8**
Criminal, Terrorist, or Nation-State Attack	4	1	1	3	1	**8**
Cyberattack	4	1	1	2	1	**7**
Dam Failure	NA	NA	NA	NA	NA	**NA**
Drought	4	3	4	3	1	**13**
Fire – Urban/Structure Collapse						
Fire – Wildland (including Rural)						
Flood	4	3	3	3	2	**11**
Geologic Hazards						
Hazardous Material Release						
Infectious Disease & Pest Infestations						
Severe Summer Weather						
Severe Winter Weather						
Space Weather						
Transportation Incident						

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 8.8.2 – City of Kief, North Dakota, Jurisdiction Risk Assessment

	Civil Disturbance	
Impact	• Blocked Roads • Business/Government Interruptions • Delayed Emergency Response • Financial Hardship/Strain (public)	• HAZMAT Release • Human Injury/Death • Loss of Communication Systems • Property Damage (Structure) • Property Damage (Vehicle)
Frequency	• Never an occurrence of a major incident	• DAPL protesters were not active in the city
Likelihood	More Likely • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 & BNSF Railroad Infrastructure	Less Likely • Small town with no major regional/state attractions • Sparse population
Vulnerability	More Vulnerable • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 & BNSF Railroad Infrastructure • Proximity to the city of Minot, the state's fourth largest city, and the Minot Air Force Base (AFB), and missile silos	Less Vulnerable • Small town with no major regional/state attractions • Sparse population • No pipelines in proximity to the city • McHenry County Sheriff's Office

Table 8.8.2 – City of Kief, North Dakota, Jurisdiction Risk Assessment – Continued

	Criminal, Terrorist, Nation-State Attack	
Impact	• Blocked Roads • Business/Government Interruptions • Delayed Emergency Response • Disease Outbreak/Mass Infections • Financial Hardship/Strain (public) • HAZMAT Release • Human Injury/Death	• Infrastructure Degradation • Loss of Communication Systems • Mass Casualties/Fatalities • Property Damage (Structure) • Property Damage (Vehicle) • **City's drinking/potable water system could be contaminated**
Frequency	• **Never an occurrence in city limits**	
Likelihood	More Likely • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 & BNSF Railroad Infrastructure • Minot AFB and Missile Silos in proximity to city limits	Less Likely • Small town with no major regional/state attractions • Sparse population • McHenry County Sheriff's office
Vulnerability	More Vulnerable • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 & BNSF Railroad Infrastructure • Proximity to the city of Minot, the state's fourth largest city, and the Minot Air Force Base (AFB), and missile silos	Less Vulnerable • Small town with no major regional/state attractions • Sparse population • No pipelines in proximity to the city

Table 8.8.2 – City of Kief, North Dakota, Jurisdiction Risk Assessment – Continued

	Cyberattack	
Impact	• Business Interruptions • Delayed Emergency Response • Financial Hardship/Strain (public) • Government Interruptions • HAZMAT Release • Human Injury/Death	• Identity Theft – loss of wages and/or assets • Infrastructure Degradation • Loss of Communication Systems • Loss of Digital/Technological Systems • Loss of Power/Electricity Outage • School Closure
Frequency	• Never an occurrence of a major attack	•
Likelihood	More Likely • Small town with lack of technological infrastructure to defend against cyberattack	Less Likely • Lack of major state or national financial institutions
Vulnerability	More Vulnerable • Small town with lack of technological infrastructure to defend against cyberattack • Elderly population relying largely on landlines for communication purposes, remote medical care, and equipment monitoring	Less Vulnerable • Lack of major state or national financial institutions • No natural gas service to the city

Table 8.8.2 – City of Kief, North Dakota, Jurisdiction Risk Assessment – Continued

	Drought	
Impact	• Crop Loss • Loss of Economy • Loss of Livestock • Loss of Wildlife Habitat (decreased wildlife populations) • Increase in Wildland Fire Potential • Water quality compromised from stock dams	• Diminished soil health • Negative impact on mental health of producers and fire responders – "community impact" • Local producers forced to sell off herds which can last for several years • Population loss as people moved away due to loss of economy
Frequency	• Fall of 1980 was dry • Severe drought in 1961/1962, 1988/1989 to 1991/1992 • Some dry conditions each year lasting a couple weeks in length	• In 2013 and 2014, dry conditions were present from June to October with little rain • **Lack of adequate snowfall spring of 2015, 2021, 2023/2024** • Severe drought conditions winter 2020/2021 • Exceptional drought spring and summer 2021
Likelihood	More Likely • Dry/wet cycle every 10 years • Climatic patterns will result in an eventual drought of significance • Lack of precipitation	Less Likely • Heavy precipitation in winter (snow pack) and summer (rainfall)
Vulnerability	More Vulnerable • Loss of economy from decreased wildlife & hunting • Agriculture economy • Elderly population • Flat terrain/open topography contributes to conditions • Pastureland adjacent to structures and city limits • **City has aquifer-fed municipal well for drinking/potable water and water treatment plant and a 50,000-gallon water tower**	Less Vulnerable • Kief Fire Department • Financial assistance programs made available by the state and federal government • McHenry County Burn Restriction Ordinance • Fire Index monitoring and mapping from NDDES • Advanced communications such as internet and TV • **City has aquifer-fed municipal well for drinking/potable water and water treatment plant and a 50,000-gallon water tower**

Table 8.8.2 – City of Kief, North Dakota, Jurisdiction Risk Assessment – Continued

	Fire – Urban Fire/Structure Collapse	
Impact	• Building Collapse • Delayed Emergency Response • Evacuation (Localized) • Explosion	• Human Injury/Death • Increase Fire Potential • **Property damage on a significant scale if impacting downtown structures and other critical facilities or infrastructure in the city**
Frequency	•	•
Likelihood	More Likely • Adopted state building codes but lack enforcement • Age of structures • Elderly populations • Increased drug use • Increased use of electric heaters • Outdated electric wiring in older homes and structures • Outdated heating systems • **BNSF Railroad Infrastructure traversing city limits**	Less Likely • Adopted state building codes but lack enforcement • Better building standards and maintenance of structures • Smoke detectors in public buildings and private homes/businesses • Well-equipped fire department with trained volunteers
Vulnerability	More Vulnerable • Adopted state building codes but lack enforcement • Age of structures • Elderly populations • Increased drug use • Increased use of electric heaters • Outdated electric wiring in older homes and structures • Outdated heating systems • **BNSF Railroad Infrastructure traversing city limits** • **Prolonged response times due to limited fire staff during the daytime**	Less Vulnerable • Kief Fire Department has trained volunteers and equipment • Better building standards and maintenance of structures • Smoke detectors in public buildings and private homes/businesses • **No natural gas service to the city**

Table 8.8.2 – City of Kief, North Dakota, Jurisdiction Risk Assessment – Continued

	Fire – Rural & Wildland	
Impact	• Building Collapse • Crop Loss • Delayed Emergency Response • Downed Power Lines • Evacuation (Localized) • Explosion • Increase Wildland Fire Potential • Loss of Power/Electricity Outage	• **Loss of Livestock** • **Loss of Wildlife Habitat** • **Mass Casualties** • **Property Damage (Structure & Vehicle)** • **Losses could be on a significant scale if impacting a major producer or farmstead** • **Loss of farm equipment and assets**
Frequency	• Never an occurrence of a wildland fire threatening city limits	
Likelihood	More Likely • Agricultural burn-off • High winds annually and dry conditions – when present • Pastureland adjacent to structures and city limits • Severe summer weather with significant lightning • **BNSF Railroad Infrastructure traversing city limits**	Less Likely • Removal of CRP near city limits • Summer and winter weather with heavy precipitation
Vulnerability	More Vulnerable • Agricultural burn-off • High winds annually and dry conditions – when present • Pastureland adjacent to structures and city limits • Severe summer weather with significant lightning • **Lack of fire breaks around city limits** • **BNSF Railroad Infrastructure traversing city limits**	Less Vulnerable • Kief Fire Department has trained volunteers and equipment • **Adequate staffing coverage/resources of fire department** • Removal of CRP near city limits • Summer and winter weather with heavy precipitation • MOUs with neighboring fire departments • McHenry County Burn Restriction Ordinance

Table 8.8.2 – City of Kief, North Dakota, Jurisdiction Risk Assessment – Continued

	Flooc	
Impact	• Blocked Roads • Delayed Emergency Response • Flooding (Highway & Structure) • Human Injury/Death •	• **Flood waters can inundate the city's sanitary sewer system from overland flooding causing system outages**
Frequency	• Surrounding soils consisting of shale and gravel allow for immediate drainage of water during summer months • **Overland flooding frequent in the spring due to rapid snow melt**	
Likelihood	More Likely • Rapid change of seasons resulting in excessive snow melt	Less Likely • Dry conditions/drought and low precipitation • Surrounding soils consisting of shale and gravel allow for immediate drainage of water during summer months • **Proper storm water system in the city**
Vulnerability	More Vulnerable • Rapid change of seasons resulting in excessive snow melt	Less Vulnerable • **Elevation of the city is higher than surrounding area** • **City has equipment to move water** • **City wells not located in low-lying area of the city with no potential for an outage and/or contamination** • Surrounding sandy soils allow for immediate drainage of water during summer months

Table 8.8.2 – City of Kief, North Dakota, Jurisdiction Risk Assessment – Continued

	Geologic Hazards	
Impact	• Blocked Roads • Delayed Emergency Response • Human Injury/Death • Infrastructure Degradation	• Loss of Economy • Loss of Power/Electricity Outage • Property Damage • Utility Outage/Shortage
Frequency	• No occurrences of geologic hazards other than radon in the city of Kief	
Likelihood	More Likely • **All N.D. Counties in EPA Radon Zone I**	Less Likely • No Abandoned Mine Lands located near city limits
Vulnerability	More Vulnerable • **All N.D. Counties in EPA Radon Zone I**	Less Vulnerable • No Abandoned Mine Lands located near city limits

Table 8.8.2 – City of Kief, North Dakota, Jurisdiction Risk Assessment – Continued

	Hazardous Material Release	
Impact	• Blocked Roads • Delayed Emergency Response • Environmental Degradation • Evacuation (localized) • Explosion • Business & Government Interruptions Human Injury/Death	• Increased Fire Potential • Loss of Economy • Loss of Power and/or Potable Water • Property Damage • School Closure **Contamination of city water from a release may lead to utility outage/shortage**
Frequency	• No significant incidents involving airplanes, automobiles/cars, commercial truck traffic, recreational vehicles, or trains	No CP train derailments in Kief city limits
Likelihood	More Likely • Transportation of chemicals by truck and railroad through city limits • Storage of chemicals/fertilizers in city limits and on farmsteads in large tanks near city limits • **U.S. Highway 52 and CP Railroad Infrastructure traversing city limits**	Less Likely • Private companies have HAZMAT certifications • Safety measures implemented BNSF Railroad • Tier II Federal Requirements
Vulnerability	More Vulnerable • Transportation of chemicals by truck and railroad through city limits • Storage of chemicals/fertilizers in city limits and on farmsteads in large tanks near city limits • **U.S. Highway 52 and CP Railroad Infrastructure traversing city limits**	Less Vulnerable • Kief Fire Department has trained volunteers and equipment • Private companies have HAZMAT certifications • Safety measures implemented BNSF Railroad • Tier II Federal Requirements

Table 8.8.2 – City of Kief, North Dakota, Jurisdiction Risk Assessment – Continued

	Infectious Disease & Pest Infestations	
Impact	• Crop Loss • Human Injury/Death • Livestock Injury/Death • Loss of Economy • Mass Casualties/Fatalities	• Strain on local medical resources (ambulance or clinic) • Loss of Drinking/Potable Water • **Financial cost to public health resources** • Loss of medical staff due to sickness • School Closure
Frequency	• Annual occurrences of death, primarily among the elderly • Occurrence of disease - 1 in 3 for people annually • Annual occurrences of influenza cases in the local population	• **The COVID-19 pandemic of 2020 resulted in mass quarantine and sheltering of the local population and temporary closure of businesses resulting in unmeasured economic losses.**
Likelihood	More Likely • Agriculture economy • Growing elderly population • Small population of children without immunization • Transporting of animals across state lines • Dependent on weather for animals and crops • U.S. Highway 52 & BNSF Railroad Infrastructure	Less Likely • Advanced communications such as internet and tv • Public health and employment regulations for public facilities • Federal health guidelines at public employers • First District Health Unit, McHenry County education and outreach • FSA and NDSU Extension/McHenry County education and outreach
Vulnerability	More Vulnerable • Agriculture economy • Growing elderly population • Small population of children without immunization • Transporting of animals across state lines • Dependent on weather for animals and crops • U.S. Highway 52 & BNSF Railroad Infrastructure	Less Vulnerable • Kief Fire Department has trained volunteers and equipment • Advanced communications such as internet and tv • Public health and employment regulations for public facilities Immunizations & medications of local population

Table 8.8.2 – City of Kief, North Dakota, Jurisdiction Risk Assessment – Continued

	Severe Summer Weather	
Impact	• Blocked Roads – Kief Underpass • Downed Trees • Evacuation (Localized) • Human Injury/Death – heat exhaustion • Infrastructure Degradation • Livestock Injury/Death • Loss of Crops • Loss of Power/Downed Power Lines	• Loss of Power/Downed Power Lines • **Property Damage – repair of roofing, siding and drainage systems for homes** • **Damage to electrical equipment from lightning** • Shelter-in-place • Vehicle Damage • **Contamination of drinking/potable water system**
Frequency	• Annual occurrences of hail, extreme heat, lightning, heavy rain, high wind • Two or three significant storms producing damage to trees and property annually	
Likelihood	• Climatic patterns will result in numerous annual occurrences of the hazard	
Vulnerability	More Vulnerable • Aging infrastructure (roads and electrical systems) • Agriculture Economy • High elderly population • **U.S. Highway 52 & BNSF Railroad Infrastructure**	Less Vulnerable • Kief Fire Department has trained volunteers and equipment • Advanced warning and notification such as internet and TV • **One phone-and manually-activated outdoor emergency siren at the Kief Fire Hall**

Table 8.8.2 – City of Kief, North Dakota, Jurisdiction Risk Assessment – Continued

	Severe Summer Weather	
Impact	• Blocked Roads: Heritage Drive, Carmel Court, Briar Drive, roads in and around Souris Valley Care Center • Evacuation (Localized) • Human Injury/Death – wind chill • Loss of Crops • Loss of Livestock	• Loss of Power/Downed Power Lines • Property Damage – repair of roofing, siding and drainage systems for homes • Shelter-in-place • Vehicle Damage • **City water mains have experienced breaking from freezing and thawing of the soil**
Frequency	• Climatic patterns will result in numerous annual occurrences of the hazard	Removal of shelter belts allows for more direction wind and increases severity of ground blizzard conditions and frequency of blocked roads
Likelihood	• Climatic patterns will result in numerous annual occurrences of the hazard	
Vulnerability	More Vulnerable • Aging infrastructure (roads and electrical systems) • Agriculture Economy • High elderly population • **U.S. Highway 52 & BNSF Railroad Infrastructure Infrastructure**	Less Vulnerable • Kief Fire Department has trained volunteers and equipment • Advanced warning and notification such as internet and TV • **One phone-and manually-activated outdoor emergency siren at the Kief Fire Hall**

Table 8.8.2 – City of Kief, North Dakota, Jurisdiction Risk Assessment – Continued

	Space Weather	
Impact	• Government Interruptions • Infrastructure Degradation • Loss of Communication Systems • Loss of Digital/Technological Systems • Loss/Overcrowded Medical Facilities	• Loss of Power/Electricity Outage • Public Distress/Social Discord • School Closure • Loss of operation of the city hall and fire hall, etc. • Loss/outage of medical devices at private residences
Frequency	• Never a recorded occurrence in McHenry County or North Dakota	
Likelihood	• Dependent on solar activity and the 11-year solar cycle • Likely to occur once every 500 years per the 2018 N.D. Enhanced Mitigation MAOP	
Vulnerability	More Vulnerable • Advanced communication systems (internet, TV, etc.) • Agriculture economy • All critical facilities and infrastructure that require electricity for operation • BNSF Railroad	Less Vulnerable • Local food production/households with gardens

Table 8.8.2 – City of Kief, North Dakota, Jurisdiction Risk Assessment – Continued

	Transportation Incident	
Impact	• **Blocked roads from inadequate road clearing or incidents** • Business Interruptions • Delayed Emergency Response • Human Injury/Death • Increased Fire Potential • Loss of Transportation/Accessibility	• Mass Casualties/Fatalities • Delayed Emergency Response • HAZMAT Release • Livestock Loss • Property Damage • **Could be catastrophic if involving a school bus filled with children and a truck carrying hazardous materials**
Frequency	• Annual occurrences of multiple accidents involving cars and/or farm equipment on U.S. Highway 52 and N.D. Highway 14	
Likelihood	More Likely • Alliance Natural Gas Pipeline Pumphouse and Enbridge Oil Pipeline • Intoxicated drivers • High truck traffic from agriculture-related business • **U.S. Highway 52 & BNSF Railroad Infrastructure**	Less Likely • Adequate traffic control signage/stop signs • No commercial passenger airport • City not located directly on any state or federal highway
Vulnerability	More Vulnerable • Distracted drivers • Intoxicated drivers • High truck traffic from agriculture-related traffic • **U.S. Highway 52 & BNSF Railroad Infrastructure**	Less Vulnerable • Adequate traffic control signage/stop signs • No commercial passenger airport • City not located directly on any state or federal highway

8.8.3 Mitigation Strategy

The McHenry County, N.D., Multi-Jurisdictional Multi-Hazard Plan Update includes a mitigation strategy consisting of seven goals in Chapter 6. The following problem statement and mitigation projects address the mitigation needs of the city of Kief, North Dakota. It should be noted that some mitigation projects that pertain to all jurisdictions are included to encourage county-wide collaboration.

Problem Statement

The city of Kief, North Dakota, can be impacted by civil disturbance; criminal, terrorist, or nation/state attack; cyberattack; drought; fire (urban and wildland); flood (overland); geologic hazards; hazardous material release; infectious disease and pest infestations; severe summer weather; severe winter weather; space weather, and transportation incident. The city experienced a major flood in 2011 that resulted in a near failure of the temporary diking system. The drinking/potable water and sanitary sewer wastewater system is impacted by severe summer weather (heavy precipitation), which results in geologic hazards causing water mains and sewer pipes to break causing utility outages. The city lacks permanent and/or portable backup generators for the following critical facilities and infrastructure: Kief Ambulance/Fire Hall, Kief Public School, lift stations and the water treatment plant. There is inadequate storm shelter capacity and an outdated outdoor early warning system consisting of two manually-activated sirens. Local emergency services need upgraded equipment and facilities. The city has a large young population with 30.9 percent being under the age of 20. Approximately 3.4 percent of the population lives below the poverty line. It is estimated by the Kief City Council that 50 percent of the city's workforce commutes to Minot, North Dakota, for employment and has transitioned into a bedroom community.

The city lacks funding for mitigation projects. With little to no capabilities to accomplish major projects independently, the city is dependent on outside sources for mitigation.

Retrofitting/upgrading of existing infrastructure (Kief underpass, drinking/potable water, and sanitary sewer wastewater system), installation of permanent backup power sources, upgrade manually-activated outdoor emergency sirens and alerting notifications, upgrade and expand storm shelters (specific attention paid to people under the age of 20), expansion of planning and regulatory capabilities, and education and outreach are a priority for the city.

8.8.4 Mitigation Capability Assessment

Capability for mitigation is divided into four categories: administrative and technical, education and outreach, financial, and planning and regulatory. Each identified resource in the four categories can be used to implement mitigation strategies and access funding for projects. **Tables comparing the mitigation capabilities of the city of Kief, North Dakota, with all other jurisdictions in McHenry County can be found below and in Chapter 7, County Mitigation Capability Assessment.**

- Administrative and Technical: Identification of administrative and technical capabilities, which include: staff, their skills and tools for mitigation planning to implement specific mitigation actions.
- Education and Outreach: Identification of education and outreach programs, and methods already in place to implement mitigation activities and communicate hazard-related information.
- Financial: Identification of access to or eligibility to use funding resources for hazard mitigation for jurisdictions.
- Planning and Regulatory: Jurisdictional plans, policies, codes, and ordinances adopted and in place that prevent and reduce the impacts of natural hazards and man-made threats.

City of Kief, North Dakota, Mitigation Capabilities Summary

The following mitigation capabilities were identified as commonplace among all natural hazards and man-made threats upon completion of the risk assessment for the city of Kief, North Dakota. More detailed information about the mitigation capabilities of the city of Kief in relation to McHenry County and all other incorporated jurisdictions can be found in Chapter 7, Mitigation Capability Assessment.

2018 & 2023 N.D. Enhanced Mitigation MAOP	N.D. Dept. of Emergency Services (NNDES)
Advanced Communications: Internet & TV	NDDES Fire Index Monitoring
Emergency siren(s)/early warning systems	NDDOT State Transportation Plan & State Shop
McHenry County Commission	NDSU/McHenry County Extension
McHenry Comprehensive Plan	Kief Auditor and Public Works
McHenry County Courthouse	Kief City Council
McHenry County Emergency Management	Kief City Hall and City Shop
McHenry County LEOP	Kief Fire Hall
McHenry County Public Health	Kief Fire Department/Protection District
McHenry County Sheriff's Office	Kief Municipal Well & Water Treatment Plant
McHenry County Zoning	Velva Ambulance
MOUs	U.S. Post Office

8.8.5 Integration of Mitigation Plan into Planning Mechanisms

Integration of the plan into current planning mechanisms is critical in mitigation to communicate the needs of each jurisdiction to achieve an all-inclusive mitigation strategy. The process for integration of the mitigation plan is included after each mitigation project, which shows the planning mechanism utilized, the plan element used for integration and the process for integration.

8.8.6 Plan Maintenance

An important aspect of any usable plan is the maintenance and upkeep of the document. At any given time, planning, risk analysis, updating the situation assessment, research, coordinating, disaster response or other activity is occurring. Plan maintenance ensures the plan will remain useful in the county for many years. A mitigation action progress report form to conduct plan maintenance is in Chapter 10 of this plan.

8.9 City of Towner, North Dakota

The following profile includes information specific to the city of Towner, North Dakota, for mitigation planning purposes. The information included is as follows:

- Profile and Inventory;
- Risk Assessment;
- Hazard Scoring Notes;
- Mitigation Projects, and
- Capabilities for Mitigation.

Integration into Planning Mechanisms

The process for integration of the mitigation plan into existing planning mechanisms is discussed at the bottom of each mitigation project in section 8.9.4, section 8.9.5 and in Chapter 6, Mitigation Strategy.

