CHAPTER 1: Introduction

Hazard Mitigation Planning

Natural, human-caused, and technological hazards have a direct impact on residents and property in Towner County. While it is impossible to eliminate most hazards, it is possible to mitigate their negative effects. Hazard mitigation is defined as any sustained action taken to reduce or eliminate long-term risk to human life and property from hazards. Mitigation actions may be implemented before, during or after an event; however, they are most successful when based on a long-term plan developed before a disaster occurs. Successful mitigation actions must be practical, cost-effective, politically acceptable and supported by a sound planning process.

This plan is organized into five chapters:

CHAPTER 1: INTRODUCTION

- General plan overview

CHAPTER 2: STUDY AREA BACKGROUND

- Background information about the demographics, economy, geography, weather and climate of the County and each jurisdiction

CHAPTER 3: HAZARD RISKS AND VULNERABILITIES

- Hazard profiles including their historical frequency, assessment of risks and vulnerabilities, identification of key issues and potential action items

CHAPTER 4: MITIGATION STRATEGY

- Identification of goals and action items to mitigate risks of hazards for each jurisdiction

CHAPTER 5: PLAN MAINTENANCE

- Procedures for monitoring, evaluating and updating the plan

Purpose

The purpose of the plan is to promote sound public policy designed to protect citizens, critical facilities, infrastructure, private property and the environment from natural and human-caused hazards. The Federal Emergency Management Agency (FEMA) identifies the primary benefits of hazard mitigation planning as:

- Identifying actions for risk reduction that are agreed upon by stakeholders and the public.
- Focusing resources on the greatest risks and vulnerabilities.
- Building partnerships by involving citizens, organizations and businesses.
- Increasing education and awareness of threats and hazards, as well as their risks.
- Communication priorities to state and federal officials.
- Aligning risk reduction with other community objectives.

The plan includes a risk and vulnerability assessment that residents, organizations, local governments and other interested participants can utilize when planning for hazards. The plan also includes a description of mitigation projects that will assist each adopting jurisdiction in reducing risk and preventing loss from future hazard events.

Additionally, all participating jurisdictions are eligible to apply for funds through FEMA's Hazard Mitigation Assistance Program (HMA). HMA offers three programs to help fund implementation of mitigation projects: the Hazard Mitigation Grant Program (HMGP), Building Resilient Infrastructure and Communities (BRIC), and Flood Mitigation Assistance (FMA) programs.

Authority

The Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288), as amended by the Disaster Mitigation Act of 2000, provides legal basis for state, local and Tribal governments to reduce risks from natural hazards through mitigation planning. All state, local and Tribal governments are required to have an approved Multi-Hazard Mitigation Plan to receive funding for certain types of non-emergency disaster assistance, including mitigation projects.

This plan is an update of Towner County's 2015 Multi-Hazard Mitigation Plan. Hazard mitigation plans are required by FEMA to be updated every five years to maintain the jurisdiction's eligibility for grant funding.

Jurisdictions that participated in the planning process and are adopting the plan by the official method of approval based on legal authority are listed in Table 1.1. To be eligible for future funds through the Hazard Mitigation Grant Program (HMGP), Building Resilient Infrastructure and Communities (BRIC) and Flood Mitigation Assistance program, jurisdictions must either adopt the plan and participate in the planning process or be sponsored by a

jurisdiction that has done so. Approval and adoption documentation can be found in Appendix A.

Table 1.1 – Adopting Jurisdictions	
Jurisdiction	**Adoption Date**
Towner County	
City of Bisbee	
City of Cando	
City of Egeland	
City of Hansboro	
City of Perth	
City of Rocklake	

The Planning Process

FEMA identifies four essential steps to the hazard mitigation planning process:

- **Resource organization:** Involving interested community members, and reaching out to critical stakeholders and those with technical expertise required during the planning process.
- **Risk assessment:** Identifying hazard characteristics and potential consequences, including effects on critical facilities.
- **Development of mitigation strategies:** Determining priorities and ways to minimize effects of identified hazards.
- **Plan implementation and progress monitoring:** Implementing the plan brings it to life and periodic monitoring ensures the plan remains relevant as conditions change.

The overall planning process for the development of the Towner County MHMP included the following activities:

- Consultant and emergency manager discussed planning team and outreach issues and options.
- Emergency manager compiled initial data about critical facilities, status of past mitigation actions, and contact lists for key stakeholders.
- Emergency manager and consultant conduct Planning Team and Community meetings to explain objectives and process, and to obtain feedback on hazard concerns and priorities, and potential mitigation actions.
- Consultant develops initial risk assessment based on secondary sources and early input from emergency manager and Planning Team and Community meetings.
- Consultant works with emergency manager to obtain additional information pertaining to past hazard events.
- Consultant completes additional outreach and research to complete risk assessment and analysis.
- Emergency manager and consultant review past action item status and develop draft mitigation action items.
- Draft mitigation actions were discussed with key stakeholders from each jurisdiction to obtain feedback and additional potential mitigation actions.
- Consultant works with emergency manager to finalize mitigation action item details.
- Emergency manager and consultant review and revise draft implementation and progress monitoring plan.
- Jurisdictional review of proposed MHMP.

Public involvement for the plan included consultations with representatives of each jurisdiction and two Planning Team meetings. Local planning documents were also reviewed and incorporated into the document when applicable. Additional details about the planning process can be found in Appendix B.

Acknowledgements

Numerous elected officials, City and County staff, and stakeholders participated in the planning process. The project would not have been possible without the assistance of Planning Team members (identified in Appendix B) and stakeholders who provided comments. The project was primarily funded with a grant awarded through the FEMA Pre-Disaster Mitigation Program, administered by the North Dakota Department of Emergency Services (DES). Guidance from state and FEMA staff was instrumental in completing the project.

Chapter 2: Study Area Background

Jurisdictional Information

Towner County is located in north central North Dakota. It is between the Canadian border and Ramsey County. Devils Lake is the region's dominant geophysical feature and is located a few miles south of the County. The total county area is 666,600 acres, making it the state's 36th largest county, considerably smaller than the median county size of 739,000 acres. The county includes six incorporated cities: Bisbee, Cando, Egeland, Hansboro, Perth, and Rocklake. Cando is the county seat and has the largest population. The county has several unincorporated communities, as well.

A general map of the county, including major features and neighboring jurisdictions, is shown in Figure 2.2 on the following page. Major roadways include US Highway 281, and State Highways 4, 5,17, and 66. The BNSF railroad runs north to Cando and then angles northwest to Bisbee.

Population and Demographics

Summarized demographic information for Towner County and North Dakota is shown in Table 2.1. The county is generally older than the state overall, with a median age of 50.4 and 25.3 percent of residents at least 65 years of age. The county's population density of 5.4 persons per square mile is less than half the statewide rate. Most residents identify themselves as White not Hispanic. The county's median income is less than the state's while the poverty level approximately matches the state's.

Historic population for the county is shown in Figure 2.1. The county had an early peak in population in 1910 and since then has gradually declined. The most recent Census population figure is 2,162 from the 2020 decennial census.

Woods and Poole project that the County will continue to lose population very gradually over the next 30 years.

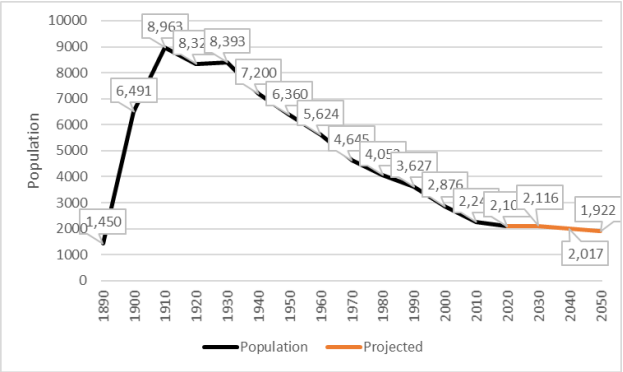
Recent population trends for each city are summarized in Table 2.2. Five of the seven cities lost population from 2000 to 2010, and three cities gained population from 2010 to 2020.

Table 2.1 – Towner County Demographics

	Towner County	North Dakota
Population	2,162	779,094
Persons under 5 years	5.7%	7.1%
Persons under 18 years	21.7%	23.6%
Persons 65 years and over	25.3%	15.7%
Median Age	50.4	35.3
Persons per square mile	5.4	11.0
White	91.9%	83.7%
Hispanic or Latino	2.7%	4.1%
American Indian or Alaska Native	3.3%	5.6%
Black or African American	0.1%	3.4%
Asian	0.5%	1.7%
Two or More Races	3.6 %	2.3%
Foreign born	5.1%	4.1%
Language other than English spoken at home	4.5%	6.0%
High school graduates, age 25+	91.4%	92.6%
Median household income	$52,300	$64,894
Persons in poverty	10.7%	10.6%
Average household size (persons)	2.07	2.3

Source: US Census Bureau; 2020 Decennial Census used for population and race/ethnicity; 2019 Population Estimates Program used for age; 2015-2019 American Community Survey used for other demographic information

Figure 2.1 – Towner County Historical and Projected Populations



Source: US Census Bureau (Historical and 2020); Woods and Poole (2030-2050 Projected)

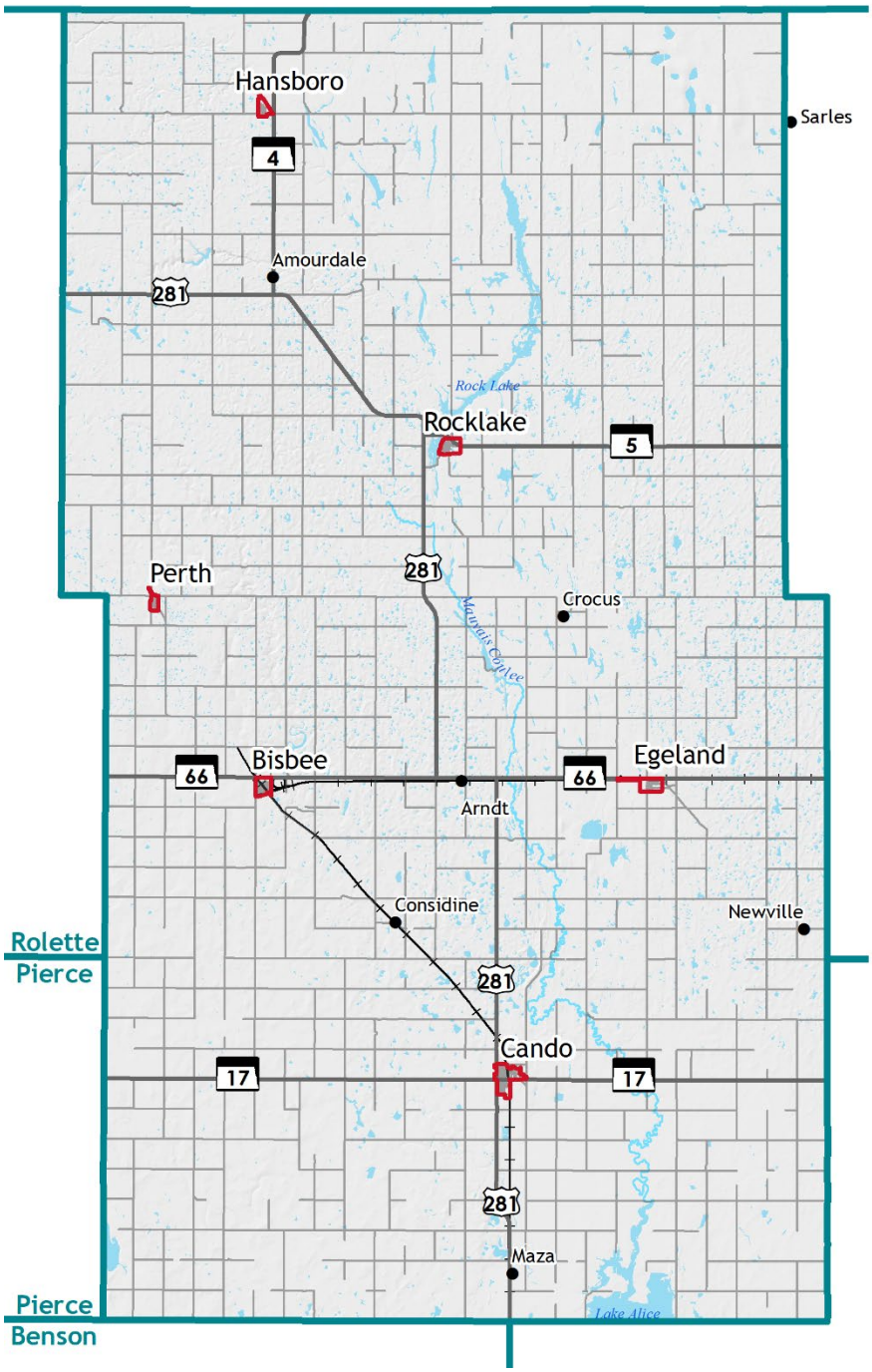


Figure 2.2
Study Area

- County Boundaries
- City Limits
- State & Federal Roads
- Other Roads
- Rail
- Unincorporated Communities

0 2.5 5 10 Miles

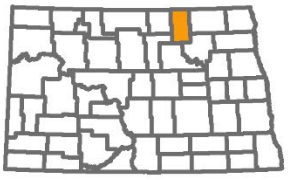


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Table 2.2 – Incorporated City Population Trends					
City	2000	2010	% Change 2000-2010	2020	% Change 2010-2019
Bisbee	167	126	-25.6%	110	-12.7%
Cando	1,342	1,115	-16.9%	1,117	0.2%
Egeland	49	28	-42.9%	32	14.3%
Hansboro	8	12	50.0%	15	25.0%
Perth	13	9	-30.8%	6	-33.3%
Rock Lake	194	101	-47.9%	94	-6.9%

Source: US Census Bureau Decennial Census: 2000, 2010 & 2020

Climate and Weather

Aggregated weather statistics for the county are shown in Table 2.3. Weather extremes in the county are shown in Table 2.4. The NWS Cooperative Network Weather Station in Cando is used for aggregate data because it has the longest available period of record in the county. Additional weather statistics can be found in Appendix C.

Table 2.3 – Towner County Aggregated Weather Statistics				
	Temperature (°F)		Precipitation (In.)	Snow Fall (In.)
	Avg Daily Max	*Avg Daily Min*	*Avg Monthly*	*Avg Monthly*
Jan	14.0	-9.1	0.39	4.7
Feb	19.1	-3.5	0.30	2.4
Mar	34.3	10.8	0.63	3.1
Apr	52.7	28.7	0.92	1.6
May	67.0	37.4	2.38	0.4
Jun	75.7	48.8	3.45	0.0
Jul	81.6	53.3	3.00	0.0
Aug	80.6	50.3	2.33	0.0
Sep	70.7	41.9	1.54	0.2
Oct	57.2	30.8	0.95	0.2
Nov	36.3	16.3	0.49	4.0
Dec	20.4	-0.8	0.36	4.8
Ann	*50.8*	*25.4*	*16.73*	*21.4*

Note: Aggregated Monthly Statistics 1/1/1912-12/31/2019
Source: NWS Cooperative Network Weather Station, Cando 321288 (High Plains Regional Climate Center)

Table 2.4 – Towner County Weather Extremes		
Highest Max Temperature	105° F	7/28/1917
Lowest Min Temperature	-48° F	1/13/1916
Highest Daily Precipitation	5.3"	6/22/1919
Greatest Snowfall	16.0”	12/28/1992
Lowest Annual Precipitation	7.28”	1934

Economy

The agricultural industry is the driving force of the Towner County economy.

The agriculture industry is tracked by annual survey and a 5-year census through the National Agricultural Statistics Service. Spring wheat was the most common crop, accounting for about 40 percent of the county’s harvested acreage in 2017. Cattle and calves make up the county’s livestock industry. The USDA Census of Agriculture indicates that in 2017 the total value of crops sold in the county was $50,179,000 and the total value of livestock was $54,511,000. Summarized 2017 Census of Agriculture information is shown in Table 2.5.

Table 2.5 - Towner County Agriculture Summary		
Crop	Acres Harvested	Production
Spring Wheat (excl Durum)	156,710	8,948,610 bu
Soybeans	138,023	4,521,388 bu
Canola	83,408	157,242,185 lbs
Dry Beans	19,781	366,110 cwt
Hay, Haylage, Silage	18,924	57,033 tons
Corn, Grain	18,218	2,014,676 bu
Other Wheat	11,242	494,498 bu
Barley	8,030	448,084 bu
Sunflowers	4,312	8,538,879 lbs
Flaxseed	3,113	88,464 bu
Peas	591	15,080 cwt
Oats	120	7,200 bu
Livestock	**Inventory**	
Cattle and Calves	9,235	
Hogs	36,015	

Source: USDA National Agricultural Statistics Service 2017 Census of Agriculture

Countywide workforce data is compiled by the Job Service North Dakota Labor Market Information Center. Table 2.6 identifies major employers in the region based on available LMI data and community estimates.

Table 2.6 Major Employers	
Towner County Medical Center	Healthcare & Social Assist
Legacy Cooperative	Wholesale
North Star Public School Dist 10	Educational Services
Towner County	Executive, Legislative and General Government
Heartview Foundation	Healthcare & Social Assist

Note: Suppressed Employers Omitted
Source: ND LMI 2020, Towner County Economic Development

CHAPTER 3: Hazard Risks and Vulnerabilities

Hazards Overview

DISASTER DECLARATIONS

Towner County is subject to several natural and human-caused or technological hazards. Many hazards are capable of creating significant levels of damage and having a negative effect on the local economy.

Table 3.1 lists Presidential Disaster Declarations for Towner County from 1953 to 2020. There were 64 unique Presidential Disaster Declarations in North Dakota during the period, and Towner County was designated for 27 of them. The most recent declared disasters pertained to the COVID-19 pandemic in 2020.

PROFILED HAZARDS

The 2019 State of North Dakota Enhanced Mission Area Operations Plan served as the basis for selecting the hazards profiled in this chapter. Homeland Security, identified in the 2014 statewide Multi-Hazard Mitigation Plan, was replaced by Civil Disturbance, Cyber Attack, and Criminal Terrorist National Attack which are profiled as separate hazards in the 2019 Enhanced Plan. Space Weather was also new in the 2019 Enhanced Plan. In this plan these hazards are profiled in a limited manner due to the low perceived level of impact or the perceived low potential to mitigate impacts. Wildland Fire and Urban Fire (including structural collapse) were combined into a single Fire hazard in the 2019 Enhanced Plan; but they are retained as separate hazards in this very rural region due to the very different impacts and responses needed for each. References to shortages and outage of critical materials from the 2014 Plan were eliminated because they are more impacts of hazards than actual hazards. Finally, Communicable Diseases from the 2014 Plan has been renamed Infectious Diseases.

Profiled natural hazards:

- Drought
- Flood
- Geologic Hazards
- Severe Summer Weather
- Severe Winter Weather
- Wildland Fire
- Space Weather

Profiled human-caused/technological hazards:

- Dam Failure
- Hazardous Materials Release
- Infectious Disease/Pest Infestation
- Transportation Incident
- Urban Fire
- Cyber Attack
- Civil Disturbance
- Criminal Terrorist Nation Attack

Table 3.1 – Towner County Presidential Disaster Declarations, 1953-2020

Year	Declaration	Hazard(s)
2020	DR 4509	Pandemic
2020	EM 3477	COVID-19
2017	DR 4323	Flood
2013	DR 4128	Severe Storms
2013	DR 4118	Flood
2011	EM 3318	Flood
2011	DR 1981	Flood
2009	DR 1829	Severe Storms
2006	DR 1645	Severe Storms
2006	DR 1616	Snow
2005	DR 1597	Severe Storms
2004	DR 1515	Severe Storms
2001	DR 1376	Flood
2001	DR 1353	Tornado
2000	DR 1334	Severe Storms
1999	DR 1279	Flood
1998	DR 1220	Flood
1997	DR 1174	Flood
1997	DR 1157	Severe Storms
1995	DR 1050	Severe Storms
1994	DR 1032	Severe Storms
1993	DR 1001	Flood
1979	DR 581	Flood
1974	DR 434	Flood
1969	DR 256	Flood
1957	DR 79	Tornado

Source: FEMA

HAZARD ANALYSIS

Natural hazards are listed first, followed by human-caused/technological hazards. Each profiled hazard includes the following information:

- **Hazard Profile:** Definition and general explanation of the hazard.
- **History:** Previous occurrences of the hazard.
- **Probability:** Estimated frequency of occurrence.
- **Location:** Identification of hazard location to specific parts of the county or as county-wide.
- **Extent:** The magnitude of the hazard.
- **Vulnerability:** Specific risk for the jurisdiction, including impacts to population, property, critical facilities, and economy.
- **Existing Capabilities:** Current actions taken by the jurisdiction to address the hazard.
- **Key Issues:** The primary issues that affect the jurisdiction and the basis for determining action items.
- **Potential Action Items:** A preliminary list of action items to address key issues. These items are refined and prioritized in Chapter 4.

The profiles include an analysis of the probability and impact of each event to determine overall hazard risk. These terms are defined similarly to their use in the 2019 Enhanced Plan. Probability is the likelihood that the hazard event will occur within the county in future years. Impact, and the extent to which critical facilities that could be significantly affected by the hazard event in a worst-case scenario. Criteria used to determine probability, impact, and overall risk class are shown below. Historical data from previous events was utilized to determine probability and magnitude when possible. Risk class is determined for the rural county (unincorporated areas) and each incorporated city. Table 3.2 illustrates the relationship between probability, impact, and risk class.

Probability

Low: less than 10 percent probability in the next year
Moderate: 10-100 percent probability in the next year
High: more than 100 percent probability in the next year

Impact

Low: less than 5 percent of jurisdiction exposed
Moderate: 5-10 percent of jurisdiction exposed
High: more than 10 percent of jurisdiction exposed

Risk Class

Low: at most either impact or probability are considered moderate, but not both
Moderate: above the low risk class, while at most either impact or probability are considered high, but not both
High: above the moderate risk class, while at least either impact or probability are considered high

Table 3.2 - Risk Class Determination Criteria

		Impact		
		Low	Moderate	High
Probability	Low	Low	Low	Moderate
	Moderate	Low	Moderate	High
	High	Moderate	High	High

Hazard statistics for recent years are provided from the National Oceanic and Atmospheric Administration (NOAA) National Climatic Data Center's Storm Data and Unusual Weather Phenomena database. The Storm Data and Unusual Weather Phenomenon database provides a comprehensive list of weather events along with vital information about each event. Information from the database is provided in the corresponding hazard profiles and Appendix C. For Towner County, the database includes information about flooding, severe summer weather and severe winter weather. Statistics for other hazards are provided by a variety of sources, as noted in each corresponding profile.

Drought

All Jurisdictions
Overall Risk: Moderate
Probability: Moderate (once per decade, approximately 10% to 20% annual probability)
Impact: Moderate (economic impact on entire county)

Seasonal Pattern
None, but impacts may be greater during Spring and Summer

Duration
Months/Years

Primary Impacts
Agricultural loss (crops, livestock)
Economic loss
Increased fire potential
Loss of potable water
Pest infestation

HAZARD PROFILE

Drought is generally defined as a deficiency of precipitation over an extended period. If severe enough, this deficiency has potential to reduce soil moisture and water below the minimum necessary for sustaining plant, animal and human life systems. It is a normal, recurrent phenomenon that takes place in nearly all climate zones. Droughts appear gradually, and it is often difficult to pinpoint their beginning and end. Droughts can last multiple years, and even persist over decades. Significant droughts in North Dakota occur approximately once per decade. Previous droughts include the 1930s, 1950s, early 1960s, mid 1970s, early 1980s, 1988 through 1991, 2007 through 2009, and 2017-2018.

Droughts are often measured by impacts; most notably agricultural damage and municipal water supply shortage. The impacts are highly variable based on time of year, amount of stored water in the soil, and meteorological factors such as temperature, humidity and wind. Impacts are also greatly affected by human factors such as local water demand and water management practices.

HISTORY AND EXTENT

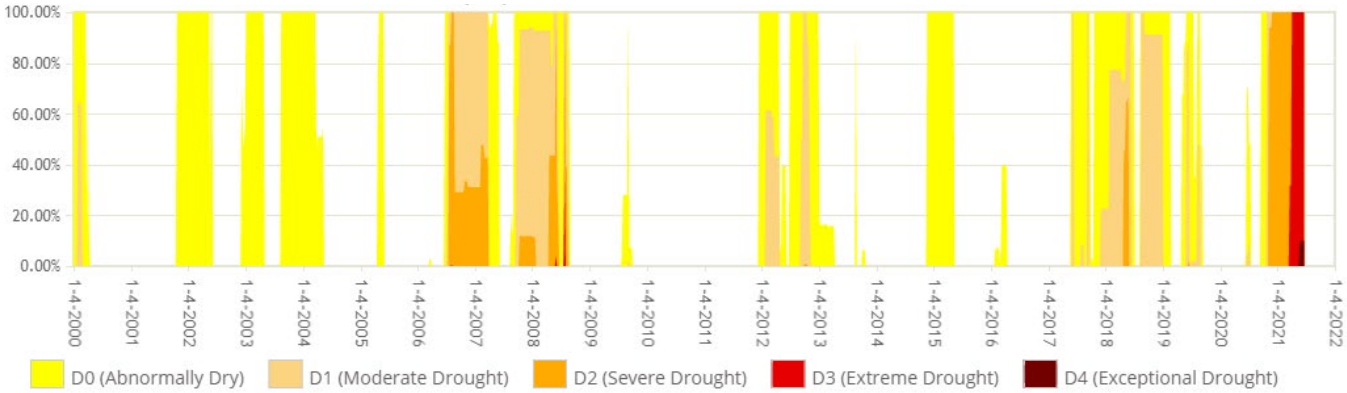
Historic trends show that wetter-than-normal periods tend to alternate with drier-than-normal periods. The average annual precipitation in Towner County is 16.7 inches as recorded at the National Weather Service Cooperative Network weather station. The county's lowest annual precipitation is 7.28 inches which was recorded in 1934.

Figure 3.1 illustrates the percent of area and intensity of drought conditions since 2000 in Towner County. Yellow indicates abnormally dry conditions. The red and brown colors indicate extreme and exceptional drought conditions, respectively. The chart shows that extreme drought that was widespread only occurred thrice during the time period.

The most recent severe drought began in the fall of 2020 and became a severe drought through most of 2021. This is the first time in the last 20 years when parts of Towner County experienced "exceptional drought" status. The D4 level on the drought scale is a very rare occurrence, happening less than 2% of the time. Impacts of this D4 drought included widespread crop and pasture losses, and shortages of water in reservoirs, streams, and wells. The County was designated as a Primary Natural Disaster Area due to the drought both 2020 and 2021.

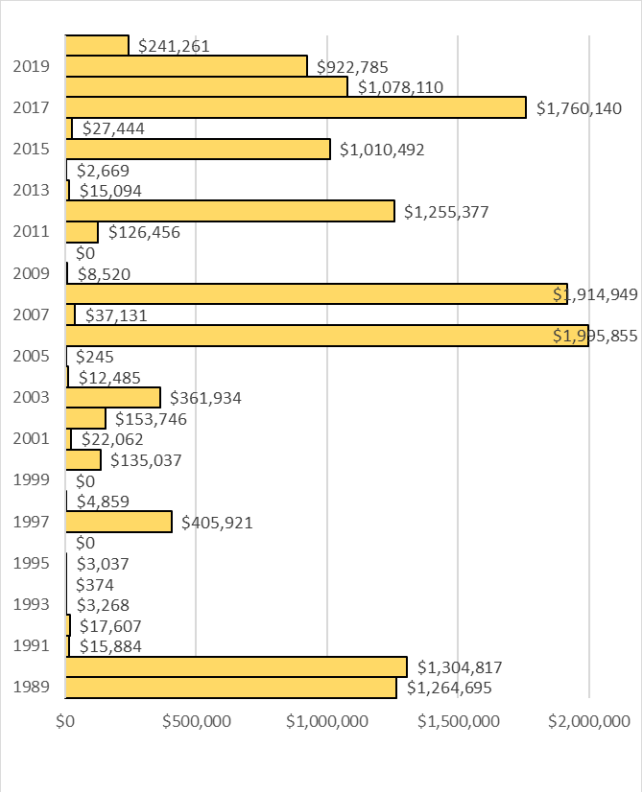
Historical drought occurrences can also be measured by looking at impacts. Federal indemnity programs provide financial assistance to help reduce the impact of drought-related agricultural losses. Figure 3.2 shows indemnity payments for Towner County from 1989-2020. The figure shows that 2006 had the largest drought indemnity payments during the time period. The years 1989, 1990,

Figure 3.1 – Towner County Drought Percent of Area and Intensity of Conditions (2000-2020)



2008, 2012, 2017, and 2018 also had drought related payments in excess of $1,000,000.

Figure 3.2 – Drought-Related Federal Indemnity Payments, Towner County, 1989-2020



Source: National Drought Mitigation Center

PROBABILITY

It is difficult to predict when a drought will appear. Historic trends show that wetter-than-normal periods tend to alternate with drier-than-normal periods. It is important to note, however, that numerous factors beyond rainfall contribute to drought status, which can make it difficult to predict and classify droughts. Based on previous regional trends, a severe drought can be expected approximately once or twice per decade.

LOCATION

Drought occurs at a regional level and is not a micro-climatic event. It generally occurs across the entire geographical area encompassed by a county. All parts of Towner County are at equal risk from drought.

VULNERABILITY

Population

- Drought has no direct impact on human life, but it greatly increases the risk of wildfire, which is a potentially life-threatening hazard. Drought accompanied by high temperatures can increase the threat of heat-related illness for persons who spend a significant amount of time outdoors or do not have adequately-cooled homes. The highest recorded temperature in the county (at the Cando monitoring station) was 105 degrees Fahrenheit recorded in July 1917. Elderly persons are at increased risk of heat-related illness. Approximately 553 residents in the county are 65 years of age or older. The estimated number of residents age 65 or older for each jurisdiction are summarized below.
    - Bisbee: 25 residents
    - Cando: 287 residents
    - Egeland: 10 residents
    - Hansboro: 1 resident
    - Perth: 1 resident
    - Rocklake: 28 residents
    - Rural Towner County: 201 residents
- Prolonged drought could affect water supplies. Bottled water could be brought in as an emergency measure, but a lack of household water could create health and sanitation issues for residents. Cando and Bisbee have municipal water systems, the remaining cities and most rural residents are connected to rural water systems. Some rural residents have their own wells. The rural water systems serving Towner County are Northeast Regional Water District and All Seasons Water Users District. A small part of the rural county is served by the Greater Ramsey Water District. The regional water supply districts are interconnected and are developing a strategy to overcome water supply shortages in the event of a severe drought.

Property

- Drought can result in significant loss of land and non-land property value for farmers and ranchers. Beyond agricultural impacts, there is also a greater threat of structure damage in drought-affected areas, as drought increases the risk of wildfire and may create water shortages that inhibit adequate fire response. Structure vulnerability from wildfire is discussed in more detail in the wildland fire section of this chapter.

Critical Facilities

- No critical facility in the county is physically impacted by drought.

Economy

- Agriculture is a significant economic driver in the county, and the economic success of each city ultimately relies on a healthy agriculture industry. Drought can have a significant economic impact on agriculture and related industries. Federal indemnity payments, previously shown in Figure 3.2, are an indicator of drought-related agricultural losses. Since 1989, the years with the greatest payments was 2006, 2008, and 2017 with an average of nearly $1.9 million paid by the USDA to reduce the economic impact of drought.
- The drought-related crop insurance payments in Towner County from 1989 to 2019 totaled $14,102,252. Based on a statewide rate of 89 percent of crops being insured, total estimated damages for the County were $15,845,227.
- The direct economic loss of drought for livestock producers is difficult to measure. Cattle and calve numbers regularly fluctuate based on a wide number of factors. Impacts on livestock producers include reduced rangeland productivity, high cost/ unavailability of water for livestock, disruption of reproductive cycles and the cost of finding supplemental feed or pasture.

Future Development

- Public water systems are monitored by the North Dakota Department of Health, and water permit applications are maintained by the North Dakota Department of Water Resources and US Army Corps of Engineers. The regional water supply districts serving Towner County are interconnected and are developing a strategy to overcome water supply shortages in the event of a severe drought.

