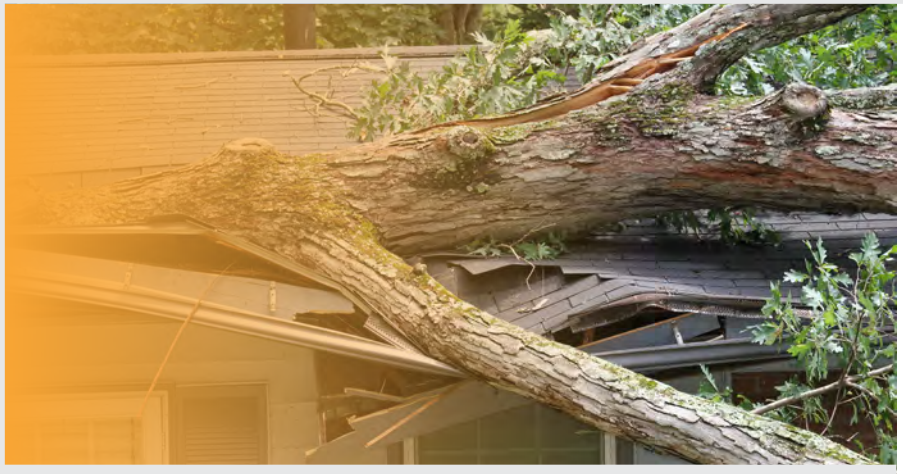
LaMoure County

MULTI-HAZARD MITIGATION PLAN



July 2020

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Chapter 1 : Introduction

Hazard Mitigation Planning

Natural and human-caused hazards have a direct impact on residents and property in LaMoure 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.

The plan is organized into five chapters:

Chapter 1: Introduction

- General plan overview

Chapter 2: Study Area Background

- Background information about each participating jurisdiction and identification of critical facilities

Chapter 3: Hazard Risks and Vulnerabilities

- Hazard profiles, 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 in the community

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.
- Communicating 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 an evaluation 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), Pre-Disaster Mitigation Grant Program (PDM) and Flood Mitigation Assistance (FMA).

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 LaMoure County's 2014 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, Pre-Disaster Mitigation program 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
LaMoure County	3-17-2020
Berlin	4-1-2020
Dickey	5-11-2020
Edgeley	5-4-2020
Jud	4-14-2020
Kulm	4-13-2020
LaMoure	4-14-2020
Marion	5-22-2020
Verona	4-13-2020

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 success of the plan and implementation of action items is dependent on public participation during all four steps of the planning process. Public involvement for the plan included Planning Team meetings, public meetings, city council/commission meetings and a public survey. Local planning documents were also reviewed and incorporated into the document when applicable.

Seventeern meetings were held to complete the planning process. Two initial meetings with the Planning Team were held in 2018 to introduce the planning process, develop a draft questionnaire, and collect initial information about key issues. A series of community meetings were held with governing bodies and interested citizens to obtain input about potential hazard consequences on the communities and their critical facilities, and potential mitigation actions.

A survey was also conducted to obtain feedback from people in the County on their concerns and possible solutions pertaining to

hazards and emergencies. The key results of the survey were provided to the Planning Team for consideration during the mitigation action development. Highlights of the survey results include:

- **The top three natural hazards of concern to respondents were severe summer weather, severe winter weather, and flooding.** Summer and winter weather were selected by over 90% of them. Flooding was selected by 52%.
- **The top three technological or human caused hazards of concern to respondents were hazardous materials releases (81%), urban fire (70%), and terrorist/active shooter incidents (46%).** It should noted that 67% of respondents listed shortage/outage of critical material as a significant concern.
- **The two most highly desired mitigation actions were protecting roads at risk from flooding and having backup power supply.** Both were listed by over 74% of respondents. The next most commonly identified mitigation action was restricting development in high flood risk areas (65%).
- **Survey results also clearly indicated adequate alert of hazards as a highly desirable mitigation action.** Over 61% of respondents listed warning sirens and nearly half also listed a cell phone alert system among their top three mitigation actions.

Additional Planning Team meetings and objectives of each meeting are listed below.

- **February 28, 2019**: Initial review of hazard assessment.
- **May 2, 2019**: Discussion on flooding impacts and responses.
- **August 14, 2019**: Initial discussion of mitigation actions.
- **September 5, 2019:** Review initial draft plan elements and refine mitigation actions.
- **October 18, 2019:** Review and refine parts of draft MHMP.
- **November 21, 2019:** Address questions regarding wildland and urban fire history and risk.

Additional details about the planning process are provided in Appendix B.

Acknowledgements

Numerous elected officials, City and County staff, and members of the public participated in the planning process. The project would not have been possible without the assistance of Planning Team members (identified in Appendix B) and members of the public who participated in public meetings, completed the survey or submitted comments through the project website.

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

LaMoure County is located in south central North Dakota, south and largely east of the Jamestown. Its total area is 733,402 acres, making it smaller than the state's median county size of 739,000 acres. The county includes 8 incorporated cities: Berlin, Dickey, Edgeley, Jud, Kulm, LaMoure, Marion, and Verona. At the 2010 Census 2,172 of LaMoure County's 4,139 people lived in cities. The county has a few inhabited unincorporated communities including Adrian, Alfred, Grand Rapids, and Nortonville. There are also two Hutterite colonies (Fairview, and Willowbank) located in the County. The total population of these rural places is estimated to be 921. They are primarily included in this plan as reference points.

A general map of the county, including major features and neighboring jurisdictions, is shown in Figure 2.1. Major roadways include State Highways 1, 13, 27, 46, 56, and US Highway 281. The county is also served by three railroad lines. One cuts across the southwest corner of the county while passing through Kulm. One follows the James River south from Jamestown through Adrian. And one runs from the east through Verona, LaMoure, Berlin before dead-ending at Edgeley.

Population and Demographics

Summarized demographic information for LaMoure County and North Dakota is shown in Table 2.1. The county is generally older than the state overall, with a median age of 50.6 and 26.7 percent of residents at least 65 years of age. The county's population density of 2.4 persons per square mile is less than half the statewide rate. Nearly all residents identify themselves as White not Hispanic. The county's median income is less than the state's while the poverty level is lower than the state's.

Table 2.1 – LaMoure County Demographics

	LaMoure County	North Dakota
Population	4,062	755,393
Persons under 5 years	5.2%	7.2%
Persons under 18 years	18.9%	26.1%
Persons 65 years and over	26.7%	14.5%
Median Age	50.6	35.1
Persons per square mile	2.4	11.7
White not Hispanic	94.3%	86.7%
Hispanic or Latino	1.6%	3.7%
American Indian or Alaska Native	0.7%	5.5%
Black or African American	0.8%	3.1%
Asian	2.2%	1.6%
Two or More Races	1.8%	2.6%
Foreign born	1.9%	2.7%
Language other than English spoken at home	3.7%	5.6%
High school graduates, age 25+	96.0%	92.0%
Median household income	$53,295	$59,114
Persons below poverty level	10.5%	11.2%
Average household size (persons)	2.23	2.33

Source: US Census Bureau; 2018 Annual Estimate used for population, age and race/ethnicity; 20013-2017 American Community Survey used for other demographic information