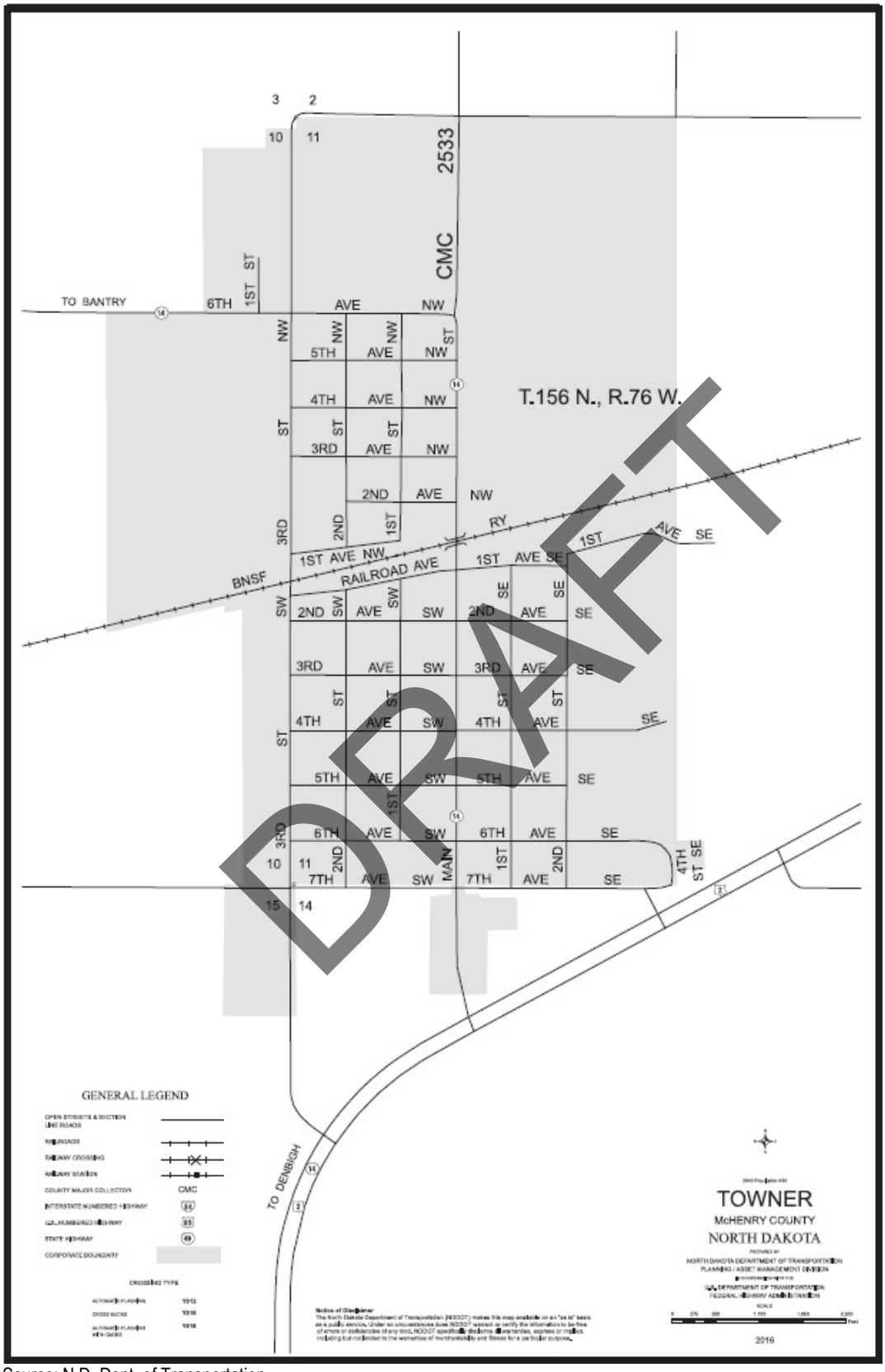
Plan Maintenance

Plan maintenance is shown in section 8.9.6.

Critical Facilities and Infrastructure

Figure 8.9.1 is a map of the city of Towner, North Dakota, provided by the N.D. Dept of Transportation.

Figure 8.9.1 – City of Towner, North Dakota, Base Map



Source: N.D. Dept. of Transportation

8.9.1 Profile and Inventory

The location, total population, vulnerable (underserved) populations, housing units and household size, businesses, critical facilities and infrastructure, new and future development, services, jurisdictional buildings, emergency response services and utilities are shown for the city of Towner, North Dakota. Detailed narratives follow each section heading to profile the city.

Detailed information on public buildings, services provided, emergency response services and utilities can be found in Chapter 3, Profile and Inventory.

Location

The city of Towner, North Dakota, is in north-central North Dakota at the intersection of U.S. Highway 2 and N.D. Highway 14 approximately 45 miles east of the city of Minot, North Dakota, the state's fourth largest city, and 19 miles west of the city of Rugby, North Dakota, the geographical center of North America.

The city of Towner, North Dakota, is the county seat of McHenry County, North Dakota.

Population

Table 8.9.1 shows population trends for the city of Towner, North Dakota, from 1920 to 2020 per the 2020 U.S. Decennial Census, with an estimate for 2022. According to the 2020 U.S. Decennial Census, the city of Towner, North Dakota, contains 479 people, a decrease of 54 people (10.1 percent) from 533 people in 2010.

Table 8.9.1 – 1920 to 2022 City of Towner, North Dakota, Population Trends and Projections

1920	1930	1940	1950	1960	1970	1980	1990	2000	2010	2020	*2022 est.*
610	622	918	955	948	870	867	669	574	533	479	*464*

Source(s): U.S. Decennial Census; American Community Survey, 5-Year Estimates

The city of Towner, North Dakota, contains approximately 8.9 percent of the population of McHenry County, North Dakota.

Vulnerable Populations

Age. Per the 2017 to 2021 American Community Survey 5-Year Estimate, the population of the city of Towner, North Dakota, consists of 110 individuals under the age of 20 and 99 individuals aged 65 and older, representing 22.5 and 20.2 percent of the city's population, respectively.

Daycare. A Kid's Corral, Busy Bee's, and two in-home providers are daycares in the city of Towner, North Dakota.

Poverty. Per the 2017 to 2021 American Community Survey 5-Year Estimate, there are 102 individuals in the city of Towner, North Dakota, that lives below the poverty line, representing 20.9 percent of the city's population.

Public Schools. The city is the location of TGU Towner Public School serving approximately 218 students in grades K to 12 according to the N.D. Dept. of Public Instruction, Fall 2023/2024 enrollment statistics.

Senior Housing Developments/Care Centers. There are no senior housing developments or care centers in the city of Towner, North Dakota.

Income-Based Affordable Housing. Towner Civic Improvement Association owns and manages eight buildings in the city of Towner, North Dakota: two sixplexes on the north side of the city, four fourplexes in the center part of the city near Main St, and an eightplex along with an elderly 12plex on the south side of the city.

Housing Units and Household Size

The 2017 to 2021 American Community Survey 5-Year Estimate shows there are 299 housing units in the city of Towner, North Dakota, consisting of 241 single-family homes, 46 multifamily homes, and 12 mobile homes.

The 2017 to 2021 American Community Survey 5-Year Estimate there are 241 households in the city of Towner, North Dakota, resulting in an average household size of 2.51 people.

Businesses

Information on businesses and economic development in the city of Towner, North Dakota, can be obtained by contacting the Towner Community Club and the Towner Development Corporation.

New and Future Development

Reword this paragraph before the meeting - The following development has occurred since the 2011 mitigation plan. Construction of the First International Bank at the intersection of U.S. Highway 2 and N.D. Highway 3, an addition onto the Towner High School, Farm Credit Services, and Gooseneck Implement constructed new facilities along U.S. Highway 2 in southeastern Towner, Towner Farmer's Union Elevator expanded its elevator in the city of Towner and added storage units, Ideal Seeds constructed a new building in the Towner Extraterritorial Area, construction of the Cobblestone Motel, new car wash by Cenex, Family Dollar, La Bella Vita Salon, the city averages construction of four new single-family homes annually.

New development in the city of Towner, North Dakota, over the last five years includes:

-

The following future development is planned or proposed in the city of Towner includes:

- The city of Towner has received ARPA and CDBG funding to upgrade a secondary lift station.
- The city broke ground in the fall of 2023 to upgrade the city's master lift station. The project is on hold until Spring 2024.
- The N.D. Highway 41 bridge is being rebuilt by the N.D. Dept. of Transportation, which will take approximately two years to complete.

- Two two-mile passing lanes in each direction were added to U.S. Highway 52 from the city of Minot to the city of Towner summer 2023.

Critical Facilities

- McHenry County, N.D. Courthouse
- McHenry County, N.D. Museum
- McHenry County Public Health
- McHenry County State's Attorney's Office
- N.D. Dept. of Transportation State Shop
- Roughrider Rodeo Association Rodeo Grounds
- TGU Public School
- Towner Ambulance and Fire Hall
- Towner City Hall
- Towner City Shop
- Towner Municipal Airport
- Towner Water Treatment Plant
- USDA Service Center – FSA and McHenry County Soil Conservation District
- U.S. Post Office

Infrastructure

- The city of Towner, North Dakota, has a sanitary sewer system with four lagoon cells and two lift stations.
- The city of Towner, North Dakota, has a drinking/potable system with a water treatment plant that is sourced from groundwater, and a water tower with a capacity of 50,000 gallons.
- The city of Towner, North Dakota, has an inert landfill.
- U.S. Highway 2 and N.D Highway 14 serve the city of Towner, North Dakota.
- Burlington Northern-Santa Fe (BNSF) Railroad infrastructure traverses the city of Towner, North Dakota.

Emergency Response Services

- The Towner Ambulance provides ambulance service to the city of Towner, North Dakota, and surrounding rural areas.
- The Towner Fire Department/Rural Protection District provides fire protection services to the city of Towner, North Dakota, and surrounding rural areas.
- The McHenry County Sherriff's Office provides law enforcement services to the city of Towner, North Dakota.
- First District Health Unit, McHenry County is in the city of Towner, North Dakota, provides public health services to the city of Towner, North Dakota, and greater McHenry County.

Services and Utilities

- The city of Towner, North Dakota, provides its own municipal garbage collection services.

- The city of Towner, North Dakota, has an inert landfill.
- The city of Towner, North Dakota, has a sanitary sewer system with four lagoon cells and two lift stations. It is estimated that two or three single-family homes utilize septic tanks.
- The city of Towner, North Dakota, has a storm water system consisting of curb and gutter, culverts and drainage ditches, and underground pipes.
- The Mouse River Journal is the official newspaper of the city of Towner, North Dakota.
- The city of Towner, North Dakota, has a drinking/potable system with a water treatment plant that is sourced from groundwater, and a water tower with a capacity of 50,000 gallons. It is estimated that two or three single-family homes utilize individual wells.
- Electricity is provided by Otter Tail Power Company in the city of Towner, North Dakota.
- Natural gas is not available in the city of Towner, North Dakota.
- Fuel oil and propane are used as an alternative heating source and are provided by companies chosen by the individual consumer in Towner, North Dakota.
- Midcontinent and SRT provide internet, phone, and TV to the city of Towner, North Dakota, and surrounding rural area.

8.9.2 Risk Assessment and Hazard Scoring Notes

Table 8.9.1 summarizes the risk assessment scoring of the city of Towner, North Dakota. The risk assessment and hazard scoring notes for each hazard specific to the city are shown in Table 8.9.2. Risk assessment notes for impact, frequency, likelihood and vulnerability ubiquitous for jurisdictions in McHenry County are found in Chapter 5, Threat and Hazard Identification Assessment in each respective hazard profile.

Table 8.9.1 – City of Towner, North Dakota, Jurisdiction Risk Assessment Scoring Summary

Risk Assessment			**Jurisdiction:**	**City of Towner, North Dakota**		
Hazard/Threat	Impact	Frequency	Likelihood	Vulnerability	Capabilities	**Total**
Civil Disturbance	5	2	2	3	2	**10**
Criminal, Terrorist, or Nation-State Attack	5	2	2	3	2	**10**
Cyberattack	5	2	3	3	3	**10**
Dam Failure	NA	NA	NA	NA	NA	**NA**
Drought	5	4	5	5	3	**16**
Fire – Urban/Structure Collapse	4	2	3	3	2	**10**
Fire – Wildland (including Rural)	5	2	3	3	2	**11**
Flood	4	2	2	3	2	**9**
Geologic Hazards	4	2	2	2	2	**8**
Hazardous Material Release	5	3	4	5	3	**14**
Infectious Disease & Pest Infestations	5	3	5	3	3	**13**
Severe Summer Weather	5	5	5	3	3	**15**
Severe Winter Weather	5	5	5	3	3	**15**
Space Weather	5	1	2	5	2	**11**
Transportation Incident	5	3	5	3	2	**14**

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 8.9.2 – City of Towner, North Dakota, Jurisdiction Risk Assessment

	Civil Disturbance	
Impact	• Blocked Roads • Business/Government Interruptions • Delayed Emergency Response • Financial Hardship/Strain (public)	• HAZMAT Release • Human Injury/Death • Loss of Communication Systems • Property Damage (Structure) • Property Damage (Vehicle)
Frequency	• Never an occurrence of a major incident	• DAPL protesters were not active in the city
Likelihood	More Likely • Lack of local active/continuous law enforcement coverage • Alliance Natural Gas Pipeline Pumpstation and Enbridge Oil Pipelines • BNSF Railway Infrastructure & U.S. Highway 2 • McHenry County Courthouse • TGU Public School	Less Likely • Small town with no major regional/state attractions • Sparse population
Vulnerability	More Vulnerable • Lack of local active/continuous law enforcement coverage • Alliance Natural Gas Pipeline Pumpstation and Enbridge Oil Pipelines • BNSF Railway Infrastructure & U.S. Highway 2 • McHenry County Courthouse • TGU Public School • USDA Service Center • Two McHenry County Sheriff's Office Deputies live in Towner • Proximity to the city of Minot, the state's fourth largest city, and the Minot Air Force Base (AFB), and missile silos • Proximity to Canada • One way through the city – Towner Underpass	Less Vulnerable • Small town with no major regional/state attractions • Sparse population • No pipelines in proximity to the city • Two McHenry County Sheriff's Office Deputies live in Towner • McHenry County Sheriff's office

Table 8.9.2 – City of Towner, North Dakota, Jurisdiction Risk Assessment – Continued

	Criminal, Terrorist, Nation-State Attack	
Impact	• Blocked Roads • Business/Government Interruptions • Delayed Emergency Response • Disease Outbreak/Mass Infections • Financial Hardship/Strain (public) • HAZMAT Release • Human Injury/Death	• Infrastructure Degradation • Loss of Communication Systems • Mass Casualties/Fatalities • Property Damage (Structure) • Property Damage (Vehicle) • **City's drinking/potable water system could be contaminated**
Frequency	• **Bomb threat at Merchant's Bank on August 5, 2021 resulting in shutting down of Main St.** • **Employees at the USDA Service Center in Towner were threatened by a group of men in 2008**	• **Wife shot her husband in 2015** • **Vehicle ran into Merchant's Bank causing property damage in 2023**
Likelihood	More Likely • Lack of local active/continuous law enforcement coverage • Alliance Natural Gas Pipeline Pumpstation and Enbridge Oil Pipelines • BNSF Railway Infrastructure & U.S. Highway 2 • McHenry County Courthouse • TGU Public School • Two McHenry County Sheriff's Office Deputies live in Towner • Energy pipelines proximate to city limits • Minot AFB and Missile Silos in proximity to city limits	Less Likely • Small town with no major regional/state attractions • Sparse population • Two McHenry County Sheriff's Office Deputies live in Towner • McHenry County Sheriff's office

Vulnerability	More Vulnerable • Lack of local active/continuous law enforcement coverage • Alliance Natural Gas Pipeline Pump Station and Enbridge Oil Pipelines • BNSF Railway Infrastructure & U.S. Highway 2 • McHenry County Courthouse • TGU Public School • USDA Service Center • Two McHenry County Sheriff's Office Deputies live in Towner • Proximity to the city of Minot, the state's fourth largest city, and the Minot Air Force Base (AFB), and missile silos • Proximity to Canada • One way through the city – Towner Underpass	Less Vulnerable • Small town with no major regional/state attractions • Sparse population • No pipelines in proximity to the city • Two McHenry County Sheriff's Office Deputies live in Towner

Table 8.9.2 – City of Towner, North Dakota, Jurisdiction Risk Assessment – Continued

	Cyberattack	
Impact	• Business Interruptions • Delayed Emergency Response • Financial Hardship/Strain (public) • Government Interruptions • HAZMAT Release • Human Injury/Death • Identity Theft – loss of wages and/or assets • Infrastructure Degradation	• Loss of Communication Systems • Loss of Digital/Technological Systems • Loss of Power/Electricity Outage • School Closure • Threats to city's drinking/potable water system which uses SCADA
Frequency	• Never an occurrence of a major attack	• TGU Public School have receiving phishing emails and other SPAM
Likelihood	<u>More Likely</u> • Alliance Natural Gas Pipeline Pump Station and Enbridge Oil Pipelines • McHenry County Courthouse • Midcontinent and SRT have communication infrastructure in city limits • Small town with lack of technological infrastructure to defend against cyberattack • TGU Public School • Verizon Tower's one north and one east of city limits	<u>Less Likely</u> • Lack of major state or national financial institutions

Vulnerability	More Vulnerable • Alliance Natural Gas Pipeline Pump Station and Enbridge Oil Pipelines • McHenry County Courthouse • Midcontinent and SRT have communication infrastructure in city limits • Small town with lack of technological infrastructure to defend against cyberattack • TGU Public School • Verizon Tower's one north and one east of city limits • Elderly population relying largely on landlines for communication purposes, remote medical care, and equipment monitoring • U.S. Post Office	Less Vulnerable • Lack of major state or national financial institutions • No natural gas service to the city

Table 8.9.2 – City of Towner, North Dakota, Jurisdiction Risk Assessment – Continued

	Drought	
Impact	• Crop Loss • Loss of Economy • Loss of Livestock • Loss of Wildlife Habitat (decreased wildlife populations) • Increase in Wildland Fire Potential • Water quality compromised from stock dams	• Diminished soil health • Negative impact on mental health of producers and fire responders – "community impact" • Local producers forced to sell off herds which can last for several years • Population loss as people moved away due to loss of economy
Frequency	• Fall of 1980 was dry • Severe drought in 1961/1962, 1988/1989 to 1991/1992 • Some dry conditions each year lasting a couple weeks in length	• In 2013 and 2014, dry conditions were present from June to October with little rain • **Lack of adequate snowfall spring of 2015, 2021, 2023/2024** • Severe drought conditions winter 2020/2021 • Exceptional drought spring and summer 2021
Likelihood	More Likely • Dry/wet cycle every 10 years • Climatic patterns will result in an eventual drought of significance • Lack of precipitation	Less Likely • Heavy precipitation in winter (snow pack) and summer (rainfall)
Vulnerability	More Vulnerable • Loss of economy from decreased wildlife & hunting • Agriculture economy • Elderly population • TGU Public School • Flat terrain/open topography contributes to conditions • Pastureland adjacent to structures and city limits • **City has aquifer-fed municipal well for drinking/potable water and water treatment plant and a 50,000-gallon water tower**	Less Vulnerable • Towner Fire Department • Financial assistance programs made available by the state and federal government • McHenry County Burn Restriction Ordinance • Fire Index monitoring and mapping from NDDES • Advanced communications such as internet and TV • **City has aquifer-fed municipal well for drinking/potable water and water treatment plant and a 50,000-gallon water tower**

Table 8.9.2 – City of Towner, North Dakota, Jurisdiction Risk Assessment – Continued

	Fire – Urban Fire/Structure Collapse	
Impact	• Building Collapse • Delayed Emergency Response • Evacuation (Localized) • Explosion	• Human Injury/Death • Increase Fire Potential • **Property damage on a significant scale if impacting downtown structures and other critical facilities or infrastructure in the city**
Frequency	• Towner Fire Department receives two structure calls each year • Single-family home fires in 2018, 2019, and 2023 • Hardware store fire in 2000	• Towner Fire Department receives two structure calls each year
Likelihood	More Likely • Adopted state building codes but lack enforcement • Age of structures • Elderly populations • Increased drug use • Increased use of electric heaters • Outdated electric wiring in older homes and structures • Outdated heating systems • **BNSF Railway Infrastructure traversing city limits**	Less Likely • Adopted state building codes but lack enforcement • Better building standards and maintenance of structures • Smoke detectors in public buildings and private homes/businesses • Well-equipped fire department with trained volunteers

Vulnerability	More Vulnerable • Adopted state building codes but lack enforcement • Age of structures • Elderly populations • Increased drug use • Increased use of electric heaters • Outdated electric wiring in older homes and structures • Outdated heating systems • **BNSF Railway Infrastructure traversing city limits** • **City hall/city shop, ambulance hall, fire hall, TGU Public School, and water treatment plant do not have permanent generators** • **Prolonged response times due to limited fire staff during the daytime**	Less Vulnerable • Towner Fire Department has three portable generators on fire trucks • Adopted state building codes but lack enforcement • Better building standards and maintenance of structures • Smoke detectors in public buildings and private homes/businesses • **City has fire hydrants for fire suppression** • **No natural gas service to the city** • **The city has a 50,000-gallon water tower** • **Towner Fire Dept. in process of building a new fire hall**

Table 8.9.2 – City of Towner, North Dakota, Jurisdiction Risk Assessment – Continued

	Fire – Rural & Wildland	
Impact	• Building Collapse • Crop Loss • Delayed Emergency Response • Downed Power Lines • Evacuation (Localized) • Explosion • Increase Wildland Fire Potential • Loss of Power/Electricity Outage	• **Loss of Livestock** • **Loss of Wildlife Habitat** • **Mass Casualties** • **Property Damage (Structure & Vehicle)** • **Losses could be on a significant scale if impacting a major producer or farmstead** • **Loss of farm equipment and assets**
Frequency	• Towner Fire Department responds to an average of five or six wildland fires each year • Never an occurrence of a wildland fire threatening city limits	
Likelihood	More Likely • Agricultural burn-off • High winds annually and dry conditions – when present • Pastureland adjacent to structures and city limits • Severe summer weather with significant lightning • **BNSF Railroad Infrastructure traversing city limits**	Less Likely • Removal of CRP near city limits • Summer and winter weather with heavy precipitation

Vulnerability	More Vulnerable • Agricultural burn-off • High winds annually and dry conditions – when present • Pastureland adjacent to structures and city limits • Severe summer weather with significant lightning • **Lack of fire breaks around city limits** • **BNSF Railway Infrastructure traversing city limits** • **City hall/city shop, ambulance hall, fire hall, TGU Public School, and water treatment plant do not have permanent generators** • **Lack of outdoor emergency siren at Towner Rodeo Grounds**	Less Vulnerable • Towner Fire Department has three portable generators on fire trucks • **Adequate staffing coverage/resources of fire department** • Removal of CRP near city limits • Summer and winter weather with heavy precipitation • MOUs with neighboring fire departments • McHenry County Burn Restriction Ordinance • **One phone-and manually-activated outdoor emergency siren at the Towner Fire Hall** • **The city has a 50,000-gallon water tower** • **Towner Fire Dept. in process of building a new fire hall**

Table 8.9.2 – City of Towner, North Dakota, Jurisdiction Risk Assessment – Continued

	Flood	
Impact	• Blocked Roads • Delayed Emergency Response • Flooding (Highway & Structure) • Human Injury/Death • **Flood waters can inundate the city's sanitary sewer system from overland flooding causing system outages**	• **TGU Public School can become flooded from overland flooding** • **Towner Underpass becomes blocked during heavy precipitation events** • **Southwest side of Towner has seepage in people's basements**
Frequency	• **Towner Underpass becomes blocked an estimated twice per year** • **TGU Public School experiences overland flooding from heavy precipitation twice per year**	• Surrounding soils consisting of shale and gravel allow for immediate drainage of water during summer months • **Overland flooding frequent in the spring due to rapid snow melt**
Likelihood	More Likely • Rapid change of seasons resulting in excessive snow melt • **Souris (Mouse) River in proximity to city limits**	Less Likely • Dry conditions/drought and low precipitation • Surrounding soils consisting of shale and gravel allow for immediate drainage of water during summer months • **Proper storm water system in the city**
Vulnerability	More Vulnerable • Rapid change of seasons resulting in excessive snow melt • TGU Public School • **City hall/city shop, ambulance hall, fire hall, TGU Public School, and water treatment plant do not have permanent generators** • **Souris (Mouse) River**	Less Vulnerable • **Elevation of the city is higher than surrounding area** • City has equipment to move water • Towner Fire Department has equipment to move water • **City wells not located in low-lying area of the city with no potential for an outage and/or contamination** • Surrounding sandy soils allow for immediate drainage of water during summer months • Eaton Flood Project – dam south of Towner allows for drainage of excess of water from the Mouse River is needed • Towner Fire Department has three portable generators on fire trucks •

Table 8.9.2 – City of Towner, North Dakota, Jurisdiction Risk Assessment – Continued

	Geologic Hazards	
Impact	• Blocked Roads • Delayed Emergency Response • Human Injury/Death • Infrastructure Degradation	• Loss of Economy • Loss of Power/Electricity Outage • Property Damage • Utility Outage/Shortage
Frequency	• No occurrences of geologic hazards other than radon in the city of Towner	
Likelihood	More Likely • **All N.D. Counties in EPA Radon Zone I**	Less Likely • No Abandoned Mine Lands located near city limits
Vulnerability	More Vulnerable • **All N.D. Counties in EPA Radon Zone I**	Less Vulnerable • No Abandoned Mine Lands located near city limits

Table 8.9.2 – City of Towner, North Dakota, Jurisdiction Risk Assessment – Continued