EXISTING CAPABILITIES

The USDA Farm Service Agency and North Dakota State University Extension both have field offices located in Cando. Both offices offer general education relating to drought management best practices. The USDA Farm Service Agency field office assists with the distribution of drought indemnity payments to agricultural producers. Cando has emergency drought procedures in place.

KEY ISSUES AND POTENTIAL ACTION ITEMS

Key Issue: Agriculture is a key component of the county's economy. A significant drought has the potential to greatly affect the industry and the county as a whole.

- *Potential Action Item*: Continue supporting the USDA Farm Service Agency and North Dakota State University Extension and provide assistance as needed to local farmers and ranchers.
- *Potential Action Item*: Develop emergency response plan that includes coordination with local livestock producers.

Flood

Rural County
Overall Risk: High
Probability: Moderate. 34.8% Chance Per Year County-Wide
Impact: Low. Flooding impacts can be severe where they occur but are often localized to relatively small areas.

Bisbee
Overall Risk: Low
Probability: Low. Less than 10% Chance Per Year
Impact: Low

Cando
Overall Risk: Moderate
Probability: Moderate. Less than 10% Chance Per Year
Impact: Moderate or low if there is a better flood protected lagoon

Egeland
Overall Risk: Low
Probability: Low. Less than 10% Chance Per Year
Impact: Low

Hansboro
Overall Risk: Moderate
Probability: Moderate
Impact: Moderate

Perth
Overall Risk: Low
Probability: Low. Less than 10% Chance Per Year
Impact: Low

Rocklake
Overall Risk: Low
Probability: Low. Less than 10% Chance Per Year
Impact: Moderate

Seasonal Pattern
March – October

Duration
One week

Primary Impacts
Agricultural loss (crops, livestock)
Blocked roads
Economic loss
Human loss and injuries
Localized evacuation
Property damage or loss

HAZARD PROFILE

Primary causes of flooding in North Dakota include heavy rain/flash flooding, rapid snowmelt/ice jams and increased seasonal moisture. Flooding can occur in riverine zones or flat areas that lack adequate drainage.

Typical insurance policies do not cover flood damages, so FEMA created the National Flood Insurance Program (NFIP) to provide flood insurance for property owners. The NFIP makes flood insurance available to residents in NFIP-participating communities that adopt and enforce floodplain management ordinances and follow other basic requirements.

A Flood Insurance Rate Map (FIRM) is created to determine flood insurance rates for each participating community. The FIRM identifies Special Flood Hazard Areas (SFHA) that have a one percent annual chance of flooding, commonly referred to as the 100-year floodplain. Areas outside the SFHA are considered to be in the Non-Special Flood Hazard Area (NSFHA). Structures in the NSFHA may still be at risk from flooding; according to FEMA, one in every four floods occurs in an NSFHA. Flood insurance is required for all property owners who acquire a loan from a federally regulated, supervised or insured financial institution for the acquisition or improvement of land, facilities or structures located within an SFHA.

HISTORY

Towner County was included in twelve flood-related Presidential Disaster Declarations between 1957 and 2020.

Localized road and culvert washouts are the most common identified impacts of flood events in the county, although some events resulted in more significant impacts. The National Climatic Data Center Storm Events Database includes brief summaries of significant storm events. A selection of recent flood events within Towner County are summarized below.

- **March 30 – April 1, 2017.** Heavy snowfall in the winter of 2016-2017 was followed by a rapid snowmelt at the end of March. This led to water overflowing the drainage system and flooding many local roads. Three bridges were damaged by the flooding.
- **August 3, 2016.** Extreme rains in the region caused water to flood ditches and encroach onto Highway 66.
- **August 10, 2010.** Major thunderstorms and torrential rains in the Egeland area resulted in local street flooding.
- **August 3, 2010.** Major thunderstorms produced large hail, tornadic activity and large amounts of rain in the

Bisbee area and resulted in crop damage. Highway 66 was closed due to water flowing over the road.

- **April 1-10, 2006.** Water drained into low areas due to rapid snowmelt, damaging approximately 40 bridges and 40 roads in the county.
- **July 11, 2000.** More than 6 inches of rain fell in the Cando area. Several urban streets were flooded and some basements filled with water. Additionally, some crops were flattened and local roads washed out.
- **Spring 1987.** Rapid snowmelt resulted in more than 80 roads being washed out in the county.

The US Army Corps of Engineers Cold Regions Research and Engineering Laboratory (CRREL) tracks ice jams in Towner County. CRREL has recorded 11 ice jams in the county since 1955. All the ice jams were along the Mauvais Coulee and its tributaries near Cando and Bisbee. The most recent ones were recorded in 2008. No ice jams in the County have resulted in reported damages.

Rising waters in the Devils Lake Basin which began in 1993 have resulted in relocation of some homes, closed roads, and fields that remain flooded over multiple years.

PROBABILITY

Recent flood events in Towner County are summarized in Table 3.3. The county averages less than one flood event per year. Flood event classification criteria and a detailed listing of events can be found in Appendix C. There is an 85% annual probability of flooding in Towner County.

Table 3.3 - Flood Events in Towner County, 2000-2019

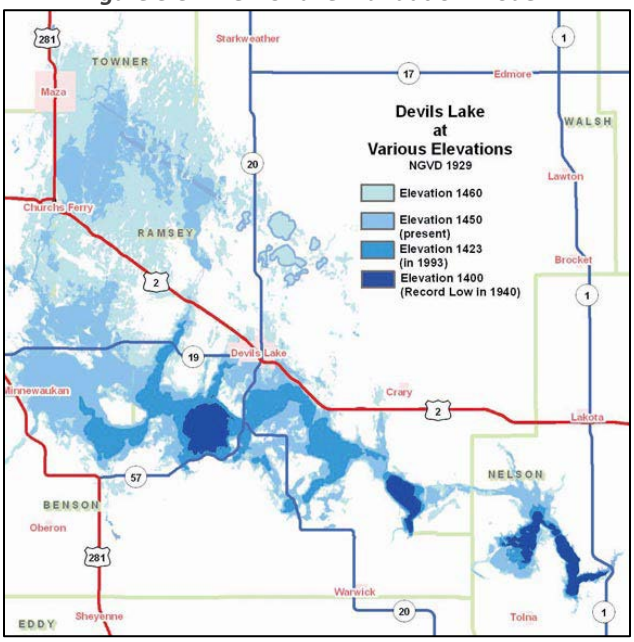
Flood Events	Event Days*	Annual Probability	Event Days per Year
Flood	17	85%	0.85

**Number of days with a reported event*
Source: National Climatic Data Center Storm Events Database

LOCATION

Flood Insurance Rate Maps effective January 19, 2001 were established for the City of Cando and Towner County. The entire Cando effective map is designated NSFHA meaning that the entire jurisdiction is classified as Zone C. The flood insurance study for these jurisdictions shows the main flooding source is essentially the rising waters of Devils Lake and associated wetlands, streams and coulees located within the "closed" Devils Lake Basin. The floodplain analysis was a stillwater analysis because the principal source is lake water. Figure 3.3 illustrates the potential areas of inundation in Towner County if associated lake elevation increased to the maximum potential elevation of 1,460 feet above sea level. Spring flooding typically caused by snowmelt runoff flowing over frozen soil can occur in small drainages located throughout the county. Drainages pass adjacent to Cando, Perth and Rocklake, but do not enter any of the cities.

Figure 3.3 – Devils Lake Inundation Model



Source: ND Department of Water Resources

Flood Insurance Rate Map information for Towner County is shown in Figures 3.4, 3.5 and 3.6. Zones A and AE (also known as a 100-year floodplain or Special Flood Hazard Area) identify areas with a one percent annual chance of flooding. There is no floodway because the floodplain analysis was a stillwater analysis for lakes and not riverine. Zone X areas shown on the maps (also known as a 500-year floodplain or Non-Special Flood Hazard Area) present a 0.2 percent annual chance of flooding.

Figure 3.4 – FIRM Panel 675

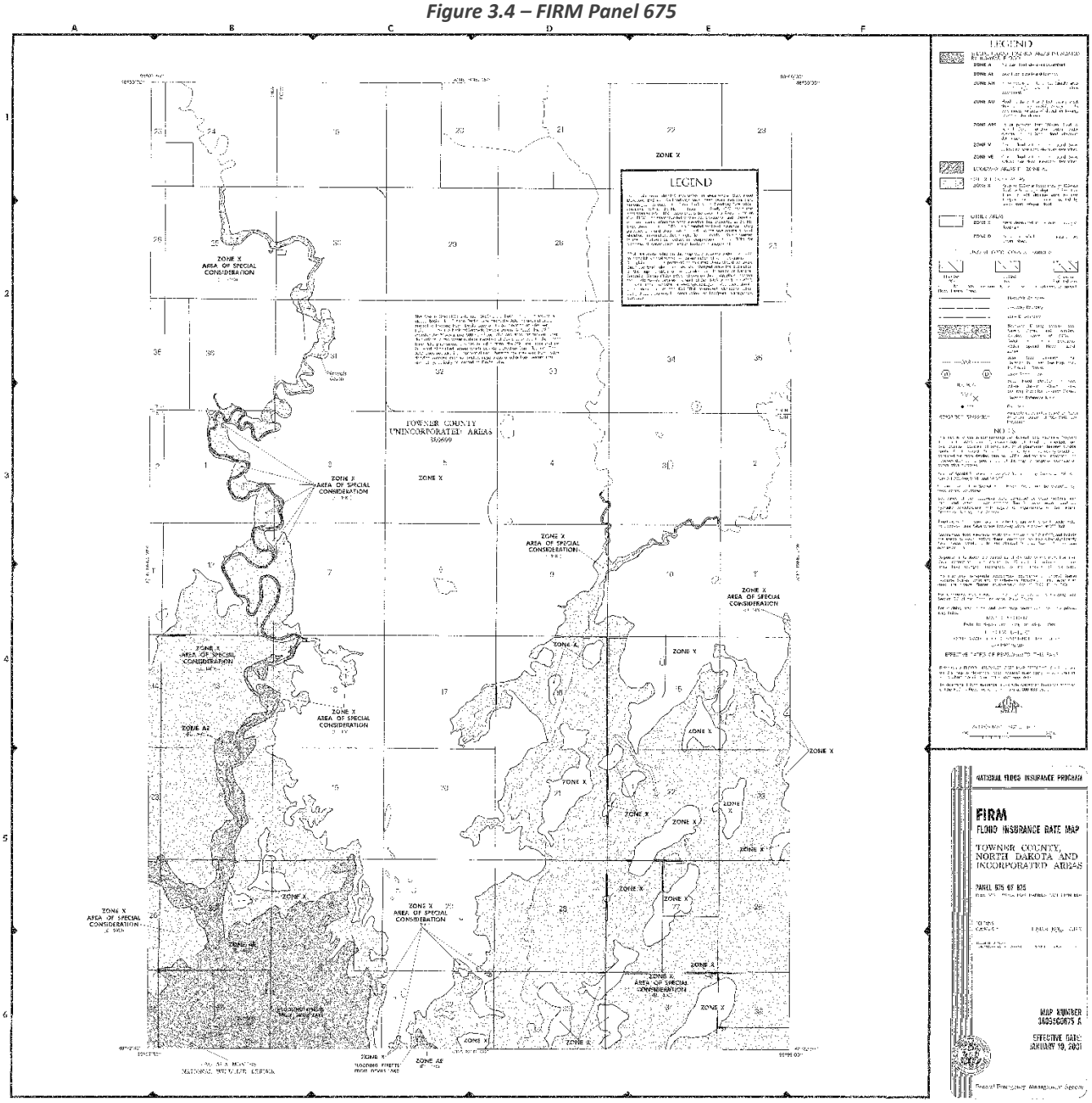


Figure 3.5 – FIRM Panel 650

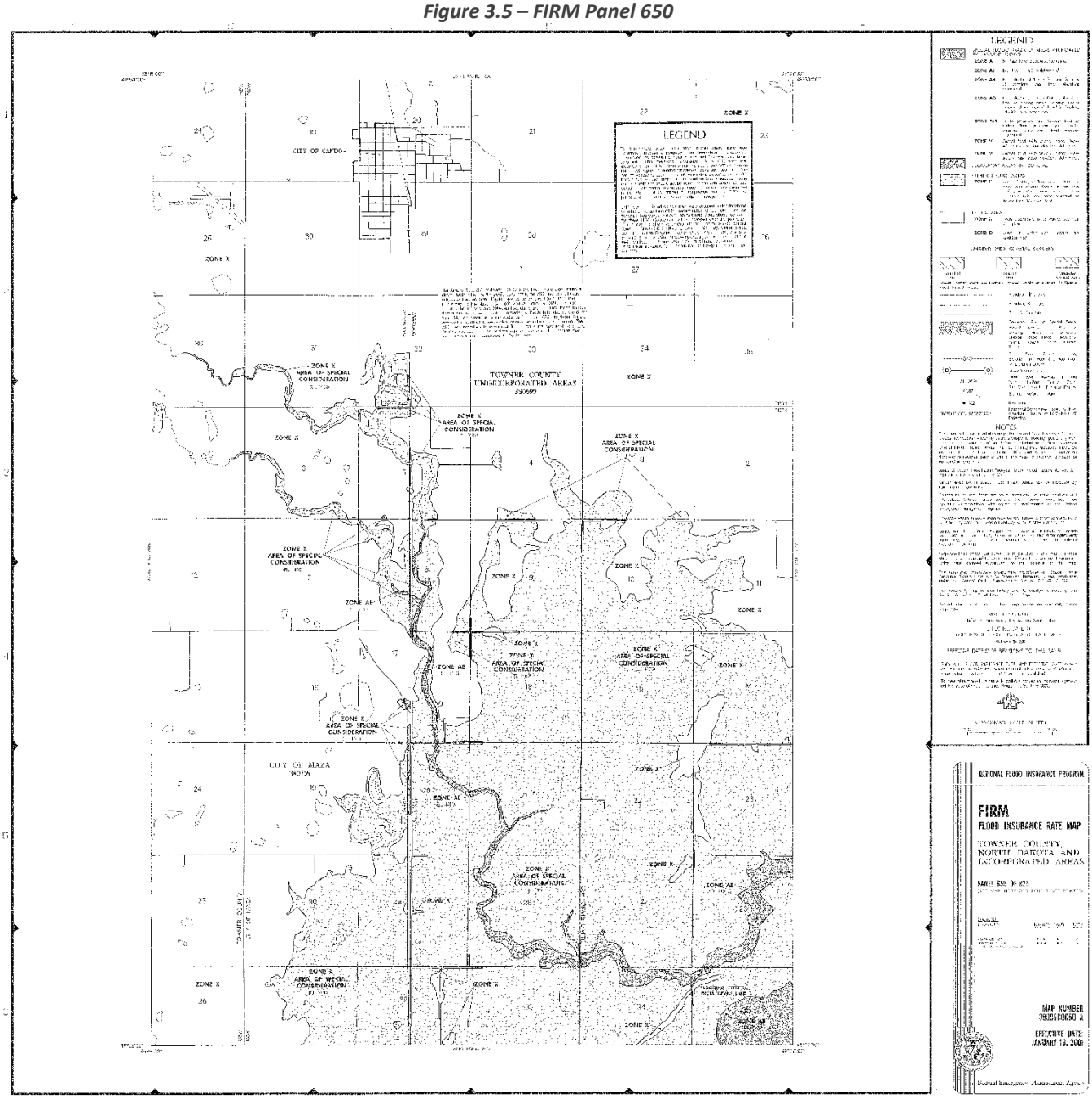
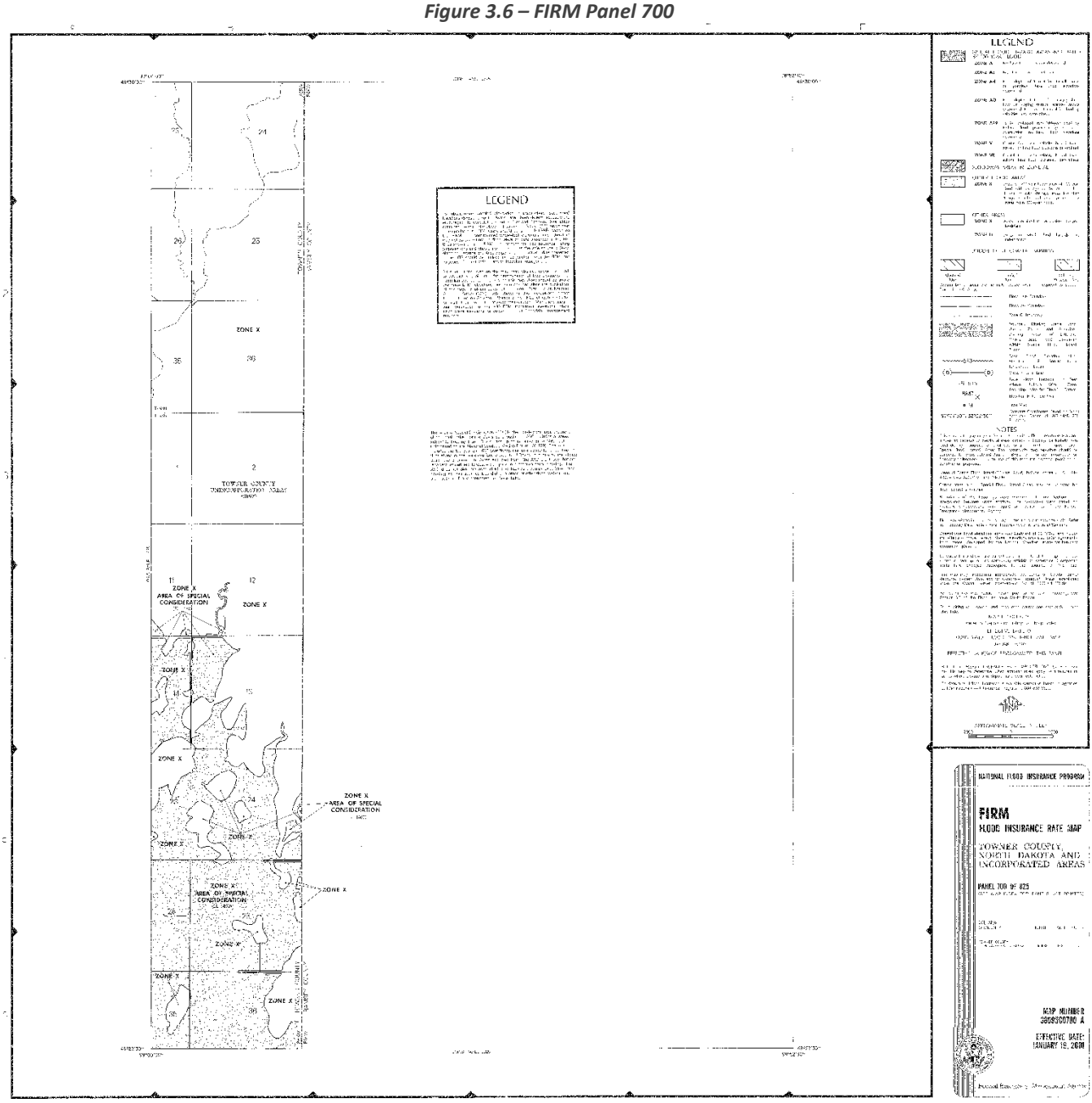


Figure 3.6 – FIRM Panel 700



Additional floodplain modeling for the County was completed in 2019 with a Risk MAP program undertaken jointly by FEMA and the North Dakota State Water Commission. The resulting RAM maps are based on topography and modeled water volumes to determine estimated floodplain areas. RAM floodplains are not regulatory and are intended for planning purposes only. However, it should be noted that any jurisdiction participating in the NFIP has the authority to use "best available information" when administering floodplain regulations. Figures 3.7 through 3.12 show areas identified by the Risk MAP study as being located in an area with significant risk of flooding.

Figure 3.7

Bisbee ND RAM Flood Risk

10% Annual Chance
4% Annual Chance
2% Annual Chance
1% Annual Chance
City Limits
State & Federal Roads
Other Roads
Rail

N

0 ¼

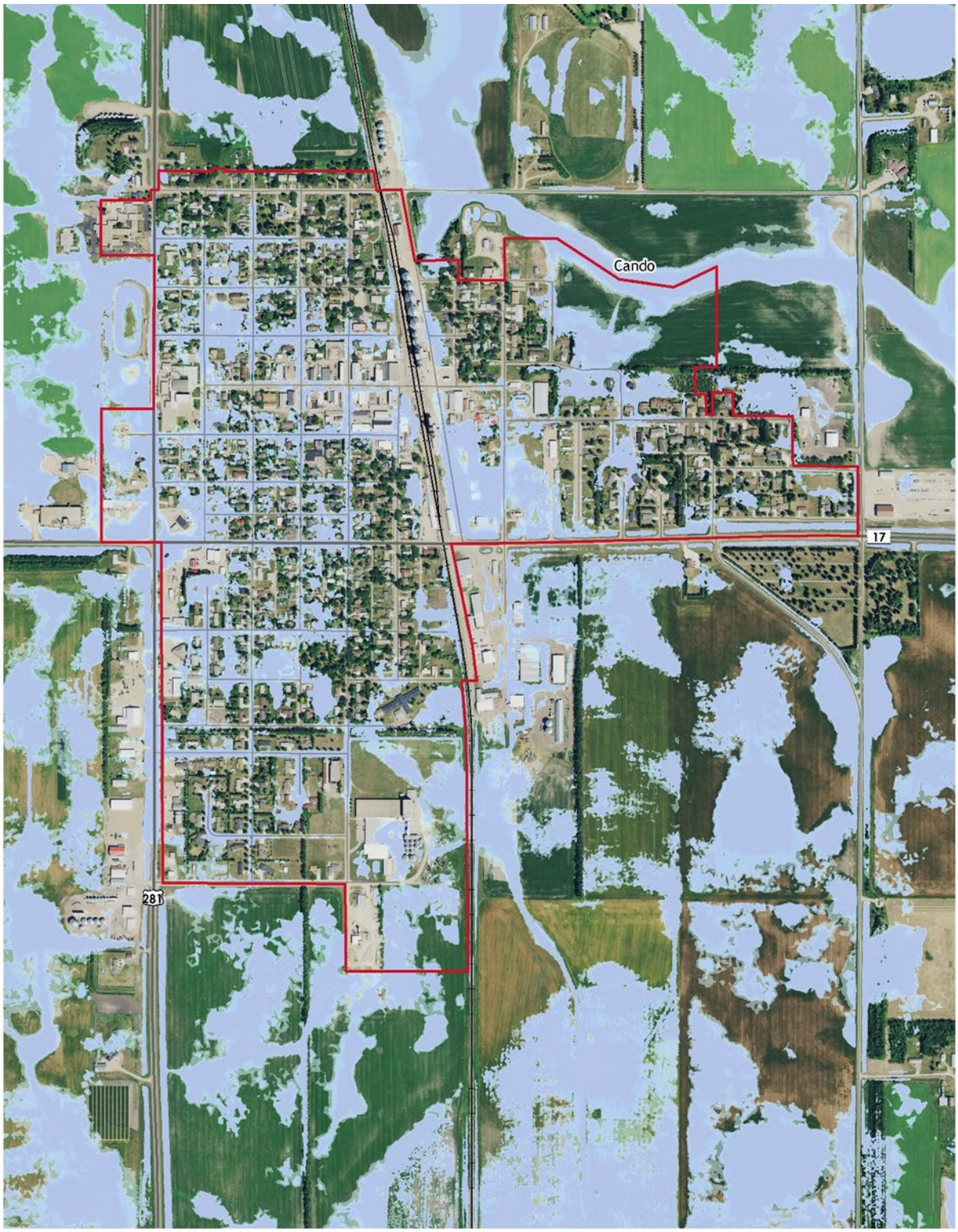


Figure 3.8
Cando ND RAM Flood Risk

10% Annual Chance
4% Annual Chance
2% Annual Chance
1% Annual Chance
0.2% Annual Chance
City Limits
State & Federal Roads
Other Roads
Rail

0 ¼ Miles

N

KLJ

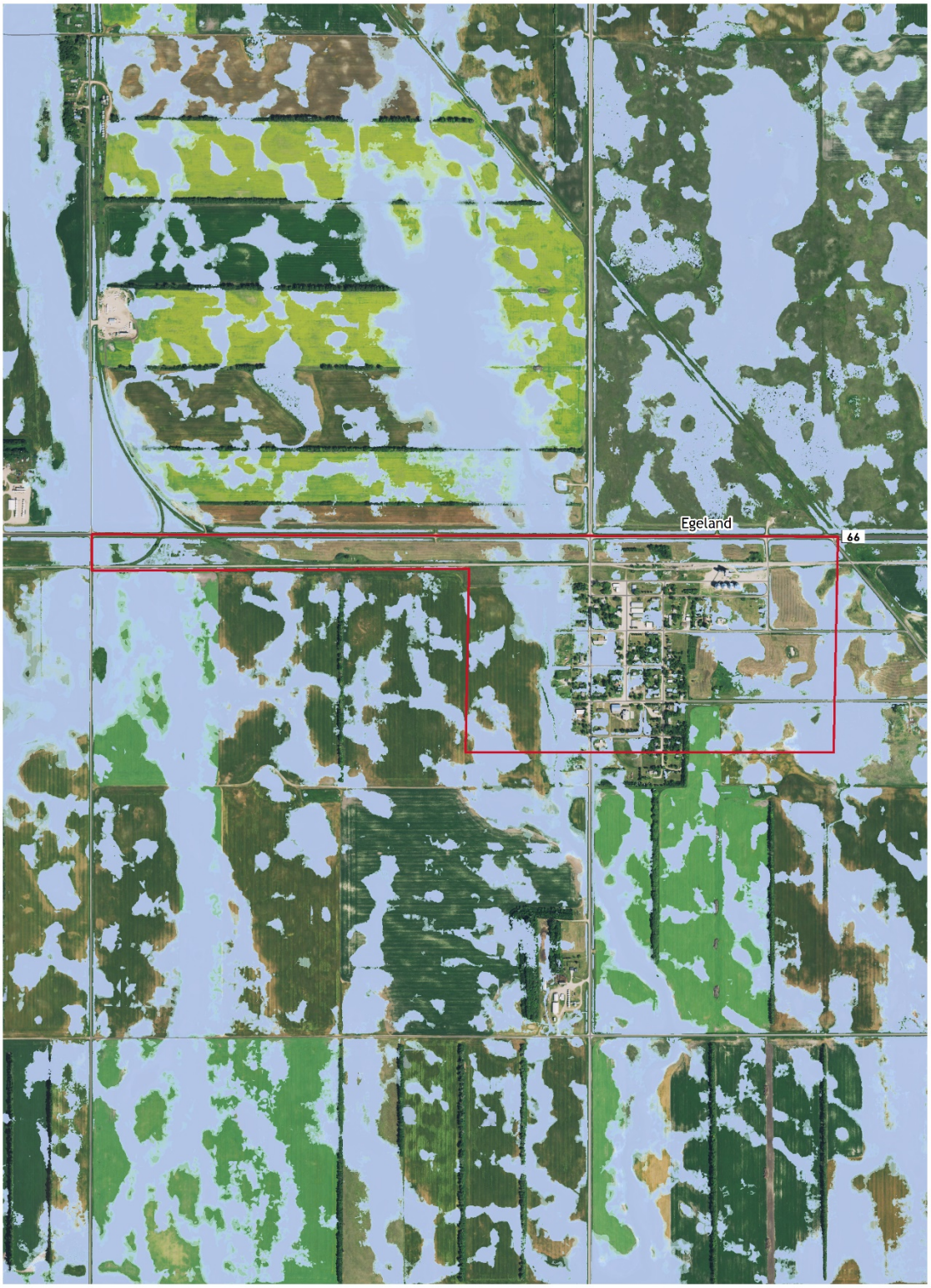


Figure 3.9
Egeland ND RAM Flood Risk

10% Annual Chance
4% Annual Chance
2% Annual Chance
1% Annual Chance
0.2% Annual Chance
City Limits
State & Federal Roads
Other Roads
Rail

0 ¼ Miles

N

KLJ

Figure 3.10
Hansboro ND RAM Flood Risk

10% Annual Chance
4% Annual Chance
2% Annual Chance
1% Annual Chance
0.2% Annual Chance
City Limits
State & Federal Roads
Other Roads
Rail

0 ¼ Miles

N

KLJ

Figure 3.11

Perth ND RAM Flood Risk

10% Annual Chance
4% Annual Chance
2% Annual Chance
1% Annual Chance
0.2% Annual Chance
City Limits
State & Federal Roads
Other Roads
Rail

0 ¼ Miles

N

KLJ

Figure 3.12
Rocklake ND RAM Flood Risk

10% Annual Chance
4% Annual Chance
2% Annual Chance
1% Annual Chance
0.2% Annual Chance
City Limits
State & Federal Roads
Other Roads
Rail

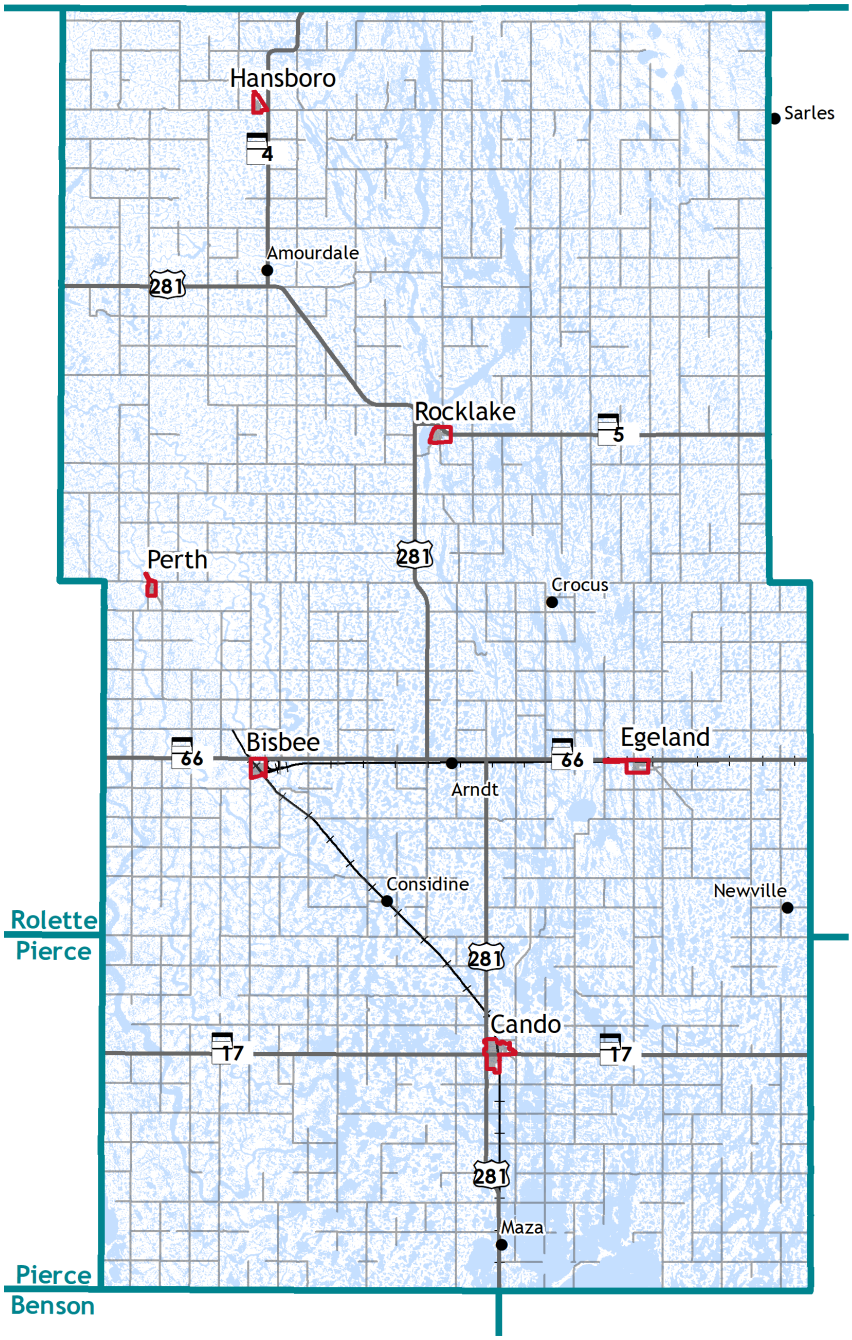
0 ¼ Miles

N

KLJ

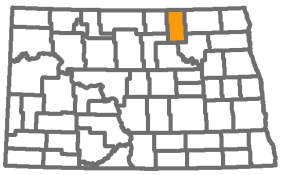
Figure 3.13

Figure 3.12
County-Wide 1% Annual Chance Flood Risk



1% Annual Chance
County Boundaries
City Limits
State & Federal Roads
Other Roads
Rail
Unincorporated Communities

0 2.5 5 10 Miles



N

KLJ

VULNERABILITY

Population

- Vulnerable population can be estimated by identifying the intersection of US Census Blocks with identified floodplains. This was done for the 2015 Towner County MHMP, with a resulting estimate of 54 residents located in county floodplain areas. None of these were in cities.