LaMoure County

Multi-Hazard Mitigation Plan

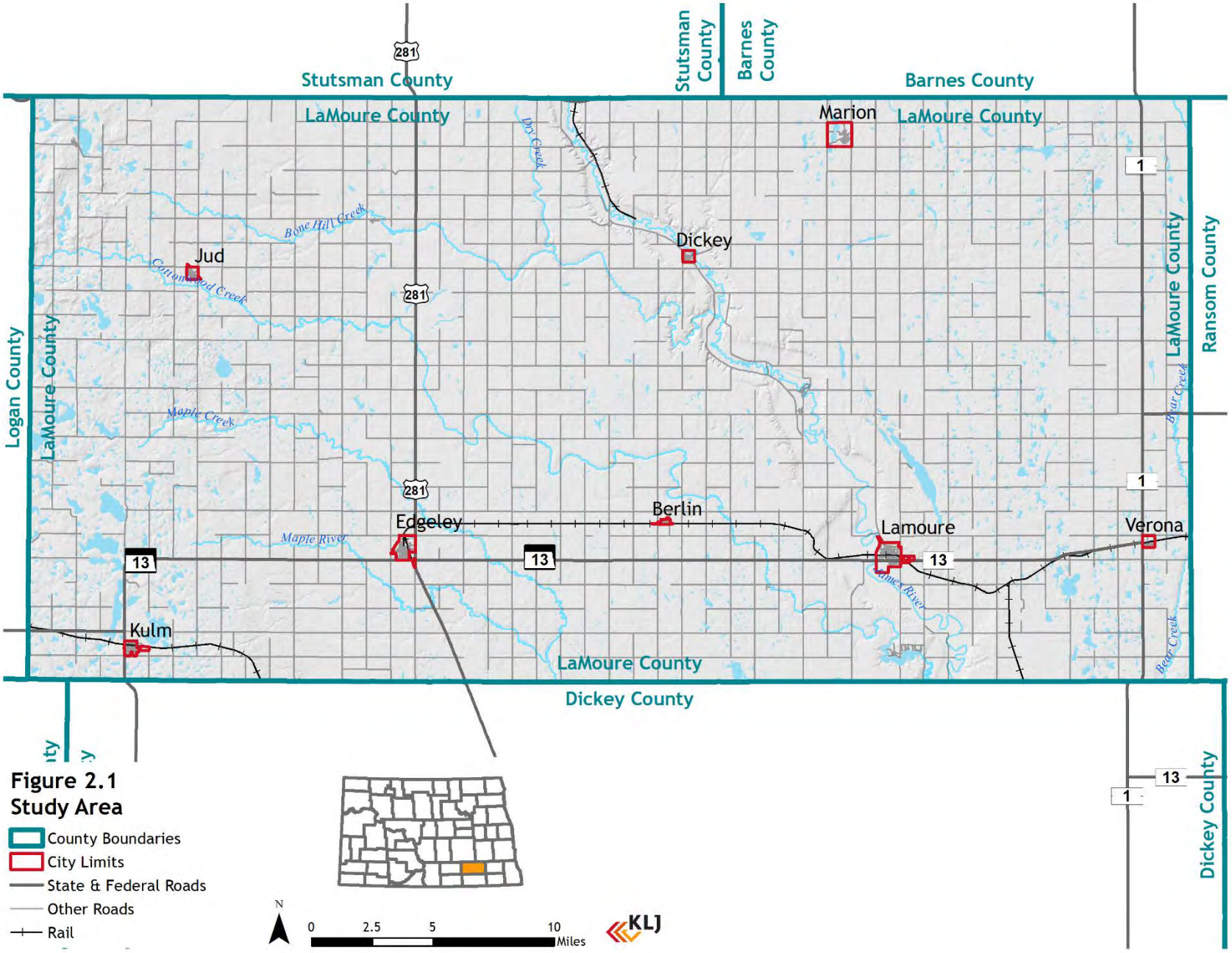
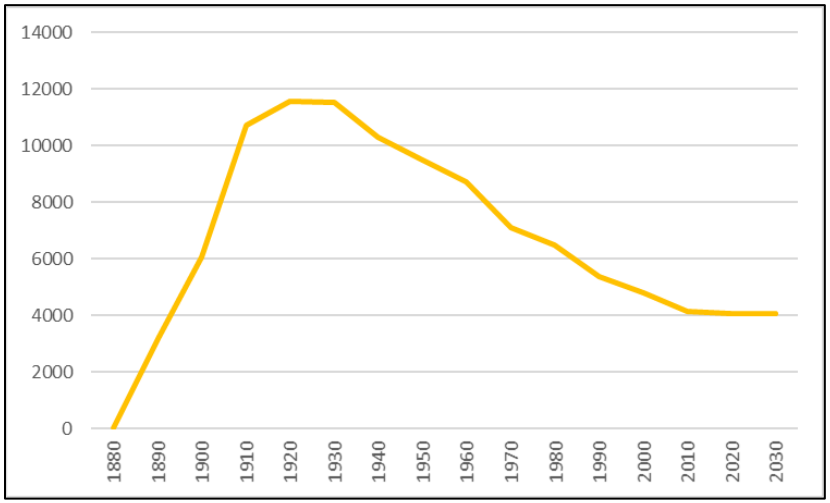


Figure 2.1
Study Area

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

Population trends for the county are shown in Figure 2.2. The county generally experienced declining population from 1920 to present day.

Figure 2.2 Historical and Projected Population



Projections from Woods and Poole indicate that the county's population will slightly decline through 2030.

More detail about population trends in the county and its cities are summarized in Table 2.2. Overall, the city population declined in population by over 10% from 2000 to 2010 but is thought to have declined only 1% from 2010 to 2018. The remaining rural population of the County declined by over 13% from 2000 to 2010, but slowed its population loss to less than 3% from 2010 to 2018.

Table 2.2 – Population Trends

Area	2000	2010	% Change 2000-2010	2018	% Change 2010-2018
Berlin	35	34	-2.9%	36	5.9%
Dickey	57	42	-26.3%	39	-7.1%
Edgeley	637	563	-11.6%	553	-1.8%
Jud	76	72	-5.3%	72	0.0%
Kulm	422	354	-16.1%	334	-5.6%
LaMoure	944	889	-5.8%	896	0.8%
Marion	146	133	-8.9%	130	-2.3%
Verona	108	85	-21.3%	91	7.1%
Rural County	2276	1967	-13.6%	1911	-2.8%
County	4701	4139	-12.0%	4062	-1.9%

Population density is shown in Figure 2.3. Most of the county is very low density, with two or less persons per acre.

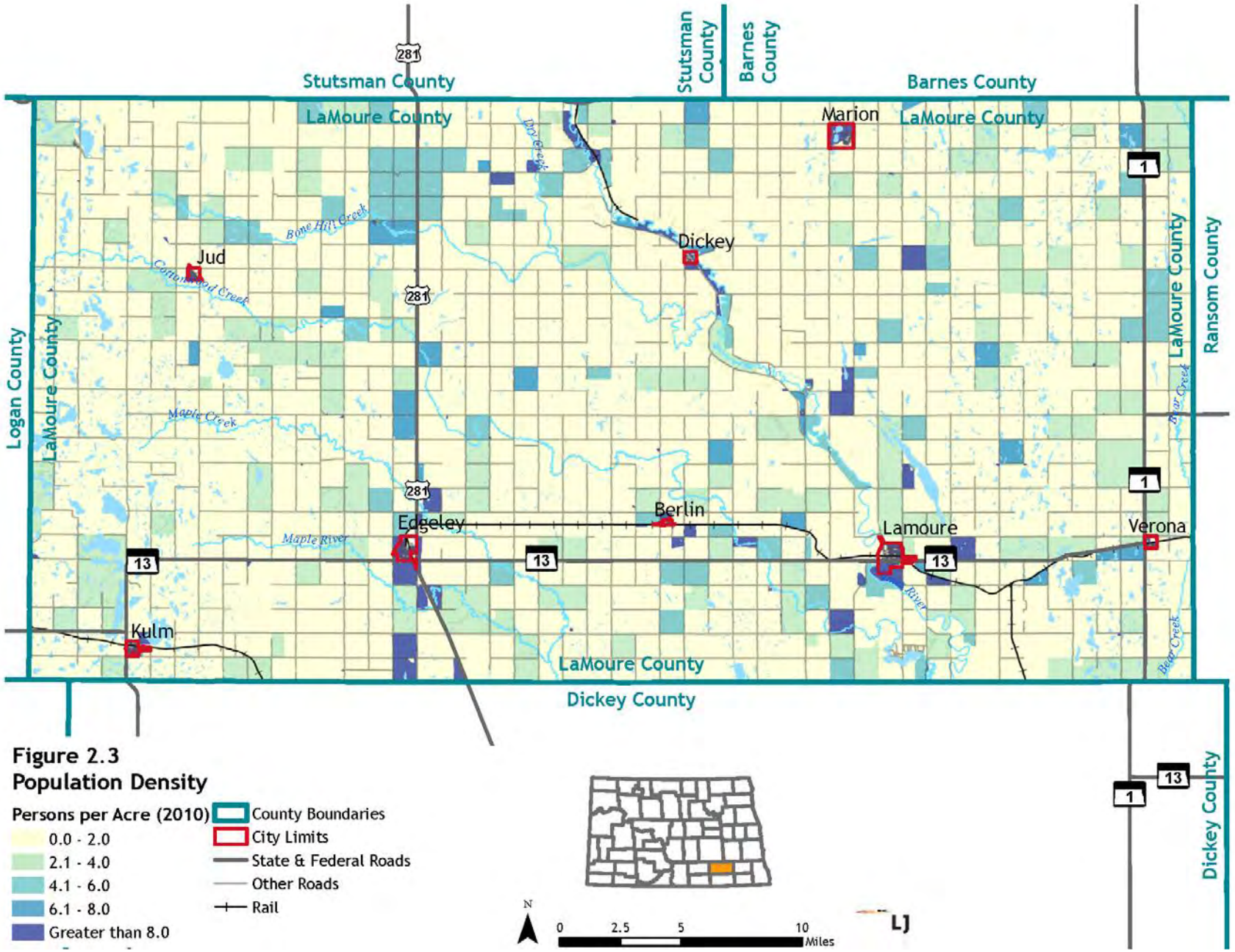


Figure 2.3
Population Density

Economy

The agriculture industry is the driving force of the LaMoure County economy. The industry is tracked by annual survey through the National Agricultural Statistics Service. Summarized survey information is shown in Table 2.3. Soybeans is the most common crop, accounting for nearly 50 percent of the county's harvested acreage in 2016. Cattle and calves make up most of the county's livestock industry. The USDA Census of Agriculture indicates that in 2017 the total value of crops sold in the county was $192,505,000 and the total value of livestock was $33,846,000.

Table 2.3 - LaMoure County Agriculture Summary

Crop (Most Recent Year)	Acres Harvested	Production
Spring Wheat (excl Durum) (2016)	40,900	2,591,000 bu
Soybeans (2016)	305,000	14,640,000 bu
Corn (2016)	173,400	32,536,000 bu
Dry Edible Peas (2016)	1,600	41,500 bu
Barley (2016)	3,880	317,000 bu
Livestock (2017)	**Inventory**	
Cattle and Calves	33,500	
Sheep and Lambs	700	

Countywide workforce data is compiled by the Job Service North Dakota Labor Market Information Center. The county's largest employers are shown in Table 2.4. A majority of the top employers in 2017 were from government, education and health care.

Table 2.4 – LaMoure County Largest Employers, 2018

Rank	Employer	Industry
1	St Rose Care Center	Nursing & Residential Care
2	LaMoure Public School	Educational Services
3	LaMoure County Government	Local Government
4	Edgeley Public School	Educational Services
5	Kulm Public School	Educational Services
6	Litchville-Marion Public School	Educational Services
7	Allied Energy	Fuel & Auto, & HVAC Services
8	Hometown Credit Union	Financial Services
9	(Non-disclosable)	-
10	CHS Inc	Merchant Wholesalers

Critical Facilities

An important element to hazard mitigation planning is to determine critical facilities that may need special consideration during the preparation of mitigation action items and the risk assessment. Critical facilities fall into several categories:

- Facilities that are essential to the health and welfare of the entire population, and may become especially important following hazard events.
- Utility systems whose disruption would have a significant impact.
- Facilities containing a high density of population, especially those containing vulnerable populations. Examples include schools, retirement homes and large employers.