	Hazardous Material Release	
Impact	• Blocked Roads • Delayed Emergency Response • Environmental Degradation • Evacuation (localized) • Explosion • Business & Government Interruptions • Human Injury/Death	• Increased Fire Potential • Loss of Economy • Loss of Power and/or Potable Water • Property Damage • School Closure • **Contamination of city water from a release may lead to utility outage/shortage**
Frequency	• No significant incidents involving airplanes, automobiles/cars, commercial truck traffic, recreational vehicles, or trains	• No BNSF train derailments in Towner city limits
Likelihood	More Likely • Transportation of chemicals by truck and railroad through city limits • Storage of chemicals/fertilizers in city limits and on farmsteads in large tanks near city limits • **U.S. Highway 2 and BNSF Railroad Infrastructure traversing city limits** • TGU Public School shop classes • Alliance Natural Gas Pipeline Pumpstation and Enbridge Oil Pipeline	Less Likely • Private companies have HAZMAT certifications • Safety measures implemented BNSF Railroad • Tier II Federal Requirements • No bulk storage tanks at McHenry County Courthouse or TGU Public School •

Vulnerability	More Vulnerable • Transportation of chemicals by truck and railroad through city limits • Storage of chemicals/fertilizers in city limits and on farmsteads in large tanks near city limits • **U.S. Highway 2 and BNSF Railroad Infrastructure traversing city limits** • TGU Public School shop classes • **No hospital or medical clinic in city limits** • Lack of official truck route around city limits – Airport Road/65th St NE and 9th Ave NE • Alliance Natural Gas Pipeline Pumpstation and Enbridge Oil Pipeline • **Lack of outdoor emergency siren at Towner Rodeo Grounds**	Less Vulnerable • Towner Ambulance • Towner Fire Department has HAZMAT training • Private companies have HAZMAT certifications • Safety measures implemented BNSF Railroad • Tier II Federal Requirements • No bulk storage tanks at McHenry County Courthouse or TGU Public School • **One phone-and manually-activated outdoor emergency siren at the Towner Fire Hall** • Unofficial truck route around city limits – Airport Road/65th St NE and 9th Ave NE • Regional HAZMAT Team in Minot 45 minutes away • Towner Fire Department has three portable generators on fire trucks •

Table 8.9.2 – City of Towner, North Dakota, Jurisdiction Risk Assessment – Continued

	Infectious Disease & Pest Infestations	
Impact	• Crop Loss • Human Injury/Death • Livestock Injury/Death • Loss of Economy • Mass Casualties/Fatalities	• Strain on local medical resources (ambulance or clinic) • Loss of Drinking/Potable Water • **Financial cost to public health resources** • Loss of medical staff due to sickness • School Closure
Frequency	• Annual occurrences of death, primarily among the elderly • Occurrence of disease - 1 in 3 for people annually • Annual occurrences of influenza cases in the local population	• **The COVID-19 pandemic of 2020 resulted in mass quarantine and sheltering of the local population and temporary closure of businesses resulting in unmeasured economic losses.**
Likelihood	More Likely • Agriculture economy • Growing elderly population • Small population of children without immunization • TGU Public School • Transporting of animals across state lines • Dependent on weather for animals and crops • U.S. Highway 2 and BNSF Railroad	Less Likely • Advanced communications such as internet and tv • Public health and employment regulations for public facilities • Federal health guidelines at public employers • First District Health Unit, McHenry County education and outreach • FSA and NDSU Extension/McHenry County education and outreach

Vulnerability	More Vulnerable • Agriculture economy • Growing elderly population • Small population of children without immunization • TGU Public School • Transporting of animals across state lines • Dependent on weather for animals and crops • U.S. Highway 2 and BNSF Railroad • No hospital or medical clinic • **City has a sanitary sewer system with lagoon cells – needs retrofitting/upgrading to withstand hazards/threats**	Less Vulnerable • Advanced communications such as internet and tv • Public health and employment regulations for public facilities Immunizations & medications of local population • Towner Veterinarian Clinic

Table 8.9.2 – City of Towner, North Dakota, Jurisdiction Risk Assessment – Continued

	Severe Summer Weather	
Impact	• Blocked Roads – Towner Underpass • Downed Trees • Evacuation (Localized) • Human Injury/Death – heat exhaustion • Infrastructure Degradation • Livestock Injury/Death • Loss of Crops • Loss of Power/Downed Power Lines	• Loss of Power/Downed Power Lines • **Property Damage – repair of roofing, siding and drainage systems for homes** • **Damage to electrical equipment from lightning** • Shelter-in-place • Vehicle Damage • **Contamination of drinking/potable water system**
Frequency	• Annual occurrences of hail, extreme heat, lightning, heavy rain, high wind • Two or three significant storms producing damage to trees and property annually	• Property damage from tornados/straight-line winds in summer 2017 and 2019 resulting in significant loss of trees • City of Towner Water Treatment Plant was hit by lightning twice in summer 2022 and 2023 causing disruptions of 10 hours and 12 hours, respectively, in mechanical operations
Likelihood	• Climatic patterns will result in numerous annual occurrences of the hazard	• Flat terrain/open topography contributes to wind conditions

Vulnerability	More Vulnerable • Adopted state building codes but lack enforcement • Aging infrastructure (roads and electrical systems) • Agriculture Economy • High elderly population • TGU Public School • Mobile homes and high number of people living below the poverty level • Public campground with six spots in city limits • **BNSF Railroad Infrastructure traversing city limits** • **U.S. Highway 2** • **No hospital or medical clinic in city limits** • **City hall/city shop, ambulance hall, fire hall, TGU Public School, and water treatment plant do not have permanent generators** • **City has a sanitary sewer system with lagoon cells – needs retrofitting/upgrading to withstand hazards/threats** • **Towner Underpass can become inundated and blocked by heavy precipitation** • **Lack of outdoor emergency siren at Towner Rodeo Grounds**	Less Vulnerable • Adopted state building codes but lack enforcement • Advanced warning and notification such as internet and TV • **City wells not located in low-lying area of the city** • Towner Ambulance • Towner Fire Department • **One phone-and manually-activated outdoor emergency siren at the Towner Fire Hall** • Towner Fire Department has three portable generators on fire trucks •

Table 8.9.2 – City of Towner, North Dakota, Jurisdiction Risk Assessment – Continued

	Severe Winter Weather	
Impact	• Blocked Roads: Heritage Drive, Carmel Court, Briar Drive, roads in and around Souris Valley Care Center • Evacuation (Localized) • Human Injury/Death – wind chill • Loss of Crops • Loss of Livestock	• Loss of Power/Downed Power Lines • Property Damage – repair of roofing, siding and drainage systems for homes • Shelter-in-place • Vehicle Damage • **City water mains have experienced breaking from freezing and thawing of the soil**
Frequency	• Annual occurrences of blizzard events • Annual occurrences of blocked roads • Annual occurrences of power loss from storms • Annual occurrences of wind events • Two or three significant blizzards producing damage to trees and property annually	• Major blizzard in fall of 2015 • March 2017 snowstorm resulted in blocked roads in the city • Major blizzard in fall of 2018 • Spring and fall snowstorms of 2019 • **Ice storm in 1997 impacted the city resulting in loss of power for four days** • **Ice Storm January 2021 and April 2022**
Likelihood	• Climatic patterns will result in numerous annual occurrences of the hazard	• Removal of shelter belts allows for more direction wind and increases severity of ground blizzard conditions and frequency of blocked roads

Vulnerability	More Vulnerable • Adopted state building codes but lack enforcement • Aging infrastructure (roads and electrical systems) • Agriculture Economy • High elderly population • TGU Public School • Mobile homes and high number of people living below the poverty level • Public campground with six spots in city limits • **BNSF Railroad Infrastructure traversing city limits** • **U.S. Highway 2** • **No hospital or medical clinic in city limits** • **City hall/city shop, ambulance hall, fire hall, TGU Public School, and water treatment plant do not have permanent generators** • **City has a sanitary sewer system with lagoon cells – needs retrofitting/upgrading to withstand hazards/threats** • **Towner Underpass can become inundated and blocked by heavy precipitation** • **The city averages one broken water main per year from freezing and thawing of the soil** • **Lack of outdoor emergency siren at Towner Rodeo Grounds**	Less Vulnerable • Adopted state building codes but lack enforcement • Advanced warning and notification such as internet and TV • **City wells not located in low-lying area of the city** • Towner Ambulance • Towner Fire Department • **One phone-and manually-activated outdoor emergency siren at the Towner Fire Hall** • Towner Fire Department has three portable generators on fire trucks •

Table 8.9.2 – City of Towner, North Dakota, Jurisdiction Risk Assessment – Continued

	Space Weather	
Impact	• Government Interruptions • Infrastructure Degradation • Loss of Communication Systems • Loss of Digital/Technological Systems • Loss/Overcrowded Medical Facilities	• Loss of Power/Electricity Outage • Public Distress/Social Discord • School Closure • Loss of operation of the city hall and fire hall, etc. • Loss/outage of medical devices at private residences
Frequency	• Never a recorded occurrence in McHenry County or North Dakota	
Likelihood	• Dependent on solar activity and the 11-year solar cycle • Likely to occur once every 500 years per the 2018 N.D. Enhanced Mitigation MAOP	
Vulnerability	More Vulnerable • Advanced communication systems (internet, TV, etc.) • Agriculture economy • All critical facilities and infrastructure that require electricity for operation • Alliance Natural Gas Pipeline Pumphouse and Enbridge Oil Pipeline. • BNSF Railroad • McHenry County Courthouse • TGU Public School • Towner Ambulance hall • Towner Fire Hall • First District Health Unit, McHenry County • USDA Service Center • **City hall/city shop, ambulance fire hall, and water treatment plant do not have permanent generators** •	Less Vulnerable • Local food production/households with gardens

Table 8.9.2 – City of Towner, North Dakota, Jurisdiction Risk Assessment – Continued

	Transportation Incident	
Impact	• **Blocked roads from inadequate road clearing or incidents** • Business Interruptions • Delayed Emergency Response • Human Injury/Death • Increased Fire Potential • Loss of Transportation/Accessibility • Mass Casualties/Fatalities	• Delayed Emergency Response • HAZMAT Release • Livestock Loss • Property Damage • **Could be catastrophic if involving a school bus filled with children and a truck carrying hazardous materials**
Frequency	• Annual occurrences of multiple accidents involving cars and/or farm equipment on U.S. Highway 2 and N.D. Highway 14	
Likelihood	<u>More Likely</u> • Alliance Natural Gas Pipeline Pumphouse and Enbridge Oil Pipeline • Intoxicated drivers • High truck traffic from agriculture-related business • **U.S. Highway 2** • **BNSF Railroad, U.S. Highway 2, and N.D. Highway 14 Infrastructure traversing city limits** • Traffic on city's Main St. going over the speed limits • Lack of sidewalks/safe routes to schools • **Lack of sightlines/visibility on Main St./N.D. Highway 14** • **City of Towner's Main St. is N.D. Highway 14** • **U.S. Highway 2 "Curve"**	<u>Less Likely</u> • Adequate traffic control signage/stop signs • No commercial passenger airport • Towner Underpass

Vulnerability	More Vulnerable • Distracted drivers • Intoxicated drivers • High truck traffic from agriculture-related traffic • **U.S. Highway 52** • **CP Railway Infrastructure traversing city limits** • No hospital in city limits • Lack of sidewalks/safe routes to schools • Lack of official truck route around city limits – Airport Road/65th St NE and 9th Ave NE • Removal of blinking yellow light at intersection of U.S. Highway 52 and N.D. Highway 41 • Truck traffic carrying chemicals traverses Main St./N.D. Highway 14 if they are under the Towner Underpass height limit	Less Vulnerable • Adequate traffic control signage/stop signs • No commercial passenger airport • Towner Underpass • Towner Ambulance • Towner Fire Department • Two McHenry County Sheriff's Office Deputies live in Towner • Unofficial truck route around city limits – Airport Road/65th St NE and 9th Ave NE

8.9.3 Mitigation Strategy

The McHenry County, N.D., Multi-Jurisdictional Multi-Hazard Plan Update includes a mitigation strategy consisting of seven goals in Chapter 6. The following problem statement and mitigation projects address the mitigation needs of the city of Towner, North Dakota. It should be noted that some mitigation projects that pertain to all jurisdictions are included to encourage county-wide collaboration.

Problem Statement

The city of Towner, North Dakota, can be impacted by civil disturbance; criminal, terrorist, or nation/state attack; cyberattack; drought; fire (urban and wildland); flood (overland); geologic hazards; hazardous material release; infectious disease and pest infestations; severe summer weather; severe winter weather; space weather, and transportation incident. The city experienced a major flood in 2011 that resulted in a near failure of the temporary diking system. The drinking/potable water and sanitary sewer wastewater system is impacted by severe summer weather (heavy precipitation), which results in geologic hazards causing water mains and sewer pipes to break causing utility outages. The city lacks permanent and/or portable backup generators for the following critical facilities and infrastructure: Towner Ambulance/Fire Hall, Towner Public School, lift stations and the water treatment plant. There is inadequate storm shelter capacity and an outdated outdoor early warning system consisting of two manually-activated sirens. Local emergency services need upgraded equipment and facilities. The city has a large young population with 30.9 percent being under the age of 20. Approximately 3.4 percent of the population lives below the poverty line. It is estimated by the Towner City Council that 50 percent of the city's workforce commutes to Minot, North Dakota, for employment and has transitioned into a bedroom community.

The city lacks funding for mitigation projects. With little to no capabilities to accomplish major projects independently, the city is dependent on outside sources for mitigation.

Retrofitting/upgrading of existing infrastructure (Towner underpass, drinking/potable water, and sanitary sewer wastewater system), installation of permanent backup power sources, upgrade manually-activated outdoor emergency sirens and alerting notifications, upgrade and expand storm shelters (specific attention paid to people under the age of 20), expansion of planning and regulatory capabilities, and education and outreach are a priority for the city.

City of Towner Project 1: Conduct Engineering Study to Identify Retrofits/Upgrades to the Drinking/Potable Water and Sanitary Sewer Wastewater Systems.

Description/Benefit	The drinking/potable water and sanitary sewer wastewater system is impacted by severe summer weather (heavy precipitation), which results in geologic hazards causing water mains and sewer pipes to break causing utility outages.		
Hazard/Threat Addressed	Drought, Flooding, Infectious Disease and Pest Infestations, Severe Summer Weather, Severe Winter Weather		
Affected Jurisdictions	City of Towner and greater McHenry County		
Project Status	Ongoing and Continue		
Priority	Very High		
Responsible Agency	Towner City Council, DWR		
Partners	Emergency Management, Public Works,		
Completion Timeframe	2 to 3 years	Cost	TBD
Funding Source	City of Towner. Hazard Mitigation Grant Program (HMGP).		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element	Process for Integration
Capital Improvement Plan Towner Comprehensive Plan	Capability Assessment, Hazard History, Risk Assessment, Towner Jurisdictional Meeting	Approval by county commission and city council

8.9.4 Mitigation Capability Assessment

Capability for mitigation is divided into four categories: administrative and technical, education and outreach, financial, and planning and regulatory. Each identified resource in the four categories can be used to implement mitigation strategies and access funding for projects. **Tables comparing the mitigation capabilities of the city of Towner, North Dakota, with all other jurisdictions in McHenry County can be found below and in Chapter 7, County Mitigation Capability Assessment.**

- Administrative and Technical: Identification of administrative and technical capabilities, which include: staff, their skills and tools for mitigation planning to implement specific mitigation actions.
- Education and Outreach: Identification of education and outreach programs, and methods already in place to implement mitigation activities and communicate hazard-related information.
- Financial: Identification of access to or eligibility to use funding resources for hazard mitigation for jurisdictions.
- Planning and Regulatory: Jurisdictional plans, policies, codes, and ordinances adopted and in place that prevent and reduce the impacts of natural hazards and man-made threats.

City of Towner, North Dakota, Mitigation Capabilities Summary

The following mitigation capabilities were identified as commonplace among all natural hazards and man-made threats upon completion of the risk assessment for the city of Towner, North Dakota. More detailed information about the mitigation capabilities of the city of Towner in relation to McHenry County and all other incorporated jurisdictions can be found in Chapter 7, Mitigation Capability Assessment.

2018 & 2023 N.D. Enhanced Mitigation MAOP	NDDES Fire Index Monitoring
Advanced Communications: Internet & TV	NDDOT State Transportation Plan & State Shop
Emergency siren(s)/early warning systems	NDSU/McHenry County Extension
McHenry County Commission	TGU Public School
McHenry Comprehensive Plan	Towner Ambulance
McHenry County Courthouse	Towner Auditor's Office
McHenry County Emergency Management	Towner City Council
McHenry County LEOP	Towner City Hall and City Shop
McHenry County Public Health	Towner Fire Department/Protection District
McHenry County Sherriff's Office	Towner Public Works – seasonal and permanent
McHenry County Zoning	Towner Municipal Airport
MOUs	USDA Service Center
N.D. Dept. of Emergency Services (NNDES)	U.S. Post Office

8.9.5 Integration of Mitigation Plan into Planning Mechanisms

Integration of the plan into current planning mechanisms is critical in mitigation to communicate the needs of each jurisdiction to achieve an all-inclusive mitigation strategy. The process for integration of the mitigation plan is included after each mitigation project, which shows the planning mechanism utilized, the plan element used for integration and the process for integration.

8.9.6 Plan Maintenance

An important aspect of any usable plan is the maintenance and upkeep of the document. At any given time, planning, risk analysis, updating the situation assessment, research, coordinating, disaster response or other activity is occurring. Plan maintenance ensures the plan will remain useful in the county for many years. A mitigation action progress report form to conduct plan maintenance is in Chapter 10 of this plan.

8.10 City of Upham, North Dakota

The following profile includes information specific to the city of Upham, North Dakota, for mitigation planning purposes. The information included is as follows:

- Profile and Inventory;
- Risk Assessment;
- Hazard Scoring Notes;
- Mitigation Projects, and
- Capabilities for Mitigation.

Integration into Planning Mechanisms

The process for integration of the mitigation plan into existing planning mechanisms is discussed at the bottom of each mitigation project in section 8.10.4, section 8.10.5 and in Chapter 6, Mitigation Strategy.

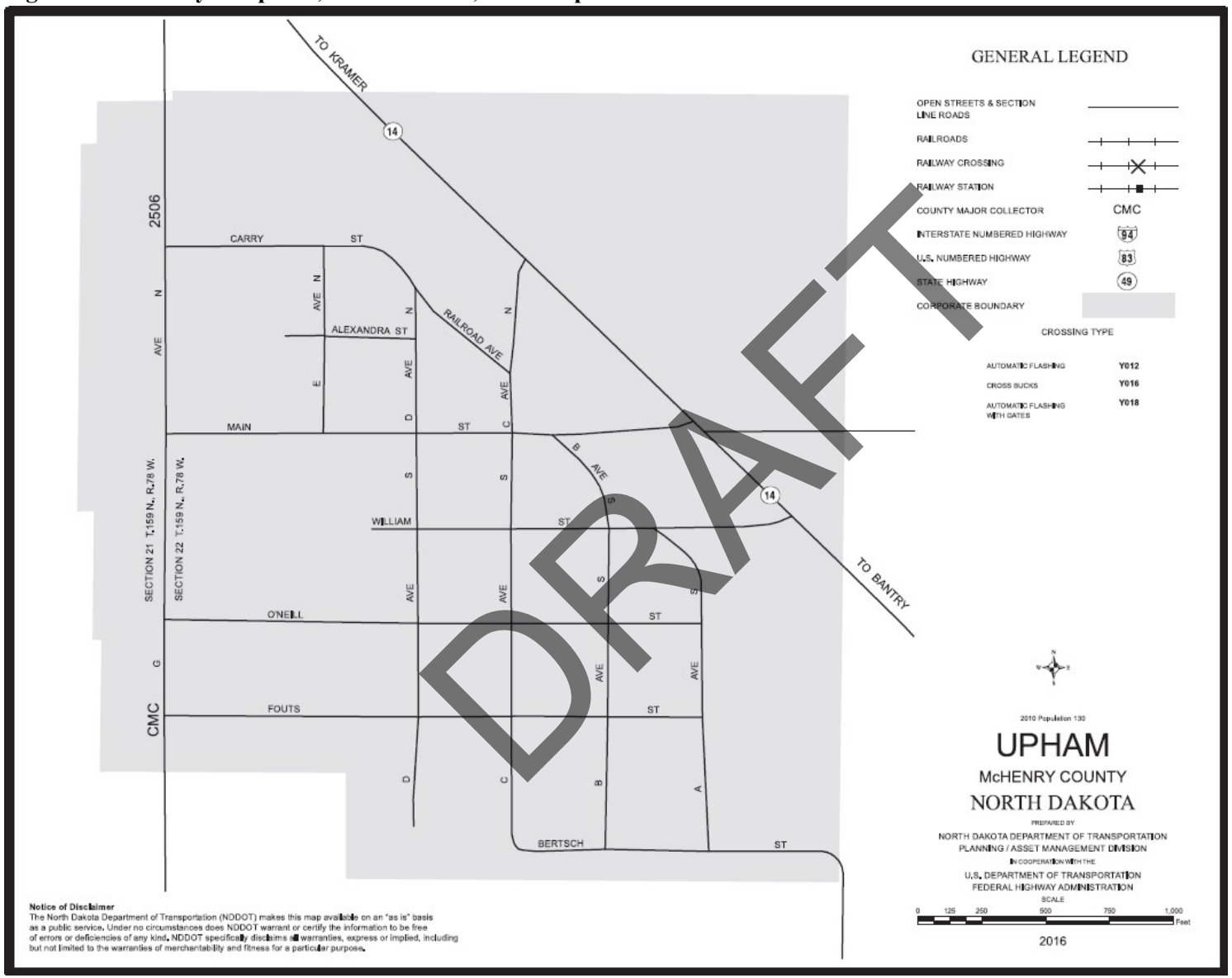
Plan Maintenance

Plan maintenance is shown in section 8.10.6.

Critical Facilities and Infrastructure

Figure 8.10.1 is a map of the city of Upham, North Dakota, provided by the N.D. Dept of Transportation.

Figure 8.10.1 – City of Upham, North Dakota, Base Map



Source: N.D. Dept. of Transportation

8.10.1 Profile and Inventory

The location, total population, vulnerable (underserved) populations, housing units and household size, businesses, critical facilities and infrastructure, new and future development, services, jurisdictional buildings, emergency response services and utilities are shown for the city of Upham, North Dakota. Detailed narratives follow each section heading to profile the city.

Detailed information on public buildings, services provided, emergency response services and utilities can be found in Chapter 3, Profile and Inventory.

Location

The city of Upham, North Dakota, is in north-central North Dakota on N.D. Highway 14, approximately 35 miles northeast of the city of Minot, North Dakota, the state's fourth largest city.

Population

Table 8.10.1 shows population trends for the city of Upham, North Dakota, from 1920 to 2020 per the 2020 U.S. Decennial Census, with an estimate for 2022. According to the 2020 U.S. Decennial Census, the city of Upham, North Dakota, contains 135 people, an increase of five people (3.8 percent) from 130 people in 2010.

Table 8.10.1 – 1920 to 2022 City of Upham, North Dakota, Population Trends and Projections

1920	1930	1940	1950	1960	1970	1980	1990	2000	2010	2020	*2022 est.*
196	257	243	403	333	272	227	205	155	130	135	*131*

Source(s): U.S. Decennial Census; American Community Survey, 5-Year Estimates

Vulnerable Populations

Age. Per the 2018 to 2022 American Community Survey 5-Year Estimate, the population of the city of Upham, North Dakota, consists of 54 individuals under the age of 20 and 31 individuals aged 65 and older, representing 29.5 and 16.9 percent of the city's population, respectively.

Daycare. There is one daycare in the city of Upham, North Dakota.

Poverty. Per the 2018 to 2022 American Community Survey 5-Year Estimate, there are 66 individuals in the city of Upham, North Dakota, that live below the poverty line, representing 36.1 percent of the city's population.

Public Schools. The public school in the city of Upham closed in 2002. Kids living in and around the city of Upham attend school in either TGU Public School, Granville, or TGU Public School, Towner, both serving grades K to 12. Kids living in McHenry County near the city of Upham also attend public schools in nearby Bottineau, Glenburn, and Newburg.