Table 3.4 – Towner County Census Block Population intersection with Identified Floodplains

	Census Block Population near Area of Special Consideration	Census Block Population near Zone AE	% of Total Population
Rural County	44	10	21.6%
Cando	0	0	0%
Total	44	10	21.6%

Note: Floodplain area from FEMA FIRM (Zones A & AE)
Source: Towner County MHMP, 2015

Property

- The statewide Multi-Hazard Mitigation Plan includes information about crop insurance payments from the USDA Risk Management Agency. Flood-related crop insurance payments in Towner County from 1989 to 2019 were approximately $380,000. Based on a statewide rate of 89 percent of crops being insured, total estimated damages for the County were $427,000. Over a 30-year period this results in an annualized loss of $14,233. Statistics can be seen in Figure 3.14.
- Repetitive loss properties are tracked for communities that participate in the NFIP. There are no known repetitive loss properties in the County.
- An estimate of residences at risk from flooding was created by intersecting the FIRM floodplain data with aerial photography. A total of 12 residences are estimated to be at risk throughout the County (all rural) according to the FIRM data. As summarized in Table 3.5 an additional 12 non-residential properties also appear to be vulnerable to flooding.

Figure 3.14 – Flood-Related Federal Indemnity Payments, Towner County, 1989-2020

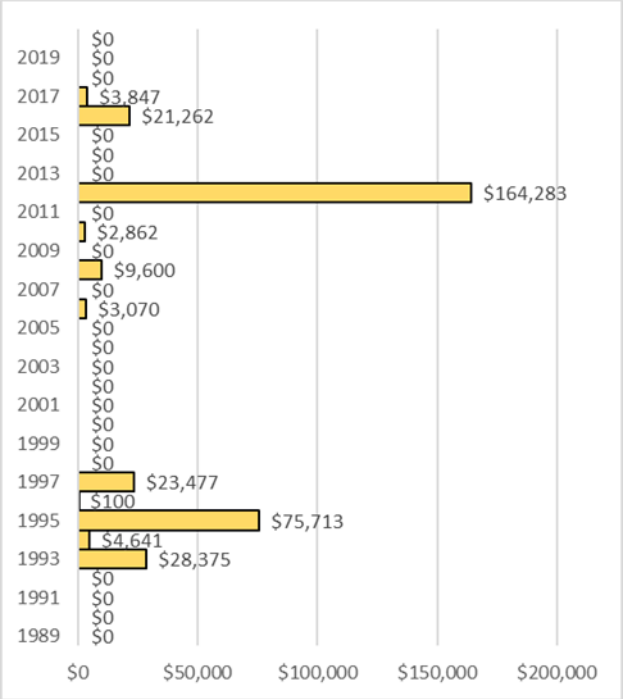


Table 3.5 – Towner County Estimated Properties within Identified Floodplain

	Residential Properties	Non-residential Properties
Rural County	12	12

Note: Floodplain area from FEMA FIRM (Zones AE and Area of Special Consideration)

Critical Facilities

- The Cando wastewater treatment facility is the only known critical facility threatened by flooding.

Economy

- Annual agricultural crop loss impacts are estimated at $14,233. Other impacts are unknown.

Future Development

- Cando and Towner County are participants in the NFIP and have floodplain regulations that limit future growth into high-risk areas. Neither jurisdiction has future land use maps so areas and potential flooding impacts on future development are undefined.

EXISTING CAPABILITIES

Both Cando and Towner County have floodplain administrators and floodplain ordinances that are actively enforced. NFIP participation is summarized in Table 3.6. Participation is lower than it was in 2015. Each jurisdiction has Flood Insurance Rate Maps that were created in 2001.

Table 3.6 - NFIP Participation in Towner County

Jurisdiction	Policies in Force	Insured Value of Participating Properties
City of Cando	0	$0
Rural County	3	$857,200

Note: Policy information as of 9/30/2021

KEY ISSUES AND POTENTIAL ACTION ITEMS

***Key Issue*:** Towner County experiences about one flood event almost every year. Flood events in the county include localized drainage system flooding and closed basin lake flooding.

- *Potential Action Item*: Conduct NFIP workshop to educate public about benefits of flood insurance.
- *Potential Action Item*: Develop educational strategy to highlight the benefits of participation in the NFIP
- *Potential Action Item*: Identify, acquire and remove high risk properties in the floodplain.
- *Potential Action Item*: Consider joining the NFIP and its Community Rating System (CRS) program.
- *Potential Action Item*: Enhance levee on west end of Hansboro to keep water from overflowing drainage ditch on west and north side of town.

***Key Issue*:** Roads in the county are sometimes washed out or inundated during flooding events. And in 2017 three bridges were damaged.

- *Potential Action Item*: Identify areas that could use enlarged culverts or road raises.
- *Potential Action Item:* Elevate commonly impacted roads or bridges.
- *Potential Action Item:* Replace damaged bridge(s) with box culverts.

***Key Issue*:** Rising waters in the Devils Lake Basin, although slowed in recent years, have resulted in closed roads, relocation of homes, and loss of productive farmland in southern Towner County.

- *Potential Action Item*: Construct flood protection levees.
- *Potential Action Item*: Elevate impacted roads.

Geologic Hazards

All Jurisdictions
Overall Risk: Low
Probability: Low
Impact: Low

Impacts
Not Applicable (no significant potential for earthquakes, landslides or sinkholes)

HAZARD PROFILE

Geologic hazards include landslide, earthquake and sinkholes related to underground mining.

The US Geological Survey (USGS) defines a landslide as a movement of rock, soil, artificial fill, or a combination thereof on a slope in a downward or outward direction. The primary causes of landslides are slope saturation by water from intense rainfall, snowmelt, or changes in groundwater levels on primarily steep slopes, earthen dams, and the banks of lakes, reservoirs, canals and rivers.

An earthquake is defined by USGS as a sudden movement of the earth, caused by the abrupt release of strain that has accumulated over a long time. North Dakota is not an area known for earthquake activity; however, many small earthquakes may occur throughout the state. Earthquake severity can be measured by looking at magnitude and intensity. Magnitude is based on the area of the fault plane and amount of slip, and it can be measured using the Richter scale. An earthquake below Richter magnitude 5.0 rarely causes damage. Intensity is based on how strong the shock is felt and the degree of damage at a given location. It can be measured using the modified Mercalli scale. Damage usually occurs with earthquakes of intensity level V or higher.

The USGS defines a sinkhole as a depression in the ground that has no natural external surface drainage. The primary cause of sinkholes is typically the dissolution of soluble rock by groundwater. This creates underground spaces. If there is not enough support for the land above the spaces, sudden collapse of the land surface can occur.

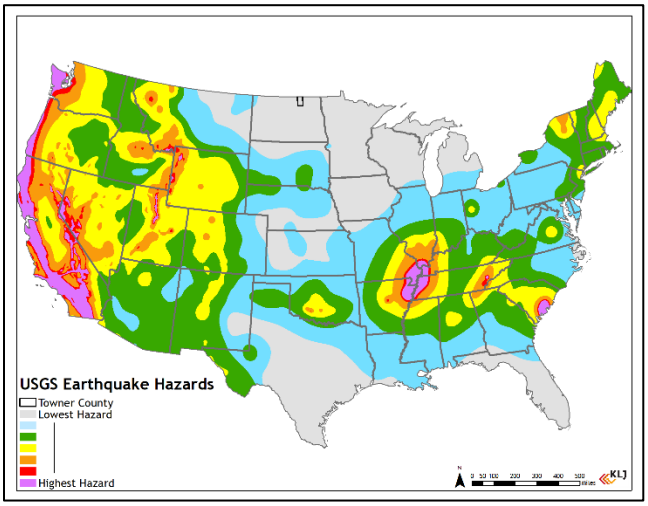
HISTORY

There is no record of earthquakes in Towner County. There is no record of any significant landslide in Towner County. Nor is there any record of sinkholes or mining activity that could lead to sinkholes.

LOCATION, EXTENT AND PROBABILITY

Figure 3.15 shows that Towner County, and practically all of North Dakota, has the lowest earthquake hazard level according to the USGS.

Figure 3.15 – USGS Earthquake Risk Levels



The Geologic Hazard risk in Towner County is primarily from landslides. Towner County has a small moderate susceptibility area in the northwest corner of the county, shown in Figure 3.16. There is no history of significant landslide in the county and the hazard area is small; therefore, landslide is not considered to be a priority hazard for the county.

VULNERABILITY

Population, Property, Critical Facilities, Economy, Future Development

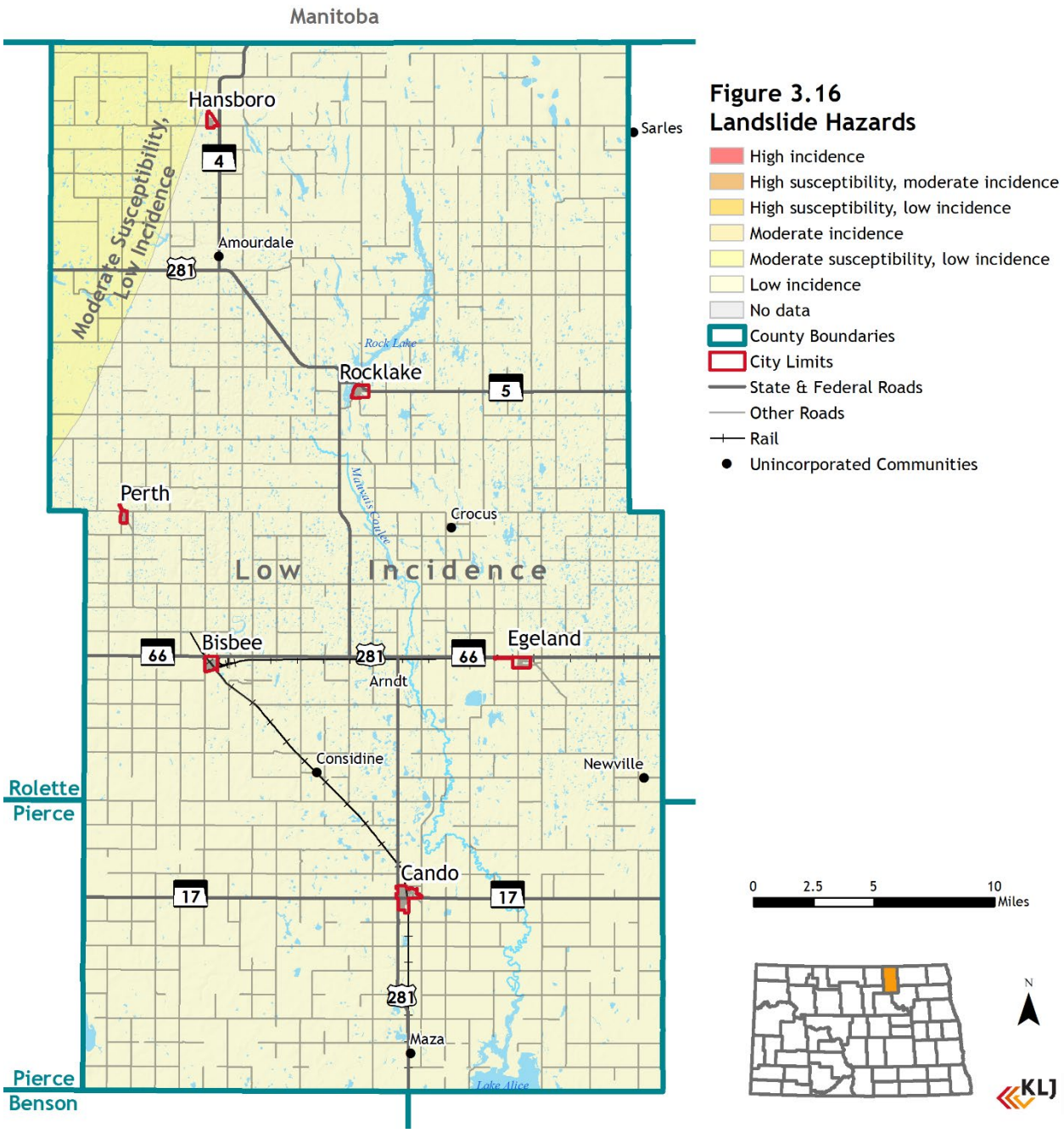
- There is no discernable vulnerability to Towner County's population, property, critical facilities, economy, or potential future development from geologic hazards.

EXISTING CAPABILITIES

The State Building Code prohibits construction on steep slopes and provides general standards that contribute to earthquake resiliency. No jurisdiction has adopted the State Building Code.

KEY ISSUES AND POTENTIAL ACTION ITEMS

***Key Issue*:** There are no key issues related to geologic hazards in Towner County


Manitoba
Hansboro
Sarles
4
Amourdale
281
Moderate Susceptibility, Low Incidence
Rock Lake
Rocklake
5
Perth
Crocus
Mauvais Coulee
Low Incidence
Bisbee
66
281
66
Egeland
Arndt
Considine
Newville
Rolette
Pierce
Cando
17
17
281
Maza
Pierce
Benson
Lake Alice
Figure 3.16
Landslide Hazards
High incidence
High susceptibility, moderate incidence
High susceptibility, low incidence
Moderate incidence
Moderate susceptibility, low incidence
Low incidence
No data
County Boundaries
City Limits
State & Federal Roads
Other Roads
Rail
Unincorporated Communities
0
2.5
5
10
Miles
N
KLJ

Severe Summer Weather

All Jurisdictions
Overall Risk: High
Probability: High
Magnitude: High

Seasonal Pattern
May - October

Duration
A few minutes to six hours

Primary Impacts
Agricultural loss (crops, livestock)
Economic loss
Human loss and injuries
Increased stress on medical services
Permanent loss of businesses
Power loss
Property damage or loss
Release of hazardous materials

HAZARD PROFILE

The elements of severe summer weather include tornadoes, wind, hail and lightning.

Tornadoes are the most destructive weather phenomenon on earth. They can produce winds ranging from 65 MPH to more than 300 MPH and pose severe danger to life and property. Peak tornado season is from June to August, and most occur during evening hours. Tornadoes typically travel from southwest to northeast at a speed between 30 and 70 MPH and are generally on the ground for less than 10 minutes; however, tornado characteristics are highly unpredictable and can change rapidly. Tornado severity is recorded with the Enhanced Fujita (EF) Scale, which replaced the Fujita (F) Scale in 2007. Wind speed estimates are determined by the damage created by a tornado. The EF Scale is shown below.

EF 0: 65-85 MPH
EF 1: 86-110 MPH
EF 2: 111-135 MPH
EF 3: 136-165 MPH
EF 4: 166-200 MPH
EF 5: Over 200 MPH

Most tornado fatalities are caused by flying debris. Wind, hail and scud clouds may mask the presence of a tornado and associated debris, which makes a public warning system critical for preventing loss of life and injuries.

Straight-line winds are a common element of severe summer storms, and typically responsible for most damage associated with the storms. Strong winds often form on the leading edge of severe storms, and gusts more than 100 MPH are possible.

Hail presents a hazard for property, crops, livestock and occasionally human life. Hail events range from an area of a few acres up to hundreds of square miles, although small events are most common. Hailstones can fall to the surface at more than 100 MPH and reach more than seven inches in diameter; however, most hailstones do not exceed two inches in diameter.

Lightning strikes pose multiple threats to life and property. A lightning strike can electrocute humans and animals, vaporize materials, cause fire and cause an electrical surge that may damage equipment. Human deaths from lightning strikes are somewhat uncommon. According to the National Oceanic and Atmospheric Administration, there were 12 recorded lightning fatalities in North Dakota from 1959-2013. Florida led the nation during that time period with 471 lightning fatalities. Livestock deaths and property damage are the most common lightning-related threats in North Dakota.

HISTORY

Towner County was included in eleven summer storm-related Presidential Disaster Declarations between 1953 and 2020.

Table 3.7 - Severe Summer Weather Events in Towner County, 1996-2020

Summer Storm Events	Event Days*	Annual Probability	Event Days per Year
Total	210	913.0%	9.1
Hail	130	565.2%	5.7
High/Thunderstorm Wind	49	213.0%	2.1
Tornado/ Funnel Cloud	30	130.4%	1.3
Excessive Heat	1	4.3%	0.0

**Number of days with a reported event*
Source: National Climatic Data Center Storm Events Database

Severe summer weather events in Towner County are summarized in Table 3.7. Hail and wind events occur approximately 6 and 2 times per year on average, respectively. Summer weather classification criteria and a detailed listing of events can be found in Appendix C.

A severe hail event is defined as a storm producing hailstones greater than 0.75 inches in diameter. According

to the National Weather Service, the largest hailstone recorded in Towner County from 1996 to 2019 is 3 inches in diameter, which occurred in May 2006. June is the most common month for severe hail in the county, accounting for 34 percent of all reported hail events between 1996 and 2019. Common impacts from hail include broken windows, damaged shingles, dented or broken gutters, and damaged vehicles. Heavy hail events can also injure livestock and destroy crops.

A severe wind event is defined as gusts of at least 50 kts or 58 MPH. According to the National Climatic Data Center the greatest straight-line wind gust recorded in Towner County from 1996 to 2019 is 74 kts (85 MPH), which occurred in August 2016. July is the most common month for high wind in the county, accounting for 23 percent of all reported wind events between 1996 and 2019. Common impacts from severe winds include broken trees and limbs, damaged agricultural structures and damaged power poles.

Tornadoes are rare in the county, as shown in Figure 3.17. There were 30 tornadoes/funnel clouds reported in the county between 1996 and 2019; however, a majority were rated at EF0 or EF1 meaning they caused minimal damage to property. The impact would be devastating if a large tornado were to directly strike a city. An EF3 tornado in 2008 originated in Rolette County and traveled several miles in Towner County before lifting. It caused EF 1 level damages. There was an EF2 tornado in August 2016 that demolished buildings at two farmsteads and destroyed some powerlines.

Anecdotal evidence suggests that lightning presents an ongoing risk to people and property in the county. But there are not documented instances of lightning caused damages.

The National Climatic Data Center Storm Events Database includes brief summaries of significant storm events. A selection of recent summer storm events within Towner County are summarized below.

- ***June 1996.*** A powerful thunderstorm near Rocklake damaged farmstead buildings and destroyed crops. Damages to property included $300,000 and damages to crops included $200,000. Winds reached 70 mph.
- ***July 2008***. An EF1 Tornado touched down near Crocus and traveled towards Egeland and crossed into Cavalier County. Law enforcement reported an 11-mile long path of intermittent damage that caused $150,000 in property damage and $5,000 in crop damage. In addition, an EF3 tornado crossed from Rolette to Towner County producing $10,000 in damages. These tornadoes were joined by hail which caused an additional $110,000 in damages.
- ***June 2008***. Severe hail reaching 1.5 inches in diameter fell near Hansboro along the Cavalier County line. The hail damaged $600,000 worth of crops and $50,000 in property damage.
- ***July 2008***. 1.5 inch diameter hail fell as part of a storm near Bisbee and caused $150,000 in crop damages and $15,000 in property damages.
- ***August 2010***. Thunderstorm winds felled trees and a garage was pushed off its foundation. A leg of a fertilizer plant was toppled over.

PROBABILITY

Recent severe summer weather events in Towner County are summarized in Table 3.7. The county has about nine event days per year. Summer weather event classification criteria and a detailed listing of events can be found in Appendix C. There is essentially a 100% annual probability of severe summer storms in Towner County.

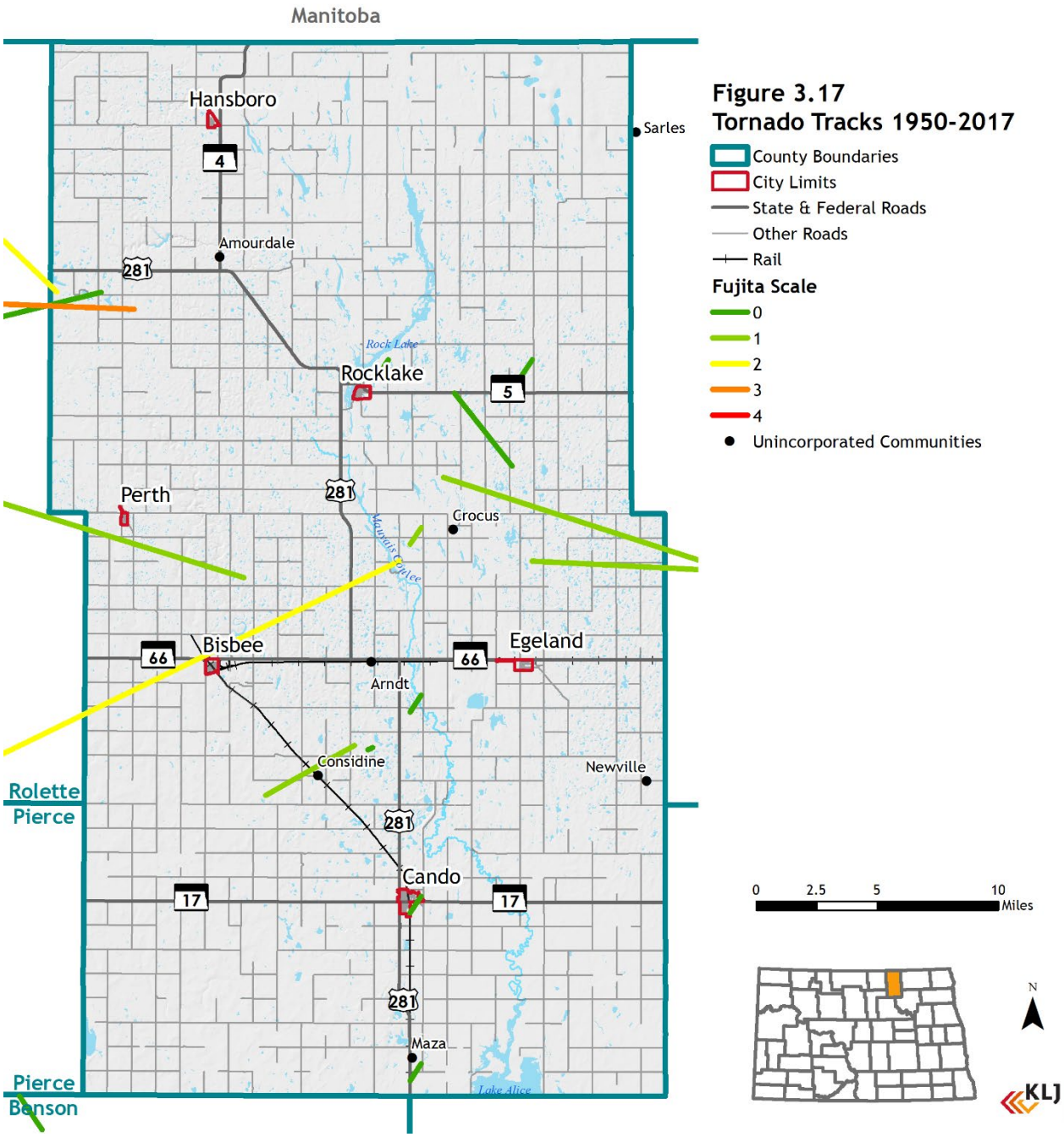
LOCATION

Severe summer weather occurs at a regional level and is not a micro-climatic event. It generally occurs across the entire geographical area of the county. As noted in the Hazard Profile, the scale of its elements can vary widely, and the location of their occurrences are unpredictable.

VULNERABILITY

Population

- The entire population is vulnerable to a severe summer storm event. Residents living in mobile homes or recreational vehicles are particularly vulnerable to tornado and wind events.
- There are an estimated 17 mobile homes in Towner County. Assuming 2.25 persons per mobile home, the vulnerable population would be:
    - No residents in rural areas of the county (no mobile homes)
    - 5 residents in Bisbee (2 mobile homes)
    - 23 residents in Cando (10 mobile homes)
    - 2 residents in Hansboro (1 mobile homes)
    - 9 residents in Rocklake (4 mobile homes)
- If a tornado were to hit a city in Towner County, the potential number of residents affected could be more than those living in mobile homes.


Manitoba
Hansboro
Sarles
4
Amourdale
281
Rock Lake
Rocklake
5
Perth
281
Crocus
Mauvais Coulee
Bisbee
66
66
Egeland
Arndt
Considine
Newville
Rolette
Pierce
281
Cando
17
17
281
Maza
Pierce
Benson
Lake Alice
Figure 3.17
Tornado Tracks 1950-2017
County Boundaries
City Limits
State & Federal Roads
Other Roads
Rail
Fujita Scale
0
1
2
3
4
Unincorporated Communities
0
2.5
5
10
Miles
N
KLJ

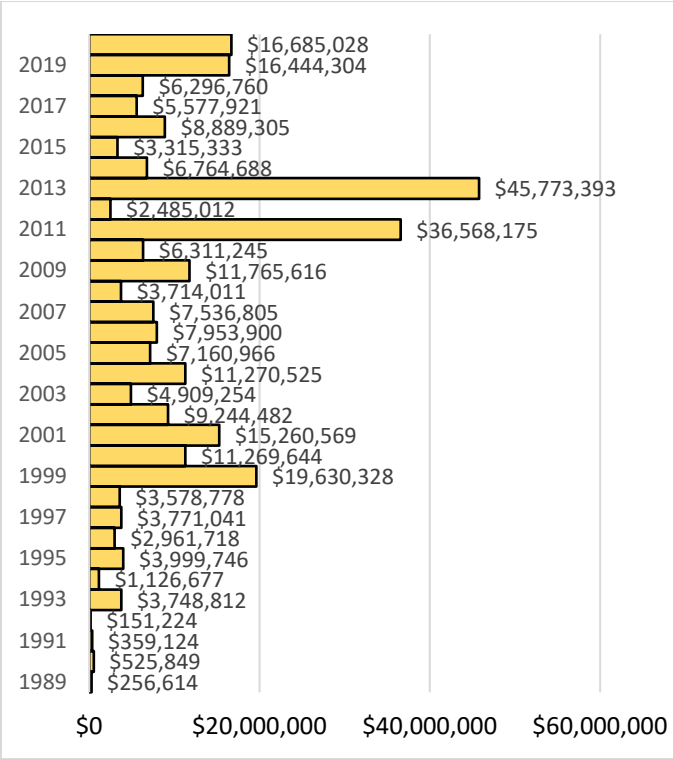
Property

- One of the most damaging summer storm events recorded by the National Climatic Data Center since 1996 is a severe thunderstorm which produced strong straight-line winds in June 1996 and caused an estimated to have caused $0.5 Million in damages.
- Agricultural indemnity payments in Towner County for severe summer weather from 1989 through 2020 totaled slightly over $285,000,000. Assuming a participation rate of 89% in the County, this suggests total damages on an annualized basis of approximately $10,000,000. Statistics can be seen in Figure 3.18.

Critical Facilities

- All critical facilities are vulnerable to a severe summer storm event. Facilities with an increased vulnerability include schools, special care centers, tall buildings or structures, electrical infrastructure and outdoor recreation or event facilities.

Figure 3.18 –Severe Summer-Related Federal Indemnity Payments, Towner County, 1989-2020



Economy

- The economic impact of severe summer weather may be greatest on the agricultural industry since crop damage due to hail or other severe weather can ruin large swaths of growing products. Annualized crop loss is estimated at $10,007,022. Other economic impacts from severe summer weather are unknown.

Future Development

- No jurisdiction in Towner County has adopted the State Building Code which consists of the 2018 International Building Code, International Residential Code, International Mechanical Code, International Energy Conservation Code and International Fuel Gas Code published by the International Code Council. The code includes a provision that buildings must be constructed to withstand a wind load of 76 MPH constant velocity and three-second gusts of 115 MPH.

EXISTING CAPABILITIES

Although each city has at least one warning siren, the sirens in Bisbee, Cando, Hansboro, and Rocklake are inadequate and need to be upgraded. Each city has designated emergency shelters. But there is not emergency shelter at the Bisbee Dam.

KEY ISSUES AND POTENTIAL ACTION ITEMS

Key Issue: Towner County averages about nine severe summer storm event days per year. Severe wind and hail are the most common summer storm events in the county, and tornadoes are also a possibility in the region. Lightning strikes have the possibility to cause significant property damage. There is need to reduce impacts.

- *Potential Action Item*: Cover windows in select critical facilities with shatter-resistant film.
- *Potential Action Item*: Install and maintain surge protection on critical equipment.
- *Potential Action Item*: Upgrade warning sirens for all cities in Towner County.
- *Potential Action Item*: Construct an emergency shelter at the Bisbee Dam.
- *Potential Action Item*: Each jurisdiction could adopt the State Building Code and require building permitting to ensure construction happens to code.

Severe Winter Weather

All Jurisdictions
Overall Risk: High
Probability: High (Approximately 6 event days per year countywide)
Magnitude: High (Potential for damages totaling millions of dollars with fatalities)

Seasonal Pattern
October - April

Duration
One to three days

Primary Impacts
Agricultural loss (crops, livestock)
Blocked roads
Economic loss
Exposure risks to people, pets, livestock and wildlife
Freezing pipes
Human loss and injuries
Increased stress on medical services
Power loss
Property damage or loss
School closure
Vehicle accidents

HAZARD PROFILE

Elements of severe winter weather include blizzards, heavy snow, ice storms and extreme cold. These elements can produce life-threatening situations and are a threat to people and property.

A blizzard is defined by the National Weather Service as a storm producing winds of 35 mph or more, with snow and/or blowing snow reducing visibility to less than 0.25 miles for at least three hours. A closely related weather event known as a surface blizzard occurs when heavy winds blow snow that has already fallen. Both traditional and surface blizzards can reduce visibility, disrupting transportation and communication systems in the area.

Heavy snow is defined as six or more inches of snow in 12 hours, or eight or more inches of snow in 24 hours. Heavy snow can damage property and make roads impassable for extended periods.

An ice storm produces heavy and damaging accumulations of ice due to a combination of rain and below freezing surface temperatures. Accumulated ice can bring down trees and power lines and poses a threat to motorists, pedestrians and livestock.

Extreme cold is a common occurrence in North Dakota during the winter months. Cold temperatures are amplified when combined with wind, creating dangerous wind chills. Exposure to extreme cold temperatures and wind chill can damage tissue (frostbite) and lower the body's core temperature (hypothermia), presenting a risk to both humans and livestock.

HISTORY

Towner County was included in 6 winter storm-related Presidential Disaster Declarations between 1953 and 2020.

A summary of the severe winter weather events in Towner County is shown in Table 3.8. On average, a severe winter weather event occurs in the county approximately six days per year.

Table 3.8 - Severe Winter Weather Events in Towner County, 1996-2020

Winter Storm Events	Event Days*	Annual Probability	Event Days per Year
Total	189	821.7%	6.1
Extreme Cold/Wind Chill	61	265.2%	1.7
Blizzard	51	221.7%	2.2
Winter Storm	40	173.9%	0.2
High Wind	15	65.2%	0.7
Heavy Snow	14	60.9%	0.6
Other winter Weather	8	34.8%	1.0

**Number of days with a reported event*
Source: National Climatic Data Center Storm Events Database

Extreme cold and blizzard events are most common. The most common impact identified by the Planning Team was road closure. The areas most often cited as a blowing snow hazard are ND Highways 4, 5, 17, 66, and US 281. Numerous County roads are also severely impacted. Power loss happens occasionally throughout the county during severe winter storms, but electricity is generally restored quickly.

Significant past severe winter weather events include:

- ***April 1997***. A blizzard and ice storm destroyed power lines across the region leaving residents without power. There were an estimated $6 million in property damages.

- ***November 2000***. A winter storm transitioned from rain to ice and damaged power lines. Damages were estimated at $14,000.
- ***March 2003***. Extreme cold with limited snow cover caused several water mains to freeze burst. Damages were estimate at $5,000.
- ***May 2004***. A powerful warm air system collided with cold air coming from Canada which caused large amounts of ice to accumulate in counties along the Canadian border. Power infrastructure was damaged. Damages were reported at $400,000.