- Facilities that are a key element to the local economy, and could cause significant economic damage if their function was disrupted.
- Historic, cultural and natural resource areas that are important to the community.

Critical facilities in LaMoure County are not generally enumerated in this document but are on file at the Emergency Manager's office. Critical facilities are also discussed in general terms in each hazard profile found in Chapter 3.

Climate and Weather

Aggregated weather statistics for the county are shown in Table 2.5. Weather extremes in the county are shown in Table 2.6. The NWS Cooperative Network Weather Station in Edgeley 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.

Conclusion

These data show that LaMoure County is a very stable agriculturally based part of North Dakota. Its population is expected to remain stable over the next decade. Weather is the dominant factor affecting its economy. The County has experience successive years of extreme weather and flooding events. The most critical mitigation efforts should be aimed at minimizing impacts from these events.

Table 2.5 – LaMoure County Aggregated Weather Statistics

	Edgeley			
	Temperature (°F)		**Precipitation (In.)**	**Snow Fall (In.)**
	Avg Daily Max	*Avg Daily Min*	*Avg Monthly*	*Avg Monthly*
Jan	19.6	-23	0.42	4.9
Feb	24.4	-20	0.39	4.2
Mar	37.4	-6	0.76	5
Apr	54.5	14	1.64	2.6
May	67.8	26	2.71	0.2
Jun	76.2	38	3.53	T
Jul	83.1	45	2.57	0
Aug	82.2	40	2.22	0
Sep	72.3	29	1.79	0.1
Oct	58.8	16	1.15	0.8
Nov	39.9	-1	0.52	3.8
Dec	25.1	-16	0.37	4.3
Ann	*53.7*	*-26*	*17.23*	*22.6*

Table 2.6 – LaMoure County Weather Extremes

Highest Max Temperature	116° F	7/6/1936
Lowest Min Temperature	-41° F	12/12/1912
Highest Daily Precipitation	5.19"	6/17/1932
Greatest Snowfall	20.0"	4/15/2013

Chapter 3: Hazard Risks and Vulnerabilities

Hazards Overview

LaMoure County is subject to numerous 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 LaMoure County from 1978 to 2018. There were 42 Presidential Disaster Declarations for all of North Dakota during the period, and including one statewide Declaration, LaMoure County was designated for eleven of them. The most recent declared disaster was the spring flooding event of 2019.

Table 3.1 -LaMoure County Presidential Disaster Declarations, 1993-2018

Year	Declaration	Hazard(s)
2019	DR 4444	Flooding
2011	DR 1981	Flooding
2010	DR 1907	Flooding
2010	DR 3309	Flooding
2009	DR 1829	Severe Storms And Flooding
2007	DR 1713	Severe Storms And Flooding
2005	DR 1597	Severe Storms, Flooding, And Ground Saturation
2001	DR 1376	Severe Storms, Flooding, & Ground Saturation
2000	DR 1334	Severe Storms, Flooding And Ground Saturation
1999	DR 1279	Severe Storms, Flooding And Ground Saturation
1998	DR 1220	Severe Storms, Flooding, Snow, Ice, Ground Saturation, Landslides, Mudslides, & Tornadoes

Source: FEMA

The 2018 draft North Dakota Enhanced Multi-Hazard Mitigation Plan served as the basis for selecting the hazards profiled in this chapter. Space Weather, Civil Disturbance, Cyber Attack, and Criminal Terrorist National Attack are profiled as separate hazards in the statewide plan; however, 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 2018 draft Statewide Plan; but they are retained as separate hazards in this very rural county due to the very different impacts and responses needed for each.

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 Diseases and Pest Infestation
- Transportation Incident
- Urban Fire
- Civil Disturbance
- Cyber Attack
- Criminal Terrorist National Attack

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

- *Hazard Profile*: Definition of the hazard and general overview.
- *Local Risk*: Previous occurrences and specific risk for the jurisdiction, including population, critical facilities and property.
- *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 2018 draft ND Enhance MHMP. Probability is the likelihood that the hazard event will occur within the county in future years. Impact is the percentage of residents and property, and the extent to which critical facilities, 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 and further detailed in Appendix C. When possible, historical data from previous events was utilized to determine probability. Impact was assessed based primarily on significant proximity to a hazard. Risk class is determined for the rural county (unincorporated areas) and each incorporated city.

Probability

Unlikely: not likely to occur even once in 100 years
Possible: likely to occur at least once every 100 years – comparable to 100 year flood event – having a 1% annual chance of occurring
Likely: likely to occur at least once every 10 years
Highly Likely: Nearly 100% likely to occur in any given year

Impact

Negligible: less than 10% of jurisdiction affected with no critical facilities affected
Limited: at least 10% but less than 25% of jurisdiction affected or one critical facility affected for one week or less
Critical: 25-50% of jurisdiction affected or at least one critical facility affected for more than one week, but less than 30 days
Catastrophic: more than 50% of jurisdiction affected or at least one critical facility affected for 30 days or more

Risk Class

Low: impacts are negligible or limited at the same time the probability is less than 10%; 10% probability impacts are still negligible
Moderate: despite negligible or limited impacts, the higher probability of an event raises the risk class above low, or although very low probability, the level of impact raises the risk class above low
High: high levels of impact raise the risk class to high when the event probability is 1% or more

Table 3.2 - Risk Class Determination Criteria

		Impact			
		Negligible	Limited	Critical	Catastrophic
Probability	Unlikely	Low	Low	Moderate	Moderate
	Possible	Low	Moderate	High	High
	Likely	Moderate	Moderate	High	High
	Highly Likely	Moderate	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 LaMoure County, the database includes information about flooding, severe summer weather and severe winter weather. Where possible, statistics for other hazards are provided by a variety of sources, as noted in each corresponding profile.

Drought

All Jurisdictions	*Overall Risk:* Moderate *Probability:* Likely (once per decade, approximately 10 percent annual probability) *Impact:* Critical (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 Description

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, and 2002 through 2008.

Numerous factors beyond precipitation contribute to the creation of drought conditions. Lower water tables and reduced stream flows or lake levels can influence soil moisture levels. Higher temperatures can cause higher levels of evapotranspiration. This in turn can reduce the atmospheric moisture available, which may result in reduced rainfall. Reduction in trees or other plants may also reduce soil moisture levels and reduced levels of evapotranspiration.

Droughts are often measured by impacts, most notably agricultural damage and municipal water supply shortage. The impacts are highly variable based on water supply source, 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.

Location

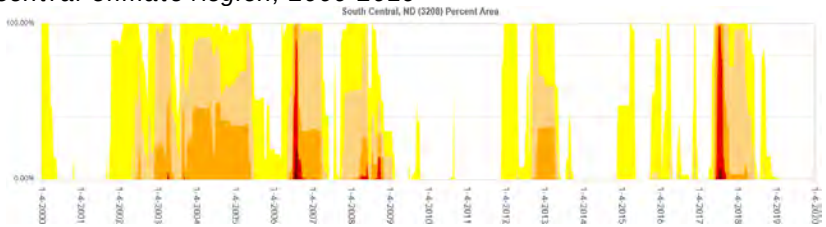
- Drought occurs at a regional level and is not a micro-climatic event. It generally occurs across the entire geographical area of the county.

Extent, Previous Occurrences, and Future 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. **The average annual precipitation in the county is 18.50 inches** as recorded by the National Weather Service Cooperative Network weather station near Edgeley. The county's **lowest annual precipitation is 9.74 inches**, which was recorded in 1936. However, numerous factors beyond rainfall contribute to drought status, which can make it difficult to predict and classify droughts.

- Figure 3.1 illustrates the percent of area and intensity of drought conditions in a six-county region that includes LaMoure County since 2000. 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 twice during the time period.

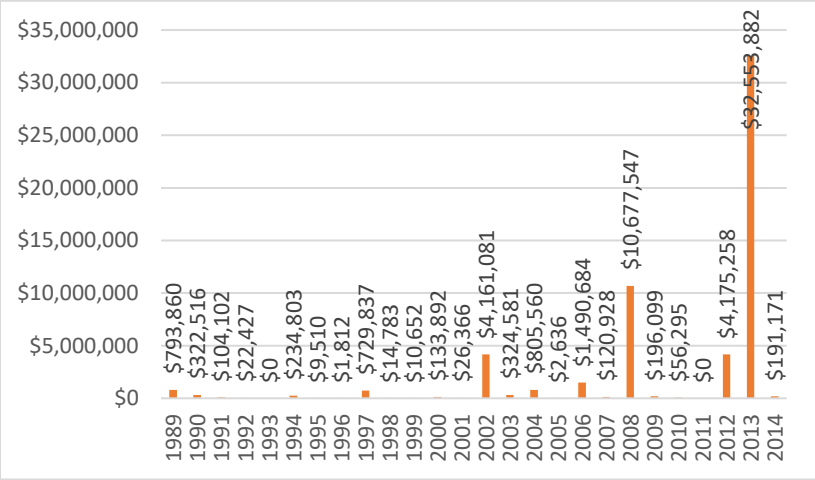
Figure 3.1 - Percent Area and Drought Intensity, ND South Central Climate Region, 2000-2019



- Historical drought occurrences can 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 LaMoure County from 1989-2014. The figure shows that **2013 had the largest drought indemnity payments** during the time period. Drought losses also occurred in 2008. Based on previous regional trends, a severe drought can be expected approximately once per decade.