Senior Housing Developments/Care Centers. There are no senior housing developments or care centers in the city of Upham, North Dakota.

Housing Units and Household Size

The 2018 to 2022 American Community Survey 5-Year Estimate shows there are 105 housing units in the city of Upham, North Dakota, consisting of 83 single-family homes, 14 multifamily homes, and eight mobile homes.

The 2018 to 2022 American Community Survey 5-Year Estimate there are 80 households in the city of Upham, North Dakota, resulting in an average household size of 2.29 people.

Businesses

Businesses in the city of Upham, North Dakota, include Section 8 Bar Y Grill, Smetty Oil, Merchants Bank, North 14 Agronomy, Dirty Dog Digging, Kuhn Henn Trucking, and 1481 Meats.

New and Future Development

The following new and future development has occurred in the city of Upham, North Dakota:

New development in the city of Upham, North Dakota, over the last five years includes:

- 1481 Meats opened in January 2024.
- Section 8 Bar & Grill is a new business located in a new building constructed in 2018.
- A single-family home constructed a new garage.
- A single-family completed an addition onto the structure.
- A structure was moved into city limits from out in the county and is being converted into business/residential use.
- The city installed new playground equipment at the city park in 2020 with grant funds awarded by the Garrison Conservancy.

The following future development is planned or proposed in the city of Upham includes:

- The city is purposing construction of new bathrooms at the city park with potential grant funding form the Garrison Conservancy.
- The city received an $84,000 CDBG grant to install new gate valves for drinking/potable water mains.
- The city's engineering contract is pursuing a USDA Search Grant to explore the city's drinking/potable water and wastewater system retrofits and/or upgrade.

Critical Facilities

- American Legion (used as a community Shelter)
- Bottineau Ambulance Substation/ Upham Fire Hall
- McHenry County Shop
- TGU Public School, Upham (located in the city of Granville but still critical to the city of Upham)
- Upham City Hall/City Shop
- Upham Water Tower Building and pumphouse

- U.S. Post Office

Infrastructure

- The city of Upham, North Dakota, has a sanitary sewer system with two lagoon cells and one lift station.
- The city of Upham, North Dakota, has a drinking/potable system with a water treatment plant that is sourced North Prairie Regional Water District, and a water tower with a capacity of 75,000 gallons.
- The city of Upham, North Dakota, has an inert landfill south of city limits.
- N.D. Highway 41 serves the city of Upham, North Dakota.
- Burlington Northern-Santa Fe (BNSF) Railroad infrastructure traverses the city of Upham, North Dakota.

Emergency Response Services

- The Bottineau Ambulance, Upham Substation provides ambulance service to the city of Upham, North Dakota, and surrounding rural areas.
- The Upham Fire Department/Rural Protection District provides fire protection services to the city of Upham, North Dakota, and surrounding rural areas.
- The McHenry County Sherriff's Office provides law enforcement services to the city of Upham, North Dakota.
- First District Health Unit, McHenry County is in the city of Upham, North Dakota, provides public health services to the city of Upham, North Dakota, and greater McHenry County.

Services and Utilities

- Circle Sanitation provides municipal garbage collection services to the city of Upham, North Dakota.
- The city of Upham, North Dakota, has an inert landfill south of city limits.
- The city of Upham, North Dakota, has a sanitary sewer system with two lagoon cells and one lift station. It is estimated that three single-family homes utilize septic tanks.
- The city of Upham, North Dakota, has a storm water system consisting of culverts and drainage ditches.
- The Mouse River Journal is the official newspaper of the city of Upham, North Dakota.
- The city of Upham, North Dakota, has a drinking/potable system with a water treatment plant that is sourced North Prairie Regional Water District, and a water tower with a capacity of 75,000 gallons. Approximately three single-family homes in the city utilize a well for drinking/potable water.
- Electricity is provided by Otter Tail Power Company in the city of Upham, North Dakota.
- Natural gas is not available in the city of Upham, North Dakota.
- Fuel oil and propane are used as an alternative heating source and are provided by companies chosen by the individual consumer in Upham, North Dakota.
- SRT provide internet, phone, and TV to the city of Upham, North Dakota, and surrounding rural area.

8.10.2 Risk Assessment and Hazard Scoring Notes

Table 8.10.1 summarizes the risk assessment scoring of the city of Upham, North Dakota. The risk assessment and hazard scoring notes for each hazard specific to the city are shown in Table 8.10.2. Risk assessment notes for impact, frequency, likelihood and vulnerability ubiquitous for jurisdictions in McHenry County are found in Chapter 5, Threat and Hazard Identification Assessment in each respective hazard profile.

Table 8.10.1 – City of Upham, North Dakota, Jurisdiction Risk Assessment Scoring Summary

Risk Assessment			**Jurisdiction:**	**City of Upham, North Dakota**		
Hazard/Threat	Impact	Frequency	Likelihood	Vulnerability	Capabilities	**Total**
Civil Disturbance						
Criminal, Terrorist, or Nation-State Attack						
Cyberattack						
Dam Failure						
Drought						
Fire – Urban/Structure Collapse						
Fire – Wildland (including Rural)						
Flood						
Geologic Hazards						
Hazardous Material Release						
Infectious Disease & Pest Infestations						
Severe Summer Weather						
Severe Winter Weather						
Space Weather						
Transportation Incident						

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 8.10.2 – City of Upham, North Dakota, Jurisdiction Risk Assessment

	Civil Disturbance	
Impact	• Blocked Roads • Business/Government Interruptions • Delayed Emergency Response • Financial Hardship/Strain (public)	• HAZMAT Release • Human Injury/Death • Loss of Communication Systems • Property Damage (Structure) • Property Damage (Vehicle)
Frequency	•	• DAPL protesters were not active in the city
Likelihood	More Likely • Lack of local active/continuous law enforcement coverage • Enbridge Natural Gas Pipeline • BNSF Railway Infrastructure & N.D. Highway 14 •	Less Likely • Small town with no major regional/state attractions • Sparse population • One McHenry County Sheriff's Office Deputy live in Upham
Vulnerability	More Vulnerable • Lack of local active/continuous law enforcement coverage • Enbridge Natural Gas Pipeline • BNSF Railway Infrastructure & N.D. Highway 14 • Proximity to the city of Minot, the state's fourth largest city, and the Minot Air Force Base (AFB), and missile silos • Proximity to Canada	Less Vulnerable • Small town with no major regional/state attractions • Sparse population • One McHenry County Sheriff's Office Deputy live in Upham

Table 8.10.2 – City of Upham, North Dakota, Jurisdiction Risk Assessment – Continued

	Criminal, Terrorist, Nation-State Attack	
Impact	• Blocked Roads • Business/Government Interruptions • Delayed Emergency Response • Disease Outbreak/Mass Infections • Financial Hardship/Strain (public) • HAZMAT Release • Human Injury/Death	• Infrastructure Degradation • Loss of Communication Systems • Mass Casualties/Fatalities • Property Damage (Structure) • Property Damage (Vehicle) • **City's drinking/potable water system could be contaminated**
Frequency	•	
Likelihood	More Likely • Lack of local active/continuous law enforcement coverage • Enbridge Natural Gas Pipeline • BNSF Railway Infrastructure & N.D. Highway 14	Less Likely • Small town with no major regional/state attractions • Sparse population • One McHenry County Sheriff's Office Deputy live in Upham
Vulnerability	More Vulnerable • Lack of local active/continuous law enforcement coverage • Enbridge Natural Gas Pipeline • BNSF Railway Infrastructure & N.D. Highway 14 • Proximity to the city of Minot, the state's fourth largest city, and the Minot Air Force Base (AFB), and missile silos • Proximity to Canada	Less Vulnerable • Small town with no major regional/state attractions • Sparse population • One McHenry County Sheriff's Office Deputy live in Upham

Table 8.10.2 – City of Upham, North Dakota, Jurisdiction Risk Assessment – Continued

	Cyberattack	
Impact	• Business Interruptions • Delayed Emergency Response • Financial Hardship/Strain (public) • Government Interruptions • HAZMAT Release • Human Injury/Death • Identity Theft – loss of wages and/or assets	• Infrastructure Degradation • Loss of Communication Systems • Loss of Digital/Technological Systems • Loss of Power/Electricity Outage • School Closure
Frequency	• Never an occurrence of a major attack	
Likelihood	More Likely • Enbridge Natural Gas Pipeline • Small town with lack of technological infrastructure to defend against cyberattack • U.S. Post Office	Less Likely • Lack of major state or national financial institutions
Vulnerability	More Vulnerable • Enbridge Natural Gas Pipeline • Small town with lack of technological infrastructure to defend against cyberattack • Elderly population relying largely on landlines for communication purposes, remote medical care, and equipment monitoring • U.S. Post Office	Less Vulnerable • Lack of major state or national financial institutions • No natural gas service to the city

Table 8.10.2 – City of Upham, North Dakota, Jurisdiction Risk Assessment – Continued

	Drought	
Impact	• Crop Loss • Loss of Economy • Loss of Livestock • Loss of Wildlife Habitat (decreased wildlife populations) • Increase in Wildland Fire Potential • Water quality compromised from stock dams	• Diminished soil health • Negative impact on mental health of producers and fire responders – "community impact" • Local producers forced to sell off herds which can last for several years • Population loss as people moved away due to loss of economy
Frequency	• Fall of 1980 was dry • Severe drought in 1961/1962, 1988/1989 to 1991/1992 • Some dry conditions each year lasting a couple weeks in length	• In 2013 and 2014, dry conditions were present from June to October with little rain • **Lack of adequate snowfall spring of 2015, 2021, 2023/2024** • Severe drought conditions winter 2020/2021 • Exceptional drought spring and summer 2021
Likelihood	More Likely • Dry/wet cycle every 10 years • Climatic patterns will result in an eventual drought of significance • Lack of precipitation	Less Likely • Heavy precipitation in winter (snow pack) and summer (rainfall)
Vulnerability	More Vulnerable • Loss of economy from decreased wildlife & hunting • Agriculture economy • Elderly population • Flat terrain/open topography contributes to conditions • Pastureland adjacent to structures and city limits	Less Vulnerable • Upham Fire Department • Financial assistance programs made available by the state and federal government • McHenry County Burn Restriction Ordinance • Fire Index monitoring and mapping from NDDES • Advanced communications such as internet and TV • North Prairie Regional Water District, and a water tower with a capacity of 75,000 gallons.

Table 8.10.2 – City of Upham, North Dakota, Jurisdiction Risk Assessment – Continued

	Fire – Urban Fire/Structure Collapse	
Impact	• Building Collapse • Delayed Emergency Response • Evacuation (Localized) • Explosion	• Human Injury/Death • Increase Fire Potential • **Property damage on a significant scale if impacting downtown structures and other critical facilities or infrastructure in the city**
Frequency	• Upham Fire Department receives on average one structure call each year • Two calls for structure fires in 2023	
Likelihood	More Likely • Has not adopted state building codes but lack enforcement • Age of structures • Elderly populations • Increased drug use • Increased use of electric heaters • Outdated electric wiring in older homes and structures • Outdated heating systems • **BNSF Railway Infrastructure traversing city limits**	Less Likely • Better building standards and maintenance of structures • Smoke detectors in public buildings and private homes/businesses • Well-equipped fire department with trained volunteers

Vulnerability	More Vulnerable • Has not adopted state building codes but lack enforcement • Age of structures • Elderly populations • Increased drug use • Increased use of electric heaters • Outdated electric wiring in older homes and structures • Outdated heating systems • **BNSF Railway Infrastructure traversing city limits** • **City hall/city shop/community center, fire hall, lift station, and TGU Public School do not have permanent generators** • **Prolonged response times due to limited fire staff during the daytime** • **Upham Fire Hall is undersized for current/modern firefighting equipment and for training of volunteers**	Less Vulnerable • Upham Fire Department has two portable generators • Better building standards and maintenance of structures • Smoke detectors in public buildings and private homes/businesses • **City has fire hydrants for fire suppression** • **No natural gas service to the city** • **The city has a 75,000-gallon water tower**

Table 8.10.2 – City of Upham, North Dakota, Jurisdiction Risk Assessment – Continued

	Fire – Rural & Wildland	
Impact	• Building Collapse • Crop Loss • Delayed Emergency Response • Downed Power Lines • Evacuation (Localized) • Explosion • Increase Wildland Fire Potential • Loss of Power/Electricity Outage	• **Loss of Livestock** • **Loss of Wildlife Habitat** • **Mass Casualties** • **Property Damage (Structure & Vehicle)** • **Losses could be on a significant scale if impacting a major producer or farmstead** • **Loss of farm equipment and assets**
Frequency	• Upham Fire Department responds to an average of 10 to 12 wildland fires each year • A male individual was intentionally starting wildland fires in 2022	• Never an occurrence of a wildland fire threatening city limits
Likelihood	More Likely • Agricultural burn-off • High winds annually and dry conditions – when present • Pastureland adjacent to structures and city limits • Severe summer weather with significant lightning • **BNSF Railroad Infrastructure traversing city limits**	Less Likely • Removal of CRP near city limits • Summer and winter weather with heavy precipitation

Vulnerability	More Vulnerable • Agricultural burn-off • High winds annually and dry conditions – when present • Pastureland adjacent to structures and city limits • Severe summer weather with significant lightning • **Lack of fire breaks around city limits** • **BNSF Railway Infrastructure traversing city limits** • **City hall/city shop/community center, fire hall, lift station, and TGU Public School do not have permanent generators** • **Lack of outdoor early warning system – the siren is nonoperational, and repairs cannot be scheduled** • **Upham Fire Hall is undersized for current/modern firefighting equipment and for training of volunteers**	Less Vulnerable • Upham Fire Department has two portable generators • **Adequate staffing coverage/resources of fire department** • Removal of CRP near city limits • Summer and winter weather with heavy precipitation • MOUs with neighboring fire departments • McHenry County Burn Restriction Ordinance • **The city has a 75,000-gallon water tower**

Table 8.10.2 – City of Upham, North Dakota, Jurisdiction Risk Assessment – Continued

	Flood	
Impact	• Blocked Roads • Delayed Emergency Response • Flooding (Highway & Structure) • Human Injury/Death	
Frequency	• The city's Main St. becomes inundated with overland flooding during heavy precipitation events and can become blocked for a few hours at a time due to slow drainage	• Surrounding soils consisting of shale and gravel (sandy soil) allow for immediate drainage of water during summer months
Likelihood	More Likely • Rapid change of seasons resulting in excessive snow melt • Inadequate stormwater drainage system on Main Avenue due to low-grade	Less Likely • Dry conditions/drought and low precipitation • Surrounding soils consisting of shale and gravel (sandy soil) allow for immediate drainage of water during summer months • **Adequate storm water system consisting of drainage ditches** • **The city's sanitary sewer system is built up and not vulnerable to overland flooding**

Vulnerability	More Vulnerable • Rapid change of seasons resulting in excessive snow melt • Inadequate stormwater drainage system on Main Avenue due to low-grade • TGU Public School, Upham • **City hall/city shop/community center, fire hall, lift station, and TGU Public School do not have permanent generators**	Less Vulnerable • Upham Fire Department has equipment to move water • Upham Fire Department has two portable generators Surrounding soils consisting of shale and gravel (sandy soil) allow for immediate drainage of water during summer months

Table 8.10.2 – City of Upham, North Dakota, Jurisdiction Risk Assessment – Continued

	Geologic Hazards	
Impact	• Blocked Roads • Delayed Emergency Response • Human Injury/Death • Infrastructure Degradation	• Loss of Economy • Loss of Power/Electricity Outage • Property Damage • Utility Outage/Shortage
Frequency	• No occurrences of geologic hazards other than radon in the city of Upham	
Likelihood	More Likely • **All N.D. Counties in EPA Radon Zone I**	Less Likely • No Abandoned Mine Lands located near city limits
Vulnerability	More Vulnerable • **All N.D. Counties in EPA Radon Zone I**	Less Vulnerable • No Abandoned Mine Lands located near city limits

Table 8.10.2 – City of Upham, North Dakota, Jurisdiction Risk Assessment – Continued

	Hazardous Material Release	
Impact	• Blocked Roads • Delayed Emergency Response • Environmental Degradation • Evacuation (localized) • Explosion • Business & Government Interruptions • Human Injury/Death	• Increased Fire Potential • Loss of Economy • Loss of Power and/or Potable Water • Property Damage • School Closure
Frequency	• No significant incidents involving airplanes, automobiles/cars, commercial truck traffic, recreational vehicles, or trains	• No BNSF train derailments in Upham city limits
Likelihood	More Likely • Transport of chemicals by truck and railroad through city limits • Storage of chemicals/fertilizers in city limits and on farmsteads in large tanks near city limits • Propane is used as a heating source with numerous tanks throughout city limits • **N.D. Highway 14 and BNSF Railroad Infrastructure traversing city limits** • Enbridge Natural Gas Pipeline	Less Likely • Private companies have HAZMAT certifications • Safety measures implemented BNSF Railroad • Tier II Federal Requirements

Vulnerability	More Vulnerable • Transportation of chemicals by truck and railroad through city limits • Storage of chemicals/fertilizers in city limits and on farmsteads in large tanks near city limits • Propane is used as a heating source with numerous tanks throughout city limits • **N.D. Highway 14 and BNSF Railroad Infrastructure traversing city limits** • **No hospital or medical clinic in city limits** • Lack of official truck route around city limits • Enbridge Natural Gas Pipeline • **Lack of outdoor early warning system – the siren is nonoperational, and repairs cannot be scheduled** • **Upham Fire Hall is undersized for current/modern firefighting equipment and for training of volunteers**	Less Vulnerable • Upham Fire Department has HAZMAT training • Private companies have HAZMAT certifications • Safety measures implemented BNSF Railroad • Tier II Federal Requirements • Courthouse or TGU Public School • Regional HAZMAT Team in Minot 45 minutes away • Upham Fire Department has two portable generators

Table 8.10.2 – City of Upham, North Dakota, Jurisdiction Risk Assessment – Continued

	Infectious Disease & Pest Infestations	
Impact	• Crop Loss • Human Injury/Death • Livestock Injury/Death • Loss of Economy • Mass Casualties/Fatalities	• Strain on local medical resources (ambulance or clinic) • Loss of Drinking/Potable Water • **Financial cost to public health resources** • Loss of medical staff due to sickness • School Closure
Frequency	• Annual occurrences of death, primarily among the elderly • Occurrence of disease - 1 in 3 for people annually • Annual occurrences of influenza cases in the local population	• **The COVID-19 pandemic of 2020 resulted in mass quarantine and sheltering of the local population and temporary closure of businesses resulting in unmeasured economic losses.**
Likelihood	More Likely • Agriculture economy • Growing elderly population • Small population of children without immunization • TGU Public School, Upham • Transporting of animals across state lines • Dependent on weather for animals and crops • N.D. Highway 14 and BNSF Railroad	Less Likely • Advanced communications such as internet and tv • Public health and employment regulations for public facilities • Federal health guidelines at public employers • First District Health Unit, McHenry County education and outreach • FSA and NDSU Extension/McHenry County education and outreach
Vulnerability	More Vulnerable • Agriculture economy • Growing elderly population • Small population of children without immunization • TGU Public School • Transporting of animals across state lines • Dependent on weather for animals and crops • N.D. Highway 14 and BNSF Railroad • No hospital or medical clinic	Less Vulnerable • Advanced communications such as internet and tv • Public health and employment regulations for public facilities Immunizations & medications of local population • Minot Mobile Veterinarian Clinic • **City has a sanitary sewer system with lagoon cells – the system was retrofitted/upgraded in 2016/2017**

Table 8.10.2 – City of Upham, North Dakota, Jurisdiction Risk Assessment – Continued

	Severe Summer Weather	
Impact	• Blocked Roads – Upham Underpass • Downed Trees • Evacuation (Localized) • Human Injury/Death – heat exhaustion • Infrastructure Degradation • Livestock Injury/Death • Loss of Crops • Loss of Power/Downed Power Lines	• Loss of Power/Downed Power Lines • **Property Damage – repair of roofing, siding and drainage systems for homes** • **Damage to electrical equipment from lightning** • Shelter-in-place • Vehicle Damage
Frequency	• Annual occurrences of hail, extreme heat, lightning, heavy rain, high wind • Two or three significant storms producing damage to trees and property annually	• Property damage from tornados/straight-line winds in summer 2017 and 2019 resulting in significant loss of trees
Likelihood	• Climatic patterns will result in numerous annual occurrences of the hazard	• Flat terrain/open topography contributes to wind conditions

Vulnerability	More Vulnerable • Has not adopted building codes • Aging infrastructure (roads and electrical systems) • Agriculture Economy • High elderly population • TGU Public School, Upham • Mobile homes • **N.D. Highway 14 and BNSF Railroad Infrastructure** • **No hospital or medical clinic in city limits** • **City hall/city shop/community center, fire hall, lift station, and TGU Public School do not have permanent generators** • **Lack of outdoor early warning system – the siren is nonoperational, and repairs cannot be scheduled** • **City lacks an official storm shelter** • **Upham Fire Hall is undersized for current/modern firefighting equipment and for training of volunteers**	Less Vulnerable • Advanced warning and notification such as internet and TV • Upham Fire Department • Upham Fire Department has two portable generators • **City has a sanitary sewer system with lagoon cells – the system was retrofitted/upgraded in 2016/2017**

Table 8.10.2 – City of Upham, North Dakota, Jurisdiction Risk Assessment – Continued

	Severe Winter Weather	
Impact	• Blocked Roads: McHenry Ave • Evacuation (Localized) • Human Injury/Death – wind chill • Loss of Crops • Loss of Livestock • Loss of Power/Downed Power Lines	• Property Damage – repair of roofing, siding and drainage systems for homes • Shelter-in-place • Vehicle Damage • **City water mains have experienced breaking from freezing and thawing of the soil**

Frequency	• Annual occurrences of blizzard events • Annual occurrences of blocked roads • Annual occurrences of power loss from storms • Annual occurrences of wind events • Two or three significant blizzards producing damage to trees and property annually	• Major blizzard in fall of 2015 • March 2017 snowstorm resulted in blocked roads in the city • Major blizzard in fall of 2018 • Spring and fall snowstorms of 2019 • **Ice storm in 1997** • **Ice Storm January 2021 and April 2022** • **A broken water main washed out a city street resulting in a car falling into in 2023** • **Several drinking/potable water main breaks annually causing outages of the system – the city does not know what materials the pipes are constructed from** • **Several sanitary sewer main breaks annually causing outages of the system.**
Likelihood	• Climatic patterns will result in numerous annual occurrences of the hazard	• Removal of shelter belts allows for more direction wind and increases severity of ground blizzard conditions and frequency of blocked roads
Vulnerability	More Vulnerable • Has not adopted building codes • Aging infrastructure (roads and electrical systems) • Agriculture Economy • High elderly population & TGU Public School, Upham • Mobile homes • **N.D. Highway 14 and BNSF Railroad Infrastructure** • **No hospital or medical clinic in city limits** • **City hall/city shop/community center, fire hall, lift station, and TGU Public School do not have permanent generators** • **Lack of outdoor early warning system – the siren is nonoperational, and repairs cannot be scheduled** • **City lacks an official storm shelter** • **City water mains have experienced breaking from freezing and thawing of the soil – some mains are only four feet underground and not below the frost line**	Less Vulnerable • Advanced warning and notification such as internet and TV • Upham Fire Department • Upham Fire Department has two portable generators • **City has a sanitary sewer system with lagoon cells – the system was retrofitted/upgraded in 2016/2017**

Table 8.10.2 – City of Upham, North Dakota, Jurisdiction Risk Assessment – Continued

	Space Weather	
Impact	• Government Interruptions • Infrastructure Degradation • Loss of Communication Systems • Loss of Digital/Technological Systems • Loss/Overcrowded Medical Facilities	• Loss of Power/Electricity Outage • Public Distress/Social Discord • School Closure • Loss of operation of the city hall and fire hall, etc. • Loss/outage of medical devices at private residences
Frequency	• Never a recorded occurrence in McHenry County or North Dakota	
Likelihood	• Dependent on solar activity and the 11-year solar cycle • Likely to occur once every 500 years per the 2018 N.D. Enhanced Mitigation MAOP	
Vulnerability	More Vulnerable • Advanced communication systems (internet, TV, etc.) • Agriculture economy • All critical facilities and infrastructure that require electricity for operation • Enbridge Natural Gas Pipeline • TGU Public School, Upham • Upham Fire Hall	Less Vulnerable • Local food production/households with gardens

Table 8.10.2 – City of Upham, North Dakota, Jurisdiction Risk Assessment – Continued

	Transportation Incident	
Impact	• **Blocked roads from inadequate road clearing or incidents** • Business Interruptions • Delayed Emergency Response • Human Injury/Death • Increased Fire Potential • Loss of Transportation/Accessibility	• Mass Casualties/Fatalities • Delayed Emergency Response • HAZMAT Release • Livestock Loss • Property Damage • **Could be catastrophic if involving a school bus filled with children and/or a truck carrying hazardous materials**
Frequency	• Annual occurrences of multiple accidents involving cars and/or farm equipment on N.D. Highway 14 • N.D. Highway 41 and 12th Ave N (Main Ave) experience incidents annually • Frequent incidents involving tipping of semi-trucks on N.D. Highway 14 east of city limits – can result in rupture of Enbridge Natural Gas Pipeline	• Upham Fire Department has responded to 14 transportation incidents in 2023 • No major incidents resulting in explosion, casualties/fatalities or property damage in city limits
Likelihood	More Likely • Enbridge Natural Gas Pipeline • Intoxicated drivers • High truck traffic from agriculture-related business • **N.D. Highway 14, N.D. Highway 41, and 12th Ave N (Main Ave)** • **BNSF Railroad – derailment of a train on east side of Upham can result in rupture of the Enbridge Natural Gas Pipeline** • Highway 2 east of city limits – can result in rupture of Enbridge Natural Gas Pipeline • Speeding traffic on 12th Ave N (Main Ave) • Lack of sidewalks/safe routes to schools • **N.D. Highway 14 "Curve"**	Less Likely • Adequate traffic control signage/stop signs • No commercial passenger airport

Vulnerability	More Vulnerable • Enbridge Natural Gas Pipeline • Intoxicated drivers • High truck traffic from agriculture-related business • **N.D. Highway 14, N.D. Highway 41, and 12th Ave N (Main Ave)** • **BNSF Railroad – derailment of a train on east side of Upham can result in rupture of the Enbridge Natural Gas Pipeline** • Highway 2 east of city limits – can result in rupture of Enbridge Natural Gas Pipeline • Speeding traffic on 12th Ave N (Main Ave) • Lack of sidewalks/safe routes to schools • **N.D. Highway 14 "Curve"** • **Lack of official truck route** • **Upham Fire Hall is undersized for current/modern firefighting equipment and for training of volunteers**	Less Vulnerable • Adequate traffic control signage/stop signs • No commercial passenger airport • Upham Fire Department • One McHenry County Sheriff's Office Deputy live in Upham

8.10.3 Mitigation Strategy

The McHenry County, N.D., Multi-Jurisdictional Multi-Hazard Plan Update includes a mitigation strategy consisting of seven goals in Chapter 6. The following problem statement and mitigation projects address the mitigation needs of the city of Upham, North Dakota. It should be noted that some mitigation projects that pertain to all jurisdictions are included to encourage county-wide collaboration.