PROBABILITY

Recent severe winter weather events in Towner County are summarized in Table 3.8. The county experience over 6 event days per year. Winter storm event classification criteria and a detailed listing of events can be found in Appendix C. There is essentially a 100% annual probability of severe winter weather in Towner County.

LOCATION

Severe winter weather occurs at a regional level and is not a micro-climatic event. It generally occurs across the entire geographical area of the county. As noted in the Hazard Profile, the scale of its elements can vary widely, and the location of their occurrences are unpredictable.

VULNERABILITY

Population

- Residents living in mobile homes, recreational vehicles, or poorly insulated homes may find it difficult to adequately heat their homes during cold temperature events. Estimated number of mobile homes and residents in Towner County include:
    - No residents in rural areas of the county (no mobile homes)
    - 5 residents in Bisbee (2 mobile homes)
    - 23 residents in Cando (10 mobile homes)
    - 2 residents in Hansboro (1 mobile homes)
    - 9 residents in Rocklake (4 mobile homes)
- Wind, ice, heavy snow and cold temperatures can combine to create hazardous conditions and "trap" residents in their homes without heat or electricity. Elderly residents may be especially vulnerable to this hazard as they are more likely to have limited mobility, especially in the event of hazardous road conditions. The estimated number of permanent residents age 65 or older for each jurisdiction are summarized below.
    - Bisbee: 25 residents
    - Cando: 287 residents
    - Egeland: 10 residents
    - Hansboro: 1 residents
    - Perth: 1 residents
    - Rocklake: 28 residents
    - Rural County: 193 residents
- People required to travel on a daily basis face increased road hazards. According to the St. Louis Federal Reserve, the labor force in Towner County is approximately 1,149 people. The mean commute time to work for residents in the county as recorded in the latest American Community Survey is 14.3 minutes.

Property

- It is difficult to estimate the impact of winter storms on property in the County. The most likely damages involve vehicle accidents and roof collapse due to heavy snow loads. A winter storm can also result in an increased risk of structure fire due to use of portable heaters and fireplaces during events that involve extremely cold temperatures.
- Losses vary based on storm severity and duration, but losses to unprotected livestock can be significant during a major storm event. Winter storms in the spring season have the potential to affect calving operations.

Critical Facilities

- A winter storm event that "traps" fire and ambulance responders within the facility would severely limit the emergency response capability of the County.
- All four rural fire departments (Rocklake, Bisbee, Egeland, and Cando) lack emergency generators.
- A severe winter storm event would most likely require closure of schools. A winter storm event that begins mid-day could present issues for students leaving school.
- Some critical facilities in Cando share a single portable emergency generator and their operations would be hampered in the event of a power outage. Another portable generator would be very helpful to mitigate impacts of a major power outage.

Economy

- The most significant economic impact may be livestock fatalities caused by extreme blizzards with resulting economic losses for farmers and ranchers.
- Severe winter weather may prevent businesses or services from opening and result in lost wages for workers.

Future Development

- The potential vulnerability to winter weather in the county is not expected to change in the foreseeable future. There is no identified impact on future development.

EXISTING CAPABILITIES

Electricity is generally restored quickly in the event of power loss. There are several critical facilities in each jurisdiction that lack emergency power generators.

KEY ISSUES AND POTENTIAL ACTION ITEMS

***Key Issue*:** Towner County averages approximately 6 days per year with a winter storm event. Severe winter weather events in the county include winter storm, high wind, heavy snow, blizzard, extreme cold/wind chill and ice storm. These events may lead to road closures.

- *Potential Action Item*: Coordinate with landowners to identify strategic locations for constructing snow fences.
- *Potential Action Item*: Continue educating residents about winter storm safety.
- *Potential Action Item*: Investigate the potential for a more distributed system of snow removal equipment.

***Key Issue*:** A winter storm event that causes a power outage may make it difficult for residents to heat their homes. Elderly residents and residents in mobile homes are the most vulnerable to extreme cold temperatures.

- *Potential Action Item*: Identify emergency warming shelter(s) and acquire back-up generator(s) to heat shelters and provide electricity during a winter storm event. Promote shelters so residents are aware of their availability.
- *Potential Action Item*: Encourage utility provider to bury electric power lines when undergoing upgrades or repair.
- *Potential Action Item*: Obtain backup power generators for critical facilities.

Space Weather

All Jurisdictions
Overall Risk: Moderate
Probability: Possible
Impact: Limited (impact could vary widely)

Seasonal Pattern
None

Primary Impacts
Agricultural loss (crops, livestock)
Economic loss
Explosion
Hazardous materials release
Human loss and injuries
Increased stress on medical services
Localized evacuation
Property damage or loss

HAZARD PROFILE

Space Weather is a direct threat to most communities because of the widespread reliance on technological systems. NASA describes space weather as any and all conditions and events on the sun, in the solar wind, in near-Earth space, and in Earth's upper atmosphere that can affect space-borne and ground based technological systems. Generally, it takes the form of particles, electromagnetic energy, and magnetic fields. Space weather events which occur in space near the earth or its atmosphere can be classified as one of three types.

- A 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.

These events can affect critical facility infrastructure and technology in various ways. Generally, they can disrupt surface-to-surface and surface-to-orbit communications. Additionally:

- Strong electrical currents driven along Earth's surface during auroral events disrupt electric power grids and contribute to the corrosion of oil and gas pipelines.
- Changes in the ionosphere during geomagnetic storms interfere with high-frequency radio communications and Global Positioning System navigation.
- During polar cap absorption events caused by solar protons, radio communications can be compromised for commercial airliners on transpolar crossing routes.

HISTORY

There are no recorded catastrophic space weather effects in Towner County or all of North Dakota. The nearest recorded storm affected Montreal, Canada on March 13, 1989, when a geomagnetic storm took out their commercial electric power for nine hours, affecting six million people. Other recorded space weather events occurred in September 1859, May 1921, May 1967, and November 2003.

As a reference for impact, a space weather event occurred in July 2012 that was not directed toward Earth. If it had been, the effects would have more severe than any since the September 1859 "Carrington Event." The Carrington Event impacted telegraph systems all over Europe and North America. Auroras were seen as far south as the Caribbean in the northern hemisphere. If such an event were to take place now, the effects would be far more devastating. Testimony before Congress as to the level of impact suggests the entire electrical transmission grid could be affected and power plants, substations and transformers that keep the grid operational could be destroyed. Experts disagree about the potential level of impact. Opinions range from disrupting electrical power supply for a few weeks all the way to loss of 90 percent of human lives due to failure of nearly all computer and electrical systems, and ancillary effects.

PROBABILITY

The capacity to forecast space weather events is limited. NOAA's Space Weather Prediction Center is the United State's official source of space weather alerts, watches, and warnings. Using modeling similar to that used for weather forecasting, the agency is able to predict space weather on time scales of hours to weeks. However, the degree of certainty and the magnitude of potential events leaves much to be desired, especially with respect to catastrophic events. Although no specific probability estimate has been provided by NOAA, the Royal Academy of Engineering in London, England published a report in

2013 that indicated for planning purposes an event similar to the Carrington Event is considered to be a 1-in-100 year event. One researcher published a research study in 2012 suggesting there is approximately a 12% chance of such an event happening in the next ten years. Source: Pete Riley. (2012) On the probability of occurrence of extreme space weather events, *Space Weather*.

LOCATION

All parts of Towner County are at equal risk from a space weather event.

VULNERABILITY

Population

- Except in the case of a high intensity solar radiation storm, the direct impacts of a space weather event on people is limited. However, nearly all of the County's population relies directly or indirectly on electricity for normal, essential functions such as heating and cooling, obtaining water, waste disposal, food refrigeration, communications, and transportation. If a space weather event caused the loss of power, the impact for a short time would be an inconvenience for most, but critical to life support for a few. Loss of power for an extended period of time could result in significant challenges to sustain life as we know it in Towner County.

Property

- The loss of electricity for a short time would primarily impact structures that are heated with electricity or protected from seepage by sump pumps in areas with high water tables. Buildings directly or indirectly dependent on electricity will likely be uninhabitable during winter months.

Critical Facilities

- All critical facilities in the region rely on electrical power to function properly. Most of these critical facilities do not have a backup power source. Therefore, short term and long-term functionality of most critical facilities in the region could be reduced or destroyed. Electrical power in Towner County, including Cando and Hansboro, is sourced from the Central Power Electric Cooperative and distributed by the Northern Plains Electric Cooperative. However, Ottertail Power provides power to Bisbee, Egeland, Perth and Rocklake. Although local power cooperatives have plans to get local power infrastructure up and running after such disasters, the minimum timeframe to do so is a matter of weeks or months. A major space weather event could make fixing damaged substations moot in view of other electrical grid damage and system failure. Therefore, the time to get power back could be much greater.
- One of the most significant and immediate potential impacts of a space weather event would be disruption or destruction of electronic systems used for healthcare in the region. Mitigation measures to protect or replace these electronic systems are not in place. The electronic systems of the Towner County Medical Center facilities are not hardened to withstand such an event.
- Emergency communications systems and all other communications systems are critical to emergency notification and response functions in the region, and could be disrupted or destroyed by a major space weather event. Mitigation measures to protect or replace these communications systems are not in place.

Economy

- To the degree that the systems of production are dependent on electrical power, their capacity to generate income would be limited.
- However, the larger impact may well be on the medium of exchange. Since almost all transactions now involve electronic transfers of monetary value, if electronic systems were damaged or destroyed, the normal means of completing transactions would lost. In fact, actual access to wealth would largely be lost.

Future Development

- There are no direct impacts of space weather events on future development. Traditional development patterns would be subject to the same impacts anticipated for existing property, critical facilities, and populations.

EXISTING CAPABILITIES

There are no known capabilities in place in the County to mitigate the impacts of space weather events. However, the very rural locale of many residents of the region has necessarily required a more independent lifestyle than more heavily populated areas. These very rural locales are more likely to have redundant systems that will allow them to sustain life for extended periods of time.

KEY ISSUES AND POTENTIAL ACTION ITEMS

***Key Issue*:** Widespread, long-term loss of electrical power will lead to loss of life and disruption of life as we know it in Towner County.

- *Potential Action Item*: Encourage household level preparations to mitigate the impacts of a sustained widespread power loss.
- *Potential Action Item*: Harden electrical components and systems for critical facilities (especially emergency response services) against the anticipated impacts of a space weather event.
- *Potential Action Item*: Develop a strategic action plan to harden medical facilities and electronic systems against the anticipated impacts of a space weather event.
- *Potential Action Item*: Appoint a strategic planning team to consider the long-term impacts of a major space weather event and develop a strategic plan to mitigate the impacts on the region.

Wildland Fire

Rural County
Overall Risk: Moderate
Probability: Moderate
Impact: Moderate

Bisbee
Overall Risk: Moderate
Probability: Low
Impact: High

Cando
Overall Risk: Low
Probability: Low
Impact: Moderate

Egeland
Overall Risk: Moderate
Probability: Low
Impact: High

Hansboro
Overall Risk: Moderate
Probability: Low
Impact: High

Perth
Overall Risk: Moderate
Probability: Low
Impact: High

Rocklake
Overall Risk: Moderate
Probability: Low
Impact: Moderate

Seasonal Pattern
March – November

Duration
Hours to weeks

Primary Impacts
Agricultural loss (crops, livestock)
Blocked roads
Economic loss
Explosion
Hazardous materials release
Human loss and injuries
Increased stress on medical services
Localized evacuation
Property damage or loss
Reduced air quality

HAZARD PROFILE

A wildfire is an unplanned fire, a term which includes grass fires, forest fires and scrub fires either human-caused or natural in origin.

Wildfires pose increasing threats to people and their property as communities develop in the wildland-urban interface. The wildland-urban interface refers to areas where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. The threat exists anywhere that structures are located close to natural vegetation and where fire can spread from vegetation to structures, or from structures to vegetation.

The three major factors that affect the occurrence and severity of wildfires are the fuels supporting the fire, the weather conditions during a fire event and the topography in which the fire is burning. These factors affect and increase the likelihood of a fire starting, the speed and direction in which a fire will travel, the intensity at which it burns, and the ability to control and extinguish it. At the landscape level, both topography and weather are beyond our control. Fuel is the only factor influencing fire behavior that humans have the ability to manage.

HISTORY

The Interagency Fire Program Analysis fire-occurrence database, compiled by Karen C. Short of the USDA Forest Service, Rocky Mountain Research Station is sourced from multiple reporting agencies; however, due to reporting limitations, it should not be considered an all-inclusive list. According to the database, there were 57 wildfires between 1992 and 2018 in Towner County. Eleven of these fires were over 100 acres, but one additional fire was 99 acres. The largest fire was 500 acres on May 5, 2016.

The North Dakota Forest Service also tracks reported wildland fires. Since only one fire district was listed as having reported wildland fires, the Forest Service data is only a partial summation of overall wildland fire events in the County. For the reporting district, there were 9 reported wildland fires from the years 2017 through 2019. The typical size of reported fires was approximately 1 acre. The maximum size reported fire was 75 acres in 2018. Data on more recent wildland fires from 2 districts in the county indicated a total of 13 fires with four that were over 100 acres.

Agricultural operations are the most likely source of these wildland fires. Burn pits and lightning strikes are also common sources.

PROBABILITY

In 2009 the North Dakota Forest Service developed a wildfire risk assessment for every county in the state based on wildfire occurrence, fire department response capabilities and weather. The assessment ranked Towner County as having a low risk for wildfire.

Figure 3.20 shows fuel types in Towner County. Predominate fuel types are classified using the 13 standard fuel models for fire behavior by Anderson. Much of the county is agricultural land, which the Anderson models do not consider to be a significant fuel; however, in times of drought or during harvest season agricultural fields may present a wildfire risk. The most prevalent fuel in the county is grassland. Grassland fires generally burn with a low intensity but can spread quickly. Grasslands are most heavily concentrated in the central and south central portion of the county. Based on the statistics noted previously, if the fire district reported incidents are representative of the other seven fire districts, an average of 27 wildland fires occur annually in Towner County, and the probability of a wildland fire of 100+ acres occurring is approximately a 60% chance per year. Given the information on wildland fires from the Fire Program Analysis database, the actual incidence of wildland fires and average size of wildland fires may be significantly higher.

LOCATION

Historically, the greatest incidence of wildland fires has been clustered in the south and south central part of the county. There is a small area with high incidence in the northeastern part of the county, as well. See Figure 3.20. The wildland-urban interface identifies risk areas where fire can spread from vegetation to structures, or from structures to vegetation. Any areas where structures are located within or adjacent to wildland environments can be included within the wildland-urban interface. This includes all rural structures in Towner County and structures along the edges of each city.

VULNERABILITY

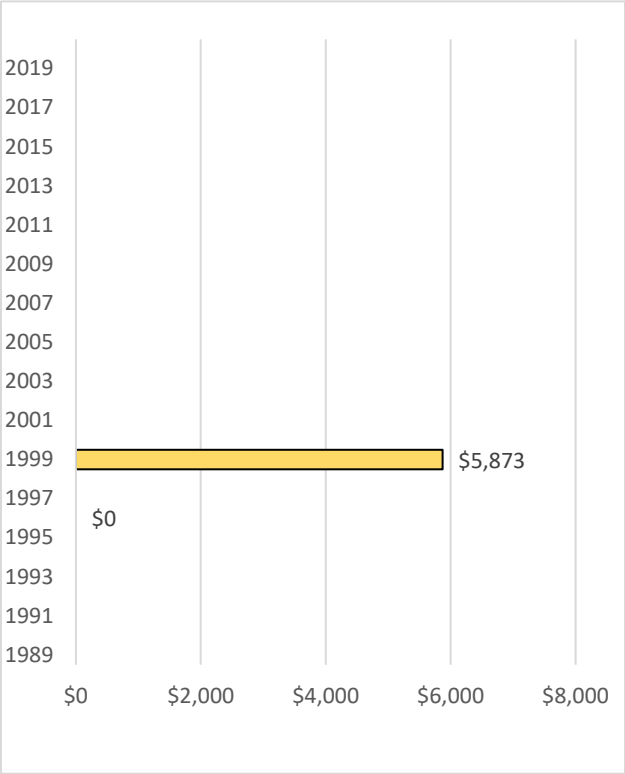
Population

- Residents of non-urbanized areas (in the wildland-urban interface) are generally at a higher risk of wildfire. According to Census Bureau estimates, there are approximately 2,189 residents in the county; of these, an estimated 772 live outside of an incorporated city and are at increased vulnerability to wildfire. Assuming approximately 10 percent of residents in incorporated cities live along or near the wildland-urban interface, 139 additional residents are vulnerable to wildfire. Using these estimates, approximately 911 residents (42 percent of total population) in the county are vulnerable to wildfire. The estimated at-risk population in each city is as follows:
    - Bisbee: 24 residents
    - Cando: 74 residents
    - Egeland: 16 residents
    - Hansboro: 15 residents
    - Perth: 6 residents
    - Rocklake: 20 residents

Property

- The statewide Multi-Hazard Mitigation Plan includes information about crop indemnity payments from the USDA Risk Management Agency. Records of wildfire-related crop indemnity payments in Towner County between 1989 and 2019 only show payments in 1999.

Figure 3.19 – Fire-Related Federal Indemnity Payments, Towner County, 1989-2019



- There is no instance of recorded widespread property loss in Towner County due to wildfire. The largest wildfire in North Dakota between 1992 and 2012 is 53,708 acres according to the National Interagency Fire Occurrence Database. The wildfire originated in

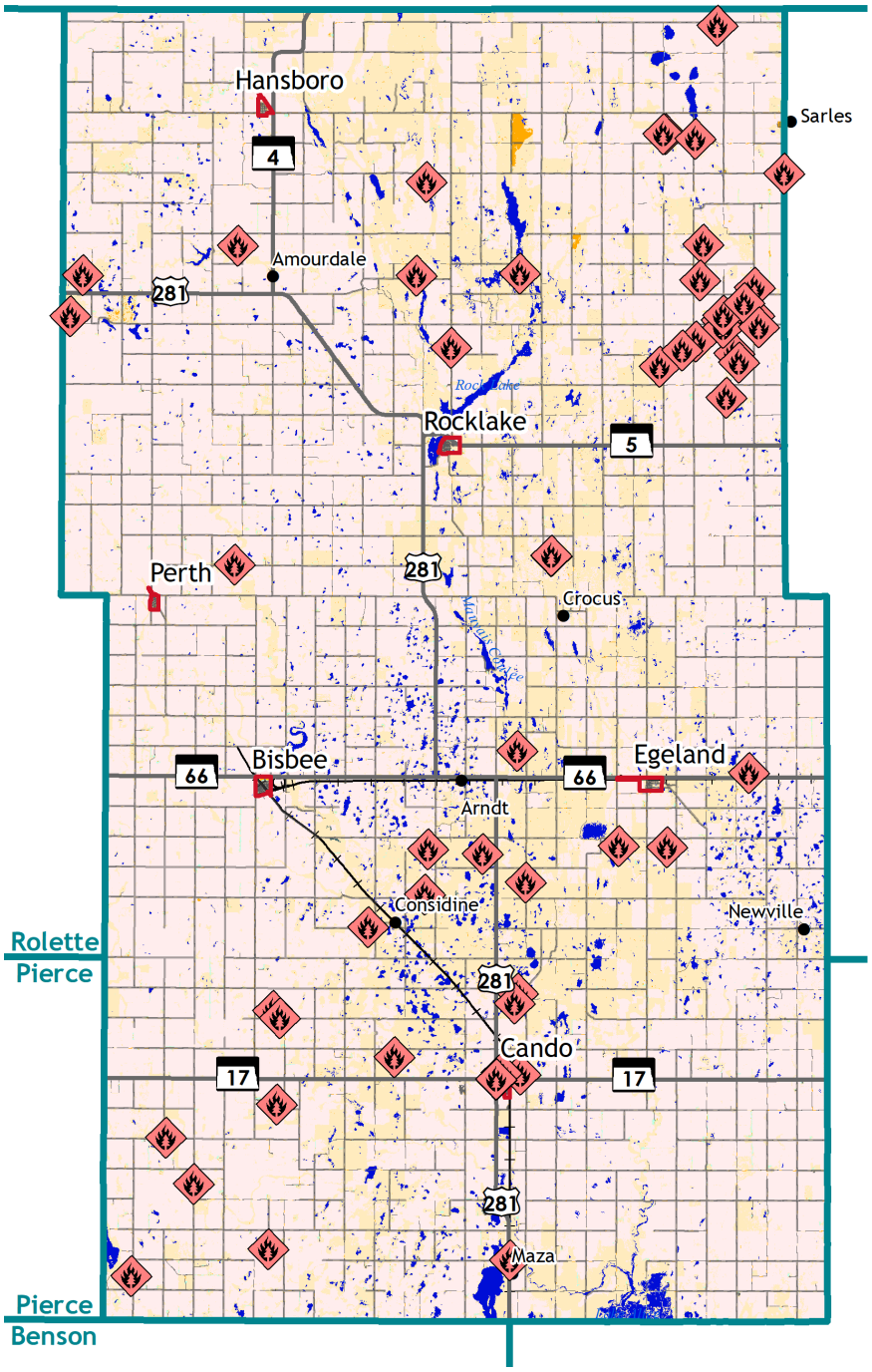


Figure 3.20
Wildfire Incidence & Fuels

- County Boundaries
- City Limits
- State & Federal Roads
- Other Roads
- Rail

Burnable Fuels

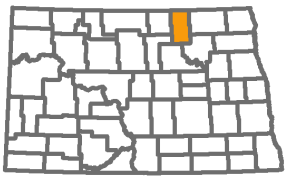
- Grass
- Grass and Shrub
- Shrubs
- Timber Litter
- Grass/Shrubs with Canopy Litter

Nonburnable Areas

- Urban Areas
- Agriculture
- Open Water
- Bare Ground

- Fire History 1992-2018 (All Sizes)
- Unincorporated Communities

0 2.5 5 10 Miles



N

KLJ

Richland County MT in 1999. The size of this fire is approximately three percent of the county's total land area. From 1992-2019, the largest fire reported in Towner County was 500 acres in 2016.

Critical Facilities

- Although nearly all of the county's critical facilities are within urbanized areas, which are considered defensible space for wildfire, several critical facilities are located along the edges of cities near the wildland-urban interface or in rural areas. These, and other facilities within 100 yards of the edge of cities or the unincorporated communities include:
  Bisbee:
    - Grain Elevator
    - Wastewater Treatment Lagoons

  Cando:
    - DOT Shop
    - Water Treatment Plant
    - Medical Center
    - North Star Public School
    - County Shop

  Egeland:
    - Fire Department
    - Post Office

  Hansboro:
    - County Shop

  Perth
    - Grain Elevator

  Rocklake
    - County Shop
    - Post Office
    - Mini Mall
    - Grain Elevator

Economy

- There are no overall estimates for the level of impact of wildland fires on the Towner County economy. However, it should be noted that wildland fires can burn through large swaths of cattle grazing land and essentially eliminate pastureland for those farmers and ranchers using the grazing land for more than a year.

Future Development

- The Towner County zoning regulations do not include any provisions that specifically address wildfire. Such regulations could include defensible space standards, road access and adequate water supply.

EXISTING CAPABILITIES

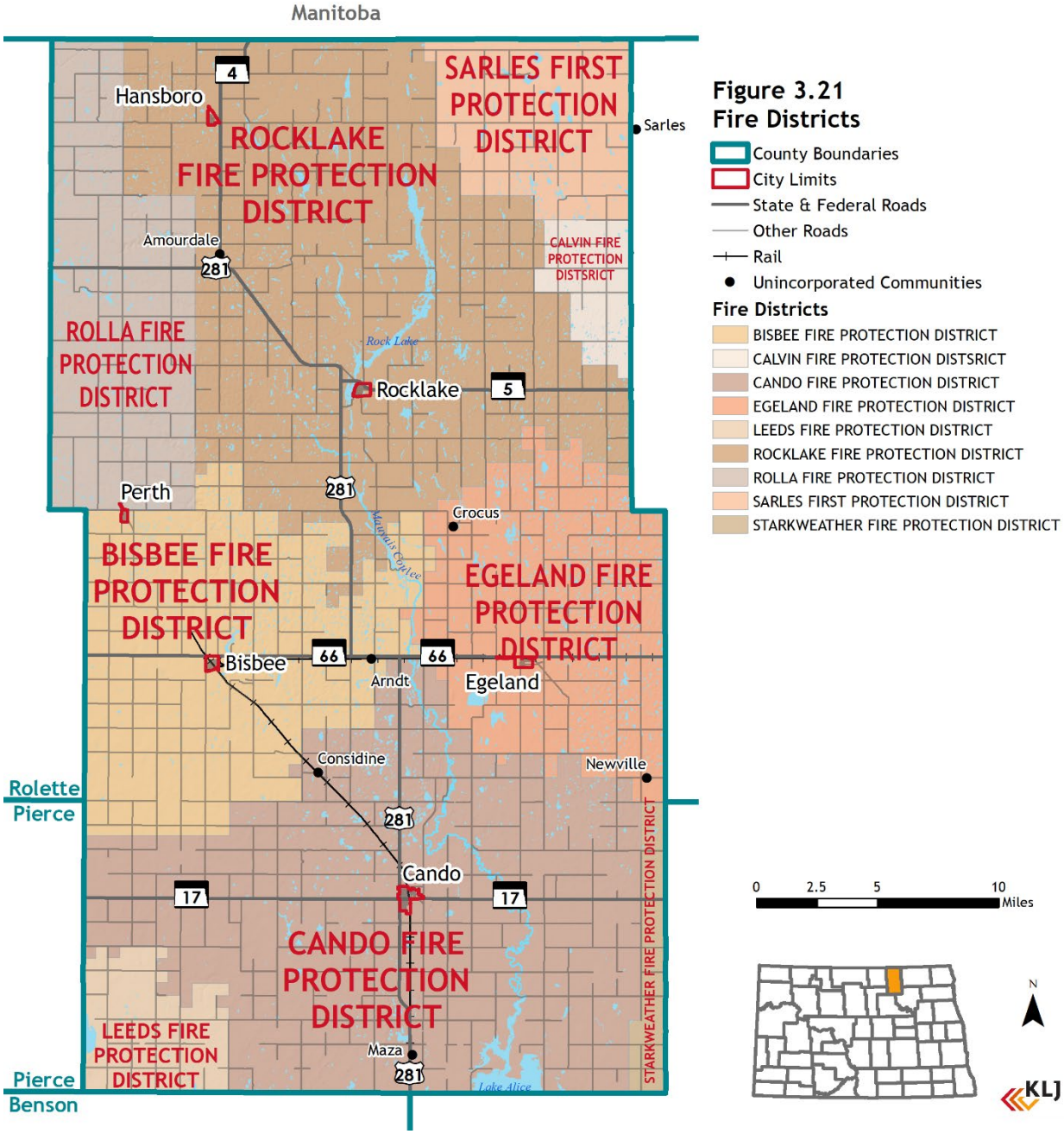
The Towner County Emergency Manager oversees the burn ban and fire danger level alert systems. Wildfire response in the county is coordinated by several fire districts. District boundaries are shown in Figure 3.21.

- Bisbee Fire Protection District
- Calvin Fire Protection District
- Cando Fire Protection District
- Egeland Fire Protection District
- Leeds Fire Protection District
- Rocklake Fire Protection District
- Rolla Fire Protection District

KEY ISSUES AND POTENTIAL ACTION ITEMS

***Key Issue*:** Towner County experienced 8 100-acre fires between 1992-2012 and experiences a wildfire greater than 100 acres approximately once every two years. Most large wildfires in the county cause minimal property damage.

- *Potential Action Item*: Perform fuel reduction activities in high-risk rural areas.
- *Potential Action Item*: Educate residents about defensible space best practices.
- *Potential Action Item*: Encourage the use of non-combustible materials (stone, brick, stucco, etc.) for new construction in wildfire hazard areas.
- *Potential Action Item*: Incorporate wildland-urban interface guidelines into the county's zoning and subdivision regulations.


Manitoba
Hansboro
4
ROCKLAKE FIRE PROTECTION DISTRICT
SARLES FIRST PROTECTION DISTRICT
Sarles
Amourdale
281
CALVIN FIRE PROTECTION DISTSRICT
ROLLA FIRE PROTECTION DISTRICT
Rock Lake
Rocklake
5
Perth
281
Crocus
Magnus Coulee
BISBEE FIRE PROTECTION DISTRICT
EGELAND FIRE PROTECTION DISTRICT
Bisbee
66
66
Arndt
Egeland
Considine
Newville
Rolette
Pierce
281
Cando
17
17
CANDO FIRE PROTECTION DISTRICT
STARKWEATHER FIRE PROTECTION DISTRICT
LEEDS FIRE PROTECTION DISTRICT
Maza
281
Lake Alice
Pierce
Benson
Figure 3.21
Fire Districts
County Boundaries
City Limits
State & Federal Roads
Other Roads
Rail
Unincorporated Communities
Fire Districts
BISBEE FIRE PROTECTION DISTRICT
CALVIN FIRE PROTECTION DISTSRICT
CANDO FIRE PROTECTION DISTRICT
EGELAND FIRE PROTECTION DISTRICT
LEEDS FIRE PROTECTION DISTRICT
ROCKLAKE FIRE PROTECTION DISTRICT
ROLLA FIRE PROTECTION DISTRICT
SARLES FIRST PROTECTION DISTRICT
STARKWEATHER FIRE PROTECTION DISTRICT
0
2.5
5
10
Miles
N
KLJ

Infectious Disease

All Jurisdictions
Overall Risk: Moderate
Probability: Moderate
Impact: Moderate

Seasonal Pattern
None

Duration
Varies

Primary Impacts
Agricultural loss (crops, livestock)
Economic loss
Human loss and injuries
Increased stress on medical services
Localized evacuation
School closure

HAZARD PROFILE

Communicable disease is an illness caused by an infectious agent such as bacteria, virus, fungi, parasites or toxin. Communicable diseases of particular concern are those that can lead to the loss of human life or widespread loss of crops and livestock. A severe communicable disease incident has potential for catastrophic effects on human populations and the economy.

There are numerous ways for communicable disease to spread among humans: physical contact with an infected person, contact with contaminated object, bites from animals or insects carrying the disease, or air travel. A widespread occurrence of infection in a community is called an epidemic. Epidemics may lead to quarantines, school and business closures, and stress on medical facilities. A widespread epidemic (often countrywide or worldwide in scope) is referred to as a pandemic. Perhaps the most notable pandemic in the modern era was the Spanish Influenza in 1918. The disease killed an estimated 20 to 40 million people worldwide, including 675,000 Americans. In North Dakota, about 2,700 people died and 6,000 were infected. As of December 13, 2021 there were 1,625 deaths attributed to COVID-19 in North Dakota.

Animal and plant diseases can harm the economy through the loss of livestock and crops. Widespread plant and animal diseases can lead to food shortages. Some animal diseases may cause sickness in humans if proper precautions are not taken with infected animals. Diseases that are a threat to cattle include tuberculosis and anthrax. According to the North Dakota Department of Health, there has been one report of tuberculosis in cattle in recent years. Anthrax is much more common, with 185 cases between 1989 and 2010; a majority of those cases occurred in 2005 when there were 109 reports. Plant diseases in North Dakota include karnal bunt disease, black stem rust race Ug99, and emerald ash borer.

HISTORY

Prior to the COVID-19 pandemic of 2020, there has been no recent history of major crop, animal or human epidemic disease or contamination in the county. As of December 10, 2021 the number of identified coronavirus cases was 461 in Towner County and there had been 11 lives lost to the pandemic.

PROBABILITY

Populations throughout the world are susceptible to epidemics and national pandemics, and Towner County residents are no exception, although the generally low population density of the area makes rapid transmission of communicable disease less likely.

Based on historical data, it is highly likely that one or more infectious diseases will occur in Towner County every year.

Based on historical data, it is likely that plant or animal diseases will occur in Towner County within a ten-year period.

LOCATION

Infectious disease and pest infestations are not controlled by geographic boundaries and can happen throughout the entire area of Towner County.