Figure 3.2 - Federal Indemnity Payments for Drought-Related Losses, LaMoure County, 1989-2014



Source: National Drought Mitigation Center

Vulnerability

Population

- Drought has no direct impact on human life, but it **greatly increases the risk of wildland fire**, 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 Edgeley monitoring station) is 116 degrees Fahrenheit recorded in July 1936**. Elderly persons are at increased risk of heat-related illness. According to the most recent American Community Survey estimates, approximately **1,130 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.
  - Berlin: 9 residents (26.5%)
  - Dickey: 8 residents (19.0%)
  - Edgeley: 162 residents (28.8%)
  - Jud: 17 residents (23.6%)
  - Kulm: 114 residents (32.2%)
  - LaMoure: 233 residents (26.2%)
  - Marion: 39 residents (29.3%)
  - Verona: 19 residents (22.4%)

- **Prolonged drought could potentially affect water supplies**. LaMoure County is served by three different rural water districts. A small area along the northern county border is served by Stutsman Rural Water District. The northeastern fourth of the County stretching almost to the City of LaMoure is served by Barnes Rural Water District. The remainder of the County is served by the Southeast Water Users District. All cities in LaMoure County receive their water supply from these rural water districts. All these rural water districts have water sources that are not considered susceptible to drought. If an extreme drought did reduce available water supply, bottled water could be brought in as an emergency measure. But a lack of household water could create health and sanitation issues for residents.

Critical Facilities

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

Property

- 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 year with the greatest payments was 2013, with $32 million paid by the USDA to reduce the economic impact of drought.** Agriculture is the primary economic driver in the county, and local economic success of each city ultimately relies on a healthy agriculture industry.

- The 2014 statewide Multi-Hazard Mitigation Plan included information about crop insurance payments from the USDA Risk

Management Agency. Drought-related **crop insurance payments in LaMoure County from 2005 to 2014 totaled $49.4 million**. Based on a statewide rate of 89 percent of crops being insured, **total estimated damages for the county were $55.5 million**.

- It is difficult to measure direct economic loss for livestock producers. 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**.

- Beyond agricultural impacts, there is also a greater threat of structure damage in drought-affected areas, as **drought increases the risk of wildland fire and may create water shortages** that inhibit adequate fire response. Structure vulnerability from wildland fire is discussed in more detail in the wildland fire section of this chapter.

Future Development

- Public water systems are monitored by the North Dakota Department of Health, and water permit applications are maintained by the North Dakota State Water Commission and US Army Corps of Engineers.

- Extension of rural water systems to non-participating locations is dependent on availability of funds, level of interest by unserved locations, and programming priorities.

Existing Capabilities

- The USDA Farm Service Agency has a field office located in LaMoure, and North Dakota State University Extension has a field office located in LaMoure. Both agencies 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.

- The primary water supply comes from rural water districts that depend on two separate aquifers. The Spiritwood aquifer has been evaluated and determined to handle substantial increased usage even in extended drought conditions. The LaMoure aquifer has not been similarly evaluated, so capacity to handle increased demand in extended drought conditions is unknown.

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.

- *Key Issue*: The LaMoure aquifer which is the source of water for the majority of LaMoure County has an unknown capacity to handle increased demand in extended drought conditions such as was experienced in the 1930's.
  - *Potential Action Item:* Complete a study to evaluate the capacity of the LaMoure aquifer in times of extended drought
  - *Potential Action Item*: Investigate the potential to bring former municipal water supply systems back online in case of emergencies.
  - *Potential Action Item*: Develop a strategy and materials to educate residents in each community about water saving techniques to help preserve water supplies.

- *Key Issue*: Limited water supply to fight both wildland fires, and fires in the smaller communities of LaMoure County.
  - *Potential Action Item*: Develop a strategy to determine prioritized locations and minimum volumes of water storage for fighting fires
  - *Potential Action Item*: Secure funding and land, and construct water reservoirs for firefighting needs.

Flood

Rural County	*Overall Risk:* High *Probability:* Likely *Impact:* Limited
Berlin	*Overall Risk:* Moderate *Probability:* Possible *Impact:* Limited
Dickey	*Overall Risk:* High *Probability:* Likely *Impact:* Critical
Edgeley	*Overall Risk:* High *Probability:* Likely *Impact:* Critical
Jud	*Overall Risk:* Moderate *Probability:* Possible *Impact:* Limited
Kulm	*Overall Risk:* Moderate *Probability:* Possible *Impact:* Limited
LaMoure	*Overall Risk:* High *Probability:* Likely *Impact:* Critical
Marion	*Overall Risk:* High *Probability:* Likely *Impact:* Critical
Verona	*Overall Risk:* Moderate *Probability:* Possible *Impact:* Limited
Seasonal Pattern	March - October
Primary Impacts	Agricultural loss (crops, livestock) Blocked or washed out roads Economic loss Human loss and injuries Localized evacuation Power loss Property damage or loss Release of hazardous materials

Hazard Description

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 the National Flood Insurance Program (NFIP) was created 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. Typically, 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 a SFHA.

Location

- LaMoure County has many areas at risk from flooding. The largest area is in the floodplain associated with the James River and its tributaries. This directly impacts the Cities of Dickey and LaMoure, and the village of Adrian. Figures 3.3-3.15 illustrate areas of potential flooding.

Extent, Previous Occurrences, and Future Probability

- LaMoure County was included in **16 flood-related Presidential Disaster Declarations** between 1993 and 2019.

- The most significant flooding issues in the county are inundated roadways resulting from heavy precipitation, snowmelt and runoff. This includes riverine flooding from the James River and its tributary creeks, as well as areas with ponding and inadequate drainage.

- Recent flood events in LaMoure County are summarized in Table 3.3. **The county averaged one flood event every two years over the last 24 years**. Flood event classification criteria and a detailed listing of events can be found in Appendix C.

Table 3.3 - Flood Events in LaMoure County,1996-2019

Flood Events	Event Days*	Annual Probability	Event Days per Year
Total	*11*	*45.8%*	*0.4*
Flood	4	16.7%	0.1
Flash Flood	7	29.2%	0.3

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

- The National Climatic Data Center Storm Events Database includes brief summaries of significant storm events. A selection of recent flood events within LaMoure County are summarized below.
  - *April, 2009*. Riverine and overland flooding, and flood fighting methods for the City of Lamoure resulting in approximately $2 million in costs and damages. This included substantial damages to roads, and 2 rural homes that were destroyed.
  - *April, 2010.* Riverine and overland flooding and flood fighting methods for the City of LaMoure resulted in approximately $500,000 costs and damages.
  - *April, 2011*. Riverine and overland flooding and flood fighting methods for the City of LaMoure resulted in approximately $700,000 costs and damages. Overland flooding from the James River damaged roads and houses.
  - *April, 2019*. Riverine and overland flooding and flood fighting methods for the Cities of LaMoure and Marion resulted in over $800,000 costs and damages.
  - *July 3, 2019*. Over 7 inches of rain fell on saturated soils and several additional township roads were closed due to overland flooding. This caused an estimated $50,000 in additional damages in 2019.
  - *October 10-12, 2019*. A blizzard left 12 inches of snow that melted in the following days. The snow melt, in addition to Jamestown and Pipestem Reservoir releases caused flooding in many parts of LaMoure County and left the James River in flood stage for the majority of October and November. This caused over $200,000 in damages on rural roads, damages to the LaMoure wastewater system, and additional flood fighting costs for the City.

- The National Climatic Data Center Storm Events Database categorizes storm events by location**. Between 1996 and 2019 there were 11 flood event days in the county, one of which affected Berlin, one that affected Jud, two that affected the city of LaMoure and two that affected Edgeley. Five affected rural parts of the county.**

- LaMoure County was included in federal flood disaster declarations that happened on additional years than those recorded by the National Climatic Data Center Storm Events Database. The additional flood events suggest at least an additional 5 event days for a total of 16 flood event days in the County between 1996 and 2019.

- FEMA defines flooding as water traveling over the ground surface. **Although structures in the county have been impacted by flooding, the most common water-based impact on structures in the county is seepage into basements due to saturated soil and/or high water tables**.

- The City of Berlin is not in a designated floodplain, and does not have structures at risk from flooding. The biggest impacts to the City caused by flooding are inundated roads that cause significant travel detours. One road within the city has occasionally been inundated.

- The City of Dickey is not in a designated floodplain, but does have at least one home and one major street at risk from flooding when the James River overflows its banks.

- The City of Edgeley has a FIRM and land within the 100 year floodplain. It experienced overland flooding in 2009 and 2019. Several buildings were damaged in 2009. In some instances, temporary levees are needed in the southeast part of the city to prevent any impacts. This was successful in 2019.

- The City of Jud is not in a designated floodplain, and does not have structures at risk from flooding. In 2005 and 2013 heavy rains caused township roads in the vicinity to be inundated, thus causing some travel detours.

- The City of Kulm is not in a designated floodplain, but does experience minor flooding on a regular basis. It is threatened by overland flooding especially from the south.

- The City of LaMoure has a FIRM (Figure 3.6) and land within the 100 year floodplain. It experienced flooding in 2009, 2010, 2011, 2016 and 2019. In 2016 a 7" rain event caused localized flooding that caused damages to some structures. In 2019 temporary barriers were installed to prevent impacts to some structures. LaMoure owns the Lake LaMoure recreational facility located approximately 4 miles south of the city. In 2009 the earthen dam was significantly damaged and was subsequently repaired with a concrete spillway.

- The City of Marion has a FIRM (Figure 3.3) and land within the 100 year floodplain. It experienced significant flooding in 1997, 2007 and 2019. No structures were damaged in these events, but temporary barriers were installed to prevent impacts to some buildings. Increased water levels of lakes on the west side of the city are held back by a levee. Current lake levels are higher now than they were in the flood of 1997. Meltwater and stormwater must be pumped over the levee in order to prevent flooding of streets and structures in the city.