Problem Statement

The city of Upham, North Dakota, can be impacted by civil disturbance; criminal, terrorist, or nation/state attack; cyberattack; drought; fire (urban and wildland); flood (overland); geologic hazards; hazardous material release; infectious disease and pest infestations; severe summer weather; severe winter weather; space weather, and transportation incident. The city's Main Avenue is impacted by overland flooding. The drinking/potable water and wastewater systems are impacted by severe winter weather as the systems are not below the frost line, resulting in numerous annual breaks causing utility outages. The stormwater drainage ditch system is impacted by heavy precipitation during severe summer weather events. The city lacks permanent and/or portable backup generators for the following critical facilities and infrastructure: Upham City Hall/City Shop/Community Center, fire hall, TGU Public School, and lift station. There is inadequate storm shelter capacity, and the outdoor early warning system is nonoperational. The Upham Fire Department Fire Hall is undersized for current/modern firefighting equipment and training of volunteers. The Enbridge Natural Gas Pipeline's right-of-way is shared with BNSF Railroad which can result in rupture of the pipeline causing a major hazardous material release and potential explosion.

The city lacks funding for mitigation projects. With little to no capabilities to accomplish major projects independently, the city is dependent on outside sources for mitigation.

Retrofit/upgrade of existing drinking/potable water, wastewater, and stormwater systems, installation of permanent backup power sources, retrofit/upgrade outdoor emergency siren, upgrade and expand storm shelters (specific attention paid to school-aged children), construction of a new fire hall, and expansion of education and outreach capabilities are a priority for the city.

City of Upham Project 1: Dredge the Wentz Canal/Souris (Mouse) River Drainage Basin.

Description/Benefit	The Wentz Canal has experienced accumulation of sediment on the west side of the city. The sediment has disrupted the flow of water increasing the impact of overland flooding. Removal of excess sediment will improve the flow of water decreasing the risk of flooding and the subsequent impacts on buildings and infrastructure. **The canal – one mile in the city and another mile west of city limits – is left to for cleaning and dredging as of November 2023. Approximately 13 miles have been completed as of November 2023.**		
Hazard/Threat Addressed	Flooding, Infectious Disease and Pest Infestations, Severe Summer Weather, Severe Winter Weather		
Affected Jurisdictions	City of Upham and McHenry County		
Project Status	Ongoing and Continue		
Priority	High		
Responsible Agency	McHenry County Water Resource District Board		
Partners	Upham City Council, Public Works, Emergency Management, County Commission, DWR		
Completion Timeframe	Spring 2024	Cost	$20,000 per mile
Funding Source	McHenry County Water Resource District Board		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
5	5	5	5	5	3	2	30

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element	Process for Integration
McHenry County Water Resource District Board Capital Improvement Plan	Capability Assessment, Hazard History, Risk Assessment, Upham Jurisdictional Meeting.	

City of Upham Project 2: Conduct Engineering Study to Identify Retrofits/Upgrades to Upham Underpass to Reduce/Eliminate Occurrences of Overland Flooding.

Description/Benefit	Call NDDOT or the railroad to get the information. NDDOT went out for bid but received none because of the size and length of the bore. City of Upham is now diverting water away from the underpass to use the existing bore/drainage area. Either a lift station.		
Hazard/Threat Addressed	Flooding, Infectious Disease and Pest Infestations, Severe Summer Weather, Severe Winter Weather, Transportation Incident,		
Affected Jurisdictions	City of Upham (McHenry County), State of North Dakota		
Project Status	Ongoing and Continue		
Priority	Very High		
Responsible Agency	Upham City Council, NDDOT		
Partners	Emergency Management, Public Works, DWR, BNSF Railroad		
Completion Timeframe	2 to 3 years	Cost	$8 to $10 million (80 federal/20 local cost share)
Funding Source	NDDOT and City of Upham		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
5	5	5	5	5	1	3	29

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element	Process for Integration

Capital Improvement Plan Upham Comprehensive Plan City of Upham NFIP Map Put in NDDOT plan	Capability Assessment, Hazard History, Risk Assessment, Upham Jurisdictional Meeting.	Approval by county commission and city council

City of Upham Project 3: Conduct Engineering Study to Develop Scope of Work (SOW) to Retrofit the City of Upham Sanitary Sewer Lagoons to Equalize Demand.

Description/Benefit	The sanitary sewer lagoons for the city of Upham are overbuilt. The system was designed for 4,000 people. Due to a smaller city population and decreased water usage in modern fixtures/appliances, the lagoons are oversized. The city needs to conduct engineering to identify a scope of work/options to retrofit the system to current demand.		
Hazard/Threat Addressed	Drought, Flooding (overland), Infectious Disease & Pest Infestations, Severe Summer Weather, Severe Winter Weather		
Affected Jurisdictions	City of Upham and greater McHenry County		
Project Status	New		
Priority	Very High		
Responsible Agency	Upham City Council		
Partners	Public Works, Emergency Management, Public Health, DWR, NDDEQ		
Completion Timeframe	3 years	Cost	TBD
Funding Source	FEMA's Building Resilient Infrastructure and Communities (BRIC) or Hazard Mitigation Grant Program (HMGP).		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
5	5	5	5	5	1	1	27

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element	Process for Integration

Capital Improvement Plan Comprehensive Plan McHenry County LEOP and Mitigation Plan	Capability Assessment, Hazard History, Risk Assessment	Conduct engineering study or identify scope of work. Approval by city council. Pursue funding options. Execute.

8.10.4 Mitigation Capability Assessment

Capability for mitigation is divided into four categories: administrative and technical, education and outreach, financial, and planning and regulatory. Each identified resource in the four categories can be used to implement mitigation strategies and access funding for projects. **Tables comparing the mitigation capabilities of the city of Upham, North Dakota, with all other jurisdictions in McHenry County can be found below and in Chapter 7, County Mitigation Capability Assessment.**

- Administrative and Technical: Identification of administrative and technical capabilities, which include: staff, their skills and tools for mitigation planning to implement specific mitigation actions.
- Education and Outreach: Identification of education and outreach programs, and methods already in place to implement mitigation activities and communicate hazard-related information.
- Financial: Identification of access to or eligibility to use funding resources for hazard mitigation for jurisdictions.
- Planning and Regulatory: Jurisdictional plans, policies, codes, and ordinances adopted and in place that prevent and reduce the impacts of natural hazards and man-made threats.

City of Upham, North Dakota, Mitigation Capabilities Summary

The following mitigation capabilities were identified as commonplace among all natural hazards and man-made threats upon completion of the risk assessment for the city of Upham, North Dakota. More detailed information about the mitigation capabilities of the city of Upham in relation to McHenry County and all other incorporated jurisdictions can be found in Chapter 7, Mitigation Capability Assessment.

2018 & 2023 N.D. Enhanced Mitigation MAOP	NDDES Fire Index Monitoring
Advanced Communications: Internet & TV	NDDOT State Transportation Plan & State Shop
Emergency siren(s)/early warning systems	NDSU/McHenry County Extension
McHenry County Commission	TGU Public School, Upham
McHenry Comprehensive Plan	Upham Auditor's Office
McHenry County Courthouse	Upham City Council
McHenry County Emergency Management	Upham City Hall and City Shop
McHenry County LEOP	Upham Fire Department/Protection District
McHenry County Public Health	Upham Planning and Zoning
McHenry County Sherriff's Office	Upham Public Works – seasonal and permanent
MOUs	U.S. Post Office
N.D. Dept. of Emergency Services (NNDES)	Wildland Fire Index Sign

8.10.5 Integration of Mitigation Plan into Planning Mechanisms

Integration of the plan into current planning mechanisms is critical in mitigation to communicate the needs of each jurisdiction to achieve an all-inclusive mitigation strategy. The process for integration of the mitigation plan is included after each mitigation project, which shows the planning mechanism utilized, the plan element used for integration and the process for integration.

8.10.6 Plan Maintenance

An important aspect of any usable plan is the maintenance and upkeep of the document. At any given time, planning, risk analysis, updating the situation assessment, research, coordinating, disaster response or other activity is occurring. Plan maintenance ensures the plan will remain useful in the county for many years. A mitigation action progress report form to conduct plan maintenance is in Chapter 10 of this plan.

8.11 City of Velva, North Dakota

The following profile includes information specific to the city of Velva, North Dakota, for mitigation planning purposes. The information included is as follows:

- Profile and Inventory;
- Risk Assessment;
- Hazard Scoring Notes;
- Mitigation Projects, and
- Capabilities for Mitigation.

Integration into Planning Mechanisms

The process for integration of the mitigation plan into existing planning mechanisms is discussed at the bottom of each mitigation project in section 8.11.4, section 8.11.5 and in Chapter 6, Mitigation Strategy.

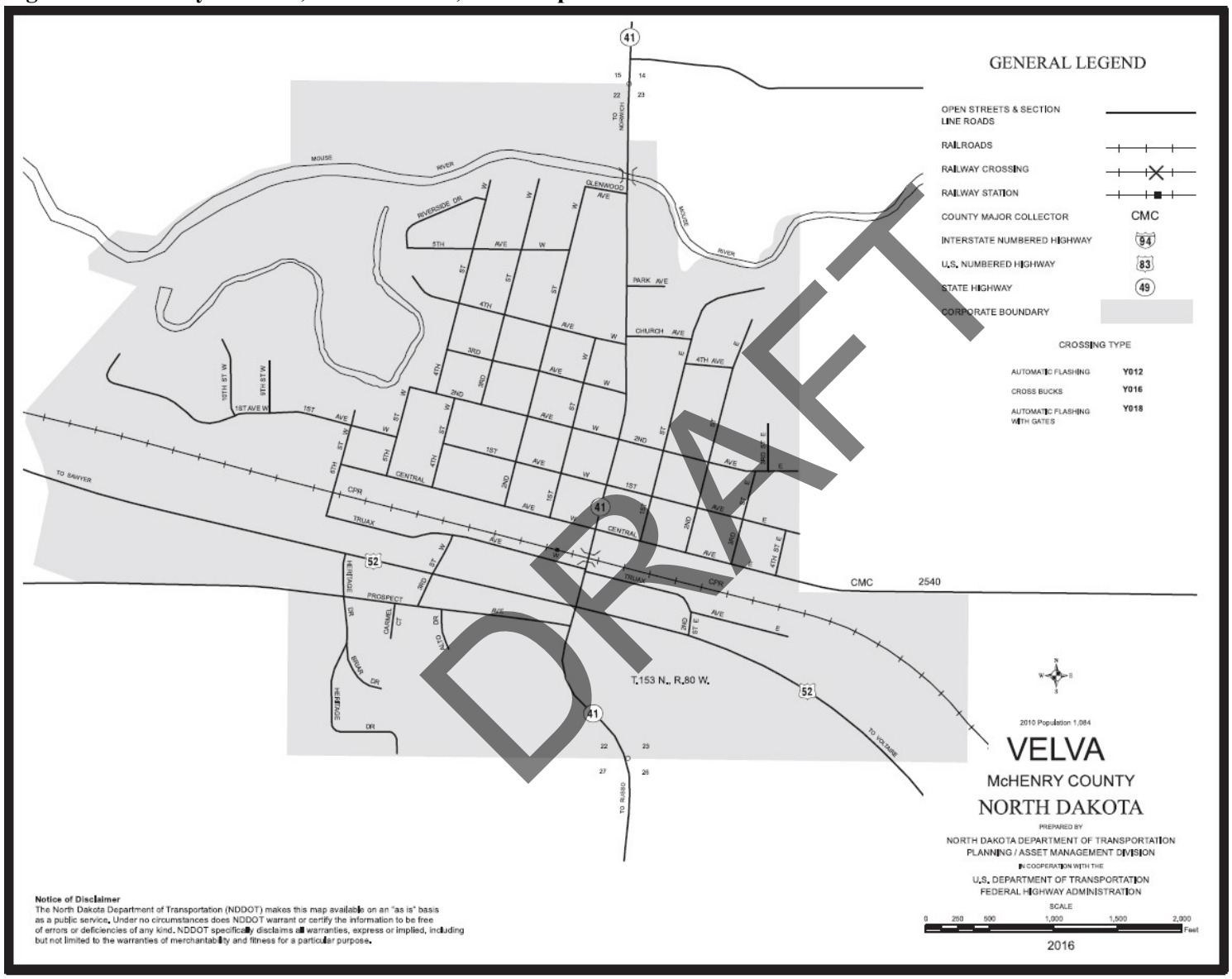
Plan Maintenance

Plan maintenance is shown in section 8.11.6.

Critical Facilities and Infrastructure

Figure 8.11.1 is a map of the city of Velva, North Dakota, provided by the N.D. Dept of Transportation.

Figure 8.11.1 – City of Velva, North Dakota, Base Map



Source: N.D. Dept. of Transportation

8.11.1 Profile and Inventory

The location, total population, vulnerable (underserved) populations, housing units and household size, businesses, critical facilities and infrastructure, new and future development, services, jurisdictional buildings, emergency response services and utilities are shown for the city of Velva, North Dakota. Detailed narratives follow each section heading to profile the city.

Detailed information on public buildings, services provided, emergency response services and utilities can be found in Chapter 3, Profile and Inventory.

Location

The city of Velva, North Dakota, is in north-central North Dakota at the intersection of U.S. Highway 52 and N.D. Highway 41 approximately 22 miles southeast of the city of Minot, North Dakota, the state's fourth largest city. The city of Velva, North Dakota, is the largest incorporated jurisdiction in McHenry County, North Dakota.

Population

Table 8.11.1 shows population trends for the city of Velva, North Dakota, from 1920 to 2020 per the 2020 U.S. Decennial Census, with an estimate for 2022. According to the 2020 U.S. Decennial Census, the city of Velva, North Dakota, contains 1,086 people, an increase of two people (0.2 percent) from 1,084 people in 2010.

Table 8.11.1 – 1920 to 2020 City of Velva, North Dakota, Population Trends and Projections

1920	1930	1940	1950	1960	1970	1980	1990	2000	2010	2020	*2022 est.*
836	870	1,017	1,170	1,330	1,241	1,101	968	1,049	1,084	1,086	*1,064*

Source(s): U.S. Decennial Census; American Community Survey, 5-Year Estimates

The city of Velva, North Dakota, contains approximately 20.3 percent of the population of McHenry County, North Dakota.

Vulnerable Populations

Age. Per the 2017 to 2021 American Community Survey 5-Year Estimate, the population of the city of Velva, North Dakota, consists of 346 individuals under the age of 20 and 207 individuals aged 65 and older, representing 30.9 and 18.5 percent of the city's population, respectively.

Daycare. Star City Learning Center and Julia's Little Waddlers Childcare are daycares in the city of Velva, North Dakota.

Poverty. Per the 2017 to 2021 American Community Survey 5-Year Estimate, there are 37 individuals in the city of Velva, North Dakota, that lives below the poverty line, representing 3.4 percent of the city's population.

Public Schools. The city is the location of Velva Public School serving approximately 435 students in grades K to 12; 264 students in grades K to 8 and 136 students in grades 9 to 12 according to the N.D. Dept. of Public Instruction, Fall 2023/2024 enrollment statistics.

Senior Housing Developments/Care Centers. Souris Valley Care Center, a Good Samarian Facility, is a 50-bed nursing home and Valley View Manor is a 16-bed assisted living facility in Velva, North Dakota.

Housing Units and Household Size

The 2017 to 2021 American Community Survey 5-Year Estimate shows there are 486 housing units in the city of Velva, North Dakota, consisting of 370 single-family homes, 79 multifamily homes, and 37 mobile homes.

The 2017 to 2021 American Community Survey 5-Year Estimate there are 420 households in the city of Velva, North Dakota, resulting in an average household size of 2.57 people.

Businesses

Information on businesses and economic development in the city of Velva can be obtained by contacting the Velva Community Development Corporation (VCDC) and the city of Velva's website - https://velvand.com/

New and Future Development

Reword this paragraph before the meeting - The following development has occurred since the 2011 mitigation plan. Construction of the First International Bank at the intersection of U.S. Highway 2 and N.D. Highway 3, an addition onto the Velva High School, Farm Credit Services and Gooseneck Implement constructed new facilities along U.S. Highway 2 in southeastern Velva, Velva Farmer's Union Elevator expanded its elevator in the city of Velva and added storage units, Ideal Seeds constructed a new building in the Velva Extraterritorial Area, construction of the Cobblestone Motel, new car wash by Cenex, Family Dollar, La Bella Vita Salon, the city averages construction of four new single-family homes annually.

New development in the city of Velva over the last five years includes:

- Krumweide is a single-family subdivision in McHenry County outside the city of Velva (but located in the city's extraterritorial area). As of December 2023, there are approximately 37 total lots with 21 single-family homes constructed.

The following future development is planned or proposed in the city of Velva includes:

- The city of Velva has received ARPA and CDBG funding to upgrade a secondary lift station.
- The city broke ground in the fall of 2023 to upgrade the city's master lift station. The project is on hold until Spring 2024.
- The N.D. Highway 41 bridge is being rebuilt by the N.D. Dept. of Transportation, which will take approximately two years to complete.
- Two two-mile passing lanes in each direction were added to U.S. Highway 52 from the city of Minot to the city of Velva summer 2023.

Critical Facilities

- Velva Public School

- Velva City Hall and Shop
- Velva Ambulance and Fire Hall
- Velva Rodeo Grounds
- North Prairie Well House
- Souris Valley Care Center
- South Prairie Soil Conservation District
- Valley View Manor
- U.S. Post Office

Infrastructure

- The city of Velva, North Dakota, has a sanitary sewer system with four lagoon cells and five lift stations.
- The city of Velva, North Dakota, has two underground cisterns each with a 60,000-gallon capacity for a total capacity of 120,000 gallons of drinking/potable water.
- The city of Velva, North Dakota, has a drinking/potable water treatment plant that is spring and well-fed.
- The city of Velva, North Dakota, has an inert landfill.
- U.S. Highway 52 and N.D Highway 41 serve the city of Velva, North Dakota.
- Canadian Pacific (CP) Railway infrastructure traverses the city of Velva, North Dakota.

Emergency Response Services

- The Velva Ambulance provides ambulance service to the city of Velva, North Dakota.
- The Velva Fire Department/Rural Protection District provides fire protection services to the city of Velva, North Dakota, and surrounding rural areas.
- The McHenry County Sherriff's Office provides law enforcement services to the city of Velva, North Dakota.
- The Velva Clinic, an affiliate of Trinity Health in Minot, is in the city of Velva, North Dakota.
- McHenry County Public Health located in the city of Towner, North Dakota, provides public health services to the city of Velva, North Dakota, and greater McHenry County.

Services and Utilities

- Circle Sanitation provides garbage collection services to the city of Velva, North Dakota.
- The city of Velva, North Dakota, has an inert landfill.
- The city of Velva, North Dakota has a sanitary sewer system consisting of four lagoon cells and five lift stations. Some residents utilize septic systems.
- The city of Velva, North Dakota, has a storm water system consisting of underground pipes and surface drainage ditches.
- The Velva Voice is the official newspaper of the city of Velva, North Dakota.
- The city provides drinking/potable water to city residents through one well which is spring-fed.
- Electricity is provided by Otter Tail Power Company in the city of Velva, North Dakota.
- Natural gas is not available in the city of Velva, North Dakota.

- Fuel oil and propane are used as an alternative heating source and are provided by companies chosen by the individual consumer in Velva, North Dakota.
- Midcontinent or SRT provides internet, phone, and TV to the city of Velva, North Dakota.

8.11.2 Risk Assessment and Hazard Scoring Notes

Table 8.11.1 summarizes the risk assessment scoring of the city of Velva, North Dakota. The risk assessment and hazard scoring notes for each hazard specific to the city are shown in Table 8.11.2. Risk assessment notes for impact, frequency, likelihood and vulnerability ubiquitous for jurisdictions in McHenry County are found in Chapter 5, Threat and Hazard Identification Assessment in each respective hazard profile.