VULNERABILITY

Population

- Elderly and young persons are most at risk for communicable disease. Approximately 553 of the county's permanent residents are 65 years of age or older. The estimated number of permanent residents age 65 or older for each jurisdiction are summarized below.
    - Bisbee: 25 residents
    - Cando: 287 residents
    - Egeland: 10 residents
    - Hansboro: 1 resident
    - Perth: 1 resident
    - Rocklake: 28 residents
    - Rural County: 201 residents

- Approximately 5.7 percent, or 125, of the county's permanent residents, are under five years of age. The estimated number of permanent residents under age five for each jurisdiction are summarized below.
    - Bisbee: 5 residents
    - Cando: 58 residents
    - Egeland: 0 residents
    - Hansboro: 0 residents
    - Perth: 0 residents
    - Rocklake: 4 residents
    - Rural County: 58 residents
- The most commonly occurring infectious disease in recent decades has been influenza. While details about influenza cases in Towner County are not readily available, the North Dakota Department of Health has published the number of cases at a county level from 2010 through 2020. The season with the highest number of cases in Towner County was 2016-2017. There were 68 cases that season.
- The Centers for Disease Control and Prevention (CDC) estimates that a medium level influenza pandemic would result in 30 percent ill, 0.8 percent of ill requiring hospitalization and 0.2 percent of ill dying from the disease. In Towner County this would equate to 648 ill, 5 requiring hospitalization and 1 death from a medium level influenza pandemic.

Property

- The 2019 North Dakota Enhanced Mitigation Mission Area Operations Plan estimated that infectious disease could impact 20 percent of crop and livestock values. According to the 2017 Census of Agriculture the market value of crops in Towner County was $140.9 million and the market value of livestock was $25.2 million. Estimating 20 percent loss for each sector results in $28 million in communicable disease-related crop loss and $5 million livestock loss.

Critical Facilities

- Gathering places and facilities that have a high density of occupants have the greatest vulnerability to communicable disease. These include:
    - Northstar School – K12 school with approximately 300 students
    - Towner County Living Center – 45 bed nursing/assisted living center
    - Towner County Medical Center – 20 bed critical access hospital

Economy

- No estimates of the overall economic impact from infectious disease have been calculated for Towner County.

Future Development

- The growth of the energy industry has resulted in an influx of young workers who are generally less susceptible to disease given their age; however, the high-density living conditions experienced by many of these workers, especially those in workforce housing facilities, could make rapid disease transmission more likely. As the population stabilizes this is unlikely to stay a significant factor, and the long-term impact of infectious disease on future development is likely to be negligible.

EXISTING CAPABILITIES

Towner County Hospital is a critical access hospital in Cando, but it does not have any ICU rooms.

The USDA Farm Service Agency and North Dakota State University Extension both have field offices located in and offer technical assistance to farmers and ranchers for the prevention and treatment of agricultural diseases.

KEY ISSUES AND POTENTIAL ACTION ITEMS

Key Issue: Human and agricultural disease have the potential to greatly impact the health and economy of the county.

- *Potential Action Item:* Continue supporting the efforts of the USDA Farm Service Agency and NDSU Extension.

Dam Failure

All Jurisdictions
Overall Risk: Low
Probability: Low
Impact: Moderate

Seasonal Pattern
More likely during flooding season, March-October

Duration
24 hours

Identified Risks
Agricultural loss (crops, livestock)
Economic loss
Human loss and injuries
Increased stress on medical services
Localized evacuation
Loss of power
Release of hazardous materials
Shortage of critical materials

HAZARD PROFILE

A dam is defined as an artificial barrier across a watercourse or natural drainage area that may impound or divert water. Dams have many potential uses, including hydro-electric power generation, irrigation, flood control, water supply and recreation. Dam structures can be earthen or from manmade materials. Dam failure is a sudden, uncontrolled release of impounded water, and can have a devastating effect on people and property downstream.

The Association of State Dam Officials identifies five primary causes of dam failure, which are often interrelated:

- Overtopping of a dam occurs when water from the reservoir spills over the top of the dam, creating instability in the structure. This can occur during a major flood event if the spillways are not adequately designed or if there is blockage in the spillway. Approximately 34 percent of all dam failures in the United States are due to overtopping.
- Foundation defects, including settlement and slope instability, cause about 30 percent of all dam failures.
- Piping is a term used to describe the process that occurs as seepage pathways create eroded pipes through a structure. Seepage often occurs around hydraulic structures and earthen features, and if left unchecked can gradually reduce the dam structure's stability. About 20 percent of all dam failures in the United States are caused by piping.
- Structural failure of materials used to construct the dam.
- Inadequate maintenance.

HISTORY

According to the statewide Multi-Hazard Mitigation Plan, no North Dakota dams rated as a high or significant hazard failed between 2009 and 2013; however, some dams did sustain significant damage from major flood events during the time period.

PROBABILITY

The Association of State Dam Officials and the US Army Corps of Engineers utilize a rating system to determine potential hazard to property or life if a dam were to suddenly fail.

- ***Low***: Dams located in rural or agricultural areas where there is little possibility of future development. Failure of low hazard dams may result in damage to agricultural land, township and county roads and farm buildings other than residences. No loss of life is expected if the dam fails.
- ***Significant***: Dams located in predominantly rural or agricultural areas where failure may damage isolated homes, main highways, railroads or cause interruption of minor public utilities. Potential for the loss of life may be expected if the dam fails.
- ***High***: Dams located upstream of developed and urban areas where failure may cause serious damage to homes, industrial and commercial buildings and major public utilities. Potential for loss of life if the dam fails. High hazard dam reservoirs must be at least 50 acre-feet.
- The North Dakota Century Code requires that all dams with greater than 1,000 acre-feet of storage have emergency procedures and safety plans. Safety plans must include a map of the evacuation area, notification directory, name of the dam owner or responsible entity, availability of materials for emergency repairs, and a list of contractors that could provide emergency assistance.

LOCATION

The North Dakota Department of Water Resources maintains a database of all dams in the county. There are 37 dams in Towner County; none are classified as high hazard and one is classified as a significant hazard. The significant hazard dam in the county is described in Table

3.9 and shown in Figure 3.22. Although there are several small dams in Towner County, related dam failures would only impact agricultural areas, and not the municipalities.

Table 3.9 – Towner County Significant Hazard Dams

Dam Name	Action Plan	Owner	Type	Year Built	Max Storage (acre-feet)
Big Coulee Dam	No	City of Bisbee	Rolled Earth	1968	22,532

Source: ND State Water Commission

Big Coulee Dam is located just north and east of the City of Bisbee. Its impoundment area is approximately 228 acres. The dam is a fishing and recreational amenity for the city and the surrounding region.

VULNERABILITY

Population

- Big Coulee Dam is located just north and east of the City of Bisbee. There is one residence located directly downstream of the dam that would be at high risk in the event of a catastrophic failure. No communities are located in the anticipated inundation area if such a failure were to occur. However, without an emergency action plan, vulnerability analysis is difficult.

Property

- One farmstead, including a single-family residence and several large storage structures, is located directly downstream of the dam. A majority of the remaining property damage would be agricultural loss.
- Agricultural land would be at risk if a low hazard dam failed in a rural part of the County.

Critical Facilities

- The rail loading siding for the Bisbee grain elevator is located approximately 1,000 feet southeast of the Bisbee Dam, but not immediately adjacent to the coulee that the dam drains into. It may be at risk in the event of a catastrophic dam failure.

Economy

- The economic impact from dam failures in Towner County is not available.

Future Development

- New development along the coulee downstream of the Big Coulee Dam is not expected.

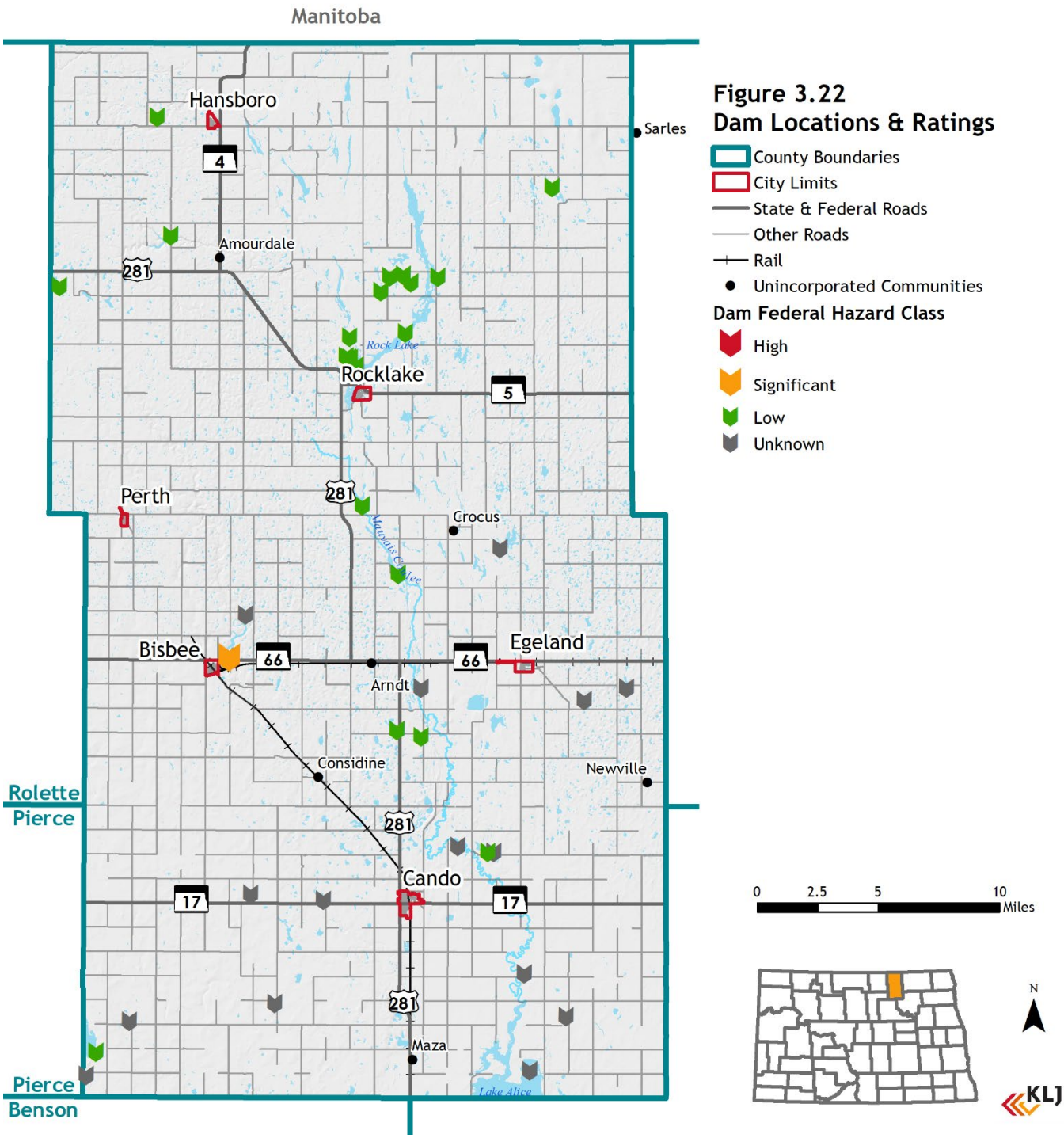
EXISTING CAPABILITIES

There is no emergency action plan for the Big Coulee Dam.

KEY ISSUES AND POTENTIAL ACTION ITEMS

Key Issue: Big Coulee Dam did have some structural issues when the last MHMP was being prepared. These issues have been resolved. However, an emergency action plan is required for this facility because it impounds more than 10,000 acre feet.

- *Potential Action Item*: Develop an emergency action plan for Bisbee Dam.


Manitoba
Hansboro
Sarles
4
Amourdale
281
Rock Lake
Rocklake
5
Perth
281
Grocus
Bisbee
66
66
Egeland
Arndt
Considine
Newville
Rolette
Pierce
281
Cando
17
17
281
Maza
Pierce
Benson
Lake Alice
Figure 3.22
Dam Locations & Ratings
County Boundaries
City Limits
State & Federal Roads
Other Roads
Rail
Unincorporated Communities
Dam Federal Hazard Class
High
Significant
Low
Unknown
0
2.5
5
10
Miles
N
KLJ

Hazardous Materials Release

Rural County
Overall Risk: Low
Probability: Low
Impact: Moderate

Bisbee
Overall Risk: Moderate
Probability: Low
Impact: High

Cando
Overall Risk: Moderate
Probability: Low
Impact: High

Egeland
Overall Risk: Moderate
Probability: Low
Impact: High

Hansboro
Overall Risk: Moderate
Probability: Low
Impact: High

Perth
Overall Risk: Moderate
Probability: Low
Impact: High

Rocklake
Overall Risk: Moderate
Probability: Low
Impact: High

Seasonal Pattern
None

Duration
1-10 hours

Primary Impacts
Agricultural loss (crops, livestock)
Economic loss
Human loss and injuries
Increased stress on medical services
Localized evacuation
Loss of income for displaced workers
Loss of power
Permanent loss of business

HAZARD PROFILE

A hazardous material is any substance that has the potential to cause harm to humans, animals or the environment, either by itself or through interaction with other factors.

Hazardous materials incidents can occur at a fixed facility or while a material is transported. Common hazardous materials incidents at fixed sites include the improper storage, treatment and disposal of hazardous waste at manufacturing and processing facilities. Transportation-related hazardous materials incidents generally occur along major transportation routes such as highways, interstates, pipelines and railroads.

Common hazardous materials found in North Dakota include natural gas, anhydrous ammonia and crude oil.

Natural gas is commonly used in North Dakota, often in its refined form of propane or butane. Propane and butane are generally transported as a liquid but will vaporize in the event of an unintended release (butane only vaporizes at temperatures above 32 degrees Fahrenheit). In their gaseous form they are both heavier than air, and generally remain close to the ground. Propane and butane are both highly flammable and present the risk of explosion. Exposure to propane and butane can also be a health hazard. Acute exposure can cause asphyxiation, respiratory irritation and physiological damage; however, these effects are most likely to occur in enclosed spaces or areas with poor ventilation.

Anhydrous ammonia is used in manufacturing, refrigeration and fertilizer. It is often stored and transported as a pressurized liquid, but it will vaporize under normal pressure. Anhydrous ammonia has explosive potential, but it requires extremely high temperatures to ignite. It generally only produces a significant health hazard when released in poorly ventilated areas, but when exposed to moisture it can cause a low-lying ammonia fog. Effects of acute anhydrous ammonia exposure include severe irritation to the eyes, respiratory tract, gastrointestinal tract and skin; severe repetitive exposure can cause permanent damage to these tissues. Anhydrous ammonia is not known to be carcinogenic.

Crude oil poses a significant risk due to its high flammability. It may release flammable vapors that increase the risk of explosion. Crude oil also poses several health risks. Exposure to crude oil can come from direct contact, inhalation or ingestion. Acute exposure to crude oil can cause direct effects such as skin irritation, breathing difficulty, headaches and nausea. Acute

exposure may also lead to long-term complications such as lung, liver or kidney damage, and increased cancer risk.

HISTORY

Primary sources of information about hazardous materials releases include the ND Department of Emergency Services, the ND Department of Environmental Quality, and the Division of Mineral Resources. The most notable hazardous material release incidents in Towner County according to the ND DEQ data source were a diesel fuel spill in 2019 and a hog confinement facility sewage spill in 2005. A total of 8 incidents occurred in the county from 1975 to the present.

- **October 24, 2019**. A fuel tanker with 5,000 gallons of diesel fuel had a spill resulting from the tank splitting while at a oil company site in Cando.
- **July 8, 2005.** A swine confinement facility had severe damage from high winds. There was concern about a sewage lagoon of the facility being damaged and potentially causing a spill. No details of the actual spill level were reported, but the potential for spillage of 50,000 gallons was estimated.

National data collection of hazardous materials releases includes the National Response Center and the Pipeline and Hazardous Materials Safety Administration.

The National Response Center is an interagency effort managed by the US Coast Guard that catalogs "all" reported hazardous materials incidents in the United States. There were no hazardous materials incidents in Towner County reported to the National Response Center from 2010 to 2020.

The Pipeline and Hazardous Materials Safety Administration (PHMSA) is part of the US Department of Transportation and monitors "all" transportation-related hazardous materials incidents in the United States. There were no incidents reported to the PHMSA during the time period 2010-2020.

PROBABILITY

In general, as evidenced by the statistics above, hazardous materials releases happen infrequently. On average, hazardous material releases in Towner County happen less than once per year.

LOCATION

Transportation routes throughout the county are primary locations at risk of hazardous materials releases. Highways and pipelines are the major transportation routes through the county. Materials transported through the county on truck include fuel, anhydrous ammonia, and saltwater.

The Emergency Planning and Community Right-to-Know Act (EPCRA) requires that operators of facilities containing hazardous materials and chemicals must identify themselves to appropriate state and local agencies. North Dakota requires that all hazardous materials operators submit Tier II Chemical Inventory Reports to the county's Local Emergency Planning Committee (LEPC) on an annual basis. Typical Tier II facilities include bulk fuel plants, anhydrous ammonia plants, propane plants, agricultural processing plants and energy producing sites. There were 25 Tier II-reporting facilities in the county in 2021.

Figure 3.23 shows major transportation corridors in Towner County, with evacuation areas of 1/2 mile and 1 mile. Tier II facilities and gathering lines are not shown but are found throughout the County. Hazard distances are from the 2012 Emergency Response Guidebook. Recommendations for initial evacuation in the case of fire for common hazardous materials are as follows:

- Crude oil, petroleum and diesel fuel: 1/2 mile
- Propane, natural gas: 1 mile
- Anhydrous ammonia: 1 mile
- Chlorine: 1/2 mile
- Ammonium nitrate fertilizers: 1/2 mile

VULNERABILITY

Population

- Vulnerable population to transportation incidents can be estimated by identifying the intersection of 2020 US Census Blocks and the identified hazard areas in Figure 3.23. Census blocks in rural areas are generally large, which makes detailed estimates difficult. For purposes of this analysis, only census blocks that have their centroid within the hazard area are included; however, it is important to note that this analysis does not consider the exact location of residential structures within each census block. Vulnerable population estimates are shown in Table 3.11. Note that this analysis does not include population vulnerable to fixed site incidents due to the difficulty in cataloging all fixed site facilities.
- There have been no hazardous materials incidents causing severe injuries or fatalities in Towner County in the last ten years.

Property

- The level of property damage for hazardous materials releases in Towner County is not readily available 0

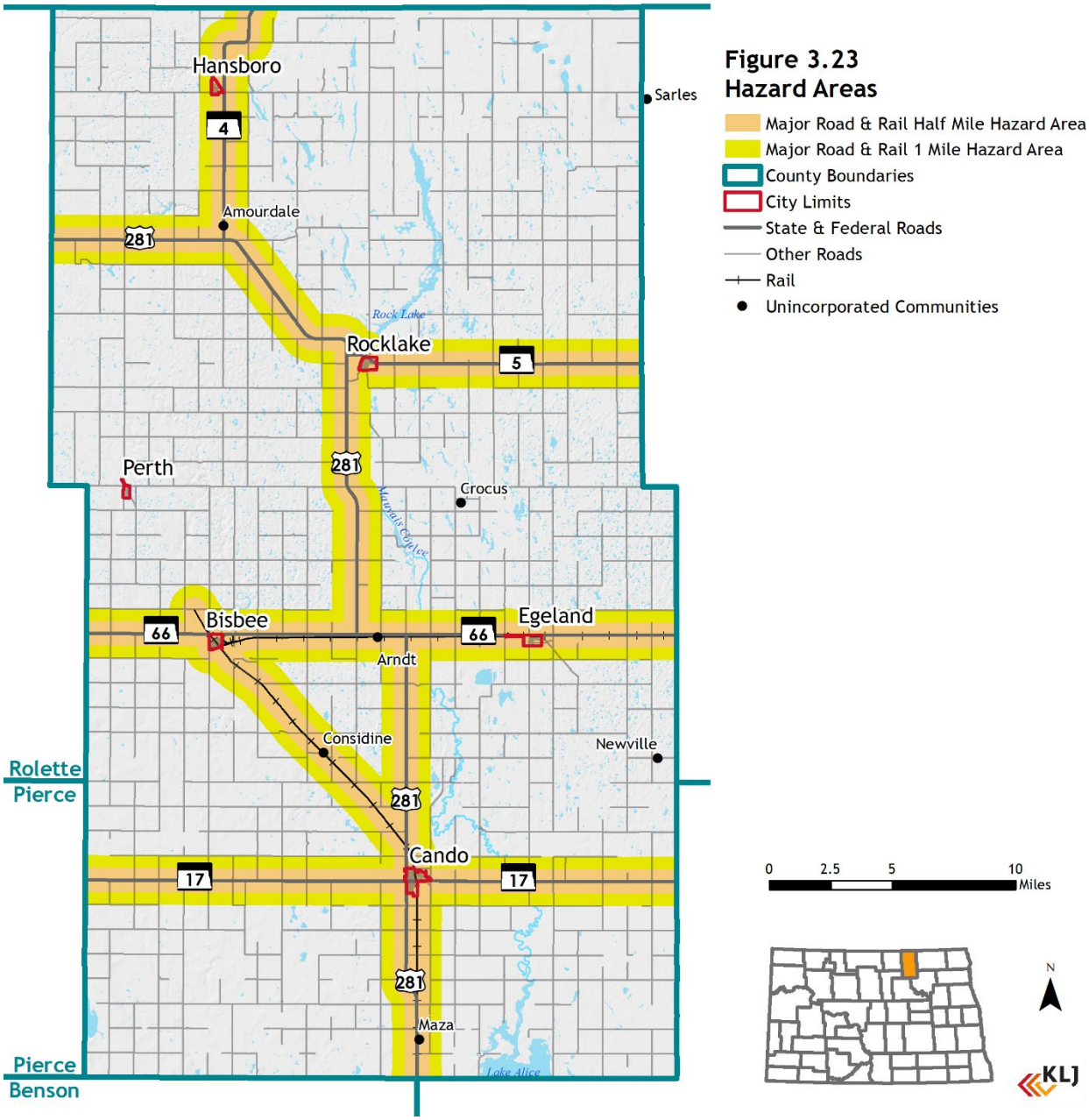

Hansboro
4
Sarles
Amourdale
281
Rock Lake
Rocklake
5
Perth
281
Crocus
Mauvais Coulee
Bisbee
66
66
Egeland
Arndt
Considine
Newville
Rolette
Pierce
281
Cando
17
17
281
Maza
Pierce
Benson
Lake Alice
Figure 3.23
Hazard Areas
Major Road & Rail Half Mile Hazard Area
Major Road & Rail 1 Mile Hazard Area
County Boundaries
City Limits
State & Federal Roads
Other Roads
Rail
Unincorporated Communities
0
2.5
5
10
Miles
N
KLJ

Table 3.11 – Towner County Population within Major Transportation Hazard Areas				
	Population in 1/2 Mile Hazard Area	% of Total Population	Population in 1 Mile Hazard Area	% of Total Population
Rural County	333	15.4%	362	16.7%
Bisbee	110	5.1%	110	5.1%
Cando	1117	51.7%	1117	51.7%
Egeland	34	1.6%	34	1.6%
Hansboro	15	0.7%	15	0.7%
Perth	6	0.3%		0.3%
Rocklake	102	4.7%	102	4.7%
Total	1711	79.1%	1740	80.5%

Critical Facilities

- Nearly all critical facilities in the county are within the 1/2 mile and 1-mile hazard areas.

Economy

- There is not identifiable economic impact due to the very low number of reported hazardous materials incidents.

Future Development

- The region's vulnerability to hazardous materials is not expected to change in the foreseeable future. There are no identified direct impacts on future development locations from hazardous materials releases.
- Local jurisdiction zoning ordinances can restrict the future development from locating near certain high-risk hazardous materials facilities, but are powerless to prevent the Department of Mineral Resources from allowing new high-risk hazardous materials facilities from being located close to that development after it is constructed.

EXISTING CAPABILITIES

The four fire departments (Cando, Bisbee, Egeland and Rocklake are trained at the awareness level on hazardous materials.

Hazardous materials operators are responsible for clean-up and reclamation of incident sites.

Local jurisdiction zoning ordinances can restrict the future development from locating near certain high-risk hazardous materials facilities, but are powerless to prevent the Department of Mineral Resources from allowing new high-risk hazardous materials facilities from being located close to that development after it is constructed.

KEY ISSUES AND POTENTIAL ACTION ITEMS

Key Issue: Hazardous materials incidents are uncommon in Towner County, and nearly all residents live, work or travel within a potential hazard area.

- *Potential Action Item*: Educate first responders and residents about hazardous materials safety.
- *Potential Action Item*: Designate evacuation shelter facility for each city located a safe distance from potential sources of a hazardous materials incident.
- *Potential Action Item*: Prohibit the construction of facilities containing hazardous materials within floodplain areas.

Transportation Incident

All Jurisdictions
Overall Risk: Low
Probability: Low
Impact: Moderate (impact could vary widely)

Seasonal Pattern
None

Duration
Varies

Primary Impacts
Economic loss
Human loss and injuries
Increased stress on medical services
Localized evacuation
Property damage or loss
Release of hazardous materials

HAZARD PROFILE

"Transportation Incident, for the purposes of this plan, is any large-scale vehicular, railroad, aircraft or watercraft accident involving mass casualties. Mass casualties can be defined as an incident resulting in a large number of deaths and/or injuries that reaches an impact that overtaxes the ability of local resources to adequately respond." [p271, 2019 ND Enhanced Mitigation Mission Area Operations Plan] The impacts of transportation incidents are most significant because of the loss of life or major injury. In rural communities, even relatively small incidents may overtax local resources because of the limited resources available to the communities. Another significant hazard associated with these incidents may be hazardous materials release. Other hazards that may precipitate a transportation incident include severe winter weather and flooding. It should also be noted that the hazard of terrorist attacks has also been aimed at transportation infrastructure and transit systems.

These events can affect critical infrastructure systems and local economies in various ways. Generally, they can block major transportation systems for extended periods of time.

HISTORY

The most common transportation incident is a multi-vehicle crash involving injury or death. There were 56 vehicle crashes with a total of 2 fatalities during the five year period from 2017-2021. Over the same time period, 4 crashes involved incapacitating injuries and another 12 had non-incapacitating injuries.

PROBABILITY

There are 115 miles of state and federal highways in the County. While the presence of these major transportation routes is a component of local risk, it is compounded because hazardous materials are transported every day along them, and along local roads in the County. Based on statistics from 2017 through 2021, the average number of crashes in Towner County is 11.2 per year. The average number of fatalities is 0.4 per year.

LOCATION

Transportation incidents can happen any place, but are more likely to occur along major highways, along railroad lines, and near airports. The major highways in Towner County are US 281, ND 4, 5, 17 & 66. The CP railroad runs through Maza to Cando and then angles up through Bisbee. The Cando Municipal Airport is the only public airport in Towner County.

VULNERABILITY

Population

- The County's population is not generally vulnerable to transportation incidents. The largest potential vulnerability stems from inhabited structures located close to major roadways where a crash involving hazardous materials could impact the occupants.

Property

- Potential property damage from a transportation incident is most likely when a major transportation route is situated close to major structures. Detailed statistics about proximity of buildings to these major transportation routes is not available.

Critical Facilities

- Several critical facilities are located along state and federal highways. They could potentially have access limited because of a transportation incident. Additionally, the highways and railroads themselves are critical infrastructure that could be disrupted for a significant time period.

Economy

- Economic impact at a county-wide scale from transportation incidents is not identifiable.

Future Development

- Potential future development property damage from a transportation incident is unlikely as long as appropriate setback requirements are adhered to during development.

EXISTING CAPABILITIES

Local emergency response capabilities in Towner County include 2 ambulance services (Cando and Rocklake) located in Towner County, and 4 quick response units. Local fire department response capabilities include certification in extrication, jaws of life, and hazardous materials. The local Towner County Hospital in Cando has an Emergency/Trauma Center with an emergency room and a surgical center, but is classified as a Level V trauma center. The nearest Level II trauma center is located in Minot.

KEY ISSUES AND POTENTIAL ACTION ITEMS

Key Issue: Towner County's very rural setting results in limited resources being available to response to transportation incidents.

- *Potential Action Item*: Obtain additional equipment for transportation related emergency response needs.

Urban Fire

All Jurisdictions
Overall Risk: Low
Probability: Low
Impact: Moderate (impact could vary widely)

Seasonal Pattern
None

Duration
Varies

Primary Impacts
Agricultural loss (crops, livestock)
Economic loss
Human loss and injuries
Increased stress on medical services
Localized evacuation
Property damage or loss
Release of hazardous materials
Structure collapse

HAZARD PROFILE

Urban fire is a threat to all communities. A small flame can begin inside a structure and rapidly turn into a major fire, creating a costly and deadly situation. The National Fire Protection Association (NFPA) reports that fires in the United States caused 3,005 civilian deaths and 17,500 civilian injuries in 2011. Eighty-four percent of civilian fire deaths were due to home structure fires. According to the National Fire Incident Reporting System (NFIRS) there are about 2,500 urban fire events each year in North Dakota.

Fires may begin intentionally (arson) or by accident. Common motives for arson are insurance fraud, vandalism and murder. Common causes of accidental fires are cooking equipment, heating equipment, electrical distribution and lighting equipment, cigarettes, clothes dryer or washer, candles, and spontaneous combustion. According to the NFPA, unattended cooking is the leading cause of structure fires, with frying as the leading type of cooking activity. Heating equipment is the second leading cause of structure fire.

HISTORY

Although the cities of Towner County have experienced multiple individual building fires, there have not been any multi-building fires or fires which have threatened whole blocks of the cities.

PROBABILITY

Detailed statistics on incidence of fires in North Dakota are not readily available. A key statistic from the National Fire Protection Association based on available data across the United States suggests that in communities with 2,500 people the annual rate of fires is 10.2 fires per 1,000 population. Source: Ahrens and Evarts. Fire Loss in the United States During 2019 (2020), NFPA.

LOCATION

Most structure fires are individual disasters and not community-wide, but the potential exists for widespread urban fires that displace several businesses or residences. The greatest risk of a multiple-structure urban fire is in historic downtowns. There is no history of multi-structure fire in Towner County. Agricultural facilities, such as grain elevators and dryers, and energy production and transport facilities are also at risk for significant fire.

VULNERABILITY

Population

- All residents in urban areas of the county are vulnerable to an urban fire event. The county's cities contain approximately 1,390 residents (64 percent of the county's total population).
- Mobile homes, RVs used as residences, and other types of workforce housing may be more vulnerable to fire than other residential structures. Collectively, estimated population in these facilities includes:
    - 4 residents in Bisbee
    - 20 residents in Cando
    - 2 residents in Hansboro
    - 8 residents in Rocklake

Property

- Property value data for individual structures is not available, but is assumed that a large multi-structure fire could cause damages over $1 million.
- Mobile homes, RVs used as residences, and other types of workforce housing may be more vulnerable to fire than other residential structures. The estimated number of such housing units includes:
    - 2 units in Bisbee
    - 10 units in Cando
    - 1 unit in Hansboro
    - 4 units in Rocklake

Critical Facilities

- Critical facilities in historic downtowns generally have a greater vulnerability to urban fire because of close building proximity. Other large facilities, such as grain elevators, electric substations and energy production facilities, may also be vulnerable to fire.
- Critical Facilities within communities are as follows:
  Bisbee critical facilities:
    - Post Office
    - City Hall
    - Fire Department
    - Grain Elevator

  Cando critical facilities:
    - Ambulance
    - Armory
    - Auditorium
    - City Hall
    - Fire Department
    - Library
    - Post Office
    - NorthStar Public School
    - Towner County Medical Center
    - Towner County Courthouse
    - DOT Shop
    - Towner County Shop
    - Towner County Living Center
    - Water Treatment Plant
    - Grain Elevator

  Egeland critical facilities:
    - Towner County Historical Museum
    - Post Office
    - City Hall
    - Fire Department

  Hansboro critical facilities:
    - County Shop
    - Grain Elevator

  Perth critical facilities:
    - Grain Elevator

  Rocklake critical facilities:
    - Ambulance/Fire Department
    - Grain Elevator
    - Mini Mall
    - Towner County Shop
    - Post Office

Economy

- Detailed statistics on Towner County's economic impact from urban fire is not available.

Future Development

- Towner County and Cando have adopted the North Dakota State Building Code. The State Building Code consists of the 2018 International Building Code, International Residential Code, International Mechanical Code, International Energy Conservation Code and International Fuel Gas Code published by the International Code Council. Future development will be protected to the extent these Codes can reduce urban fire.

EXISTING CAPABILITIES

All areas of the county are within the service area of a volunteer fire department.