- The City of Verona is not in a designated floodplain, but does experience threats from overland flooding and localized ponding during spring snow melts.

- There are many locations outside cities in LaMoure County that have experienced significant flooding. Two key locations are the Memorial Park facilities near Grand Rapids, and housing located adjacent to Twin Lakes. Over the years, there have been hundreds of county and township road sites which have been damaged by flooding. Total damages exceed $700,000. Despite many improvements there are still many sites at risk, especially from the James River and its tributary creeks.

Figure 3.3 - Marion ND FIRM

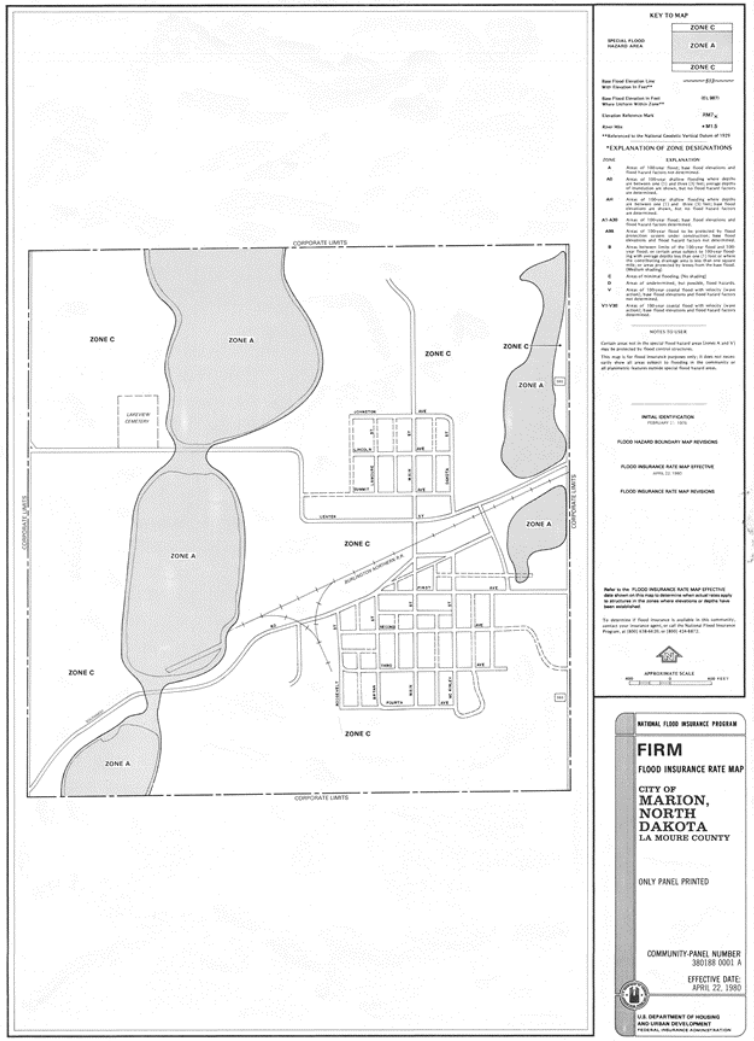


Figure 3.4 - Edgeley ND Flood Hazard Boundary Map