Table 8.11.1 – City of Velva, North Dakota, Jurisdiction Risk Assessment Scoring Summary

Risk Assessment			**Jurisdiction:**	**City of Velva, North Dakota**		
Hazard/Threat	Impact	Frequency	Likelihood	Vulnerability	Capabilities	**Total**
Civil Disturbance	4	1	2	3	1	**9**
Criminal, Terrorist, or Nation-State Attack	4	1	2	3	1	**9**
Cyberattack	5	2	2	4	2	**11**
Dam Failure	5	1	1	5	3	**9**
Drought	5	2	5	3	3	**12**
Fire – Urban/Structure Collapse	5	2	2	2	2	**9**
Fire – Wildland (including Rural)	4	2	3	2	2	**9**
Flood	5	2	3	5	2	**13**
Geologic Hazards	4	3	4	4	1	**14**
Hazardous Material Release	4	2	4	4	2	**11**
Infectious Disease & Pest Infestations	5	4	5	3	2	**15**
Severe Summer Weather	5	5	5	3	2	**16**
Severe Winter Weather	5	5	5	3	2	**16**
Space Weather	5	1	2	5	1	**12**
Transportation Incident	5	2	4	3	2	**12**

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 8.11.2 – City of Velva, North Dakota, Jurisdiction Risk Assessment

	Civil Disturbance	
Impact	• Blocked Roads • Business/Government Interruptions • Delayed Emergency Response • Financial Hardship/Strain (public)	• HAZMAT Release • Human Injury/Death • Loss of Communication Systems • Property Damage (Structure) • Property Damage (Vehicle)
Frequency	• Never an occurrence of a major incident	• DAPL protesters were not active in the city
Likelihood	More Likely • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 • CP Railway Infrastructure	Less Likely • Small town with no major regional/state attractions • Sparse population • No pipelines in proximity to the city
Vulnerability	More Vulnerable • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 • CP Railway Infrastructure • Velva Public School • Two McHenry County Sheriff's Office Deputies live in Velva • Proximity to the city of Minot, the state's fourth largest city, and the Minot Air Force Base (AFB), and missile silos • Proximity to Canada • One way in and out of town – Velva Underpass	Less Vulnerable • Small town with no major regional/state attractions • Sparse population • No pipelines in proximity to the city • Two McHenry County Sheriff's Office Deputies live in Velva

Table 8.11.2 – City of Velva, North Dakota, Jurisdiction Risk Assessment – Continued

	Criminal, Terrorist, Nation-State Attack	
Impact	• Blocked Roads • Business/Government Interruptions • Delayed Emergency Response • Disease Outbreak/Mass Infections • Financial Hardship/Strain (public) • HAZMAT Release • Human Injury/Death	• Infrastructure Degradation • Loss of Communication Systems • Mass Casualties/Fatalities • Property Damage (Structure) • Property Damage (Vehicle) • **City's drinking/potable water system could be contaminated**
Frequency	• **People's State Bank robbery 40 years ago** • **Drug activity in the community in early 2020s**	
Likelihood	More Likely • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 • CP Railway Infrastructure • City lacks security fencing for water treatment plant	Less Likely • Small town with no major regional/state attractions • Sparse Population • No pipelines in proximity to the city
Vulnerability	More Vulnerable • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 • CP Railway Infrastructure • Velva Public School • Two McHenry County Sheriff's Office Deputies live in Velva • Proximity to the city of Minot, the state's fourth largest city, and the Minot Air Force Base (AFB), and missile silos • Proximity to Canada • **City has security fencing for water treatment plant**	Less Vulnerable • Small town with no major regional/state attractions • No pipelines in proximity to the city • Two McHenry County Sheriff's Office Deputies live in Velva • **City water treatment plant has security fencing**

Table 8.11.2 – City of Velva, North Dakota, Jurisdiction Risk Assessment – Continued

	Cyberattack	
Impact	• Business Interruptions • Delayed Emergency Response • Financial Hardship/Strain (public) • Government Interruptions • HAZMAT Release • Human Injury/Death	• Identity Theft – loss of wages and/or assets • Infrastructure Degradation • Loss of Communication Systems • Loss of Digital/Technological Systems • Loss of Power/Electricity Outage • School Closure
Frequency	• Never an occurrence of a major attack	• City of Velva, Velva Public School, Souris Valley Care Center have receiving phishing emails and other SPAM
Likelihood	<u>More Likely</u> • Small town with lack of technological infrastructure to defend against cyberattack • Velva Public School • Verizon Tower north of city limits • SRT Communication Tower in city limits	<u>Less Likely</u> • Lack of major state or national financial institutions
Vulnerability	<u>More Vulnerable</u> • Small town with lack of technological infrastructure to defend against cyber attacks • Elderly population relying largely on landlines for communication purposes, remote medical care, and equipment monitoring • Velva Public School • Souris Valley Care Center • U.S. Post Office • CP Railway Infrastructure • Verizon Tower north of city limits • SRT Communication Tower in city limits	<u>Less Vulnerable</u> • Lack of major state or national financial institutions • No pipelines in proximity to the city • No natural gas service to the city

Table 8.11.2 – City of Velva, North Dakota, Jurisdiction Risk Assessment – Continued

	Drought	
Impact	• Crop Loss • Loss of Economy • Loss of Livestock • Loss of Wildlife Habitat (decreased wildlife populations) • Increase in Wildland Fire Potential • Water quality compromised from stock dams	• Diminished soil health • Negative impact on mental health of producers and fire responders – "community impact" • Local producers forced to sell off herds which can last for several years • Population loss as people moved away due to loss of economy
Frequency	• Fall of 1980 was dry • Severe drought in 1961/1962, 1988/1989 to 1991/1992 • Some dry conditions each year lasting a couple weeks in length	• In 2013 and 2014, dry conditions were present from June to October with little rain • **Lack of adequate snowfall spring of 2015 and spring 2021** • Severe drought conditions winter 2020/2021 • Exceptional drought spring and summer 2021
Likelihood	More Likely • Dry/wet cycle every 10 years • Climatic patterns will result in an eventual drought of significance • Lack of precipitation	Less Likely • Heavy precipitation in winter (snow pack) and summer (rainfall)
Vulnerability	More Vulnerable • Loss of economy from decreased wildlife & hunting • Agriculture economy • Elderly population • Velva Public School • Souris Valley Care Center • Flat terrain/open topography contributes to conditions • Pastureland adjacent to structures and city limits • **City has spring-fed well for drinking/potable water** • **City located on a shale and gravel pit allowing fast drainage of water**	Less Vulnerable • Velva Fire Department • Financial assistance programs made available by the state and federal government • McHenry County Burn Ban Ordinance • Fire Index monitoring and mapping from NDDES • Advanced communications such as internet and TV • **City has spring-fed well for drinking/potable water** • **The city of Velva, North Dakota, has two underground cisterns each with a 60,000-gallon capacity for a total capacity of 120,000 gallons of drinking/potable water.**

Table 8.11.2 – City of Velva, North Dakota, Jurisdiction Risk Assessment – Continued

	Fire – Urban Fire/Structure Collapse	
Impact	• Building Collapse • Delayed Emergency Response • Evacuation (Localized) • Explosion	• Human Injury/Death • Increase Fire Potential • **Property damage on a significant scale if impacting downtown structures and other critical facilities or infrastructure in the city**
Frequency	• Occurrences of structures/vehicles being impacted every five years • Annual occurrences of fires involving single-family homes. Garages, and farm equipment	• House fire in 2021 resulting in total loss
Likelihood	More Likely • Building codes but lack enforcement • Age of structures • Increased use of electric heaters • Outdated electric wiring in older homes and structures • Outdated heating systems • **CP Railway Infrastructure traversing city limits**	Less Likely • Building codes but lack enforcement • Better building standards and maintenance of structures • Smoke detectors in public buildings and private homes/businesses • Well-equipped fire department with trained volunteers
Vulnerability	More Vulnerable • Building codes but lack enforcement • Age of structures • Increased use of electric heaters • Outdated electric wiring in older homes and structures • Outdated heating systems • **CP Railway Infrastructure traversing city limits** • **City hall/city shop, ambulance/fire hall, Velva Public School, and water treatment plant do not have permanent generators** • **Prolonged response times due to limited fire staff during the daytime** • **Enerbase Propane bulk facility adjacent to city limits** • **Souris (Mouse) River Oil bulk facility in city limits**	Less Vulnerable • Velva Fire Department • Building codes but lack enforcement • Better building standards and maintenance of structures • Smoke detectors in public buildings and private homes/businesses • **City has fire hydrants for fire suppression** • **The city of Velva, North Dakota, has two underground cisterns each with a 60,000-gallon capacity for a total capacity of 1020,000 gallons of drinking/potable water.** • No natural gas service to the city

Table 8.11.2 – City of Velva, North Dakota, Jurisdiction Risk Assessment – Continued

	Fire – Rural & Wildland	
Impact	• Building Collapse • Crop Loss • Delayed Emergency Response • Downed Power Lines • Evacuation (Localized) • Explosion • Increase Wildland Fire Potential • Loss of Power/Electricity Outage	• **Loss of Livestock** • **Loss of Wildlife Habitat** • **Mass Casualties** • **Property Damage (Structure & Vehicle)** • **Losses could be on a significant scale if impacting a major producer or farmstead** • **Loss of farm equipment and assets**
Frequency	• Approximately 15+ significant fires occurring annually • Controlled burns can become out of control annually	
Likelihood	More Likely • Agricultural burn-off • High winds annually and dry conditions – when present • Pastureland adjacent to structures and city limits • Severe summer weather with significant lightning • **CP Railway Infrastructure traversing city limits**	Less Likely • Removal of CRP near city limits • Summer and winter weather with heavy precipitation
Vulnerability	More Vulnerable • Agricultural burn-off • High winds annually and dry conditions – when present • Pastureland adjacent to structures and city limits • Severe summer weather with significant lightning • **Lack of fire breaks around city limits** • **CP Railway Infrastructure traversing city limits** • **City hall/city shop, ambulance/fire hall, Velva Public School, and water treatment plant do not have permanent generators**	Less Vulnerable • Velva Fire Department and Velva Rural Fire District • **Adequate staffing coverage/resources** • Removal of CRP near city limits • Summer and winter weather with heavy precipitation • MOUs with neighboring fire departments • McHenry County Burn Restriction Ordinance • **Two manually-activated outdoor emergency sirens** • **The city of Velva, North Dakota, has two underground cisterns each with a 60,000-gallon capacity for a total capacity of 120,000 gallons of drinking/potable water.** • **Souris (Mouse) River acts as firebreak on north/northwest.**

Table 8.11.2 – City of Velva, North Dakota, Jurisdiction Risk Assessment – Continued

	Flood	
Impact	• Blocked Roads • Delayed Emergency Response • Flooding (Highway & Structure) • Human Injury/Death • **Flood waters inundate the city's sanitary sewer system from ground seepage impacting people's basements**	• **Velva Public School can become flooded from overland flooding** • **Velva Underpass becomes blocked during heavy precipitation**
Frequency	• **Overland flooding frequent in the spring due to rapid snow melt** • **Velva Underpass becomes blocked during heavy** • **Velva Public School experiences overland flooding precipitation**	• Surrounding soils consisting of shale and gravel allow for immediate drainage of water during summer months • **In 2011, Souris (Mouse) River flooding almost topped the dikes**
Likelihood	More Likely • Rapid change of seasons resulting in excessive snow melt • **Lack of proper storm water system in the city for drainage** • **Souris (Mouse) River ice jams result in riverine flooding**	Less Likely • Dry conditions/drought and low precipitation • Surrounding soils consisting of shale and gravel allow for immediate drainage of water during summer months
Vulnerability	More Vulnerable • Rapid change of seasons resulting in excessive snow melt • Velva Fire Department lacks equipment to move water • Velva Public School • Souris Valley Care Center • **City wells located in low-lying area of the city with the potential for an outage and/or contamination** • **City hall/city shop and ambulance/fire hall, and water treatment plant do not have permanent generators** • **Howe Bridge causes ice jams on Souris (Mouse) River**	Less Vulnerable • **City enrolled in NFIP and has flood ordinances** • City has equipment to move water • Velva Fire Department • Alternate routes were identified for townships roads and evacuation routes for the city • Surrounding soils consisting of shale and gravel allow for immediate drainage of water during summer months • **City has operator and second operator for infrastructure** • **Souris River Joint Water Resource District has a flood management plan for the Souris (Mouse) River** • **Souris (Mouse) River rerouted into new channel north of the city and removed river from flowing through existing city neighborhoods**

Table 8.11.2 – City of Velva, North Dakota, Jurisdiction Risk Assessment – Continued

	Geologic Hazards	
Impact	• Blocked Roads • Delayed Emergency Response • Human Injury/Death • Infrastructure Degradation	• Loss of Economy • Loss of Power/Electricity Outage • Property Damage • Utility Outage/Shortage
Frequency	• Annual water main breaks from shifting/expansive soils and landslides on the higher elevations south of the city	
Likelihood	More Likely • The city of Velva is located in a valley along the Souris (Mouse) River resulting in landslides • Erosion in old Souris (Mouse) River Channel • **All N.D. Counties in EPA Radon Zone I**	Less Likely • No Abandoned Mine Lands located near city limits • PSC has an AML reclamation project aimed at recovering AMLs – work has been done in other parts of the state
Vulnerability	More Vulnerable • The city of Velva is located in a valley along the Souris (Mouse) River resulting in landslides • Erosion in old Souris (Mouse) River Channel • **All N.D. Counties in EPA Radon Zone I**	Less Vulnerable • No Abandoned Mine Lands located near city limits • PSC has an AML reclamation project aimed at recovering AMLs – work has been done in other parts of the state

Table 8.11.2 – City of Velva, North Dakota, Jurisdiction Risk Assessment – Continued

	Hazardous Material Release	
Impact	• Blocked Roads • Delayed Emergency Response • Environmental Degradation • Evacuation (localized) • Explosion • Human Injury/Death	• Increased Fire Potential • Loss of Economy • Loss of Power and/or Potable Water • Property Damage • **Contamination of city water from a release may lead to utility outage/shortage**
Frequency	• **No significant incidents involving airplanes, automobiles/cars, commercial truck traffic, recreational vehicles, or trains** • No major train derailments in Velva city limits • **Souris (Mouse) River Oil had overflow from a truck driver filling a tank in 2012**	• **Train derailments occurring east and west of the city near the city of Drake in May 2023 and the city of Minot Anhydrous Ammonia Spill in 2002** **July 2, 2023, a tractor entered the Souris (Mouse) River near the Howe Bridge leaking an estimated 20 gal. of diesel fuel**
Likelihood	More Likely • Transportation of chemicals by truck/rail through city limits • Storage of chemicals/fertilizers in large tanks in city limits and on farmsteads • **CP Railway Infrastructure & U.S. Highway 52** • **Velva Public School & Souris Valley Care Center**	Less Likely • Private companies have HAZMAT certifications • Safety measures implemented CP Railway • Tier II Federal Requirements

Table 8.11.2 – City of Velva, North Dakota, Jurisdiction Risk Assessment – Continued

	Hazardous Material Release	
Vulnerability	More Vulnerable • Transportation of chemicals by truck/rail through city limits • Storage of chemicals/fertilizers in large tanks in city limits and on farmsteads • **CP Railway Infrastructure & U.S. Highway 52** • **Velva Public School & Souris Valley Care Center** • **City hall/city shop, ambulance/fire hall, Velva Public School, and water treatment plant do not have permanent generators** • **No hospital in city limits** • Lack of truck route around city limits – N.D. Highway 41 is currently truck route and bisects the city	Less Vulnerable • Velva Ambulance • Velva Fire Department has HAZMAT training • **Two manually-activated outdoor emergency sirens** • No pipelines in proximity to the city • Safety measures implemented CP Railway • Tier II Federal Requirements • Regional HAZMAT Team in Minot 20 minutes away • Velva Clinic

Table 8.11.2 – City of Velva, North Dakota, Jurisdiction Risk Assessment – Continued

	Infectious Disease & Pest Infestations	
Impact	• Crop Loss • Human Injury/Death • Livestock Injury/Death • Loss of Economy • Mass Casualties/Fatalities	• Strain on local medical resources (ambulance or clinic) • Loss of Drinking/Potable Water • **Financial cost to public health resources** • Loss of medical staff due to sickness • School Closure
Frequency	• Annual occurrences of death, primarily among the elderly • Occurrence of disease - 1 in 3 for people annually • Annual occurrences of influenza cases in the local population	• **The COVID-19 pandemic of 2020 resulted in mass quarantine and sheltering of the local population and temporary closure of businesses resulting in unmeasured economic losses.**
Likelihood	More Likely • Growing elderly population – Souris Valley Care Center • Velva Public School • Small population of children without immunization • Agriculture economy • Dependent on weather for animals and crops • Transporting of animals across state lines • U.S. Highway 52	Less Likely • Advanced communications such as internet and tv • Public health and employment regulations for public facilities • Federal health guidelines at Souris Valley Care Center
Vulnerability	More Vulnerable • Growing elderly population – Souris Valley Care Center • Velva Public School • Small population of children without immunization • Agriculture economy • Transporting of animals across state lines • **U.S. Highway 52** • **No hospital in city limits** • **City has a sanitary sewer system with lagoon cells – needs retrofitting/upgrading to withstand hazards/threats**	Less Vulnerable • Advanced communications such as internet and tv • Public health and employment regulations for public facilities Immunizations & medications of local population • Velva Clinic • Velva Mobile Veterinarian Clinic • **City has a sanitary sewer system with lagoon cells that has significant impact on public health/quality of life – needs retrofitting/upgrading to withstand hazards/threats**

Table 8.11.2 – City of Velva, North Dakota, Jurisdiction Risk Assessment – Continued

	Severe Summer Weather	
Impact	• Blocked Roads – Velva Underpass • Downed Trees • Evacuation (Localized) • Human Injury/Death – heat exhaustion • Infrastructure Degradation • Loss of Crops & Livestock • Loss of Power/Downed Power Lines	• **Property Damage – repair of roofing, siding and drainage systems for homes** • **Damage to electrical equipment from lightning** • Shelter-in-place • Vehicle Damage • Contamination of drinking/potable water system
Frequency	• Windstorm events occurring annually • Property damage from tornados/straight-line winds in summer 2017 & 2019 • 2022 (just before 4th of July) – incident included straight-line wind and microburst resulting in 40+ fallen trees at the Velva City Park	• Annual occurrences of hailstorms • Two or three significant storms annually • City of Velva Water Treatment Plant was hit by lightning twice in 2023 causing disruptions in mechanical operations
Likeli.	• Climatic patterns will result in numerous annual occurrences of the hazard	• Flat terrain/open topography contributes to conditions
Vulnerability	More Vulnerable • High elderly population • Mobile homes • One city campground and two private campgrounds • Aging infrastructure (roads and electrical systems) • Lack of municipal building code enforcement • **CP Railway Infrastructure & U.S. Highway 52** • **Velva Public School & Souris Valley Care Center** • **No hospital in city limits** • **City hall/city shop, ambulance/fire hall, Velva Public School, and water treatment plant do not have permanent generators** • **City wells located in low-lying area of the city with the potential for an outage and/or contamination** • **Water mains have experienced breaking and outages from heavy precipitation resulting in landslides/expansive soils** • **City has a sanitary sewer system with lagoon cells – needs retrofitting/upgrading to withstand hazards/threats**	Less Vulnerable • Velva Ambulance • Velva Fire Department • Velva Clinic • Advanced warning and notification such as internet and TV • Adopted building codes but lack enforcement • **Two manually-activated outdoor emergency sirens** • No pipelines in proximity to the city

Table 8.11.2 – City of Velva, North Dakota, Jurisdiction Risk Assessment – Continued

	Severe Winter Weather	
Impact	• Blocked Roads: Heritage Drive, Carmel Court, Briar Drive, roads in and around Souris Valley Care Center • Evacuation (Localized) • Human Injury/Death – wind chill • Loss of Crops • Loss of Livestock	• Loss of Power/Downed Power Lines • Property Damage – repair of roofing, siding and drainage systems for homes • Shelter-in-place • Vehicle Damage • **Water mains have experienced freezing and have broken**
Frequency	• Annual occurrences of power loss from storms • Annual occurrences of blocked roads • Annual occurrences of wind events • Two or three significant blizzards producing damage to trees and property annually	• Major blizzard in fall of 2015 • March 2017 snowstorm resulted in numerous blocked roads • Major blizzard in fall of 2018 • Spring and fall snowstorms of 2019 • **Ice storm in 1997 = loss of power for four days** • **Ice Storm January 2021 and April 2022**
Likeli.	• Climatic patterns will result in numerous annual occurrences of the hazard	• Flat terrain/open topography contributes to conditions
Vulnerability	More Vulnerable • High elderly population • Mobile homes • One city campground and two private campgrounds • Aging infrastructure (roads and electrical systems) • Lack of municipal building code enforcement • **CP Railway Infrastructure & U.S. Highway 52** • **Velva Public School & Souris Valley Care Center** • **No hospital in city limits** • **City hall/city shop, ambulance/fire hall, Velva Public School, and water treatment plant do not have permanent generators** • **City wells located in low-lying area of the city with the potential for an outage and/or contamination**	Less Vulnerable • Velva Ambulance • Velva Fire Department • Velva Clinic • Advanced warning and notification such as internet and TV • Adopted building codes but lack enforcement • **Two manually-activated outdoor emergency sirens** • No pipelines in proximity to the city More Vulnerable • **Water mains have experienced breaking and outages from heavy precipitation resulting in landslides/expansive soils** • **City has a sanitary sewer system with lagoon cells – needs retrofitting/upgrading to withstand hazards/threats**

Table 8.11.2 – City of Velva, North Dakota, Jurisdiction Risk Assessment – Continued

	Space Weather	
Impact	• Government Interruptions • Infrastructure Degradation • Loss of Communication Systems • Loss of Digital/Technological Systems • Loss/Overcrowded Medical Facilities • Loss of Power/Electricity Outage • Public Distress/Social Discord • School Closure	• Loss of operation of the city hall and fire hall, etc. • Loss/outage of medical devices at private residences
Frequency	• Never a recorded occurrence in McHenry County or North Dakota	
Likelihood	• Dependent on solar activity and the 11-year solar cycle • Likely to occur once every 500 years per the 2018 N.D. Enhanced Mitigation MAOP	
Vulnerability	<u>More Vulnerable</u> • Advanced communication systems (internet, TV, etc.) • Agriculture economy • All critical facilities and infrastructure that require electricity for operation • Velva Public School • Souris Valley Care Center • **City hall/city shop, ambulance fire hall, and water treatment plant do not have permanent generators**	<u>Less Vulnerable</u> • Local food production/households with gardens • No pipelines in proximity to the city

Table 8.11.2 – City of Velva, North Dakota, Jurisdiction Risk Assessment – Continued

	Transportation Incident	
Impact	• **Blocked roads from inadequate road clearing or incidents** • Business Interruptions • Delayed Emergency Response • Human Injury/Death • Increased Fire Potential • Loss of Transportation/Accessibility • Mass Casualties/Fatalities	• Delayed Emergency Response • HAZMAT Release • Livestock Loss • Property Damage • **Could be catastrophic if involving a school bus filled with children and a truck carrying hazardous materials**
Frequency	• Annual occurrences of multiple accidents involving cars and/or farm equipment • **Frequent incidents on U.S. Highway 52**	
Likelihood	More Likely • Intoxicated drivers • High truck traffic from agriculture-related traffic • **U.S. Highway 52** • **CP Railway Infrastructure traversing city limits** • Truck traffic on city's Main St. going over the speed limits • Lack of sidewalks/safe routes to schools • **Lack of sightlines/visibility on Main St./N.D. Highway 41 with connecting city streets** • **Retrofitting/Upgrading needed for N.D. Highway 41 bridge over Souris (Mouse) River**	Less Likely • No commercial passenger airport • No pipelines in proximity to the city • **Retrofitting/Upgrading of Sawyer Bridge**

Vulnerability	More Vulnerable • Intoxicated drivers • High truck traffic from agriculture-related traffic • **U.S. Highway 52** • **CP Railway Infrastructure traversing city limits** • No hospital in city limits • Lack of sidewalks/safe routes to schools • Lack of truck route around city limits – N.D. Highway 41 is currently truck route and bisects the city • Removal of blinking yellow light at intersection of U.S. Highway 52 and N.D. Highway 41	Less Vulnerable • Velva Ambulance • Velva Fire Department – has light and heavy rescue equipment and extrication tools • No commercial passenger airport • Two McHenry County Sheriff's Office Deputies live in Velva • No pipelines in proximity to the city • Velva Clinic

8.11.3 Mitigation Strategy

The McHenry County, N.D., Multi-Jurisdictional Multi-Hazard Plan Update includes a mitigation strategy consisting of seven goals in Chapter 6. The following problem statement and mitigation projects address the mitigation needs of the city of Velva, North Dakota. It should be noted that some mitigation projects that pertain to all jurisdictions are included to encourage county-wide collaboration.

Problem Statement

The city of Velva, North Dakota, can be impacted by civil disturbance; criminal, terrorist, or nation/state attack; cyberattack; drought; fire (urban and wildland); flood (overland); geologic hazards; hazardous material release; infectious disease and pest infestations; severe summer weather; severe winter weather; space weather, and transportation incident. The city experienced a major flood in 2011 that resulted in a near failure of the temporary diking system. The drinking/potable water and sanitary sewer wastewater system is impacted by severe summer weather (heavy precipitation), which results in geologic hazards causing water mains and sewer pipes to break causing utility outages. The city lacks permanent and/or portable backup generators for the following critical facilities and infrastructure: Velva Ambulance/Fire Hall, Velva Public School, lift stations, and the water treatment plant. There is inadequate storm shelter capacity and an outdated outdoor early warning system consisting of two manually-activated sirens. Local emergency services need upgraded equipment and facilities. The city has a large young population with 30.9 percent being under the age of 20. Approximately 3.4 percent of the population lives below the poverty line. It is estimated by the Velva City Council that 50 percent of the city's workforce commutes to Minot, North Dakota, for employment and has transitioned into a bedroom community.