KEY ISSUES AND POTENTIAL ACTION ITEMS

***Key Issue*:** There is no history of large-scale urban fire in the county, but it is an ongoing concern.

- *Potential Action Item*: Provide education about fire prevention best practices for local business owners and residents.
- *Potential Action Item*: Continue response preparation with local fire districts.
- *Potential Action Item*: Remove abandoned properties that could be a target for arson.

Civil Disturbance

All Jurisdictions
Overall Risk: Low
Probability: Low
Impact: Moderate

Seasonal Pattern
None

Duration
Varies

Primary Impacts
Economic loss
Human loss and injuries
Increased stress on medical services
Localized evacuation
Property damage or loss

HAZARD PROFILE

Civil disturbances can occur when large groups, organizations, or distraught individuals act with potentially disastrous or disruptive results. Many issues can cause civil disturbance, but most are due to political grievances, economic disputes or social discord, terrorism, or foreign agitators. Additionally, civil disturbance can result following a disaster that creates panic in the community. Civil disturbances are criminal actions and not protected by the 1st Amendment. Forms of civil disturbances may range from groups blocking sidewalks, roadways, and buildings to mobs rioting and looting to gang activity. They can be either spontaneous or planned events. [p47, 2019 ND Enhanced Mitigation Mission Area Operations Plan]

HISTORY

Events that can be classified as civil disturbances have been very limited in North Dakota. Until 2020, there had been three documented events in the last fifty years:

- 1969 – Zip to Zap event. This event was initiated as a large scale party during a college break, but turned into a riot when tensions arose between students and authorities.
- 2016 – Dakota Access Pipeline (DAPL) event. This event was initiated when protestors gathered to express their opposition to the construction of the pipeline. It turned into multiple criminal activities including rioting, vandalism, theft, criminal trespass, terroristic threats, and arson. While the event started with a few hundred protestors it grew into a group estimated at nearly 10,000 participants.
- 2020 – Downtown Fargo Riot. The March for George Floyd protest that began in the afternoon turned into a riot with some protesters attacking occupied police cars and vandalizing property. Taxpayer costs were estimated at $842,000.

Despite the very rural location in two of the documented events, the civil disturbances turned into large scale events requiring law enforcement capacity significantly beyond local resources. Neither event had been anticipated, and local resources were quickly overwhelmed. Communication channels are so immediate and widespread that similar events can be initiated with little to no advance warning to local law enforcement officials.

Impacts from civil disturbances can range from using up limited budgets for local law enforcement to property damage or destruction to potential injury and loss of life. The cost of responding to the DAPL event have been estimated in the neighborhood of $38 million. Other potential impacts may include disruption of transportation systems and environmental damage.

PROBABILITY

Despite the very rural nature of Towner County, there is a realistic potential for similar events to happen in the County. No level of probability has been determined.

LOCATION

While the very rural nature of Towner County suggests that no part of the County is safe from a potential civil disturbance, there is probably a greater likelihood of an incident happening at the site related to the topic of a gathering. These might include sites where environmental damage is a concern or sites where an historical event has occurred.

VULNERABILITY

Population

- The number of residents vulnerable to a civil disturbance is highly variable based on the site and timing of an event. A large-scale incident, similar to the DAPL event, would have the potential for hundreds of injuries or fatalities.
- The largest concentration of resident population in Towner County would be in Cando.
- With the right provocation or initiative, a civil disturbance can happen anywhere. Therefore, the

entire population of the County could be considered vulnerable.

Property

- As illustrated by the Fargo event, damage in an urban setting can result in damages in the hundreds of thousands of dollars.

Critical Facilities

- Because of the historical precedence in North Dakota, it is not safe to rule out any location or critical facility from being potentially impacted by a civil disturbance.
- Local government facilities, including the county courthouse and each city hall, may be attractive targets. Other potential targets include schools, and the energy production, processing, and transport facilities.

Economy

- Direct impacts of civil disturbances to the Towner County economy as a whole are likely to be minor, however, the potential to severely affect individual property owners or businesses is significant. No direct costs to the local economy can be calculated.

Future Development

- Civil disturbances are not constrained by location or age of development. However, proposals for certain types of controversial uses are more likely to precipitate civil disturbances than typical development proposals.

EXISTING CAPABILITIES

The primary response capabilities in Towner County are the Sheriff Department and Cando police department. There is also a ND Highway Patrol regional office in Devils Lake. There are ongoing efforts to organize coordinated responses in North Dakota in the case of another DAPL type event.

KEY ISSUES AND POTENTIAL ACTION ITEMS

Key Issue: Civil disturbances are an ongoing concern, but it is unlikely that a large-scale event will occur in the County. The key issue for civil disturbance is unpredictability and the high cost of incident response.

- *Potential Action Item*: Develop a collaborative approach to assessing risk and mobilizing needed resources for civil disturbances.
- *Potential Action Item*: Enhance security measures at critical facilities.

Criminal Terrorist Nation Attack

All Jurisdictions
Overall Risk: Low
Probability: Low
Impact: Moderate (impact could vary widely)

Seasonal Pattern
None

Duration
Varies

Primary Impacts
Agricultural loss (crops, livestock)
Economic loss
Human loss and injuries
Increased stress on medical services
Localized evacuation
Property damage or loss
Release of hazardous materials
Structure collapse

HAZARD PROFILE

For the purposes of this profile, Criminal Terrorist Nation Attack includes chemical attacks, biological attacks, radiological attacks, nuclear attacks, explosive attacks, food/food production attacks, and armed assaults. These can broadly be defined as any intentional adversarial human-caused incident, domestic or international, that causes mass casualties, large economic losses, large infrastructure damage or widespread panic in the country. Such attacks can result in a variety of hazards. For example, terrorists might compromise a dam leading to catastrophic dam failure. Other hazards that can be intentionally initiated by human actions given the appropriate materials and motivation include infectious disease, transportation incidents, hazardous material releases, utility or communication failures, cyber attacks and wildland fires. [p54, 2019 ND Enhanced Mitigation Mission Area Operations Plan]

The impacts from such attacks can vary based on the scale of targets, the capacity and resources of the attackers, the degree of effort in preparation and instigation of the attacks, and the degree of mitigation in place to reduce impacts.

HISTORY

There are no identified incidents of Criminal Terrorist Nation attacks in Towner County. Threats to or in North Dakota of Criminal Terrorist Nation Attacks are a reality which may not be commonly recognized. Since January 2014 there have been 43 Terrorist Screening Center hits or encounters within North Dakota. In that same time period there have been hundreds of suspicious activity reports of which 266 were passed on to the FBI for potential investigation. [p56, 2019 ND Enhanced Mitigation Mission Area Operations Plan]

Examples of these potential Criminal Terrorist Nation Attacks include bomb threats and an oil pipeline shutoff. The type and scope of such incidents can vary dramatically as illustrated by the following two examples.

- September 11, 2001 attack on the World Trade Center and the Pentagon. This attack killed 2,977 people and injured thousands more, as well as causing billions in damages, and disrupting business and government activities throughout the United States.
- January 21, 1995 attack on the underground phone cable system in Fargo. This attack caused $1 million in damages and interrupted phone service for 20,000 people.

PROBABILITY

As documented in the previous subsection, there have been Criminal Terrorist Nation attacks in North Dakota. There is no known calculated probability for these incidents in Towner County. However, it is instructive to consider the results of an FBI study of active shooter incidents in the United States between 2000 and 2013. Key findings of the study include:

- Over 66% of the incidents studied ended before law enforcement arrived and could engage the shooter.
- The frequency of the incidents increased over time.
- In almost every case a shooter acted alone.

LOCATION

The FBI study noted previously found that while the greatest frequency of incidents were in commercial areas or educational settings, there have been incidents that have occurred in open spaces, government facilities, houses of worship, residences and health care facilities. Additionally, these events happened in very rural and very urban settings, and both indoors and out of doors. For the purposes of this analysis, all areas of Towner County are equally at risk.

VULNERABILITY

Population

- Terrorist and Nation/State attacks are commonly aimed at major population centers where the degree of impact may be more significant. Such attacks on Towner County are extremely unlikely due to its low population density and lack of targets of national significance. Some types of such attacks may have nation-wide impacts that do affect the region. However, criminal attacks may result from different motivations, be less predictable, and more likely in rural areas. The active shooter type incident is completely unpredictable and could happen at any location.

Property

- As noted previously Criminal Terrorist Nation Attacks are not likely to be focused on rural places like Towner County. If such attacks were to occur in the region, most types of these incidents would likely have limited impacts to property.

Critical Facilities

- Terrorist and Nation/State attacks are commonly aimed at targets of national significance and are extremely unlikely in the region due to a lack of such targets. Some types of such attacks may have nation-wide impacts that do affect the region. However, criminal attacks may result from different motivations, be less predictable, and more likely in rural areas like Towner County. Level of security in local critical facilities is also likely to be lower than in more heavily populated parts of North Dakota or the United States.

Economy

- If a major Terrorist or Nation/State attack were to occur in Towner County, depending on the type of attack and resulting damage, it could have devastating impacts to the local economy. If certain critical facilities were damaged or destroyed it could hamper the ability for normal civilian functions to occur for several months. Although the impacts of a criminal incident are likely to have less long-term or wide-spread impacts, even those like the Fargo phone system attack noted previously can significantly impact individual businesses or property owners.

Future Development

- The county's overall vulnerability to Criminal Terrorist Nation Attacks is not expected to change in the foreseeable future.

EXISTING CAPABILITIES

The primary response capabilities in Towner County are the Sheriff Department and police department of Cando. There is also a ND Highway Patrol station in Devils Lake that serves the surrounding region. One of the officers in the region will be working out of Rolla, ND beginning in 2022. Other state and federal law enforcement agencies may have stations or offices in Devils Lake or Minot. There are ongoing efforts to organize coordinated responses in North Dakota in the case civil disturbances and Criminal Terrorist Nation attacks.

KEY ISSUES AND POTENTIAL ACTION ITEMS

Key Issue: The most likely Criminal Terrorist Nation Attack incident affecting the region is a criminal attack such as an active shooter.

- *Potential Action Item*: Develop educational materials on best practices to enhance security at locations with perceived risk of such attacks, and encourage their implementation.
- *Potential Action Item*: Assess safety/security at oil/gas facilities.
- *Potential Action Item*: Upgrade security cameras at K12 schools where needed.
- *Potential Action Item*: Assess safety/security at critical facilities throughout the County, including water treatment plants.

Cyber Attack

All Jurisdictions
Overall Risk: Moderate
Probability: Moderate
Impact: Moderate(impact could vary widely)

Seasonal Pattern
None

Duration
Varies

Primary Impacts
Economic loss
Property damage or loss (data property)
Disruption of critical services
Human loss and injuries

HAZARD PROFILE

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

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

To ensure a quick and proper response to cyber attacks, systems vulnerable to cyber terrorism should have an incident response plan to minimize negative impacts." [p66, 2019 ND Enhanced Mitigation Mission Area Operations Plan].

HISTORY

There are no documented incidents of cyber attacks in Towner County. There were three known large-scale cyber attacks in North Dakota in recent years.

- 2016 DAPL event doxing. Unknown individual(s) discovered and released personally identifying information of law enforcement officers who were part of the response to the DAPL event.
- 2017 UND website distributed denial of service. The UND website was flooded with so many incoming queries that it became unresponsive and was no longer functional to legitimate users.
- 2018 phishing attack on a North Dakota company. Phishing emails were sent to over 150 employees and over a dozen were successfully phished. Personnel records, including personally identifiable information, were accessed.

PROBABILITY

According to a Clark School [University of Maryland] study, every 39 seconds there is a hacker attack on computers with internet access with the result of affecting one in three Americans every year. Source: https://eng.umd.edu/news/story/study-hackers-attack-every-39-seconds

According to an online article published on the Business2Community.com website, the cybersecurity firm BlueVoyant published a report in August 2020 finding that state and local governments have seen a 50% increase in cyberattacks since 2017. The report outlined the cyberattacks as either targeted intrusions, fraud, or damage caused by hackers. BlueVoyant noted that the 50% increase in attacks is likely a fraction of the true number of incidents because many go unreported. Source: https://www.business2community.com/cybersecurity/state-local-government-cyberattacks-up-50-02348278

LOCATION

A cyber attack could occur or impact any location in the County. It could occur anywhere in the United States and potentially still have impacts to the County and its people, businesses, governments, and infrastructure. Such attacks can be small scale and localized or affect major segments of the United States.

VULNERABILITY

Population

- Cyber attacks can impact individuals by the loss of privacy, loss of financial resources, loss or corruption of critical information, loss of time spent resolving or responding to attacks, and several other negative consequences.

Property

- Property, facilities and infrastructure can be damaged or destroyed by a cyber attack incident.

Critical Facilities

- A cyber attack could occur or impact any location in the County. It could occur anywhere in the United States and potentially still have impacts to the County and its businesses, governments, infrastructure and people.
- Cyber attacks can disrupt electronic operations or functions of critical facilities resulting in potentially catastrophic direct and indirect consequences. Table 3.13 summarizes critical infrastructure and key resources in Towner County. Many of these could be impacted by a cyber attack.

Economy

- Cyber attacks can impact the local economy, although known incidences of cyber attacks do not typically have a county-wide economic impact. A cyber ransom attack is likely the most obvious way that there could be a county wide impact.

Table 3.13 – Critical Infrastructure and Key Resources in Towner County

CIKR Resource	Description	# in Towner County
Food/Agriculture	Major food distribution centers	1
Energy	Power generation and petrochemical facilities	0
Public Health	Hospitals and other healthcare facilities	2
Transportation	Bridges and major highways	7
Emergency Services	Police, fire, ambulance and dispatch centers	12
Communications	Major communications towers	3
Water	Treatment facilities	2

Future Development

- Cyber attacks are not anticipated to directly impact potential future development patterns.

EXISTING CAPABILITIES

Standard cyber attack protection is in place through the county's internet service provider. Existing protection for private individuals and businesses, public services, and other local government agencies is unknown.

KEY ISSUES AND POTENTIAL ACTION ITEMS

Key Issue: Critical facilities and local organizations are at risk from cyber attacks.

- *Potential Action Item*: Develop educational materials on best practices to harden electronic systems of critical facilities and local organizations and encourage their implementation.
- *Potential Action Item*: Upgrade cyber protection of local government facilities and data.

Summary

There are 10 priority hazards identified for Towner County. The key issues for each hazard are summarized below. Hazards are summarized for the county overall. Hazard risk for each jurisdiction is summarized in Table 3.14.

Table 3.14 – Towner County Risk Summary

	County	Bisbee	Cando	Egeland	Hansboro	Perth	Rocklake	
Criminal Terrorist Nation Attack	L	L	L	L	L	L	L	
Civil Disturbance	L	L	L	L	L	L	L	
Cyber Attack	M	M	M	M	M	M	M	
Dam Failure	L	L	L	L	L	L	L	
Drought	M	M	M	M	M	M	M	
Flood	H	L	M	L	M	L	L	
Geologic Hazards	L	L	L	L	L	L	L	
Hazardous Materials Release	L	M	M	M	M	M	M	
Infectious Disease	M	M	M	M	M	M	M	
Severe Summer Weather	H	H	H	H	H	H	H	
Severe Winter Weather	H	H	H	H	H	H	H	
Space Weather	M	M	M	M	M	M	M	
Transportation Incident	L	L	L	L	L	L	L	
Urban Fire	L	L	L	L	L	L	L	
Wildland Fire	M	M	L	M	M	M	M	

H = High, M = Moderate, L = Low

CRIMINAL TERRORIST NATION ATTACK

The potential impacts from a criminal terrorist nation attack can widely vary based on the type of attack, but the County has neither the population or the infrastructure base to make it a likely target.

CIVIL DISTURBANCE

Civil disturbance impacts again, could vary widely, but the likelihood of a significant disturbance is very limited.

CYBER ATTACK

Cyber attacks are a high probability event. There are important critical facilities that could be directly attacked or impacted. While impacts are generally limited, the potential impacts could vary widely.

DAM FAILURE

Although there are many dams in Towner County, the only significant hazard dam in the County recently was upgraded, and poses a low risk of impacts.

DROUGHT

Severe drought conditions have occurred in Towner County in recent years. Agriculture is a key component of the county's economy. A significant drought has the potential to greatly affect the industry and the county as a whole. The rural water services do not foresee circumstances where there is not potable water available for household use, but are strengthening their capacity by creating an interconnected water supply system.

FLOOD

Towner County has approximately an 85% annual probability of flooding. Flood events in the county include overland flooding and rising waters of the Devils Lake basin.

Rural roads in the county may be overtopped or washed out.

The Cando water treatment facility is the only critical facility in the County to be threatened by flooding, but there are historically parts of several communities prone to overland flooding during spring snowmelt events.

GEOLOGIC HAZARDS

A small part of the county is within a moderate susceptibility/low incidence landslide hazard area as defined by USGS. The rest of the county has no anticipated risk of landslides.

There is no history and a very small likelihood of any earthquake impacting the county.

HAZARDOUS MATERIALS INCIDENT

Hazardous materials incidents happen an average of less than once per year in Towner County, but a majority of its residents live, work or travel within a potential hazard area.

INFECTIOUS DISEASE

Human and agricultural disease have the potential to greatly impact the health and economy of the county. The COVID-19 pandemic has resulted in significantly more cases than typical influenza cases.

SEVERE SUMMER WEATHER

Towner County averages approximately nine days per year with a summer storm event. Severe wind and hail are the most common summer storm events in the county, and tornadoes are also a possibility in the region.

SEVERE WINTER WEATHER

Towner County averages approximately six days per year with a winter storm event. Severe winter weather events in the county include winter storm, high wind, heavy snow, blizzard, extreme cold/wind chill and ice storm.

A winter storm event that causes a power outage may make it difficult for residents to heat their homes. Elderly residents and residents in temporary housing are the most vulnerable to extreme cold temperatures.

SPACE WEATHER

Towner County like the rest of the United States is not equipped to deal with a major space weather event like the Carrington Event (geomagnetic storm) of 1859. Similar events have happened in the last few decades but have not had as widespread impacts. Due to the extreme dependence on electricity and computer systems, there is concern that such an event could have severe impacts on life in Towner County.

TRANSPORTATION INCIDENT

Transportation incidents are not common in Towner County and potential concerns are more about the potential of those incidents involving hazardous materials than about large-scale crashes.

URBAN FIRE

Urban fire has a very low incidence rate in Towner County, and the probably impacts are relatively benign.

WILDLAND FIRE

Wildland fires happen several times each year in Towner County. But wildfires greater than 100 acres have approximately a 60% annual chance of occurrence. Most large wildfires in the county cause minimal property damage.

CHAPTER 4: Mitigation Strategy

The mitigation strategy includes specific action items to reduce the impact of the priority hazards identified in Chapter 3. The process for identifying action items was as follows:

- Consultant developed initial action item suggestions based on hazard assessment.
- Emergency manager and consultant review of jurisdictional and citizen input on hazard concerns and potential action items.
- Goals and past mitigation actions were reviewed to help guide action item development.
- Emergency manager and consultant development of mitigation action items.
- Planning team member review and refinement of proposed mitigation action items.
- Jurisdictional representative review and comment on draft mitigation action items.

Capability Assessment

Before identifying goals and action items, it is important to know the capabilities of each jurisdiction to undertake different types of hazard mitigation projects. Specific capabilities are listed as part of each hazard profile in Chapter 3. Additional capabilities are summarized below.

LEGAL AND REGULATORY

- **Zoning Ordinance.** Cando and Towner County have zoning ordinances.
- **Comprehensive Plan.** There are no jurisdictions with comprehensive plans.
- **Floodplain Ordinance.** Cando and Towner County have floodplain ordinances.
- **Building Code.** Cando and Towner County have adopted the State Building Code.

ADMINISTRATIVE AND TECHNICAL

- **Emergency Management Department.** Towner County has an emergency management department.
- **Building Permits.** Cando and Towner County require building permits.
- **Building Inspections.** There are no jurisdictions that require building inspections.

FISCAL

- **Federal Grants.** Towner County and each incorporated jurisdiction are eligible for a variety of federal grants, including Community Development Block Grants. More details are provided in the Funding subsection on page 4-2.
- **Taxing Authority.** Towner County and each incorporated jurisdiction have authority to levy taxes.
- **Bonding.** Towner County and each incorporated jurisdiction have capacity to issue bonds.

Goals

The goals defined below provide the general guiding principles that were used when developing mitigation activities. The goals may be used to guide the development of additional action items as the plan is evaluated in future years. The goals below are all priorities and presented in no particular order.

- **Reduce the impacts of flooding to people and property**
- **Enhance the public's awareness of hazards**
- **Reduce the impacts of severe summer and winter weather to people and property**
- **Reduce impacts of drought and wildland fires to people and property.**
- **Reduce the impacts of human-caused or technological hazards to people and property.**

Previous Mitigation Actions

There were 16 mitigation actions for Towner County and its participating jurisdictions in the last Multi-Hazard Mitigation Plan. Four of these mitigation actions applied to more than one jurisdiction. Appendix D contains a summary table of the status of past mitigation actions. Seven actions were completed (or partially completed). Three actions are ongoing and incorporated into this plan. Five actions were substantially retained although slightly modified for inclusion in this plan. The status of one action is unknown.

The greatest challenge to completing mitigation activities has been the limited resources (time and money) of the County and each jurisdiction. Local government is run by a small number of people, some part-time. Many of the mitigation actions included in this plan can be implemented through existing County and City programs, and many require only a minimal cost. Those that require substantial costs are linked to grant programs that can provide much of the necessary funding.

Funding

Towner County will need to utilize local, state and federal funding to implement the action items identified in this plan. The County and each jurisdiction have access to multiple state and federal funding opportunities. US Department of Housing and Urban Development (HUD) Community Development Block Grants (CDBG) and US Department of Agriculture (USDA) Community Facility Grants are available for a wide variety of uses. There are also other viable funding streams tailored specifically for hazard mitigation and disaster response. FEMA's Hazard Mitigation Grant Program (HMGP) could provide funding for a wide variety of mitigation projects and is only available following a North Dakota disaster declaration. Additional FEMA grant programs that provide funds for mitigation include the Building Resilient Infrastructure and Communities (BRIC) program and Flood Mitigation Assistance (FMA) program.

FEMA's Hazard Mitigation Assistance Unified Guidance, which includes eligible activities for each of FEMA's mitigation grant programs, can be found at: https://www.fema.gov/media-library/assets/documents/103279

Action Items

The mitigation action items for the participating jurisdictions, identified in Tables 4.1 – 4.7 are recommendations developed through discussion with Planning Team members, community representatives, and key stakeholders from the County. A broad range of potential mitigation activities were considered; many of these potential activities are listed in Chapter 3 with the applicable hazard. These potential actions were evaluated based on community representative and emergency manager feedback, and further prioritized and refined in collaboration with key stakeholders from each jurisdiction. Further explanation of the mitigation activity selection process can be found in Appendix D.

The mitigation action items listed in Tables 4.1 – 4.7 provide a roadmap for targeting and implementing mitigation projects over the next five years. Each action item listed identifies the hazard or hazards that it is intended to mitigate. Due to space limitations the hazard names are truncated. The following list matches the truncated name to the full hazard name.

- **Drought:** Drought
- **Fire:** Wildland Fire
- **Flood:** Flood
- **Geologic:** Geologic Hazards
- **Summer:** Severe Summer Weather
- **Winter:** Severe Winter Weather
- **Wildland:** Wildland Fire
- **CTNS:** Criminal Terrorist Nation Attack
- **Dam:** Dam Failure
- **HazMat:** Hazardous Materials Releases
- **Disease:** Infectious Disease or Pest Infestations
- **Space:** Space Weather
- **Cyber:** Cyber Attack
- **Civil:** Civil Disturbance
- **Transp:** Transportation Incident
- **Urban:** Urban Fire
- **Multiple:** two or more of the above listed hazards

Project costs are identified in terms of staff time, or a numeric cost estimate range. The numeric values are generally based on a previously identified cost, but in some cases shows order of magnitude rather than a budgetary value. The amount of staff time required may vary widely, but budgeting for direct expenses for mitigation projects labeled staff time are assumed to be extremely limited. Projects are prioritized based on urgency of need, anticipated time to develop, and a generalized benefit-cost analysis that factors in potential cost and project benefit.

are identified in terms of staff time, low, moderate or high cost. The amount of staff time required may vary widely, but budgeting for direct expenses for mitigation projects labeled staff time are assumed to be extremely limited. The terms low, moderate, and high are aimed at increasing magnitudes of cost. Low represents projects estimated to cost less than $1000, moderate – less than $10,000 and high – in excess of $10,000 (in some cases like road and bridge improvements possibly over $100,000). Projects are prioritized based on a generalized benefit-cost analysis that factors in potential cost and project benefit. It is important to note that many project costs are eligible for grant or other outside funding. Funding options and project costs may vary year-to-year, so before moving forward with implementation the jurisdiction should perform a detailed benefit-cost analysis. The implementation timeline for each project may be highly variable based on the availability of needed local funds.

Table 4.1 – Towner County Mitigation Action Items					
ID	Priority	Action	Hazard	Cost	Timeframe
A	High	Continue to educate local jurisdictions and the public about benefits of flood insurance	Flooding	Staff Time	Ongoing
B	High	Install entrance security system for courthouse	Multiple	$20,000-40,000	2022
C	Low	Create living snow fences in strategic locations	Winter	$750 - $1,500 per 100 feet of frontage	Ongoing
D	Low	Install 911 signs throughout county	Multiple	$50 - $300 per sign	Ongoing
B'	Moderate	Install emergency storm shelter at Bisbee Dam	Dam	$50,000	2023

Table 4.2 – Bisbee Mitigation Action Items					
ID	Priority	Action	Hazard	Cost	Timeframe
E	Moderate	Construct or enlarge north side culverts to reduce risk of local flooding	Flooding	$5,000 - $50,000	2024
F	Low	Install generators and connections at select critical facilities	Multiple	$10,000 - $20,000 per generator	2024
G	Low	Remove silt and debris from storm drain culverts	Flooding	Staff Time	Ongoing
H	High	Upgrade emergency warning siren for Bisbee	Multiple	$23,000	2022

Table 4.3 –Cando Mitigation Action Items					
ID	Priority	Action	Hazard	Cost	Timeframe
I	Moderate	Conduct NFIP workshop to educate real estate industry members and citizens about flood insurance	Flooding	Staff Time	2023
J	Moderate	Mitigate flooding hazard to Cando sewer lagoons	Flooding	Varies Based on Project	2023
K	Low	Install generator for water treatment plant	Multiple	$10,000 - $20,000 per generator	2023
L	Low	Install security fence around water plant.	CTNS	$50 - $150 per linear foot	2023
M	High	Upgrade emergency warning siren for Cando	Multiple	$23,000	2022

Table 4.4 – Egeland Mitigation Action Items					
ID	Priority	Action	Hazard	Cost	Timeframe
N	High	Construct a flood mitigation project to reduce flooding risk from the west	Flooding	$10,000 - $200,000	2023
O	Low	Install backup generator for sanitary lift station	Multiple	$10,000 - $20,000 per generator	2024
P	High	Upgrade emergency warning siren for Egeland	Multiple	$23,000	2022

Table 4.4 –Hansboro Mitigation Action Items					
ID	Priority	Action	Hazard	Cost	Timeframe
Q	Moderate	Improve flood protection infrastructure to reduce risk of local flooding	Flooding	$5,000 - $200,000+	2023
R	High	Upgrade emergency warning siren for Hansboro	Multiple	$23,000	2023
S	Low	Create a hazard information kiosk in Hansboro to educate about mitigation opportunities	Multiple	$500	2024
T	Low	Obtain backup generator to reduce impacts from power outages	Multiple	$10,000 - $20,000	2024

Table 4.4 –Perth Mitigation Action Items					
ID	Priority	Action	Hazard	Cost	Timeframe
U	Moderate	Install culvert on west side of Perth to reduce flooding	Flooding	$5,000 - $50,000	2023
V	High	Obtain winter snow removal equipment	Winter	High	2023

Table 4.4 –Rocklake Mitigation Action Items					
ID	Priority	Action	Hazard	Cost	Timeframe
W	Moderate	Construct or enlarge culverts/storm sewer inlets to reduce risk of local flooding	Flooding	$5,000 - $50,000	2023
X	Low	Install backup generator for sanitary sewer lift station	Multiple	$10,000 - $20,000	2024
Y	Moderate	Acquire portable water pump to remove snowmelt water from streets when needed	Flooding	$10,000	2023
Z	High	Upgrade emergency warning siren for Rocklake	Multiple	$23,000	2022
A’	Low	Review Rocklake existing emergency response plans for possible enhancements	Multiple	Staff Time	2024
C’	Moderate	Analyze alternatives to address significant crash site and implement preferred alternative	Transp	Varies	2024

Project Summaries for Action Items

The Towner County Emergency Manager is the local champion for the plan, and responsible for maintaining energy and enthusiasm for each jurisdiction's overall mitigation program. Responsibility for implementing mitigation projects ultimately rests with each jurisdiction. The individual or agency responsible for overseeing implementation of mitigation projects for each jurisdiction is listed as part of each project summary. The actual person(s) performing the project may be different than the responsible party.

TOWNER COUNTY

A: Continue to educate local jurisdictions and the public about benefits of flood insurance.

The Emergency Manager has an ongoing practice of providing education to the communities and the public about the benefits of flood insurance. Changes to NFIP policy and insurance will be incorporated into the coming year's educational efforts.

Responsible party: Towner County Emergency Management

B: Install entrance security system for courthouse.

Civil unrest, active shooters, terrorists, disorderly conduct, theft, and sabotage are all potential threats to employee and public safety in the courthouse. Entrance security will be improved by installing walk-through metal detectors and security doors for the courthouse in order to enhance security and manage access to the building.

Responsible party: Towner County Emergency Management

C: Create living snow fences in strategic locations.

Living snow fences are a long-tern solution to hazardous road sections. They generally last approximately 75 years and require little maintenance once roots are established in new plantings. A mature living snow fence can hold approximately 12 times as much snow as a similar-sized Wyoming-style slatted snow fence.

Living snow fences can also provide cover for livestock and create wildlife habitat. Living snow fences present several challenges. They are generally located beyond the road's right-of-way, so it is necessary to work with neighboring landowners to establish the fence. A snow fence often takes away land that could otherwise be used for agriculture, and it can also present a maintenance challenge for landowners. For these reasons it is often necessary to provide compensation to landowners in the form of an annual stipend. These payments vary based on potential productivity of the land.

Another challenge is that living snow fences can take five to seven years to mature and be an effective barrier. A manufactured snow fence would be required during this time period if immediate results are desired.

Funding for living snow fences may be available through FEMA mitigation programs through the Five Percent Initiative. State agencies in North Dakota occasionally make funds available for snow fence projects.

The County Emergency Manager will continue to work with County and State Highway Departments to identify key locations where living snow fences would be most beneficial.

Responsible party: Towner County Emergency Management

D: Install 911 signs throughout county.

Adequate 911 signage is a key requirement for effective response to emergency incidents in the County. While significant progress has been made, more signage will be installed when budget allows.

Responsible party: Towner County Emergency Management

B': Install Emergency Storm Shelter at Bisbee Dam

The Bisbee Dam is a major recreational facility in the County. An emergency storm shelter could save multiple lives during a tornado event.

Responsible party: Towner County Emergency Management

BISBEE

E: Construct or enlarge north side culverts to reduce risk of local flooding.

Bisbee needs more and bigger culverts on the north side of town to assist drainage for snowmelt or heavy rains.

Culvert mitigation is eligible for FEMA funds through the HMGP, BRIC and FMA grant programs.

Responsible party: Bisbee Auditor

F: Install generators and connections at select critical facilities.

Bisbee needs a generator to power the sanitary sewer lift station during power outages.

Generators are eligible for funding through the HMGP program, and funding is available through the BRIC program in some instances.

Back-up power sources was identified as the top summer storm and winter storm action item in a community survey administered for the previous MHMP. But this mitigation action has not been completed yet.

Responsible party: Bisbee Auditor

G: Remove silt and debris from storm drain culverts.

Some Bisbee storm drains are partially blocked by silt and debris. Accomplishing this clean-out will reduce flooding risk for several properties in the community.

Responsible party: Bisbee Auditor

H: Upgrade emergency warning siren for Bisbee.

Bisbee's warning siren is no longer functioning adequately and needs to be upgraded so it is louder and can be initiated by multiple emergency personnel.