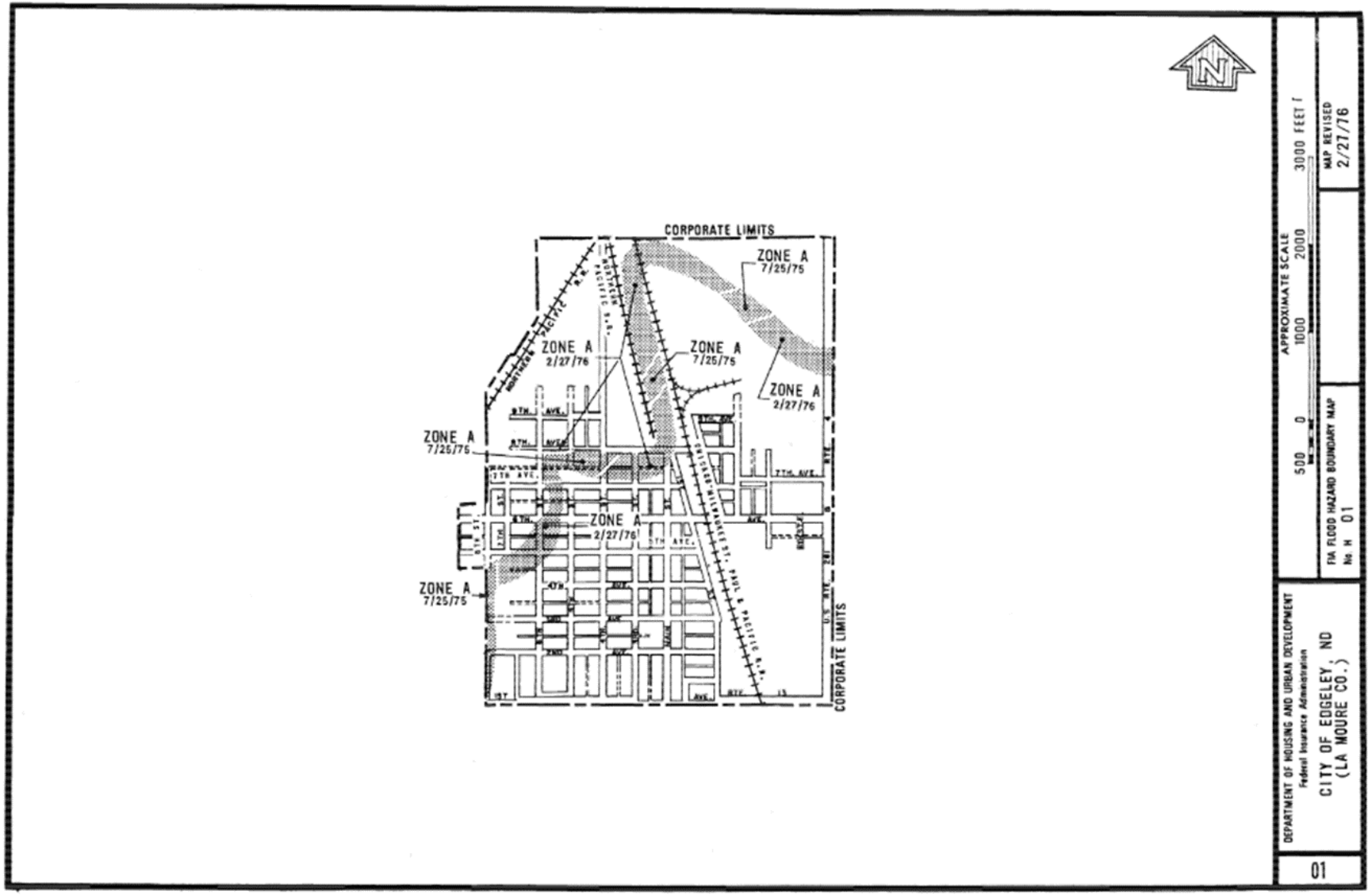


Figure 3.5 - Edgeley ND FIRM

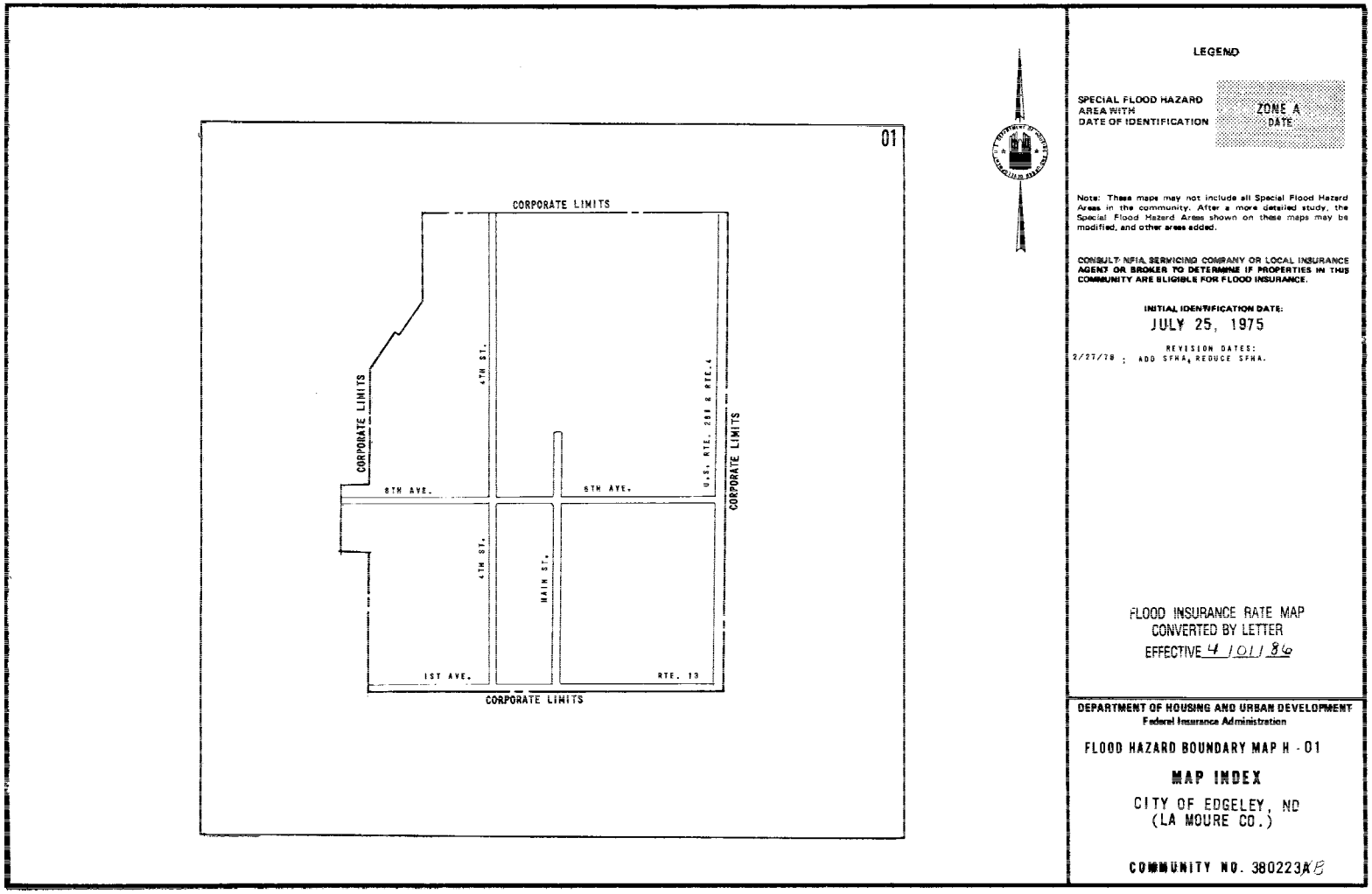


Figure 3.6 - LaMoure ND FIRM

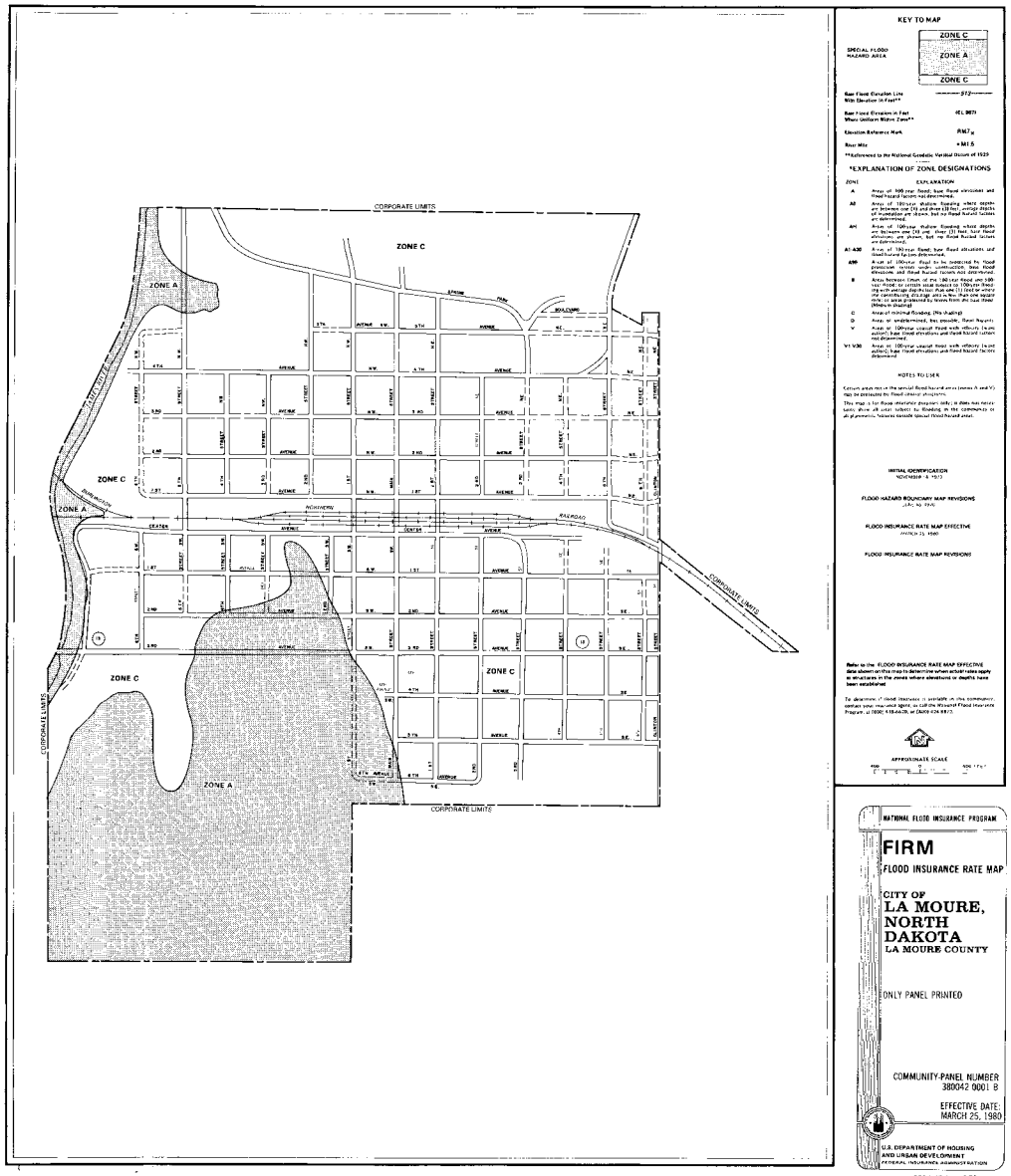


Figure 3.7 - Berlin ND Risk Assessment Map

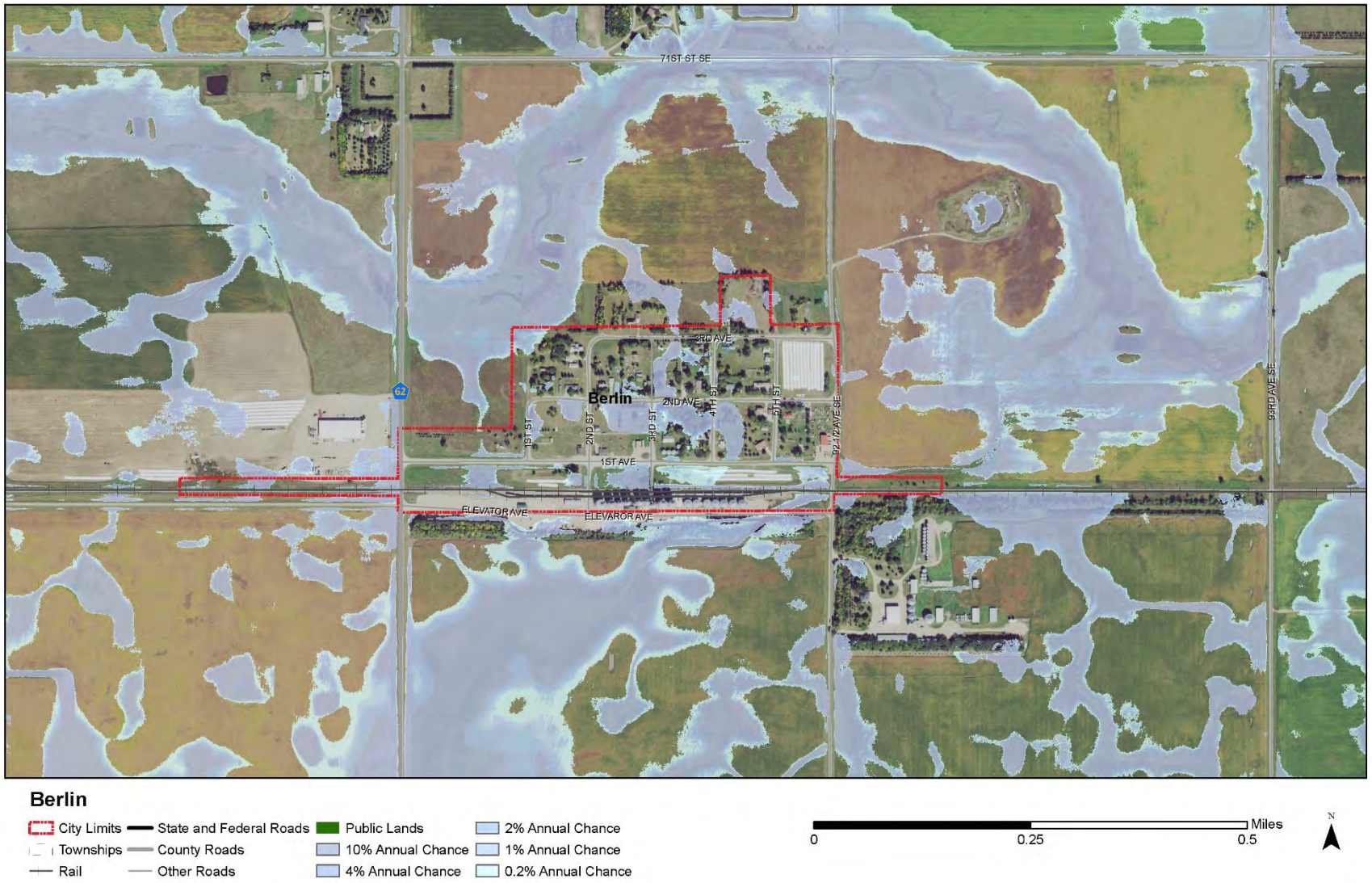


Figure 3.8 - Dickey ND Risk Assessment Map

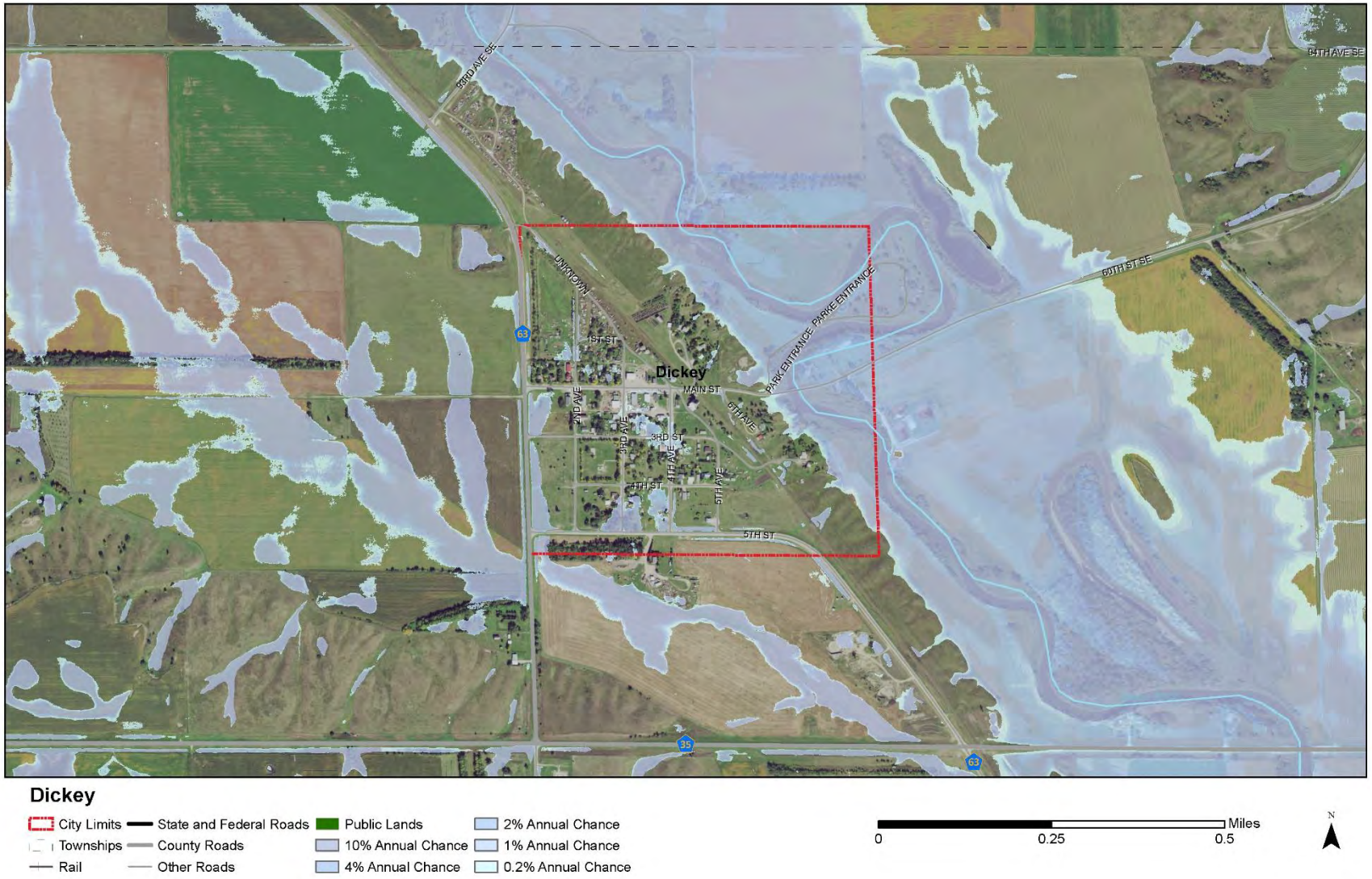


Figure 3.9 - Edgeley ND Risk Assessment Map