The city lacks funding for mitigation projects. With little to no capabilities to accomplish major projects independently, the city is dependent on outside sources for mitigation.

Retrofitting/upgrading of existing infrastructure (Velva underpass, drinking/potable water, and sanitary sewer wastewater system), installation of permanent backup power sources, upgrade manually-activated outdoor emergency sirens and alerting notifications, upgrade and expand storm shelters (specific attention paid to people under the age of 20), expansion of planning and regulatory capabilities, and education and outreach are a priority for the city.

City of Velva, North Dakota, Mitigation Priority Expansion/Update

The 2024 McHenry County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan reflects no change in mitigation priority for the city of Velva, North Dakota.

City of Velva Project 1: Conduct Engineering Study to Identify Retrofits/Upgrades to the Drinking/Potable Water and Sanitary Sewer Wastewater Systems.

Description/Benefit	The drinking/potable water and sanitary sewer wastewater system is impacted by severe summer weather (heavy precipitation), which results in geologic hazards causing water mains and sewer pipes to break causing utility outages.		
Hazard/Threat Addressed	Drought, Flooding, Infectious Disease and Pest Infestations, Severe Summer Weather, Severe Winter Weather		
Affected Jurisdictions	City of Velva and greater McHenry County		
Project Status	Ongoing and Continue		
Priority	Very High		
Responsible Agency	Velva City Council, DWR		
Partners	Emergency Management, Public Works,		
Completion Timeframe	2 to 3 years	Cost	TBD
Funding Source	City of Velva. Hazard Mitigation Grant Program (HMGP).		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element	Process for Integration
Capital Improvement Plan Velva Comprehensive Plan	Capability Assessment, Hazard History, Risk Assessment, Velva Jurisdictional Meeting.	Approval by county commission and city council

City of Velva Project 3: Conduct Engineering Study to Develop Scope of Work (SOW) to Retrofit the City of Velva Sanitary Sewer Lagoons to Equalize Demand.

Description/Benefit	The sanitary sewer lagoons for the city of Velva are overbuilt. The system was designed for 4,000 people. Due to a smaller city population and decreased water usage in modern fixtures/appliances, the lagoons are oversized. The city needs to conduct engineering to identify a scope of work/options to retrofit the system to current demand.		
Hazard/Threat Addressed	Drought, Flooding (overland), Infectious Disease & Pest Infestations, Severe Summer Weather, Severe Winter Weather		
Affected Jurisdictions	City of Velva and greater McHenry County		
Project Status	New		
Priority	Very High		
Responsible Agency	Velva City Council		
Partners	Public Works, Emergency Management, Public Health, DWR, NDDEQ		
Completion Timeframe	3 years	Cost	TBD
Funding Source	FEMA's Building Resilient Infrastructure and Communities (BRIC) or Hazard Mitigation Grant Program (HMGP).		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
5	5	5	5	5	1	1	27

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element	Process for Integration
Capital Improvement Plan Comprehensive Plan McHenry County LEOP and Mitigation Plan McHenry County THIRA	Capability Assessment, Hazard History, Risk Assessment	Conduct engineering study or identify scope of work. Approval by city council. Pursue funding options. Execute.

8.11.4 Mitigation Capability Assessment

Capability for mitigation is divided into four categories: administrative and technical, education and outreach, financial, and planning and regulatory. Each identified resource in the four categories can be used to implement mitigation strategies and access funding for projects. **Tables comparing the mitigation capabilities of the city of Velva, North Dakota, with all other jurisdictions in McHenry County can be found below and in Chapter 7, County Mitigation Capability Assessment.**

- Administrative and Technical: Identification of administrative and technical capabilities, which include: staff, their skills and tools for mitigation planning to implement specific mitigation actions.
- Education and Outreach: Identification of education and outreach programs, and methods already in place to implement mitigation activities and communicate hazard-related information.
- Financial: Identification of access to or eligibility to use funding resources for hazard mitigation for jurisdictions.
- Planning and Regulatory: Jurisdictional plans, policies, codes, and ordinances adopted and in place that prevent and reduce the impacts of natural hazards and man-made threats.

City of Velva, North Dakota, Mitigation Capabilities Summary

The following mitigation capabilities were identified as commonplace among all natural hazards and man-made threats upon completion of the risk assessment for the city of Velva, North Dakota. More detailed information about the mitigation capabilities of the city of Velva in relation to McHenry County and all other incorporated jurisdictions can be found in Chapter 7, Mitigation Capability Assessment.

2018 & 2023 N.D. Enhanced Mitigation MAOP	McHenry Co. Sherriff's Office
Advanced Communications: Internet & TV	MOUs
First District Health Unit	NDDES Fire Index Monitoring
McHenry County Courthouse	NDDOT Statewide Highway/Transportation Plan
McHenry Co. LEOP	NDSU/McHenry Co. Extension
McHenry Co. Emergency Mgmt.	Velva City Council
Velva Fire Dept./Prot. Dist.	Emergency siren(s)/early warning/alerting systems
N.D. Dept. of Emergency Services (NNDES)	Admin. staff for grant writing/mgmt. purposes
Velva Auditor's Office	Velva Comprehensive Plan
Velva Public Works	Velva Zoning

8.11.5 Integration of Mitigation Plan into Planning Mechanisms

Integration of the plan into current planning mechanisms is critical in mitigation to communicate the needs of each jurisdiction to achieve an all-inclusive mitigation strategy. The process for integration of the mitigation plan is included after each mitigation project, which shows the planning mechanism utilized, the plan element used for integration and the process for integration.

8.11.6 Plan Maintenance

An important aspect of any usable plan is the maintenance and upkeep of the document. At any given time, planning, risk analysis, updating the situation assessment, research, coordinating, disaster response or other activity is occurring. Plan maintenance ensures the plan will remain useful in the county for many years. A mitigation action progress report form to conduct plan maintenance is in Chapter 10 of this plan.

8.12 City of Voltaire, North Dakota

The following profile includes information specific to the city of Voltaire, North Dakota, for mitigation planning purposes. The information included is as follows:

- Profile and Inventory;
- Risk Assessment;
- Hazard Scoring Notes;
- Mitigation Projects, and
- Capabilities for Mitigation.

Integration into Planning Mechanisms

The process for integration of the mitigation plan into existing planning mechanisms is discussed at the bottom of each mitigation project in section 8.12.4, section 8.12.5 and in Chapter 6, Mitigation Strategy.

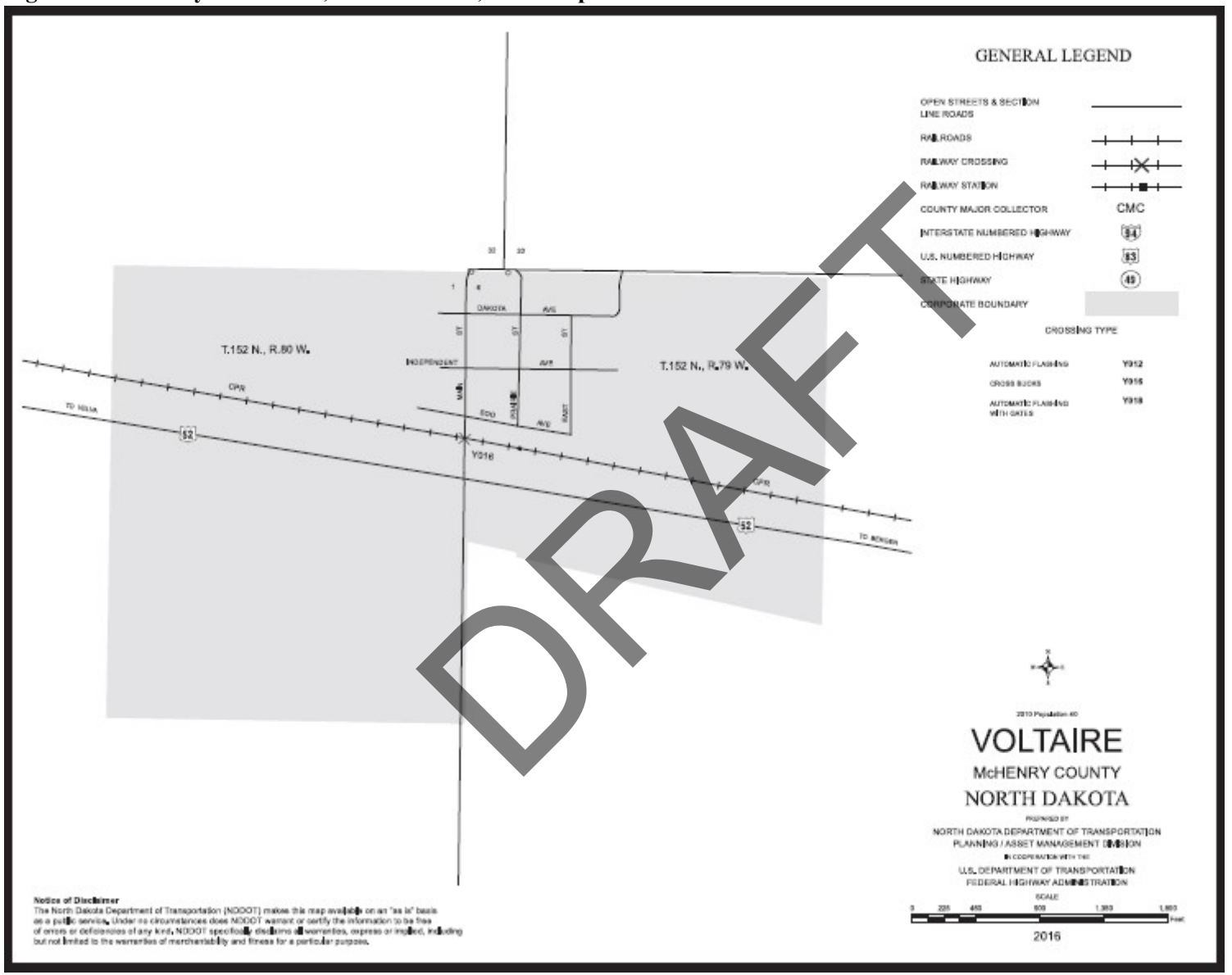
Plan Maintenance

Plan maintenance is shown in section 8.12.6.

Critical Facilities and Infrastructure

Figure 8.12.1 is a map of the city of Voltaire, North Dakota, provided by the N.D. Dept of Transportation.

Figure 8.12.1 – City of Voltaire, North Dakota, Base Map



Source: N.D. Dept. of Transportation

8.12.1 Profile and Inventory

The location, total population, vulnerable (underserved) populations, housing units and household size, businesses, critical facilities and infrastructure, new and future development, services, jurisdictional buildings, emergency response services and utilities are shown for the city of Voltaire, North Dakota. Detailed narratives follow each section heading to profile the city.

Detailed information on public buildings, services provided, emergency response services and utilities can be found in Chapter 3, Profile and Inventory.

Location

The city of Voltaire, North Dakota, is in north-central North Dakota on U.S. Highway 52 approximately 25 miles southeast of the city of Minot, North Dakota, the state's fourth largest city.

Population

Table 8.12.1 shows population trends for the city of Voltaire, North Dakota, from 1920 to 2020 per the 2020 U.S. Decennial Census, with an estimate for 2022. According to the 2020 U.S. Decennial Census, the city of Voltaire, North Dakota, contains 1,086 people, an increase of two people (0.2 percent) from 1,084 people in 2010.

Table 8.12.1 – 1920 to 2020 City of Voltaire, North Dakota, Population Trends and Projections

1920	1930	1940	1950	1960	1970	1980	1990	2000	2010	2020	*2022 est.*
--	61	101	72	70	54	65	63	51	40	46	*43*

Source(s): U.S. Decennial Census; American Community Survey, 5-Year Estimates

Vulnerable Populations

Age. Per the 2018 to 2022 American Community Survey 5-Year Estimate, the population of the city of Voltaire, North Dakota, consists of four individuals under the age of 20 and 14 individuals aged 65 and older, representing 9.3 and 32.6 percent of the city's population, respectively.

Daycare. There are no daycares in the city of Voltaire, North Dakota.

Poverty. Per the 2017 to 2021 American Community Survey 5-Year Estimate, there are three individuals in the city of Voltaire, North Dakota, that live below the poverty line, representing 7.0 percent of the city's population.

Public Schools. There has never been a public school in the city of Voltaire, North Dakota.

Senior Housing Developments/Care Centers. There has never been any senior housing developments or care centers in the city of Voltaire, North Dakota.

Housing Units and Household Size

The 2017 to 2021 American Community Survey 5-Year Estimate shows there are 31 housing units in the city of Voltaire, North Dakota, consisting of 30 single-family homes, no multifamily homes, and one mobile home.

The 2017 to 2021 American Community Survey 5-Year Estimate there are 27 households in the city of Voltaire, North Dakota, resulting in an average household size of 1.59 people.

Businesses

There are no businesses located in the city limits of Voltaire, North Dakota.

New and Future Development

There has been no new development in the city of Voltaire, North Dakota over the last five years includes:

The are no future developments planned or proposed in the city of Voltaire, North Dakota.

Critical Facilities

- There are no critical facilities in the city of Voltaire, North Dakota.

Infrastructure

- The city of Voltaire, North Dakota, does not have sanitary sewer system as residents utilize septic systems.
- The city of Voltaire, North Dakota, obtains its drinking/potable water from individual wells.
- U.S. Highway 52 serves the city of Voltaire, North Dakota.
- Canadian Pacific (CP) Railway infrastructure traverses the city of Voltaire, North Dakota.

Emergency Response Services

- The Velva Ambulance provides ambulance service to the city of Voltaire, North Dakota.
- The Velva Fire Department/Rural Protection District provides fire protection services to the city of Voltaire, North Dakota, and surrounding rural areas.
- The McHenry County Sherriff's Office provides law enforcement services to the city of Voltaire, North Dakota.
- The Velva Clinic, an affiliate of Trinity Health in Minot, serves the city of Voltaire, North Dakota.
- McHenry County Public Health located in the city of Towner, North Dakota, provides public health services to the city of Voltaire, North Dakota, and greater McHenry County.

Services and Utilities

- Circle Sanitation provides garbage collection services to the city of Voltaire, North Dakota.
- The city of Voltaire, North Dakota, does not have sanitary sewer system as residents utilize septic systems.
- The city of Voltaire, North Dakota, obtains its drinking/potable water from individual wells.
- The Velva Voice is the official newspaper of the city of Voltaire, North Dakota.
- Electricity is provided by Otter Tail Power Company in the city of Voltaire, North Dakota.

- Natural gas is not available in the city of Voltaire, North Dakota.
- Fuel oil and propane are used as an alternative heating source and are provided by companies chosen by the individual consumer in Voltaire, North Dakota.
- Midcontinent or SRT provides internet, phone, and TV to the city of Voltaire, North Dakota.

8.12.2 Risk Assessment and Hazard Scoring Notes

Table 8.12.1 summarizes the risk assessment scoring of the city of Voltaire, North Dakota. The risk assessment and hazard scoring notes for each hazard specific to the city are shown in Table 8.12.2. Risk assessment notes for impact, frequency, likelihood and vulnerability ubiquitous for jurisdictions in McHenry County are found in Chapter 5, Threat and Hazard Identification Assessment in each respective hazard profile.

Table 8.12.1 – City of Voltaire, North Dakota, Jurisdiction Risk Assessment Scoring Summary

Risk Assessment			**Jurisdiction:**	**City of Voltaire, North Dakota**		
Hazard/Threat	Impact	Frequency	Likelihood	Vulnerability	Capabilities	**Total**
Civil Disturbance	5	1	1	3	1	**9**
Criminal, Terrorist, or Nation-State Attack	5	1	1	3	1	**9**
Cyberattack	2	1	2	2	1	**6**
Dam Failure	NA	NA	NA	NA	NA	**NA**
Drought	3	5	5	3	2	**14**
Fire – Urban/Structure Collapse	5	1	2	2	1	**9**
Fire – Wildland (including Rural)	5	2	3	5	1	**14**
Flood	2	2	2	2	1	**7**
Geologic Hazards	5	1	1	1	1	**7**
Hazardous Material Release	5	1	3	3	1	**11**
Infectious Disease & Pest Infestations	3	2	3	2	1	**9**
Severe Summer Weather	5	5	5	2	1	**16**
Severe Winter Weather	5	5	5	2	1	**16**
Space Weather	5	1	2	5	1	**12**
Transportation Incident	5	2	2	2	1	**10**

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 8.12.2 – City of Voltaire, North Dakota, Jurisdiction Risk Assessment

	Civil Disturbance	
Impact	• Blocked Roads • Business/Government Interruptions • Delayed Emergency Response • Financial Hardship/Strain (public)	• HAZMAT Release • Human Injury/Death • Loss of Communication Systems • Property Damage (Structure) • Property Damage (Vehicle)
Frequency	• Never an occurrence of a major incident	• DAPL protesters were not active in the city
Likelihood	More Likely • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 • CP Railway Infrastructure	Less Likely • Small town with no major regional/state attractions • Sparse population • No pipelines in proximity to the city
Vulnerability	More Vulnerable • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 • CP Railway Infrastructure	Less Vulnerable • Small town with no major regional/state attractions • Sparse population • No pipelines in proximity to the city

Table 8.12.2 – City of Voltaire, North Dakota, Jurisdiction Risk Assessment – Continued

	Criminal, Terrorist, Nation-State Attack	
Impact	• Blocked Roads • Business/Government Interruptions • Delayed Emergency Response • Disease Outbreak/Mass Infections • Financial Hardship/Strain (public) • HAZMAT Release • Human Injury/Death	• Infrastructure Degradation • Loss of Communication Systems • Mass Casualties/Fatalities • Property Damage (Structure) • Property Damage (Vehicle)
Frequency	• **Aside from minor incidents of vandalism, no incidents have occurred.**	
Likelihood	More Likely • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 • CP Railway Infrastructure	Less Likely • Small town with no major regional/state attractions • Sparse Population • No pipelines in proximity to the city
Vulnerability	More Vulnerable • Lack of local active/continuous law enforcement coverage • U.S. Highway 52 • CP Railway Infrastructure	Less Vulnerable • Small town with no major regional/state attractions • No pipelines in proximity to the city

Table 8.12.2 – City of Voltaire, North Dakota, Jurisdiction Risk Assessment – Continued

	Cyberattack	
Impact	• Business Interruptions • Delayed Emergency Response • Financial Hardship/Strain (public) • Government Interruptions • HAZMAT Release • Human Injury/Death	• Identity Theft – loss of wages and/or assets • Infrastructure Degradation • Loss of Communication Systems • Loss of Digital/Technological Systems • Loss of Power/Electricity Outage • School Closure
Frequency	• Never an occurrence of a major attack aside from personal email accounts of city residents	
Likelihood	More Likely • Small town with lack of technological infrastructure to defend against cyberattack	Less Likely • Lack of major state or national financial institutions • No businesses in city limits • City records are on paper
Vulnerability	More Vulnerable • Small town with lack of technological infrastructure to defend against cyber attacks • Elderly population relying largely on landlines for communication purposes, remote medical care, and equipment monitoring • CP Railway Infrastructure	Less Vulnerable • Lack of major state or national financial institutions • No pipelines in proximity to the city • No natural gas service to the city • No businesses in city limits • City records are on paper

Table 8.12.2 – City of Voltaire, North Dakota, Jurisdiction Risk Assessment – Continued

	Drought	
Impact	• Crop Loss • Loss of Economy • Loss of Livestock • Loss of Wildlife Habitat (decreased wildlife populations) • Increase in Wildland Fire Potential • Water quality compromised from stock dams	• Diminished soil health • Negative impact on mental health of producers and fire responders – "community impact" • Local producers forced to sell off herds which can last for several years • Population loss as people moved away due to loss of economy
Frequency	• Fall of 1980 was dry • Severe drought in 1961/1962, 1988/1989 to 1991/1992 • Some dry conditions each year lasting a couple weeks in length	• In 2013 and 2014, dry conditions were present from June to October with little rain • **Lack of adequate snowfall spring of 2015 and spring 2021** • Severe drought conditions winter 2020/2021 • Exceptional drought spring and summer 2021
Likelihood	<u>More Likely</u> • Dry/wet cycle every 10 years • Climatic patterns will result in an eventual drought of significance • Lack of precipitation	<u>Less Likely</u> • Heavy precipitation in winter (snow pack) and summer (rainfall)
Vulnerability	<u>More Vulnerable</u> • Loss of economy from decreased wildlife & hunting • Agriculture economy • Elderly population • Flat terrain/open topography contributes to conditions • Pastureland adjacent to structures and city limits • **City residents have individual water wells** • **The city lacks water storage**	<u>Less Vulnerable</u> • Velva Fire Department • Financial assistance programs made available by the state and federal government • McHenry County Burn Ban Ordinance • Fire Index monitoring and mapping from NDDES • Advanced communications such as internet and TV • **City residents have individual water wells**

Table 8.12.2 – City of Voltaire, North Dakota, Jurisdiction Risk Assessment – Continued

	Fire – Urban Fire/Structure Collapse	
Impact	• Building Collapse • Delayed Emergency Response • Evacuation (Localized) • Explosion	• Human Injury/Death • Increase Fire Potential
Frequency	• No incidents of urban fire in city limits	
Likelihood	More Likely • Building codes but lack enforcement • Age of structures • Increased use of electric heaters • Outdated electric wiring in older homes and structures • Outdated heating systems • **CP Railway Infrastructure traversing city limits**	Less Likely • Building codes but lack enforcement • Better building standards and maintenance of structures • Smoke detectors in public buildings and private homes/businesses
Vulnerability	More Vulnerable • Building codes but lack enforcement • Age of structures • Increased use of electric heaters • Outdated electric wiring in older homes and structures • Outdated heating systems • **CP Railway Infrastructure traversing city limits** • **Prolonged response times due to the city not having a fire department** • **City residents have individual water wells** • **The city lacks water storage**	Less Vulnerable • Velva Fire Department • Building codes but lack enforcement • Better building standards and maintenance of structures • Smoke detectors in public buildings and private homes/businesses • **City residents have individual water wells**

Table 8.12.2 – City of Voltaire, North Dakota, Jurisdiction Risk Assessment – Continued

	Fire – Rural & Wildland	
Impact	• Building Collapse • Crop Loss • Delayed Emergency Response • Downed Power Lines • Evacuation (Localized) • Explosion • Increase Wildland Fire Potential • Loss of Power/Electricity Outage	• **Loss of Livestock** • **Loss of Wildlife Habitat** • **Mass Casualties** • **Property Damage (Structure & Vehicle)** • **Losses could be on a significant scale if impacting a major producer or farmstead** • **Loss of farm equipment and assets**
Frequency	• Controlled burns can become out of control annually • Annual occurrences of fires in and around city limits	
Likelihood	More Likely • Agricultural burn-off • High winds annually and dry conditions – when present • Pastureland adjacent to structures and city limits • Severe summer weather with significant lightning • **CP Railway Infrastructure traversing city limits**	Less Likely • Removal of CRP near city limits • Summer and winter weather with heavy precipitation
Vulnerability	More Vulnerable • Agricultural burn-off • High winds annually and dry conditions – when present • Pastureland adjacent to structures and city limits • Severe summer weather with significant lightning • **Lack of fire breaks around city limits** • **CP Railway Infrastructure traversing city limits** • **Prolonged response times due to the city not having a fire department** • **City residents have individual water wells** • **The city lacks water storage** • **Lack of outdoor early warning system**	Less Vulnerable • Velva Fire Department • **Adequate staffing coverage/resources** • Removal of CRP near city limits • Summer and winter weather with heavy precipitation • MOUs with neighboring fire departments • McHenry County Burn Restriction Ordinance

Table 8.12.2 – City of Voltaire, North Dakota, Jurisdiction Risk Assessment – Continued