Responsible party: Bisbee Auditor

CANDO

I: Conduct an NFIP workshop to educate real estate industry members and citizens about flood insurance.

Changes to NFIP policy and insurance provide a significant reason for a workshop that will educate realtors, lenders, and property owners.

Funds for public awareness or education campaigns about mitigation are available under the HMGP Five Percent Initiative.

Responsible party: Cando Floodplain Administrator

J: Mitigate flooding hazard to Cando sewer lagoons.

Potential actions include constructing a protective levee around the lagoons or elevating the entire lagoon infrastructure. These projects are eligible for funding through the FEMA HMGP and BRIC grant programs.

Responsible party: Cando Floodplain Administrator

K: Install generator for water treatment plant.

Cando does not have a dedicated emergency generator for its water treatment plant. Installing a generator would eliminate risk for every developed property in the City. Back-up power sources were a top priority in the community survey administered as part of the last MHMP. But this mitigation action has not been completed yet.

Generators are eligible for funding through the HMGP program, and funding is available through the BRIC program in some instances.

Responsible party: Cando Auditor

L: Install security fence around water plant.

The water plant is one of the three highest value critical facilities in Cando. Installing a high-quality security fence can significantly reduce the risk of tampering or other criminal actions that impact the entire City.

Responsible party: Cando Auditor

M: Upgrade emergency warning siren for Cando.

Cando's warning siren is no longer functioning adequately and needs to be upgraded so it is louder and can be initiated by multiple emergency personnel.

Responsible party: Cando Auditor

EGELAND

N: Construct a flood mitigation project to reduce flooding risk from the west.

Egeland is threatened by flooding from heavy rains and snowmelt along its entire west side. Reducing this hazard is the community's highest priority. A flood mitigation project that creates barriers for at-risk properties and redirects floodwaters is needed. An engineering analysis should be completed to identify the most efficient way to mitigate this hazard.

Responsible party: Egeland Auditor

O: Install backup generator for sanitary lift station.

Severe summer and winter storms at times result in power outages that leave Egeland with the threat of sewage backup into many of the developed properties in the City. Installing a sanitary sewer lift station back-up generator significantly reduces this risk.

Generators are eligible for funding through the HMGP program, and funding is available through the BRIC program in some instances.

Responsible party: Egeland Auditor

P: Upgrade warning siren for Egeland.

The emergency siren for Egeland needs to be upgraded so the alert is louder and can be initiated by multiple emergency personnel.

Responsible party: Egeland Auditor

HANSBORO

Q: Improve flood protection infrastructure to reduce risk of local flooding.

Hansboro has flooding issues right through the middle of the city that impact Main Street and three residences. The flooding comes from the west and from the northeast. An analysis should be completed to determine the impacts related to both flooding sources. A flood mitigation project that creates barriers for at-risk properties and redirects floodwaters is needed. It is anticipated that the height of the existing levee needs to be raised. A culvert installed north of the city at the old railroad grade may provide a solution for the northeastern part of the City.

Responsible party: Hansboro Auditor

R: Upgrade emergency warning siren for Hansboro.

The emergency siren for Hansboro needs to be upgraded so the alert is louder and can be initiated by multiple emergency personnel.

Responsible party: Hansboro Auditor

S: Create a hazard information kiosk in Hansboro to educate about mitigation opportunities.

Improve public awareness and education on hazard prevention and mitigation by establishing an information center/kiosk at a public place in Hansboro that highlights storm shelter locations and best practices for public safety during severe summer and winter weather events.

Responsible party: Hansboro Auditor and County Emergency Manager

T: Obtain backup generator to reduce impacts from power outages

Severe summer and winter storms at times result in power outages that leave Hansboro with the threat of property damage into many of the developed properties in the City. Having a back-up generator significantly reduces this risk.

Generators are eligible for funding through the HMGP program, and funding is available through the BRIC program in some instances.

Responsible party: Hansboro Auditor

PERTH

U: Install culvert on west side of Perth to reduce flooding

Perth needs a culvert on the west side of town to assist with snowmelt drainage.

Responsible party: Perth Auditor

V: Obtain winter snow removal equipment

Perth is often blocked in by winter snowstorms. The city is dependent on county plows to get to them. Obtaining their own equipment would allow quicker access in emergency response situations and allow people to get back to work or other critical trips sooner.

Responsible party: Mayor of Perth

ROCKLAKE

W: Construct or enlarge culverts/storm sewer inlets to reduce risk of local flooding.

Rocklake needs to increase the size of its storm drain outlet culvert on the north side of town to 18 inches. The city also needs to replace eight storm sewer inlet grates throughout town with dome grates to prevent debris accumulation.

Responsible party: Rocklake Mayor

X: Install backup generator for sanitary sewer lift station.

Install generator on sanitary sewer lift station in Rocklake to reduce the risk of sewage backup and damage to multiple properties.

Generators are eligible for funding through the HMGP program, and funding is available through the PDM program in some instances.

Responsible party: Rocklake Mayor

Y: Acquire portable water pump to remove snowmelt water from streets when needed.

Water from snowmelt often floods local streets because the storm sewer system is frozen and cannot convey water away from the city. A portable water pump can mitigate the impacts.

Responsible party: Rocklake Mayor

Z: Upgrade emergency warning siren for Rock Lake

The emergency sirens Rock Lake needs to be upgraded so the alert is louder and can be initiated by multiple emergency personnel.

Responsible party: Rocklake Mayor and Towner County Emergency Manager

A': Review Rocklake existing emergency response plans for possible enhancements

This is a pilot project for the City of Rocklake and Towner County. The emergency manager will work with social support agencies, city staff, and the general public to identify opportunities to enhance monitoring, warning and action systems for summer and winter severe weather in order to better support vulnerable populations.

Responsible party: Mayor of Rocklake and Towner County Emergency Manager

C': Analyze alternatives to address significant crash site and implement preferred alternative

The intersection of Eller Avenue with ND Hwy 5 has been the site of multiple crashes in part because of poor visibility and in part because of the high posted speed limit. This problem should be addressed before a fatality or a major transportation incident occurs. The required analysis should identify geometric and alignment improvements as well as signing, signal, and speed limit options. Implementation may be simple such as reduced speed limits if it meets DOT requirements or more complex to the point of moving the location of the intersection to increase visibility. Consequently, funding sources and costs to implement the solution may vary widely.

Responsible party: Mayor of Rocklake and Towner County Emergency Manager

CHAPTER 5: Plan Maintenance

This chapter details the plan maintenance process to make sure the Towner County Multi-Hazard Mitigation Plan will remain an active and relevant document. The plan maintenance process includes monitoring the implementation of mitigation projects, evaluating the effectiveness of the plan at achieving its goals and updating the plan. This chapter also includes information regarding how the plan will be integrated into existing planning mechanisms.

Plan Monitoring and Evaluation

The Local Emergency Planning Committee (LEPC) will monitor and evaluate the plan once per year. A basic agenda for each meeting should include:

- Discussion of project progress for the current period
- Local champion reports on project status
- Discussion of upcoming projects and grant/funding opportunities
- Develop action list for upcoming reporting period

The responsible party should provide the following basic information about projects in the reporting period:

- What was accomplished since the last review meeting
- What obstacles, problems or delays the project encountered
- If the project needs to be changed or reviewed

Project progress should be recorded on the Mitigation Action Progress Report Form found in Appendix E. A form should be completed for each project during the reporting period (and projects from previous reporting periods that have not been completed). If time constraints are an issue, the LEPC may decide to only complete the form for high priority projects; lower-priority projects may be generally discussed without completing the form.

The County Emergency Manager should maintain a folder with all Mitigation Action Progress Report Forms and meeting notes.

The risk and vulnerability assessment should be evaluated during an LEPC meeting approximately two years after plan adoption. Any changes to risks since plan adoption, such as a major flood event that damaged areas thought to be safe from flooding, should be noted. If there are new additions or changes to critical facilities in each County, a report detailing these changes should be made. If significant changes are required, the Emergency Manager should schedule a meeting to discuss amending the current plan. If no significant changes are required, the Emergency Manager should save the report of changes for reference during the next five-year plan update.

LEPC meetings that are reserved for discussion of the plan should be open to the public and advertised. Since weather and infectious disease impacts have been so significant in the area in recent years, there may be public interest in ongoing efforts to reduce hazard impacts. A simple Annual Emergency Management Status Report may be a reasonable product of the LEPC monitoring and evaluation process. The report could be posted on the county's website and relevant Facebook pages. A copy of the Report could be sent to newspapers serving the area.

Although Emergency Management staff time is already stretched meeting existing workload requirements, a part of the ongoing outreach effort could include distribution of infographic style posters that would remind and educate county citizens about key hazards and mitigation opportunities.

Integration into Existing County-wide Planning Mechanisms

The previous Multi-Hazard Mitigation Plan noted that the County had begun to update its comprehensive plan. This plan has not yet been completed. A comprehensive plan is a valuable tool for counties and cities to evaluate needs and establish strategies for meeting these needs. What is especially useful is the opportunity to look for synergies in addressing multiple needs in a comprehensive and coordinated manner. The best emergency management practices prevent problems from even being constructed or initiated because jurisdictional practices reduce the lack of foresight that allows such things to happen. To the extent possible, local jurisdictions should establish comprehensive plan policies, zoning and subdivision regulations that minimize potential conflict and risk from potentially negative development. As an example, this may include establishing larger setback requirements from potential hazards.

Items from the risk/vulnerability assessment and action items that involve response activities from this plan should also be integrated into the county's Local Emergency Operations Plan (LEOP).

Due to the limited resources of each jurisdiction, few planning mechanisms generally exist within the county. The majority of the mitigation actions included in this plan are infrastructure related. However, none of the

jurisdictions have a capital improvements plan. It is the role of each responsible party identified in Chapter 4 to be present at annual budget meetings and advocate for consideration of mitigation projects.

Independent of local jurisdiction activities, the County emergency manager may be able to unilaterally educate and encourage implementation of more best practices.

Additional activities which various jurisdictions and organizations could pursue to further implement this plan are:

- Adopt the state building code
- Enact subdivision and zoning regulations
- Collaborate with the next relevant Comprehensive Economic Development Strategy (CEDS) process by sharing analyses from this document to inform the CEDS planning process, and potentially help implement mitigation strategies of this document. This could include broadening the current CEDS goal from "assisting counties and communities in developing mitigation plans and programs" by adding "and implementing these plans and programs."
- Developing comprehensive plans that actively integrate with multi-hazard mitigation planning

All jurisdictions should prioritize action items applicable to them and incorporate them into their annual budget decisions.

Current economic conditions and limited population growth suggest that resources will continue to remain scarce in the near future. For the next five years, specific effort needs to be directed at maintaining interest in mitigation. Two ways to help maintain interest are.

- Develop a kiosk or small display with posters and materials for distribution to inform county residents about opportunities and methods to increase resilience. Situate the kiosk at periodic public events such as fairs, community days, etc.
- Periodically provide a news release or short article for local newspapers on some aspect of emergency management such as tips for keeping your home safe from wildland fires. Post the same material on County websites and Facebook pages.

Updating the Plan

The County Emergency Manager is responsible for overseeing the five-year update process. Twelve to fourteen months should be allowed for completion of the plan – nine to eleven months to develop a draft and three months to collect DES and FEMA comments/revisions and formally adopt the plan. The Emergency Manager should begin the plan update process approximately fifteen months prior to the expiration of the current plan. The first step is to develop the project scope by utilizing the Plan Update Evaluation Worksheet in Appendix E. Funding opportunities from DES/FEMA may also be evaluated when determining project scope.

The Emergency Manager should maintain any documentation gathered during the five-year period that will be useful when developing the update. This will help to greatly reduce the research collection phase of the plan update, which will reduce the time and cost of the plan update. It will also ensure that any priority items identified during LEPC monitoring meetings will be included in the plan.

Appendix A: Adoption Resolutions

Appendix B: Planning Process

Project Schedule

Note: Sign-in Sheets and Meeting Notices can be found later in this Appendix. A list of representatives from participating jurisdictions is available with the sign-in sheets.

Planning Team Meeting (March 16, 2020; Towner County Veterans Service Office, Memorial Building)

An overview of plan objectives and covered hazards was provided. Hazards of greatest concern were discussed, and potential action items were identified.

City Officials Meeting (June 23, 2020; 3pm; Rocklake Fire Hall)

An overview of plan objectives and covered hazards was provided. Hazards of greatest concern were discussed, and potential action items were identified. Each community represented provided notes on specific hazard events and threats, and potential mitigation actions.

Meeting Attendance

Representatives from each participating jurisdiction who attended at least one meeting are listed below. Planning Team members are denoted with an asterisk(*).

TOWNER COUNTY

- Lori Beck, Emergency Manager*
- Robert Kennedy, Sheriff*
- Kevin Rinas, Road Supervisor*
- Valerie Pederson, Social Services
- Lindy Berg, Extension Agent
- Heidi Halverson, Towner County Ambulance Service
- Doug Berg, County Commissioner*
- Chantel Parker, Towner County Medical Center*
- Joni Morlock, Towner County Auditor*
- David Lagein, County Commissioner*
- Sherry Walters, Towner County Public Health
- Janet Mallea, Towner County Ambulance Service*

BISBEE

- Paul Johnson, Bisbee Fire Department*
- Ethan Oakland, Mayor*

CANDO

- Aaron Payerl, Cando Fire Chief*
- Jesse Vote, Cando Fire Department
- Jeremy Olson, Council Member
- Rollie Bjornstad, Mayor*

EGELAND

- Jeremy Johnson, Egeland Fire Department
- Maynard Jackson, Mayor*

HANSBORO

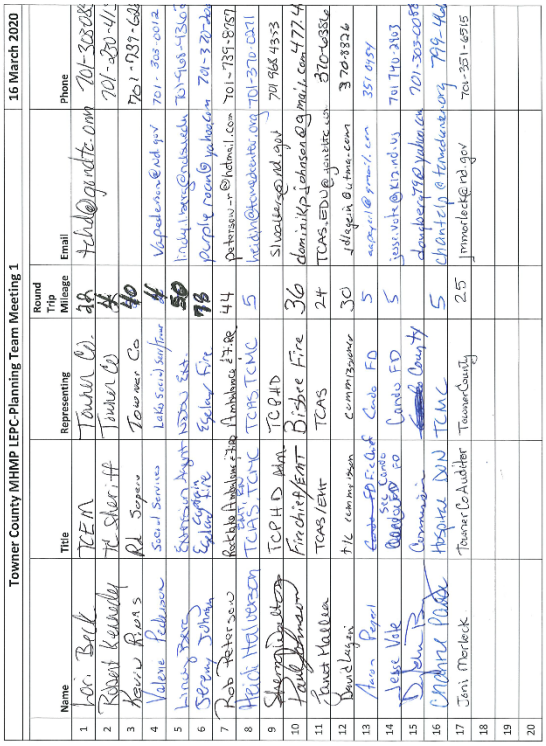
- Steve Hill, Council Member
- James Seghers, Mayor*

PERTH

- Bob Swenson, Mayor*
- Arlene Swenson, Auditor

ROCKLAKE

- Rob Peterson, Rocklake Fire Chief
- Danny Krumwiede, Mayor*
- Tamme Vote, Auditor



Towner County MHMP LEPC-Planning Team Meeting 1 — 16 March 2020

	Name	Title	Representing	Round Trip Mileage	Email	Phone
1	Lori Beck	TCEM	Towner Co.	28	lorib@gondtc.com	701-323-0828
2	Robert Kennedy	Tc Sheriff	Towner Co	44		701-220-4115
3	Kevin Rinas	Rd Supervisor	Towner Co	40		701-797-6021
4	Valerie Pederson	Social Services	Lake Social Services	44	vlpederson@nd.gov	701-323-0012
5	Lindy Berg	Extension Agent	NDSU Ext.	50	lindy.berg@ndsu.edu	701-968-4340
6	Jeremy Johnson	Egeland Fire	Egeland Fire	98	purple rain@yahoo.com	701-323-2020
7	Rob Peterson	Rocklake Ambulance Chief	Rocklake Ambulance	47.88 44	petersonr@hotmail.com	701-797-8767
8	Heidi Halverson	EMS Director	TCAS, TCMC	5	heidih@towncounty.org	701-370-0211
9	Sherry Walters		TCPHD		swalters@nd.gov	701 968 4353
10	Paul Johnson	Fire Chief/EMT	Bisbee Fire	36	dominikpjohnson@gmail.com	4772 4
11	Janet Mallea	TCAS/EMT	TCAS	24	TCAS.EDU@gondtc.com	370-0338
12	David Lagein	tic commissioner	commissioner	30	idlagein@ultra.com	370-3326
13	Aaron Payerl	Fire Chief	Cando FD	5	aaronpayerl@gmail.com	351 0159
14	Jesse Vote	Cando FD	Cando FD	5	jesse.vote@ktn.nd.us	701 749 2167
15	Brian Bjornstad	Cando FD	Towner County		dawbrej79@yahoo.com	701-323-0093
16	Chantel Parker	Hospital DON	TCMC	5	chantelp@towndonehealthcare.org	799-4600
17	Joni Morlock	Towner Co Auditor	Towner County	25	jmmorlock@nd.gov	701-351-0515
18						
19						
20						

Towner County MHMP LEPC-Planning Team Meeting 2 — **23 June 2020**

	Name	Title	Representing	Round Trip Mileage	Email	Phone
1	Lori Beck	Emergency Manager	Towner County			701-968-4366
2	Danny Krumwiede	Mayor	Rocklake			701-370-0497
3	Bob Swenson	Mayor	Perth			701-201-0109
4	Arlene Swenson	Auditor	Perth			701-201-0109
5	Steve Hill	Councilmember	Hansboro			
6	James Seghers	Mayor	Hansboro			701-550-6490
7	Jeremy Olson	Councilmember	Cando			701-968-3000
8	Rollie Bjornstad	Mayor	Cando			701-739-8026
9	Maynard Jackson	Mayor	Egeland			701-351-7000
10	Ethan Oakland	Mayor	Bisbee			701-370-8615
11	Tammie Vote	Auditor	Rocklake			
12						
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Additional Project Consultations

Due to the COVID-19 pandemic, the number of project meetings was limited. A number of direct consultations with Planning Team members, regional agency or organization representatives, other key stakeholders and experts were used to supplement the input received from project meetings. People consulted directly included:

- Karen Short, Missoula Fire Sciences Laboratory
- Daniel Schaefer, All Seasons Water Users District
- Jeremy Schuler, Northeast Regional Water District
- Nels Halgren, Greater Ramsey Water District
- Doug Nelson, ND Forest Service
- Dave from NDFIRS Support Center
- Kevin Larson, Northern Plains Electric Coop
- Randy Connell, NFIP PIVOT Support
- Cole Baker, ND Department of Water Resources
- Gabrielle Proffitt, ND Department of Commerce
- Joni Morlock, TC Auditor
- Robert Kennedy, TC Sheriff
- Doug Howard, TC Deputy
- Jesse Vote, Cando Fireman
- Paul Johnson, Bisbee Fire Chief
- Ethan Oakland, Bisbee Mayor
- Jason Moore, Egeland Fire Chief
- Darrell Odegaard, Bisbee Fireman
- Darrel Lagein, Rock Lake Ambulance
- Amanda Hoover, Cando Auditor
- Majusta Kleven, TC Public Health

Planning Team

Because of the difficulty of holding meetings during the pandemic and the limited LEPC meeting schedule, it was important to obtain Towner County LEPC comments and reach out to additional key stakeholders from across the County for input. The following table lists Planning Team members who participated in at least one meeting or a consultation.

Planning Team Members	Jurisdiction
Lori Beck, Emergency Manager	Towner Co
Kevin Rinas, Road Superintendent	Towner Co
Joni Morlock, Auditor	Towner Co
Doug Berg, County Commission chair	Towner Co
Dave Lagein, County Commission	Towner Co
Scott Boe, County Commission	Towner Co
Ken Teubner, County Commission	Towner Co
Josh Frey, States Attorney	Towner Co
Bob Kennedy, Sheriff	Towner Co
Majusta Kleven, Public Health	Towner Co
Janet Mallea, Cando Ambulance	Cando
Jen Lagein, Rocklake Ambulance	Rocklake
Aaron Payerl, Cando Fire Department	Cando
Jason Moore, Egeland Fire Department	Egeland
Paul Johnson, Bisbee Fire Department	Bisbee
Darrel Lagein, Rocklake Fire Dept.	Rocklake
Rollie Bjornstad, Mayor	Cando
Robert Swenson, Mayor	Perth
Maynard Jackson, Mayor	Egeland
Danny Krumwiede, Mayor	Rocklake
Jim Seghers, Mayor	Hansboro
Ethan Oakland, Mayor	Bisbee
Chantel Parker, TC Med Center	Cando

Publicity

The two meetings were publicized by announcements posted in local post offices and at the meeting site. Additionally, key stakeholders were invited by phone call or email to participate in the meetings.

Reviewed Documents

Documents reviewed and incorporated into this plan include:

- 2015 Towner County Multi-Hazard Mitigation Plan
- 2019 North Dakota Draft Enhanced Multi-Hazard Mitigation Plan (risk assessment)
- Towner County Zoning Ordinance
- Cando Zoning Ordinance
- 2014 ND State Aviation System Plan
- Earthquake Hazards and Probabilities in North Dakota
- Landslides in North Dakota. January 2017. Murphy. Geo News.
- September 2018 National Performance of Dams Program (NPDP-01 V1) from Stanford University
- Fire Loss in the United States During 2019. September 2020. Ahrens and Evarts. National Fire Protection Association.

Appendix C: Additional Hazard Information

Storm Events Database

This section contains storm events from the NOAA National Climatic Data Center Storm Events Database. The criteria for each event type to qualify for inclusion to the database are:

- **Blizzard:** Sustained winds of 35 MPH or greater, snow reducing visibility to less than ¼ mile and lasting at least three hours.
- **Cold/Wind Chill:** Wind chill reaching -35 degrees F or lower.
- **Flash Flood:** Rapid and extreme flow of high water above pre-determined flood levels, beginning within six hours of the causative event.
- **Drought:** Deficiency of moisture resulting in a D2 classification or higher as indicated in the multi-agency Drought Monitor.
- **Flood:** Any high flow, overflow or inundation by water that causes or threatens damage, generally occurring more than six hours after the causative event.
- **Funnel Cloud:** A rotating, visible, extension of a cloud pendant from a convective cloud with circulation not reaching the ground.
- **Hail:** Hail of at least ¾ inch diameter, or hail less than ¾ inch diameter that causes injuries or fatalities.
- **Heavy Rain:** Unusually large amount of rain which does not cause a flash flood or flood, but causes damage, e.g., roof collapse or other human/economic impact. Urban ponding events would generally be classified as heavy rain.
- **Heat:** A period of heat resulting from high temperatures and relative humidity as determined by locally-established thresholds.
- **Heavy Snow:** Snow accumulation exceeding locally defined 12 and/or 24-hour criteria. Could include snow events of 6, 8 or 10 inches in 24 hours or less depending on typical regional snowfall.
- **High/Strong/Thunderstorm Wind:** Sustained winds of 40 mph or greater lasting for 1 hour or longer, or winds of 58 mph for any duration.
- **Ice Storm:** Ice accretion of ¼ or ½ inch or more (varies depending on local jurisdiction defining criteria).
- **Lightning:** Sudden electrical discharge from a storm resulting in a fatality, injury or property damage.
- **Tornado:** A funnel cloud that makes contact with the ground and creates ground-based visual effects such as dust/dirt or other disturbance.
- **Wildfire:** Wildfire that causes one or more fatalities or injuries, and/or property damage.
- **Winter Storm:** A winter weather event that has more than one significant hazard (i.e. heavy snow and blowing snow; snow and ice; snow and sleet; sleet and ice; or snow, sleet and ice). A winter storm would normally pose a threat to life and property.
- **Winter Weather:** Winter precipitation event that causes a death, injury or significant economic impact.

Note that in most instances property and crop damage was not included with storm reports in the counties.

Towner County Hazard Events, 1996-2019							
Location	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Towner (Zone)	1/17/1996	Blizzard		0	0		
Towner (Zone)	2/1/1996	Cold/Wind Chill		0	0		
Towner (Zone)	2/10/1996	Blizzard		0	0		
Towner (Zone)	3/23/1996	Blizzard		0	0		
Towner (Zone)	3/23/1996	Blizzard		0	0		
Cando	6/5/1996	Tornado	F0	0	0		
Cando	6/18/1996	Hail	1 in.	0	0	$10,000	$10,000
Maza	6/18/1996	Hail	F0	0	0		
Cando	6/18/1996	Tornado	1 in.	0	0		
Sarles	6/19/1996	Hail	0.75 in.	0	0		
Rock Lake	6/19/1996	Hail	0.75 in.	0	0		
Rock Lake	6/28/1996	Thunderstorm Wind	70 mph	0	0	$300,000	$200,000
Perth	7/28/1996	Hail	1 in.	0	0		
Maza	7/28/1996	Hail	1 in.	0	0		
Cando	7/28/1996	Hail	1 in.	0	0		
Cando	7/28/1996	Hail	1 in.	0	0		
Towner (Zone)	11/5/1996	Heavy Snow		0	0		
Towner (Zone)	11/16/1996	Blizzard		0	0		
Towner (Zone)	11/20/1996	Winter Storm		0	0		
Towner (Zone)	11/25/1996	Cold/Wind Chill		0	0		
Towner (Zone)	12/17/1996	Blizzard		0	0		
Towner (Zone)	12/20/1996	Blizzard		0	0		
Towner (Zone)	12/21/1996	Cold/Wind Chill		0	0		
Towner (Zone)	1/9/1997	Blizzard		0	0		
Towner (Zone)	1/15/1997	Blizzard		0	0		
Towner (Zone)	1/21/1997	Blizzard		0	0		
Towner (Zone)	1/30/1997	Ice Storm		0	0		
Towner (Zone)	3/4/1997	Blizzard		0	0		
Towner (Zone)	4/4/1997	Ice Storm		0	0	$6,000,000	
Towner (Zone)	4/5/1997	Blizzard		0	0	$6,000,000	
Perth	6/19/1997	Hail	0.75 in.	0	0		
Perth	6/19/1997	Hail	0.75 in.	0	0		
Rock Lake	8/3/1997	Hail	1 in.	0	0		
Towner (Zone)	9/28/1997	High Wind	48 mph	0	0		
Bisbee	10/11/1997	Hail	1 in.	0	0		
Towner (Zone)	11/2/1997	High Wind	47 mph	0	0		
Towner (Zone)	2/27/1998	Winter Storm		0	0		
Towner (Zone)	3/13/1998	Blizzard		0	0		
Bisbee	8/18/1998	Hail	0.75 in.	0	0		
Perth	8/26/1998	Hail	1 in.	0	0		
Bisbee	8/26/1998	Hail	1 in.	0	0		
Towner (Zone)	11/10/1998	Blizzard		0	0		
Towner (Zone)	11/18/1998	Winter Storm		0	0		
Towner (Zone)	12/18/1998	Blizzard		0	0		
Towner (Zone)	1/13/1999	Winter Storm		0	0		
Towner (Zone)	4/1/1999	Blizzard		0	0		
Towner (Zone)	4/3/1999	Winter Storm		0	0		
Perth	5/4/1999	Hail	0.75 in.	0	0		

Towner County Hazard Events, 1996-2019							
Location	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Egeland	7/22/1999	Thunderstorm Wind	52 mph	0	0		
Cando	8/6/1999	Hail	0.75 in.	0	0		
Towner (Zone)	10/31/1999	High Wind	53 mph	0	0	$4,000	
Towner (Zone)	11/1/1999	High Wind	66 mph	0	0		
Towner (Zone)	12/19/1999	Blizzard		0	0		
Cando	6/11/2000	Thunderstorm Wind		0	0	$1,000	
Cando	6/11/2000	Funnel Cloud		0	0		
Maza	6/22/2000	Hail	0.75 in.	0	0		
Cando	7/11/2000	Flash Flood		0	0		
Hansboro	8/11/2000	Hail	0.75 in.	0	0		
Cando	8/11/2000	Hail	0.75 in.	0	0		
Bisbee	8/11/2000	Hail	0.88 in.	0	0		
Hansboro	8/13/2000	Thunderstorm Wind		0	0	$1,000	
Cando	8/28/2000	Hail	0.75 in.	0	0		
Towner (Zone)	11/6/2000	Winter Storm		0	0	$1,4000	
Towner (Zone)	12/16/2000	Blizzard		0	0		
Towner (Zone)	12/27/2000	Winter Storm		0	0		
Cando	6/11/2001	Thunderstorm Wind		0	0	$500	
Towner (Zone)	8/4/2001	Heat		0	0		
Hansboro	8/14/2001	Hail	0.75 in.	0	0		
Hansboro	8/21/2001	Hail	1.75 in.	0	0		
Hansboro	8/21/2001	Hail	1.75 in.	0	0		
Towner (Zone)	10/24/2001	Blizzard		0	0		
Towner (Zone)	12/5/2001	Winter Storm		0	0		
Towner (Zone)	12/22/2001	Blizzard		0	0		
Towner (Zone)	2/11/2002	High Wind	50 mph	0	0		
Egeland	6/10/2002	Hail	0.75 in.	0	0		
Cando	6/10/2002	Hail	1 in.	0	0		
Maza	6/22/2002	Flash Flood	1 in.	0	0		
Cando	6/22/2002	Hail		0	0		
Cando	8/8/2002	Thunderstorm Wind		0	0	$5,000	
Cando	8/8/2002	Thunderstorm Wind	52 mph	0	0		
Bisbee	8/23/2002	Hail		0	0	$200	
Perth	8/23/2002	Hail	0.75 in.	0	0		
Hansboro	8/23/2002	Thunderstorm Wind	1 in.	0	0		
Cando	8/26/2002	Hail	0.75 in.	0	0		
Cando	8/26/2002	Hail	0.75 in.	0	0		
Bisbee	8/26/2002	Hail	1 in.	0	0		
Rocklake	8/27/2002	Hail	0.75 in.	0	0		
Hansboro	8/27/2002	Hail	0.75 in.	0	0		
Egeland	8/27/2002	Hail	0.88 in.	0	0		
Hansboro	8/31/2002	Hail	0.88 in.	0	0		
Cando	8/31/2002	Hail	1 in.	0	0		
Cando	8/31/2002	Hail	1 in.	0	0		
Towner (Zone)	2/11/2003	Blizzard		0	0		
Towner (Zone)	3/8/2003	Cold/Wind Chill		0	0	$5,000	
Towner (Zone)	4/1/2003	Winter Storm		0	0		
Towner (Zone)	4/2/2003	Winter Storm		0	0		

Towner County Hazard Events, 1996-2019							
Location	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Perth	6/27/2003	Hail	F0	0	0		
Maza	6/27/2003	Tornado	F0	0	0		
Bisbee	6/27/2003	Tornado	F0	0	0		
Bisbee	6/27/2003	Tornado	F0	0	0		
Bisbee	6/27/2003	Hail	1 in.	0	0		
Bisbee	6/27/2003	Tornado	1.75 in.	0	0		
Hansboro	7/2/2003	Thunderstorm Wind	55 mph	0	0		
Cando	7/2/2003	Thunderstorm Wind	55 mph	0	0		
Rocklake	7/14/2003	Hail	1 in.	0	0		
Towner (Zone)	1/2/2004	Winter Storm		0	0		
Towner (Zone)	1/4/2004	Cold/Wind Chill		0	0		
Towner (Zone)	1/21/2004	Cold/Wind Chill		0	0		
Towner (Zone)	1/24/2004	Winter Storm		0	0		
Towner (Zone)	1/26/2004	Cold/Wind Chill		0	0		
Towner (Zone)	3/1/2004	Winter Storm		0	0		
Towner (Zone)	3/27/2004	Flood		0	0		
Towner (Zone)	4/1/2004	Flood		0	0		
Towner (Zone)	5/11/2004	Ice Storm		0	0	$400,000	
Maza	5/15/2004	Hail	0.75 in.	0	0		
Cando	5/19/2004	Hail	F1	0	0		
Cando	5/19/2004	Hail	1.75 in.	0	0		
Bisbee	5/19/2004	Hail	2 in.	0	0		
Bisbee	5/19/2004	Hail	2.5 in.	0	0		
Bisbee	5/19/2004	Hail	2.5 in.	0	0		
Bisbee	5/19/2004	Tornado	2.5 in.	0	0		
Towner (Zone)	5/31/2004	Flood		0	0		
Towner (Zone)	6/1/2004	Flood		0	0		
Rocklake	6/6/2004	Hail	F1	0	0		
Cando	6/6/2004	Tornado	1 in.	0	0		
Cando	6/6/2004	Thunderstorm Wind	70 mph	0	0		
Cando	6/6/2004	Thunderstorm Wind	70 mph	0	0		
Towner (Zone)	6/23/2004	Cold/Wind Chill		0	0		
Cando	7/2/2004	Tornado	F0	0	0		
Maza	7/12/2004	Thunderstorm Wind	55 mph	0	0		
Bisbee	8/15/2004	Hail	0.75 in.	0	0		
Bisbee	8/15/2004	Hail	0.88 in.	0	0		
Towner (Zone)	8/19/2004	Cold/Wind Chill		0	0		
Towner (Zone)	12/11/2004	Winter Storm		0	0		
Towner (Zone)	12/29/2004	Winter Storm		0	0		
Towner (Zone)	12/31/2004	Winter Storm		0	0		
Towner (Zone)	1/1/2005	Winter Storm		0	0		
Towner (Zone)	1/12/2005	Winter Storm		0	0		
Towner (Zone)	1/13/2005	Cold/Wind Chill		0	0		
Towner (Zone)	1/21/2005	Blizzard		0	0		
Towner (Zone)	3/10/2005	High Wind	40 mph	0	0		
Rocklake	4/18/2005	Hail	0.75 in.	0	0		
Rocklake	5/7/2005	Hail	0.75 in.	0	0		
Towner (Zone)	5/21/2005	High Wind	54 mph	0	0		

Towner County Hazard Events, 1996-2019							
Location	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Maza	6/11/2005	Flash Flood		0	0		
Towner (Zone)	6/12/2005	Flood		0	0		
Cando	6/19/2005	Thunderstorm Wind	78 mph	0	0		
Egeland	6/23/2005	Hail	2 in.	0	0		
Bisbee	7/2/2005	Hail	0.88 in.	0	0		
Cando	7/7/2005	Thunderstorm Wind	55 mph	0	0		
Cando	7/7/2005	Thunderstorm Wind	64 mph	0	0		
Cando	7/7/2005	Thunderstorm Wind	64 mph	0	0		
Perth	7/10/2005	Hail	0.88 in.	0	0		
Maza	7/10/2005	Hail	0.88 in.	0	0		
Cando	7/10/2005	Thunderstorm Wind	55 mph	0	0		
Cando	7/11/2005	Flash Flood		0	0		
Rocklake	7/16/2005	Thunderstorm Wind	61 mph	0	0		
Maza	8/2/2005	Thunderstorm Wind	55 mph	0	0		
Cando	8/2/2005	Thunderstorm Wind	61 mph	0	0		
Towner (Zone)	8/31/2005	High Wind	57 mph	0	0		
Towner (Zone)	10/4/2005	Winter Storm		0	0		
Towner (Zone)	10/5/2005	Blizzard		0	0		
Towner (Zone)	11/8/2005	High Wind	52 mph	0	0		
Towner (Zone)	11/14/2005	Winter Storm		0	0		
Towner (Zone)	11/15/2005	Blizzard		0	0		
Towner (Zone)	1/24/2006	Blizzard		0	0		
Towner (Zone)	2/16/2006	Cold/Wind Chill		0	0		
Towner (Zone)	3/1/2006	Heavy Snow		0	0		
Countywide	3/31/2006	Flood		0	0		
Countywide	4/1/2006	Flood		0	0	$294,000	
Armourdale	4/28/2006	Hail	0.75 in.	0	0		
Rocklake	5/23/2006	Hail	1 in.	0	0		
Rocklake	5/23/2006	Hail	1 in.	0	0		
Rocklake	5/27/2006	Hail	0.75 in.	0	0		
Bisbee	5/27/2006	Hail	0.75 in.	0	0		
Bisbee	5/27/2006	Hail	0.88 in.	0	0		
Bisbee	5/27/2006	Hail	1 in.	0	0		
Bisbee	5/27/2006	Hail	2 in.	0	0		
Bisbee	5/27/2006	Flash Flood	3 in.	0	0		
Bisbee	5/27/2006	Hail		0	0		
Rocklake	6/23/2006	Tornado	F0	0	0		
Rocklake	6/23/2006	Tornado	F0	0	0		
Cando	6/30/2006	Hail	1 in.	0	0		
Towner (Zone)	7/25/2006	Drought		0	0		
Towner (Zone)	8/1/2006	Drought		0	0		
Rocklake	8/4/2006	Hail	1 in.	0	0		
Hansboro	8/4/2006	Hail	1 in.	0	0		
Towner (Zone)	10/30/2006	Winter Storm		0	0		
Towner (Zone)	12/30/2006	Heavy Snow		0	0		
Towner (Zone)	1/12/2007	Extreme Cold/Wind Chill		0	0		

Towner County Hazard Events, 1996-2019							
Location	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Towner (Zone)	2/3/2007	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	2/13/2007	Drought		0	0		
Towner (Zone)	2/28/2007	Winter Storm		0	0		
Towner (Zone)	3/1/2007	Drought		0	0		
Towner (Zone)	3/1/2007	Winter Storm		0	0		
Towner (Zone)	3/15/2007	Heavy Snow		0	0		
Perth	5/21/2007	Hail	0.75 in.	0	0		
Cando	5/21/2007	Hail	1 in.	0	0		
Perth	6/12/2007	Hail	1 in.	0	0		
Rocklake	6/25/2007	Hail	0.75 in.	0	0		
Hansboro	6/25/2007	Thunderstorm Wind	1 in.	0	0		
Hansboro	6/25/2007	Flash Flood	1 in.	0	0		
Ellsberry	6/25/2007	Hail	70 mph	0	0		
Ellsberry	6/25/2007	Hail		0	0		
Cando	7/15/2007	Hail	0.75 in.	0	0		
Cando	7/31/2007	Thunderstorm Wind	0.88 in.	0	0		
Cando	7/31/2007	Hail	50 mph	0	0		
Newville	8/13/2007	Hail	0.88 in.	0	0		
Towner (Zone)	11/13/2007	High Wind	35 mph	0	0		
Towner (Zone)	12/4/2007	Heavy Snow		0	0		
Towner (Zone)	1/17/2008	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	1/29/2008	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	2/8/2008	Blizzard		0	0		
Towner (Zone)	2/9/2008	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	2/13/2008	Winter Storm		0	0		
Towner (Zone)	2/19/2008	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	5/21/2008	Frost/Freeze		0	0		
Towner (Zone)	5/27/2008	Frost/Freeze		0	0		
Hansboro	6/23/2008	Hail	1.5 in.	0	0	$50,000	$600,000
Armourdale	7/7/2008	Tornado	1.75 in.	0	0	$10,000	$100,000
Crocus	7/7/2008	Tornado	EF1	0	0	$150,000	$5,000
Rocklake	7/7/2008	Hail	EF3	0	0	$5,000	$5,000
Bisbee Lyster Arpt	7/28/2008	Hail	0.88 in.	0	0	$15,000	$150,000
Bisbee	8/2/2008	Thunderstorm Wind	50 mph	0	0	$5,000	$10,000
Towner (Zone)	10/26/2008	High Wind	35 mph	0	0		
Towner (Zone)	11/6/2008	Winter Storm		0	0		
Towner (Zone)	12/13/2008	Blizzard		0	0		
Towner (Zone)	12/15/2008	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	12/19/2008	Winter Storm		0	0		
Towner (Zone)	12/20/2008	Extreme Cold/Wind Chill		0	0		

Towner County Hazard Events, 1996-2019							
Location	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Towner (Zone)	1/3/2009	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	1/14/2009	Cold/Wind Chill		0	0		
Towner (Zone)	1/14/2009	Cold/Wind Chill		0	0		
Towner (Zone)	1/15/2009	Cold/Wind Chill		0	0		
Towner (Zone)	1/31/2009	High Wind	40 mph	0	0		
Towner (Zone)	2/8/2009	Ice Storm		0	0		
Towner (Zone)	3/11/2009	Extreme Cold/Wind Chill		0	0		
Hansboro	3/22/2009	Flood		0	0	$5,000	
Hansboro	4/10/2009	Flood		0	0	$5,000	
Zion	6/26/2009	Hail	0.75 in.	0	0		
Cando Muni Arpt	6/26/2009	Hail	1 in.	0	0		
Crocus	6/27/2009	Funnel Cloud	EF0	0	0		
Considine	6/27/2009	Tornado	EF0	0	0		
Considine	6/27/2009	Tornado		0	0		
Bisbee	6/27/2009	Funnel Cloud		0	0		
Cando Muni Arpt	7/19/2009	Hail	1 in.	0	0		
Cando	7/20/2009	Hail	1.25 in.	0	0		
Bisbee Lyster Arpt	8/24/2009	Hail	1 in.	0	0		
Towner (Zone)	12/13/2009	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	12/14/2009	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	12/23/2009	Heavy Snow		0	0		
Towner (Zone)	12/24/2009	Blizzard		0	0		
Towner (Zone)	1/7/2010	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	1/22/2010	Winter Storm		0	0		
Towner (Zone)	1/25/2010	Blizzard		0	0		
Towner (Zone)	2/13/2010	Winter Storm		0	0		
Towner (Zone)	5/25/2010	High Wind	35 mph	0	0		
Cando	6/8/2010	Hail	1 in.	0	0		
Rocklake	6/24/2010	Hail	0.88 in.	0	0		
Rocklake	6/24/2010	Hail	1 in.	0	0		
Rocklake	7/26/2010	Hail	1 in.	0	0		
Rocklake	8/1/2010	Thunderstorm Wind	EF1	0	0		
Crocus	8/1/2010	Tornado	60 mph	0	0		
Egeland	8/10/2010	Flash Flood		0	0	$5,000	$10,000
Towner (Zone)	10/26/2010	Blizzard		0	0		
Towner (Zone)	11/24/2010	Heavy Snow		0	0		
Towner (Zone)	12/15/2010	Heavy Snow		0	0		
Towner (Zone)	12/20/2010	Heavy Snow		0	0		
Towner (Zone)	12/29/2010	Winter Storm		0	0		

Towner County Hazard Events, 1996-2019							
Location	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Towner (Zone)	2/1/2011	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	2/8/2011	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	2/13/2011	High Wind	35 mph	0	0		
Towner (Zone)	3/11/2011	Blizzard		0	0		
Hansboro	4/10/2011	Flood		0	0		
Towner (Zone)	5/26/2011	Frost/Freeze		0	0		
Rocklake	7/4/2011	Hail	1 in.	0	0		
Maza	7/20/2011	Thunderstorm Wind	50 mph	0	0		
Cando	7/20/2011	Thunderstorm Wind	60 mph	0	0		
Rocklake	9/1/2011	Hail	1 in.	0	0		
Towner (Zone)	1/18/2012	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	2/10/2012	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	2/11/2012	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	2/25/2012	Winter Storm		0	0		
Maza	6/20/2012	Hail	0.75 in.	0	0		
Hansboro	7/19/2012	Hail	1 in.	0	0		
Towner (Zone)	11/10/2012	Winter Storm		0	0		
Towner (Zone)	1/11/2013	Blizzard		0	0		
Towner (Zone)	1/19/2013	Blizzard		0	0		
Towner (Zone)	1/20/2013	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	1/31/2013	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	2/1/2013	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	2/17/2013	Blizzard		0	0		
Towner (Zone)	3/3/2013	Heavy Snow		0	0		
Towner (Zone)	3/17/2013	Winter Storm		0	0		
Towner (Zone)	3/17/2013	Blizzard		0	0		
Towner (Zone)	4/14/2013	Winter Storm		0	0		
Hansboro	4/28/2013	Flood		0	0	$5,000	
Hansboro	5/1/2013	Flood		0	0	$5,000	
Towner (Zone)	5/14/2013	High Wind	51 mph	0	0		
Zion	6/23/2013	Hail	1 in.	0	0		
Maza	6/23/2013	Thunderstorm Wind	55 mph	0	0		
Maza	7/6/2013	Hail	1 in.	0	0		
Cando	7/13/2013	Thunderstorm Wind	50 mph	0	0		
Cando	7/13/2013	Thunderstorm Wind	50 mph	0	0		
Towner (Zone)	12/3/2013	Winter Storm		0	0		
Towner (Zone)	12/6/2013	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	12/28/2013	Blizzard		0	0		

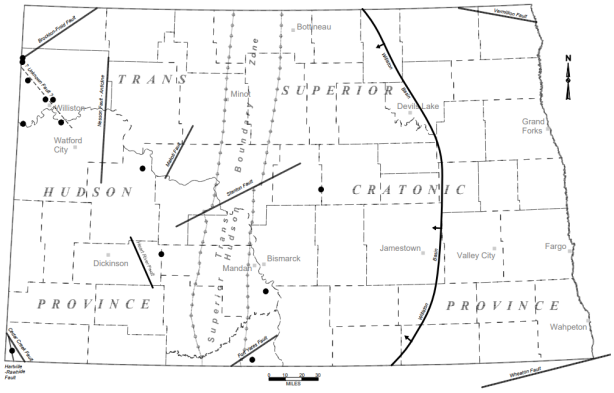
Towner County Hazard Events, 1996-2019							
Location	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Towner (Zone)	12/28/2013	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	1/3/2014	Blizzard		0	0		
Towner (Zone)	1/4/2014	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	1/16/2014	Blizzard		0	0		
Towner (Zone)	1/22/2014	Blizzard		0	0		
Towner (Zone)	1/22/2014	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	1/26/2014	Blizzard		0	0		
Towner (Zone)	1/26/2014	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	2/28/2014	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	3/1/2014	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	3/31/2014	Blizzard		0	0		
Hansboro	6/4/2014	Hail	1 in.	0	0		
Hansboro	6/4/2014	Hail	1.5 in.	0	0		
Crocus	6/8/2014	Hail	1 in.	0	0		
Towner (Zone)	1/2/2015	Heavy Snow		0	0		
Towner (Zone)	1/3/2015	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	1/6/2015	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	2/21/2015	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	5/17/2015	High Wind	52 mph	0	0		
Towner (Zone)	5/18/2015	Frost/Freeze		0	0		
Newville	6/20/2015	Tornado	EF0	0	0		
Arndt	7/17/2015	Funnel Cloud		0	0		
Zion	7/23/2015	Hail	1 in.	0	0		
Cando	7/23/2015	Hail	1 in.	0	0		
Towner (Zone)	10/12/2015	High Wind	35 mph	0	0		
Towner (Zone)	11/18/2015	High Wind	50 mph	0	0		
Towner (Zone)	12/22/2015	Winter Storm		0	0		
Towner (Zone)	1/16/2016	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	2/7/2016	High Wind	35 mph	0	0		
Hansboro	6/3/2016	Hail	1 in.	0	0		
Pasha	7/20/2016	Hail	1 in.	0	0		
Agate	8/3/2016	Tornado		0	0	$15,000	$100,000
Zion	8/3/2016	Hail	EF2	0	0		
Rocklake	8/3/2016	Heavy Rain	1 in.	0	0		
Newville	8/3/2016	Hail	1.5 in.	0	0		
Maza	8/3/2016	Hail	1.5 in.	0	0		
Egeland	8/3/2016	Thunderstorm Wind	2 in.	0	0		
Considine	8/3/2016	Thunderstorm Wind	2.5 in.	0	0		

Towner County Hazard Events, 1996-2019							
Location	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Cando	8/3/2016	Hail	2.75 in.	0	0		
Cando	8/3/2016	Hail	52 mph	0	0		
Bisbee Lyster Arpt	8/3/2016	Thunderstorm Wind	65 mph	0	0		
Bisbee Lyster Arpt	8/3/2016	Hail	78 mph	0	0		
Bisbee Lyster Arpt	8/3/2016	Heavy Rain	85 mph	0	0		
Bisbee Lyster Arpt	8/3/2016	Flash Flood		0	0		
Arndt	8/3/2016	Thunderstorm Wind		0	0		
Towner (Zone)	12/5/2016	Winter Storm		0	0		
Towner (Zone)	12/6/2016	Blizzard		0	0		
Towner (Zone)	12/7/2016	Blizzard		0	0		
Towner (Zone)	12/16/2016	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	12/25/2016	Blizzard		0	0		
Towner (Zone)	1/2/2017	Winter Storm		0	0		
Towner (Zone)	1/12/2017	Blizzard		0	0		
Towner (Zone)	1/12/2017	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	3/6/2017	Blizzard		0	0		
Towner (Zone)	3/7/2017	High Wind	52 mph	0	0		
Hansboro	3/30/2017	Flood		0	0	$50,000	
Hansboro	4/1/2017	Flood		0	0	$50,000	
Hansboro	6/2/2017	Hail	0.88 in.	0	0		
Cando Muni Arpt	6/2/2017	Hail	1 in.	0	0		
Cando Muni Arpt	6/2/2017	Hail	1.25 in.	0	0		
Cando	6/2/2017	Hail	1.25 in.	0	0		
Bisbee Lyster Arpt	6/2/2017	Hail	1.25 in.	0	0		
Armourdale	6/2/2017	Hail	1.25 in.	0	0		
Cando	7/6/2017	Thunderstorm Wind	51 mph	0	0		
Rocklake	7/11/2017	Funnel Cloud	EF0	0	0		
Rocklake	7/11/2017	Funnel Cloud		0	0		
Rocklake	7/11/2017	Tornado		0	0		
Armourdale	7/11/2017	Funnel Cloud		0	0		
Ellsberry	7/19/2017	Hail	1.5 in.	0	0		
Zion	7/29/2017	Hail	1 in.	0	0		
Perth	7/29/2017	Heavy Rain		0	0		
Towner (Zone)	10/26/2017	High Wind	52 mph	0	0		
Towner (Zone)	12/24/2017	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	12/29/2017	Extreme Cold/Wind Chill		0	0		

Towner County Hazard Events, 1996-2019							
Location	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Towner (Zone)	1/1/2018	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	1/12/2018	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	1/15/2018	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	3/5/2018	Winter Storm		0	0		
Zion	6/14/2018	Hail	EF1	0	0		
Rocklake	6/14/2018	Thunderstorm Wind	EF1	0	0		
Rocklake	6/14/2018	Tornado	1.25 in.	0	0		
Cando Mun Arpt	6/29/2018	Thunderstorm Wind	50 mph	0	0		
Rocklake	7/14/2018	Hail	1.25 in.	0	0		
Zion	9/6/2018	Hail	1 in.	0	0		
Towner (Zone)	12/26/2018	Heavy Snow		0	0		
Towner (Zone)	12/27/2018	Blizzard		0	0		
Towner (Zone)	12/31/2018	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	1/1/2019	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	1/27/2019	Heavy Snow		0	0		
Towner (Zone)	1/27/2019	Blizzard		0	0		
Towner (Zone)	1/28/2019	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	2/3/2019	Heavy Snow		0	0		
Towner (Zone)	2/7/2019	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	2/24/2019	Blizzard		0	0		
Towner (Zone)	2/24/2019	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	3/2/2019	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	6/29/2019	Strong Wind	35 mph	0	0		$10,000
Rocklake	7/8/2019	Hail	EF0	0	0		
Newville	7/8/2019	Tornado	1 in.	0	0		
Bisbee Airport	9/20/2019	Hail	EF0	0	0		
Bisbee	9/20/2019	Tornado	1.25 in.	0	0		
Towner (Zone)	10/10/2019	Winter Storm		0	0		
Towner (Zone)	10/11/2019	Blizzard		0	0		
Towner (Zone)	1/15/2020	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	1/17/2020	Blizzard		0	0		
Towner (Zone)	2/12/2020	Extreme Cold/Wind Chill		0	0		
Towner (Zone)	4/1/2020	Winter Storm		0	0		
Newville	7/13/2020	Hail	1 in.	0	0		
Newville	7/13/2020	Hail	1.75 in.	0	0		
Considine	7/17/2020	Hail	1 in.	0	0		

Geologic Hazards

Chapter 3 summarizes general threat of geologic hazards in Towner County. Landslides, earthquakes, and sinkholes are all types of geologic hazards. Landslides have been the phenomenon with the greatest impact in the North Dakota and are generally a consideration for major construction projects in parts of the State. Towner County is virtually landslide free with only one documented slide (located in Section 4 T157N R68W). Earthquakes are less commonly considered a risk. Although the risk of an earthquake capable of causing significant damage is slight, there have been earthquakes in recent ND history. The map below illustrates the major faults and tectonic boundaries along with earthquakes that have occurred in North Dakota.



The closest identified earthquake to Towner County occurred in Sheridan County on November 15, 2008 with a reported magnitude of 2.6. The following excerpt and chart from an article written by Fred J. Anderson and titled *Earthquake Hazards and Probabilities in North Dakota and the Magnitude 9.0 Indonesian Earthquake of December 26, 2004* in the NDGS Newsletter summarizes the risk:

Previous Earthquakes in North Dakota

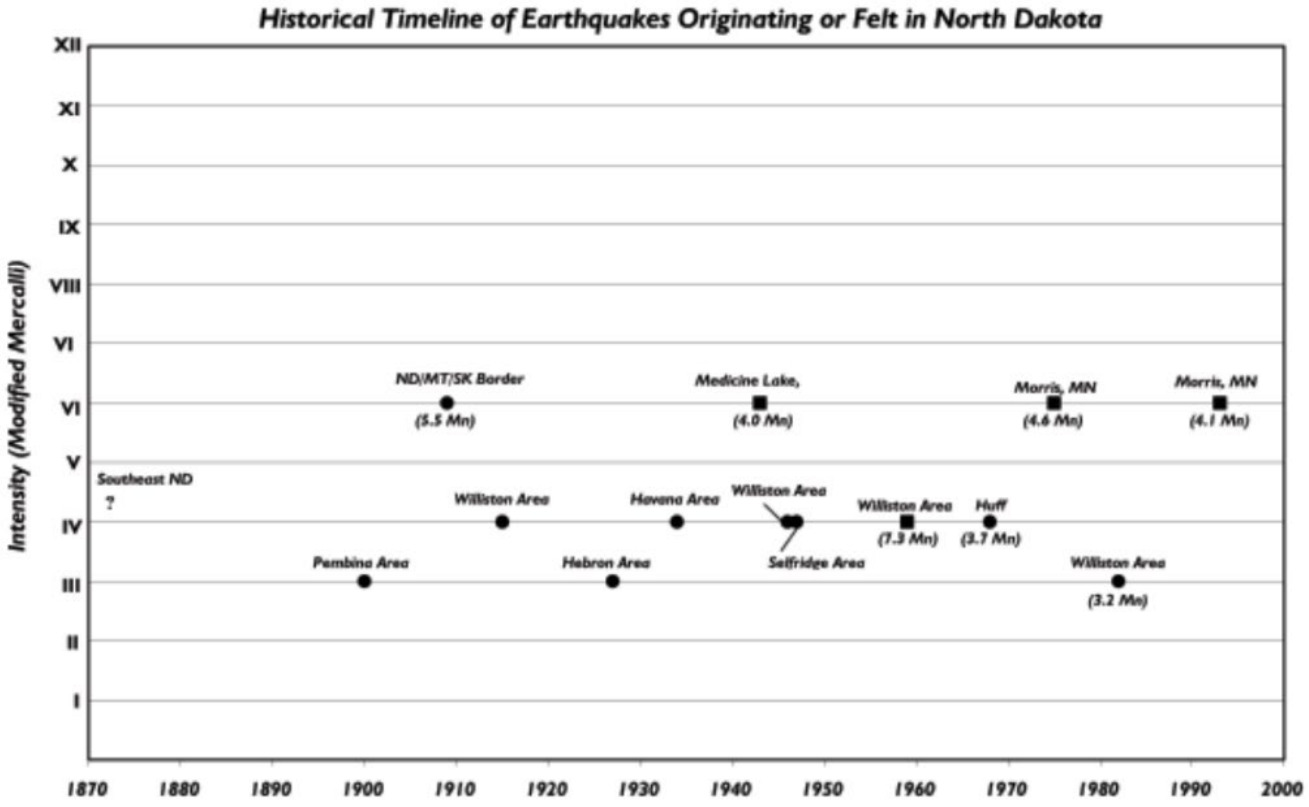
The first instrumentally verified earthquake in the state was recorded on July 8, 1968 in the vicinity of Huff, North Dakota, just south of the Bismarck-Mandan area. This earthquake has been recorded as a Richter magnitude 3.7 event. Several other earthquakes have been felt within the state beginning as far back as October 9, 1872 (See Historical Timeline of Earthquakes Originating or Felt in North Dakota chart below). As of this writing a total of nine earthquakes have been determined to have occurred within the state and five additional earthquakes were recorded to have been felt within the state although they did not originate within state boundaries (Biek, 1997)…….It is interesting to note that based on this historical record, an earthquake, either originating within the state or being felt within the state, occurs, on an average, of approximately once per decade.

North Dakota Seismic Hazards

…… how North Dakota compares to the rest of the U.S., on the matter of seismic hazard. From a seismological perspective we can look at this in a couple of different ways.

One way to evaluate the seismic hazard of a particular area is to consider what the probability would be that an earthquake of a given magnitude would occur at a particular location of interest during a specified period of time. If one were to consider what the probabilities of an earthquake of magnitude 5.0 or greater (earthquakes of magnitude 5.0 or greater are generally considered to be of a destructive character) occurring within the next 1000 years (roughly 14 lifetimes) at a range of 50 km (around 31 miles) from each major North Dakota city we would find a less than 10 percent chance of experiencing this kind of an earthquake within the next 1000 years…..The city of Williston has the highest probability. This is due to [its] location to preexisting, deeply buried fault structures at the northwestern and southeastern boundaries of the state and on the configuration of the Precambrian basement rocks, previously summarized as related to earthquakes in North Dakota by Bluemle (1989).

Another way to characterize seismic risk is by way of ground acceleration presented as ground shaking hazard, which is the rate of horizontal ground motion for a particular area calculated from the frequency and number of previous earthquakes of various magnitudes and currently available information on fault-slip rates. Compared to the rest of the U.S., North Dakota is well within the area with the lowest potential ground shaking hazard of 0-2% g (when an earthquake occurs the forces caused by ground shaking can be measured and expressed as a percentage of g or the force of gravity at the surface of the earth).


Historical Timeline of Earthquakes Originating or Felt in North Dakota
Intensity (Modified Mercalli)
XII
XI
X
IX
VIII
VI
VI
V
IV
III
II
I
Southeast ND
?
ND\MT\SK Border
(5.5 Mn)
Medicine Lake,
(4.0 Mn)
Morris, MN
(4.6 Mn)
Morris, MN
(4.1 Mn)
Williston Area
Havana Area
Williston Area
Selfridge Area
Williston Area
(7.3 Mn)
Huff
(3.7 Mn)
Pembina Area
Hebron Area
Williston Area
(3.2 Mn)
1870
1880
1890
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000

Appendix D: Mitigation Action Determination

Hazards needing priority mitigation were discussed at each community meeting and with planning team members. The public was also requested to identify priority mitigation actions via the community survey. Mitigation action items were developed with multiple activities:

- Early input on potential mitigation action items was obtained at the Planning Team and Community meetings
- Consultant provided a list of potential mitigation actions
- Goals and a hierarchy of needs were reviewed and confirmed
- Status of past mitigation action items was reviewed
- Draft mitigation action items compiled
- Draft mitigation actions were discussed with key stakeholders from each jurisdiction to obtain feedback and additional potential mitigation actions
- Additional planning team member input to refine mitigation action items
- Emergency manager confirms priorities and timeline for final mitigation actions list
- Final mitigation action items distributed for planning team and jurisdictional representative affirmation

Hierarchy of Needs

1. Life/Safety – protecting the lives and ensuring the safety of people is the highest priority

2. Emergency Response Capability – maintaining the capacity of local emergency responders is the second highest priority

3. Critical Facilities Protection – protecting the structure and functionality of critical facilities is the third highest priority

4. Property Protection – protecting existing structures and property, which represent the wealth and means to livelihood, from hazards is the fourth highest priority

5. Future Development/Economic Capacity – the final priority is to maintain capacity for current business and economic activity, as well as protecting the potential for future development activity

Past Mitigation Action Status

The table on the following pages summarizes the status of the mitigation action items from the 2015 Towner County MHMP.

Towner County Previous MHMP Mitigation Action Item Status						
Jurisdiction	**Mitigation Action**	**Complete**	**Ongoing**	**Retained**	**Dropped**	**Unknown**
County-wide and Cando	Conduct NFIP workshop to educate public about benefits of flood insurance.		x			
County-wide and Bisbee	Evaluate alternatives for repairing the Bisbee Dam/Big Coulee Dam and pursue implementation to reduce the likelihood of failure.	x				
County-wide	Cover windows in select facilities with shatter-resistant film.	x				
County-wide	Develop county-wide Reverse 911 system.	x				
County-wide	Create living snow fences in strategic locations.		x			
County-wide	Elevate roads impacted by rising water levels.	x				
County-wide	Acquire and remove properties impacted by rising water levels.	x				
County-wide	Develop a public information campaign for agricultural producers.	x				
County-wide	Install 911 signs throughout county.		x			
Bisbee, Egeland, Hansboro, Perth, Rocklake	Construct or enlarge culverts/storm sewer inlets to reduce risk of local flooding.			x		
Bisbee, Cando, Egeland, Rocklake	Install generators and connections at select critical facilities.			x		
Bisbee	Remove silt and debris from storm drain culverts.			x		
Cando	Mitigate flooding hazard to Cando sewer lagoons.			x		
Cando	Install security fence around water plant.			x		
Hansboro	Install Warning Siren.*	x				
Rocklake	Acquire portable water pump to remove snowmelt water from streets when storm sewer is frozen.					x

* Some equipment to make the Hansboro siren functional was installed, but sirens at Hansboro and all other cities are old and need to be upgraded.

Appendix E: Monitoring Forms

Worksheet 7.1
Mitigation Action Progress Report Form

Mitigation Action Progress Report Form

Progress Report Period	From Date:	To Date:
Action/Project Title		
Responsible Agency		
Contact Name		
Contact Phone/Email		
Project Status	❑ Project completed ❑ Project canceled ❑ Project on schedule ❑ Anticipated completion date:_____ ❑ Project delayed Explain _____	

Summary of Project Progress for this Report Period

1. What was accomplished for this project during this reporting period?

_____

_____

2. What obstacles, problems, or delays did the project encounter?

_____

_____

3. If uncompleted, is the project still relevant? Should the project be changed or revised?

_____

_____

4. Other comments

_____

_____

Worksheet 7.2
Plan Update Evaluation Worksheet

Plan Update Evaluation Worksheet

Plan Section	Considerations	Explanation
Planning Process	Should new jurisdictions and/or districts be invited to participate in future plan updates?	
	Have any internal or external agencies been invaluable to the mitigation strategy?	
	Can any procedures (e.g., meeting announcements, plan updates) be done differently or more efficiently?	
	Has the Planning Team undertaken any public outreach activities?	
	How can public participation be improved?	
	Have there been any changes in public support and/or decision- maker priorities related to hazard mitigation?	
Capability Assessment	Have jurisdictions adopted new policies, plans, regulations, or reports that could be incorporated into this plan?	
	Are there different or additional administrative, human, technical, and financial resources available for mitigation planning?	
	Are there different or new education and outreach programs and resources available for mitigation activities?	
	Has NFIP participation changed in the participating jurisdictions?	
Risk Assessment	Has a natural and/or technical or human-caused disaster occurred?	
	Should the list of hazards addressed in the plan be modified?	
	Are there new data sources and/or additional maps and studies available? If so, what are they and what have they revealed? Should the information be incorporated into future plan updates?	
	Do any new critical facilities or infrastructure need to be added to the asset lists?	
	Have any changes in development trends occurred that could create additional risks?	
	Are there repetitive losses and/or severe repetitive losses to document?	

Worksheet 7.2

Plan Update Evaluation Worksheet

Plan Section	Considerations	Explanation
Mitigation Strategy	Is the mitigation strategy being implemented as anticipated? Were the cost and timeline estimates accurate?	
	Should new mitigation actions be added to the Action Plan? Should existing mitigation actions be revised or eliminated from the plan?	
	Are there new obstacles that were not anticipated in the plan that will need to be considered in the next plan update?	
	Are there new funding sources to consider?	
	Have elements of the plan been incorporated into other planning mechanisms?	
Plan Maintenance Procedures	Was the plan monitored and evaluated as anticipated?	
	What are needed improvements to the procedures?	