	Flood	
Impact	• Blocked Roads • Delayed Emergency Response • Flooding (Highway & Structure) • Human Injury/Death	• **Flood waters inundate the city's sanitary sewer system from ground seepage impacting people's basements**
Frequency	• **Rare occurrences of overland flooding impacting city streets** •	• Surrounding soils consisting of shale and gravel allow for immediate drainage of water during summer months
Likelihood	More Likely • Rapid change of seasons resulting in excessive snow melt • **Lack of proper storm water system in the city for drainage**	Less Likely • Dry conditions/drought and low precipitation • Surrounding soils consisting of shale and gravel allow for immediate drainage of water during summer months
Vulnerability	More Vulnerable • Rapid change of seasons resulting in excessive snow melt • **City residents have individual water wells**	Less Vulnerable • Alternate routes were identified for townships roads and evacuation routes for the city • Surrounding soils consisting of shale and gravel allow for immediate drainage of water during summer months

Table 8.12.2 – City of Voltaire, North Dakota, Jurisdiction Risk Assessment – Continued

	Geologic Hazards	
Impact	• Blocked Roads • Delayed Emergency Response • Human Injury/Death • Infrastructure Degradation	• Loss of Economy • Loss of Power/Electricity Outage • Property Damage • Utility Outage/Shortage
Frequency	• Annual water main breaks from shifting/expansive soils and landslides on the higher elevations south of the city	
Likelihood	More Likely • The city of Voltaire is located in a valley along the Souris (Mouse) River resulting in landslides • Erosion in old Souris (Mouse) River Channel • **All N.D. Counties in EPA Radon Zone I**	Less Likely • No Abandoned Mine Lands located near city limits • PSC has an AML reclamation project aimed at recovering AMLs – work has been done in other parts of the state
Vulnerability	More Vulnerable • The city of Voltaire is located in a valley along the Souris (Mouse) River resulting in landslides • Erosion in old Souris (Mouse) River Channel • **All N.D. Counties in EPA Radon Zone I**	Less Vulnerable • No Abandoned Mine Lands located near city limits • PSC has an AML reclamation project aimed at recovering AMLs – work has been done in other parts of the state

Table 8.12.2 – City of Voltaire, North Dakota, Jurisdiction Risk Assessment – Continued

	Hazardous Material Release	
Impact	• Blocked Roads • Delayed Emergency Response • Environmental Degradation • Evacuation (localized) • Explosion • Human Injury/Death	• Increased Fire Potential • Loss of Economy • Loss of Power and/or Potable Water • Property Damage
Frequency	• **No significant incidents involving airplanes, automobiles/cars, commercial truck traffic, recreational vehicles, or trains** • No major train derailments in Voltaire city limits	
Likelihood	More Likely • Transportation of chemicals by truck/rail through city limits • Storage of chemicals/fertilizers in large tanks in city limits and on farmsteads • **CP Railway Infrastructure & U.S. Highway 52**	Less Likely • Private companies have HAZMAT certifications • Safety measures implemented CP Railway • Tier II Federal Requirements
Vulnerability	More Vulnerable • Transportation of chemicals by truck/rail through city limits • Storage of chemicals/fertilizers in large tanks in city limits and on farmsteads • **CP Railway Infrastructure & U.S. Highway 52** • **Lack of outdoor early warning system**	Less Vulnerable • Velva Ambulance • Velva Fire Department has HAZMAT training • No pipelines in proximity to the city • Safety measures implemented CP Railway • Tier II Federal Requirements • Regional HAZMAT Team in Minot 25 minutes away

Table 8.12.2 – City of Voltaire, North Dakota, Jurisdiction Risk Assessment – Continued

	Infectious Disease & Pest Infestations	
Impact	• Crop Loss • Human Injury/Death • Livestock Injury/Death • Loss of Economy • Mass Casualties/Fatalities	• Strain on local medical resources (ambulance or clinic) • Loss of Drinking/Potable Water • **Financial cost to public health resources** • Loss of medical staff due to sickness • School Closure
Frequency	• Annual occurrences of death, primarily among the elderly • Occurrence of disease - 1 in 3 for people annually • Annual occurrences of influenza cases in the local population	• **The COVID-19 pandemic of 2020 resulted in mass quarantine and sheltering of the local population and temporary closure of businesses resulting in unmeasured economic losses.**
Likelihood	More Likely • Growing elderly population • Small population of children without immunization • Agriculture economy • Dependent on weather for animals and crops • U.S. Highway 52	Less Likely • Advanced communications such as internet and tv • Public health and employment regulations for public facilities
Vulnerability	More Vulnerable • Growing elderly population • Small population of children without immunization • Agriculture economy • Dependent on weather for animals and crops • U.S. Highway 52 • City residents utilize septic systems	Less Vulnerable • Advanced communications such as internet and tv • Public health and employment regulations for public facilities Immunizations & medications of local population • Voltaire Clinic • Voltaire Mobile Veterinarian Clinic • **City residents utilize septic systems**

Table 8.12.2 – City of Voltaire, North Dakota, Jurisdiction Risk Assessment – Continued

	Severe Summer Weather	
Impact	• Blocked Roads – Voltaire Underpass • Downed Trees • Evacuation (Localized) • Human Injury/Death – heat exhaustion • Infrastructure Degradation • Loss of Crops & Livestock	• Loss of Power/Downed Power Lines • **Property Damage – repair of roofing, siding and drainage systems for homes** • **Damage to electrical equipment from lightning** • Shelter-in-place • Vehicle Damage
Frequency	• Windstorm events occurring annually • Property damage from tornados/straight-line winds in summer 2017 & 2019	• Annual occurrences of hailstorms • Two or three significant storms annually
Likelihood	• Climatic patterns will result in numerous annual occurrences of the hazard	• Flat terrain/open topography contributes to conditions
Vulnerability	More Vulnerable • High elderly population • One mobile home • One city campground and two private campgrounds • Aging infrastructure (roads and electrical systems) • Lack of municipal building code enforcement • **CP Railway Infrastructure & U.S. Highway 52** • **City residents utilize individual wells for drinking/potable water** • **Lack of outdoor early warning system**	Less Vulnerable • Velva Ambulance • Velva Fire Department • Velva Clinic • Advanced warning and notification such as internet and TV • Adopted building codes but lack enforcement • No pipelines in proximity to the city • **City residents utilize individual wells for drinking/potable water**

Table 8.12.2 – City of Voltaire, North Dakota, Jurisdiction Risk Assessment – Continued

	Severe Winter Weather	
Impact	• Blocked Roads: Heritage Drive, Carmel Court, Briar Drive, roads in and around Souris Valley Care Center • Evacuation (Localized) • Human Injury/Death – wind chill • Loss of Crops • Loss of Livestock	• Loss of Power/Downed Power Lines • Property Damage – repair of roofing, siding and drainage systems for homes • Shelter-in-place • Vehicle Damage
Frequency	• Annual occurrences of power loss from storms • Annual occurrences of blocked roads • Annual occurrences of wind events • Two or three significant blizzards producing damage to trees and property annually	• Major blizzard in fall of 2015 • March 2017 snowstorm resulted in numerous blocked roads • Major blizzard in fall of 2018 • Spring and fall snowstorms of 2019 • **Ice storm in 1997 = loss of power for four days** • **Ice Storm January 2021 and April 2022**
Likelihood	• Climatic patterns will result in numerous annual occurrences of the hazard	• Flat terrain/open topography contributes to conditions
Vulnerability	More Vulnerable • High elderly population • One mobile home • One city campground and two private campgrounds • Aging infrastructure (roads and electrical systems) • Lack of municipal building code enforcement • **CP Railway Infrastructure & U.S. Highway 52** • **City residents utilize individual wells for drinking/potable water** • **Lack of outdoor early warning system**	Less Vulnerable • Velva Ambulance • Velva Fire Department • Velva Clinic • Advanced warning and notification such as internet and TV • Adopted building codes but lack enforcement • No pipelines in proximity to the city • **City residents utilize individual wells for drinking/potable water**

Table 8.12.2 – City of Voltaire, North Dakota, Jurisdiction Risk Assessment – Continued

	Space Weather	
Impact	• Government Interruptions • Infrastructure Degradation • Loss of Communication Systems • Loss of Digital/Technological Systems • Loss/Overcrowded Medical Facilities • Loss of Power/Electricity Outage	• Public Distress/Social Discord • School Closure • Loss of operation of the city hall and fire hall, etc. • Loss/outage of medical devices at private residences
Frequency	• Never a recorded occurrence in McHenry County or North Dakota	
Likelihood	• Dependent on solar activity and the 11-year solar cycle • Likely to occur once every 500 years per the 2018 N.D. Enhanced Mitigation MAOP	
Vulnerability	<u>More Vulnerable</u> • Advanced communication systems (internet, TV, etc.) • Agriculture economy • All critical facilities and infrastructure that require electricity for operation	<u>Less Vulnerable</u> • Local food production/households with gardens • No pipelines in proximity to the city • No critical facilities or infrastructure • City records are on paper

Table 8.12.2 – City of Voltaire, North Dakota, Jurisdiction Risk Assessment – Continued

	Transportation Incident	
Impact	• **Blocked roads from inadequate road clearing or incidents** • Business Interruptions • Delayed Emergency Response • Human Injury/Death • Increased Fire Potential • Loss of Transportation/Accessibility • Mass Casualties/Fatalities	• Delayed Emergency Response • HAZMAT Release • Livestock Loss • Property Damage • **Could be catastrophic if involving a school bus filled with children and a truck carrying hazardous materials**
Frequency	• Annual occurrences of multiple accidents involving cars and/or farm equipment • **Frequent incidents on U.S. Highway 52**	
Likelihood	More Likely • Intoxicated drivers • High truck traffic from agriculture-related traffic • **U.S. Highway 52** • **CP Railway Infrastructure traversing city limits**	Less Likely • No commercial passenger airport • No pipelines in proximity to the city
Vulnerability	More Vulnerable • Intoxicated drivers • High truck traffic from agriculture-related traffic • **U.S. Highway 52** • **CP Railway Infrastructure traversing city limits**	Less Vulnerable • Velva Ambulance • Velva Fire Department – has light and heavy rescue equipment and extrication tools • No commercial passenger airport

8.12.3 Mitigation Strategy

The McHenry County, N.D., Multi-Jurisdictional Multi-Hazard Plan Update includes a mitigation strategy consisting of seven goals in Chapter 6. The following problem statement and mitigation projects address the mitigation needs of the city of Voltaire, North Dakota. It should be noted that some mitigation projects that pertain to all jurisdictions are included to encourage county-wide collaboration.

Problem Statement

The city of Voltaire, North Dakota, can be impacted by civil disturbance; criminal, terrorist, or nation/state attack; cyberattack; drought; fire (urban and wildland); flood (overland); geologic hazards; hazardous material release; infectious disease and pest infestations; severe summer weather; severe winter weather; space weather, and transportation incident. The city is positioned at an elevation that allows for drainage of runoff without any occurrences of overland flooding. City residents obtain drinking/potable water from individua wells and utilize septic systems for sanitary sewer purposes. The city does not have any critical facilities or infrastructure and does not have any emergency services. The city lacks an outdoor early warning system in city limits but receives early warning for a siren at nearby industries. The Voltaire City Council stated that no businesses are in city limits and that residents commute to Velva, Minot, and other areas for employment.

The city lacks funding for mitigation projects. With little to no capabilities to accomplish major projects independently, the city is dependent on outside sources for mitigation.

Education and outreach are a priority for the city.

City of Voltaire, North Dakota, Mitigation Priority Expansion/Update

The 2024 McHenry County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan reflects no change in mitigation priority for the city of Voltaire, North Dakota.

McHenry County Project EO-1: Conduct Education and Outreach to Improve Household Disaster Resiliency, Readiness, and Preparedness.

Description/Benefit	Continued education and outreach to keep households and vulnerable populations ready in case of a disaster using websites, social media, local media, utility inserts, mailings, etc. Develop new websites or communication outlets where necessary. Special attention paid to maintaining and further developing severe weather awareness campaign, 'Are You Prepared' information, shelter-in-place pamphlets, fire prevention, school safety, storm spotters' program, Tier II, among others. Additional attention should be given to flooding, hazardous materials, severe weather, fire, truck routes, and safe routes to school. • **Apps:** Drake-Anamoose Public School, Souris Valley Care Center, City of Velva, Velva Public School • **Calling Trees:** Brown Township, Souris Valley Care Center employees • **Existing websites:** McHenry County, City of Deering, City of Granville, City of Towner, City of Velva, public schools, FDHU • **Existing social media:** Face pages for McHenry County Emergency Service, Drake-Anamoose Public School, TGU Public Schools, Towner; TGU Public School, Granville, City of Towner; City of Granville; City of Upham; McHenry County Sheriff's Office, Velva Ambulance and Fire; Anamoose Fire Dept., Drake Fire Dept., Upham Fire Dept., Souris Valley Care Center, NDSU Extension/McHenry County • **Develop new:** Pursue additional social media platforms, where appropriate. • Specific attention should be paid to the cities of Balfour, Bergen, and Kief. • **Information should be translated into Spanish and Afrikaans for migrant/seasonal workers** • **A public notice should be sent in the fall for a countywide clearing of ditches.**		
Hazard/Threat Addressed	All Natural Hazards and Man-Made Threats		
Affected Jurisdiction(s)	McHenry County and Incorporated Jurisdictions		
Project Status	Ongoing and Continue/New		
Priority	Very High		
Responsible Agency(ies)	County Commission, City Council(s), Emergency Management, Emergency Services, Public Health, Public Schools		
Partners	Extension, Media, Medical Services Providers, Public Utilities		
Completion Timeframe	Forever ongoing. **See following page.**	Cost	$1,000 to 3,000 annually
Funding Source(s)	Local general funds. FDHU, McHenry County. NDSU Extension/McHenry County. National Weather Service.		

Values: 1 is low (negative impact and/or too costly) -- Value of 5 is high (positive impact/higher benefit compared to cost)

Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
5	5	5	5	5	5	5	35

Integration of Mitigation Plan Requirements into Local Planning Mechanisms

Planning Mechanisms Utilized	Plan Element	Process for Integration
McHenry County LEOP McHenry County Mitigation Plan & THIRA	Capability Assessment, Hazard History, Risk Assessment	LEPC selects appropriate content at its first meeting each year. Identify schedule during the IPP Workshop.

McHenry County Project EO-1: List of Education and Outreach Resources for Natural Hazards

- **Dam Failure –** There are dam structures in McHenry County, North Dakota, and therefore the risk to dam failure is constant. The N.D. Dept. of Water Resources has developed Dam Safety Standards: https://www.swc.nd.gov/pdfs/home_page/draft_nd_dam_safety_standards_policy_reg_05_2023.pdf

  The water board for each county in McHenry County, North Dakota, should review the safety standards and its first meeting of every year before flood season is expected to begin.

- **Drought –** Droughts occur in McHenry County, North Dakota, as variations in precipitation is an expected climatic pattern. The Federal Emergency Management Agency has information on drought available at: https://www.ready.gov/drought.

  The NDSU Extension/ McHenry County should disseminate Drought information every spring prior to the summer season.

- **Fire (Wildland) –** The frequency and intensity of wildland fires has increased in McHenry County, North Dakota. The Federal Emergency Management Agency has information on wildland fires available at: https://www.ready.gov/wildfires

  The fire chiefs of each fire district in McHenry County, North Dakota, should conduct an education and outreach presentation in conjunction with information discussed at the LEPC at its first fire department meeting of each year before fire season begins.

- **Flood –** Presidential Disaster Declarations from flooding have occurred in McHenry County, North Dakota, in 2009, 2010, 2011, 2013, 2019, 2020, 2022, and 2023. The Federal Emergency Management Agency has information on Flooding available at: https://www.ready.gov/floods

  Each water resource district board and emergency management office in McHenry County, North Dakota, should review flood ordinances annually to identify any changes needed for implemented at the county and city level. The water resource district board should also publish an annual article in the local newspaper or social media on the importance and effectiveness of the National Flood Insurance Program (NFIP).

- **Geologic Hazards –** All of North Dakota is in EPA Radon Zone 1. Therefore, all counties in the state are vulnerable to this hazard, and all homes have a high potential to test for elevated radon levels. A radon fact sheet is available through the N.D. Dept. of Emergency Services: https://deq.nd.gov/wm/radon/

  Each emergency management office in McHenry County, North Dakota, should publish an annual article in the local newspaper or social media about the risk to radon and can include information from the FactSheet provided by the N.D. Dept. of Emergency Services.

- **Severe Summer Weather –** Severe Summer Weather is a climatic pattern expected annually in McHenry County, North Dakota. Extreme heat is most impactful on older Americans. The Federal Emergency Management Agency has information on extreme heat available at:
    - https://www.ready.gov/heat
    - https://www.ready.gov/thunderstorms-lightning
    - https://www.ready.gov/tornadoes

  Each emergency management office in McHenry County, North Dakota, should publish an annual article in the local newspaper or social media about the risk to extreme heat in the spring prior to the start of summer.

- **Severe Winter Weather –** Severe Winter Weather is a climatic pattern expected annually in McHenry County, North Dakota. Extreme cold/wind chill is most impactful on older Americans and individuals with limited income/means. According to Headwaters Economics' Neighborhoods at Risk Economic Profile System, the largest change in the share of single mother families in poverty occurred in McHenry County, ND, between 2010 and 2021, which went from 1.3% to 4.6%. The Federal Emergency Management Agency has information on Severe Winter Weather available at: https://www.ready.gov/winter-weather

  Each emergency management office in McHenry County, North Dakota, should publish an annual article in the local newspaper or social media about the dangers of extreme cold/wind chill each fall prior to the start of winter.

- **Space Weather –** McHenry County, North Dakota, cannot control the Sun but can conduct education and outreach regarding Space Weather. The National Oceanic and Atmospheric Administration operates a Space Weather Prediction Center and have information available at: https://www.swpc.noaa.gov/

  Each emergency management office in McHenry County, North Dakota, should contact the Space Weather Prediction Center and request information that can be used for education and outreach to the public regarding Space Weather.

8.12.4 Mitigation Capability Assessment

Capability for mitigation is divided into four categories: administrative and technical, education and outreach, financial, and planning and regulatory. Each identified resource in the four categories can be used to implement mitigation strategies and access funding for projects. **Tables comparing the mitigation capabilities of the city of Voltaire, North Dakota, with all other jurisdictions in McHenry County can be found below and in Chapter 7, County Mitigation Capability Assessment.**

- Administrative and Technical: Identification of administrative and technical capabilities, which include: staff, their skills and tools for mitigation planning to implement specific mitigation actions.
- Education and Outreach: Identification of education and outreach programs, and methods already in place to implement mitigation activities and communicate hazard-related information.
- Financial: Identification of access to or eligibility to use funding resources for hazard mitigation for jurisdictions.
- Planning and Regulatory: Jurisdictional plans, policies, codes, and ordinances adopted and in place that prevent and reduce the impacts of natural hazards and man-made threats.

City of Voltaire, North Dakota, Mitigation Capabilities Summary

The following mitigation capabilities were identified as commonplace among all natural hazards and man-made threats upon completion of the risk assessment for the city of Voltaire, North Dakota. More detailed information about the mitigation capabilities of the city of Voltaire in relation to McHenry County and all other incorporated jurisdictions can be found in Chapter 7, Mitigation Capability Assessment.

2018 & 2023 N.D. Enhanced Mitigation MAOP	McHenry Co. Sherriff's Office
Advanced Communications: Internet & TV	MOUs
First District Health Unit	NDDES Fire Index Monitoring
McHenry County Courthouse	NDDOT Statewide Highway/Transportation Plan
McHenry Co. LEOP	NDSU/McHenry Co. Extension
McHenry Co. Emergency Mgmt.	Voltaire City Council
N.D. Dept. of Emergency Services (NNDES)	Emergency siren(s)/early warning/alerting systems
Voltaire Auditor's Office	Admin. staff for grant writing/mgmt. purposes

8.12.5 Integration of Mitigation Plan into Planning Mechanisms

Integration of the plan into current planning mechanisms is critical in mitigation to communicate the needs of each jurisdiction to achieve an all-inclusive mitigation strategy. The process for integration of the mitigation plan is included after each mitigation project, which shows the planning mechanism utilized, the plan element used for integration and the process for integration.

8.12.6 Plan Maintenance

An important aspect of any usable plan is the maintenance and upkeep of the document. At any given time, planning, risk analysis, updating the situation assessment, research, coordinating, disaster response or other activity is occurring. Plan maintenance ensures the plan will remain useful in the county for many years. A mitigation action progress report form to conduct plan maintenance is in Chapter 10 of this plan.

10. Plan Maintenance

Mitigation planning for McHenry County, North Dakota, is continuous. An important aspect of any useable plan is the maintenance and upkeep of the document. At any given time, planning, risk analysis, updating the risk assessment, research, coordinating, disaster response or other activity is occurring. Thus, ensuring the plan will remain useful is critical.

Plan Monitoring

McHenry County's emergency manager and the LEPC are responsible for monitoring, evaluating and updating the plan. All disaster and emergency incidents will be evaluated for general and specific hazard history and mitigation strategy recommendations to be added to the plan.

The plan will be updated and submitted to the N.D. Dept. of Emergency Services and FEMA within five years to assure the county maintains a FEMA-approved multi-jurisdictional multi-hazard mitigation plan.

Plan Evaluation

At its February meeting each year, each county commission, city council/commission and emergency response entity will review actions taken on mitigation projects and losses due to hazards in the past year.

- **A Mitigation Action Progress Report Form for reporting of annual mitigation actions taken and losses due to hazards is included in this chapter for McHenry County.**
- **The annual reports are due back to the emergency manager by March 15.**

The comments about the plan, project implementation, and information will be shared through each jurisdiction's minutes, and these minutes will be sent to county emergency management. The emergency manager will share this information with the McHenry County, North Dakota, Commission. Emergency services and the public health department will be encouraged to inform emergency management of incidents constantly and consistently as they occur so that the data can be immediately considered to better understand the risks in the county and enable accurate updating of hazard information to include in hazard mitigation efforts.

Public Involvement and Future Public Participation

The following bullets list steps emergency management can take to ensure public involvement and future public participation:

- A presentation of plan progress will be made to each county commission on a quarterly basis – focusing primarily on providing updates on progress of the mitigation strategy (specifically the education and outreach components), grant funding being either pursued or already obtained.
- The mitigation plan will become a permanent agenda item at each LEPC and the discussion will be included in meeting minutes. The LEPC has representation from each incorporated jurisdiction (Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire.) in McHenry County, North Dakota.

- Information on sheltering capabilities in McHenry County, North Dakota, will be disseminated at the Goodrich Fire Hall in the city of Goodrich; and the McHenry County Courthouse, McHenry Memorial Home, McClusky Ambulance Hall, McClusky Fire Hall, and Parkview Housing in the city of McClusky annually. The information will be mailed to each household in the city of Martin on an annual basis as well.

- The McHenry County LEPC will work with the cities of Anamoose, Balfour, Bergen, Deering, Drake, Granville, Karlsruhe, Kief, Towner, Upham, Velva, and Voltaire.to complete the mitigation action progress report form annually or after incidents of significance.

- The McHenry County Emergency Manager will conduct outreach specific to the cities of Balfour, Bergen, Kief, and Voltaire, and due to their unique vulnerability.

- County emergency management will post on social media mitigation actions completed by each incorporated jurisdiction to promote public awareness on the importance of mitigation.

10.1 McHenry County, N.D. Mitigation Action Progress Report Form

The Mitigation Action Progress Report Form is part of the annual review of hazard impacts, mitigation projects and reporting of data to the emergency manager. Please complete to maintain the mitigation plan for McHenry County, North Dakota. Include date and location of incident(s), and photographs or other documentation. **Additional information can be included and attached to this form on a separate page.**

Return to: McHenry County Emergency Manager
407 Main St., Room 307
Towner, ND 58788
pierceem@nd.gov

Due: March 15

List injuries or property losses due to hazards in past year:

List new vulnerable areas that need to be addressed:

Identify what actions on jurisdiction's mitigation projects were taken in past year:

If no action, why:

First & Last Name	
Title & Jurisdiction Represented	
Date (MM/DD/YYYY)	
Contact Info (Email & Phone)	