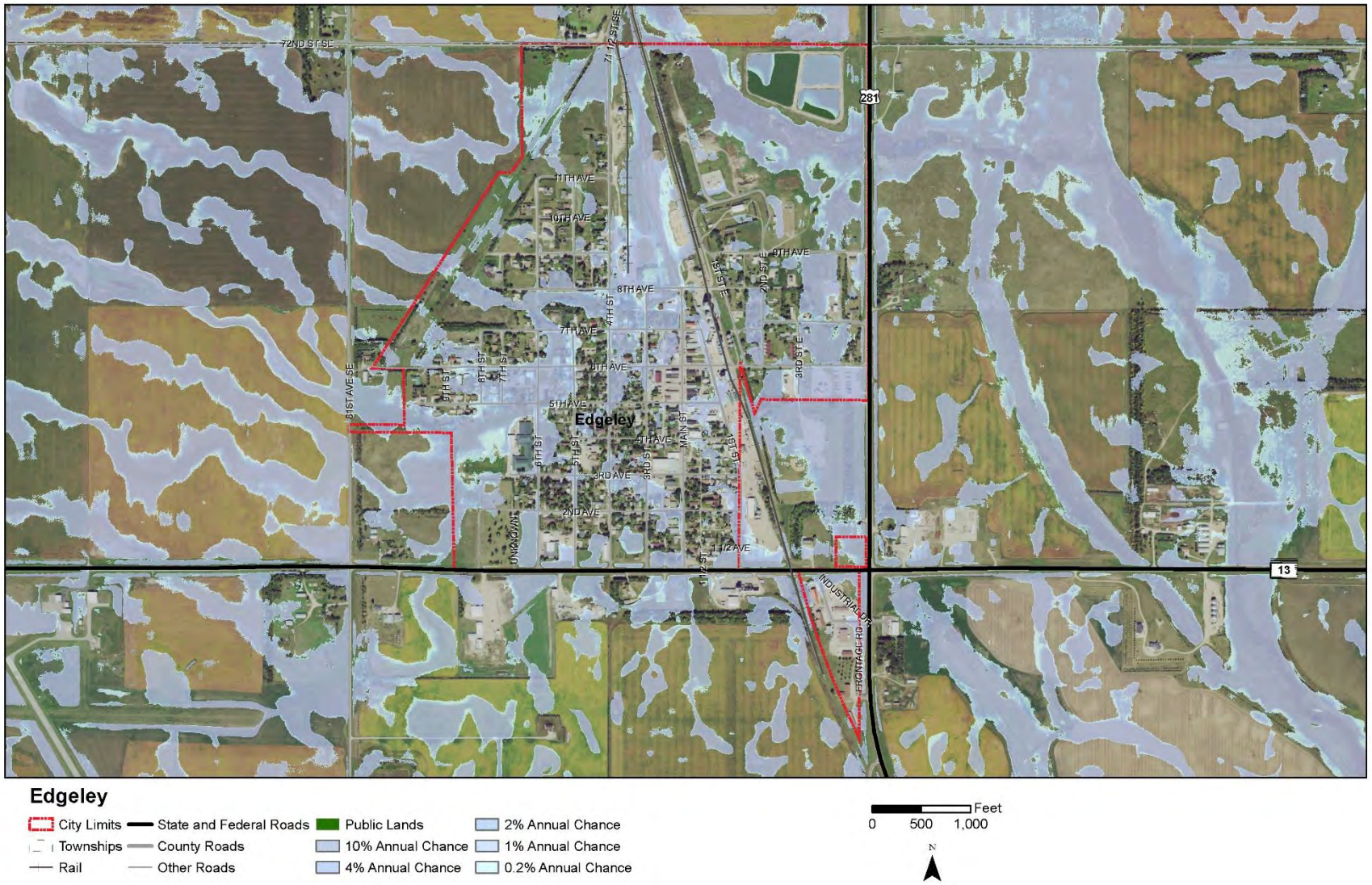


Figure 3.10 - Jud ND Risk Assessment Map

Figure 3.11 - Kulm ND Risk Assessment Map

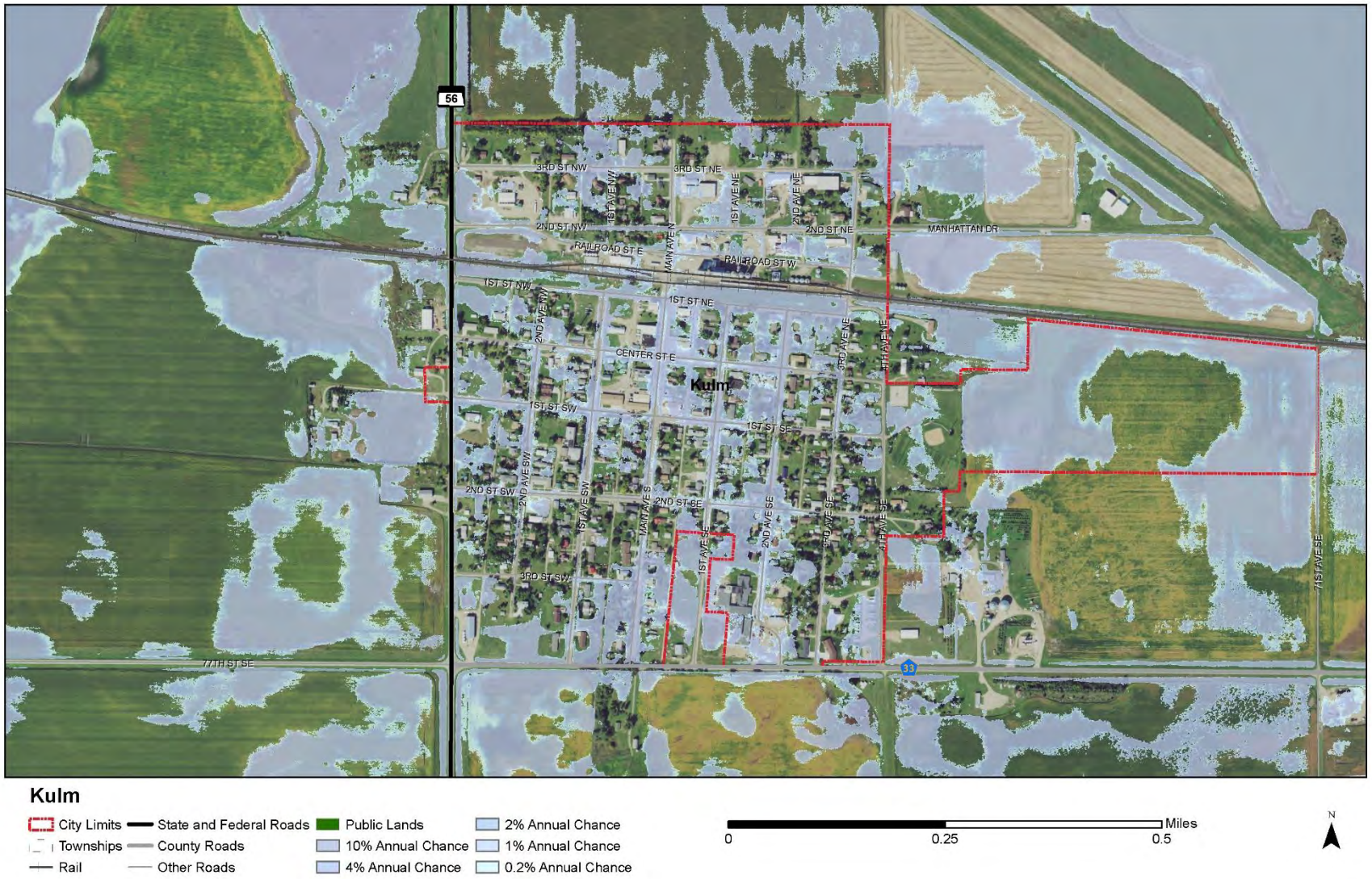


Figure 3.12 - LaMoure ND Risk Assessment Map

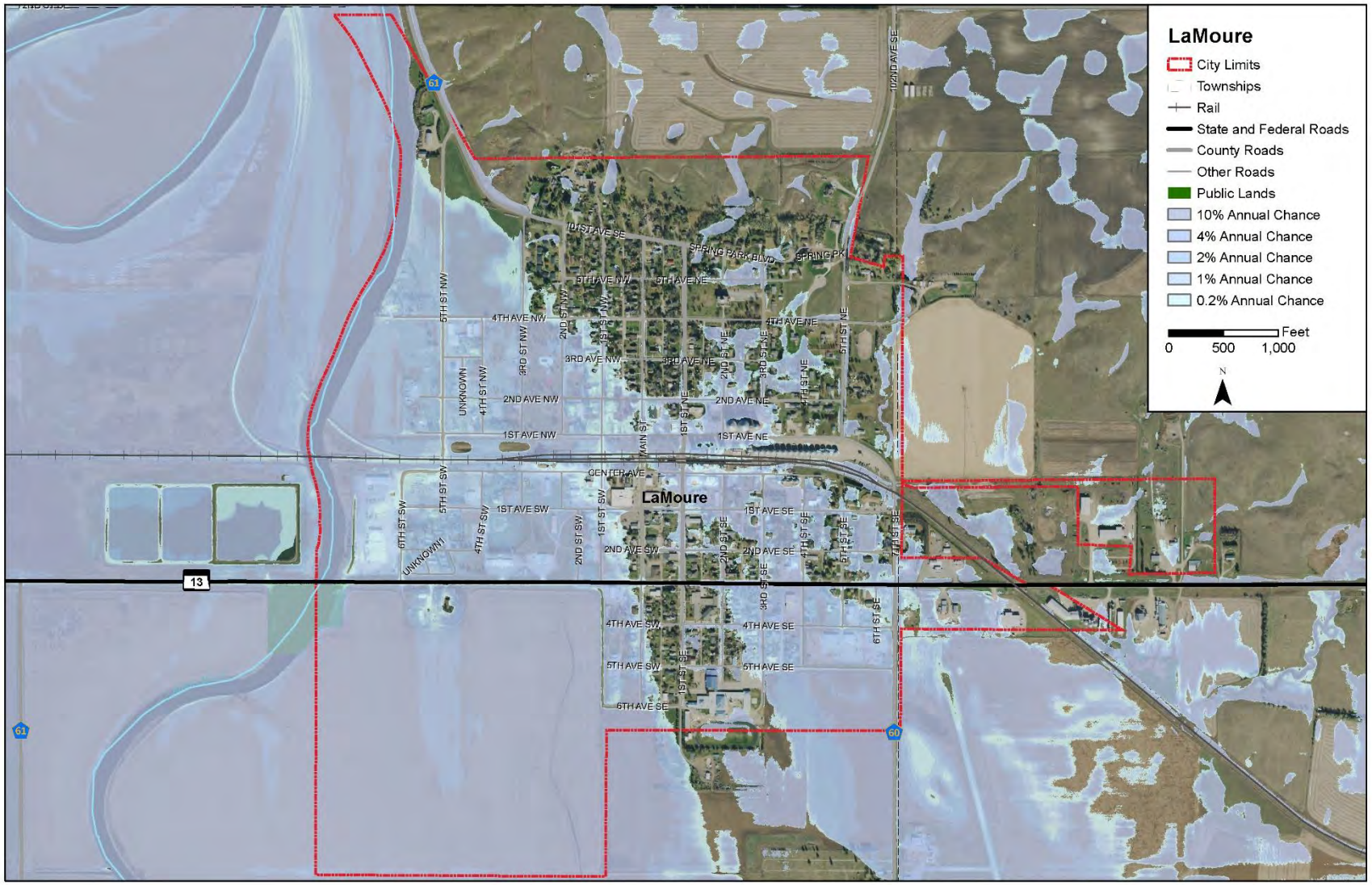


Figure 3.13 - Marion ND Risk Assessment Map

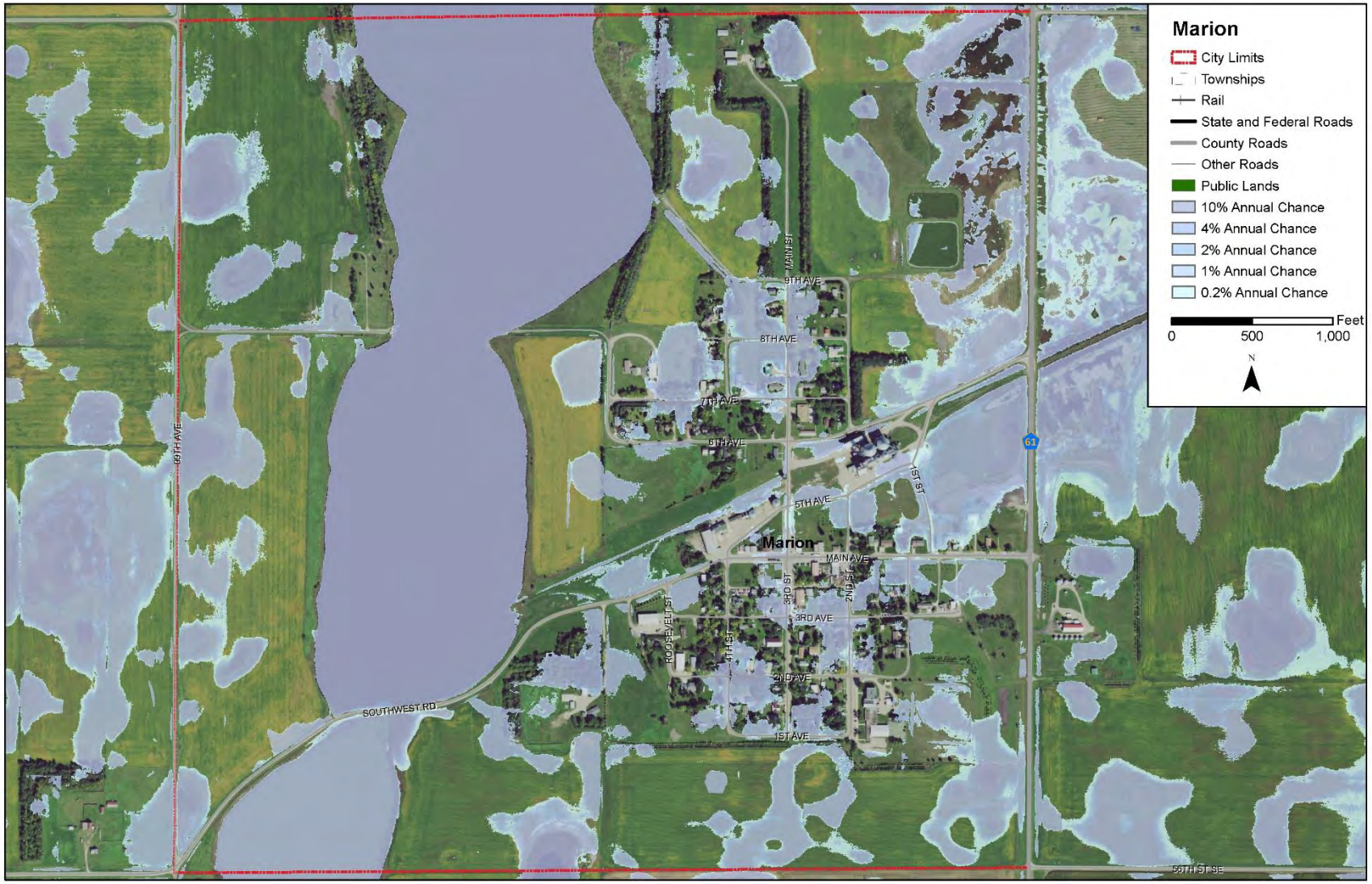


Figure 3.14 - Verona ND Risk Assessment Map

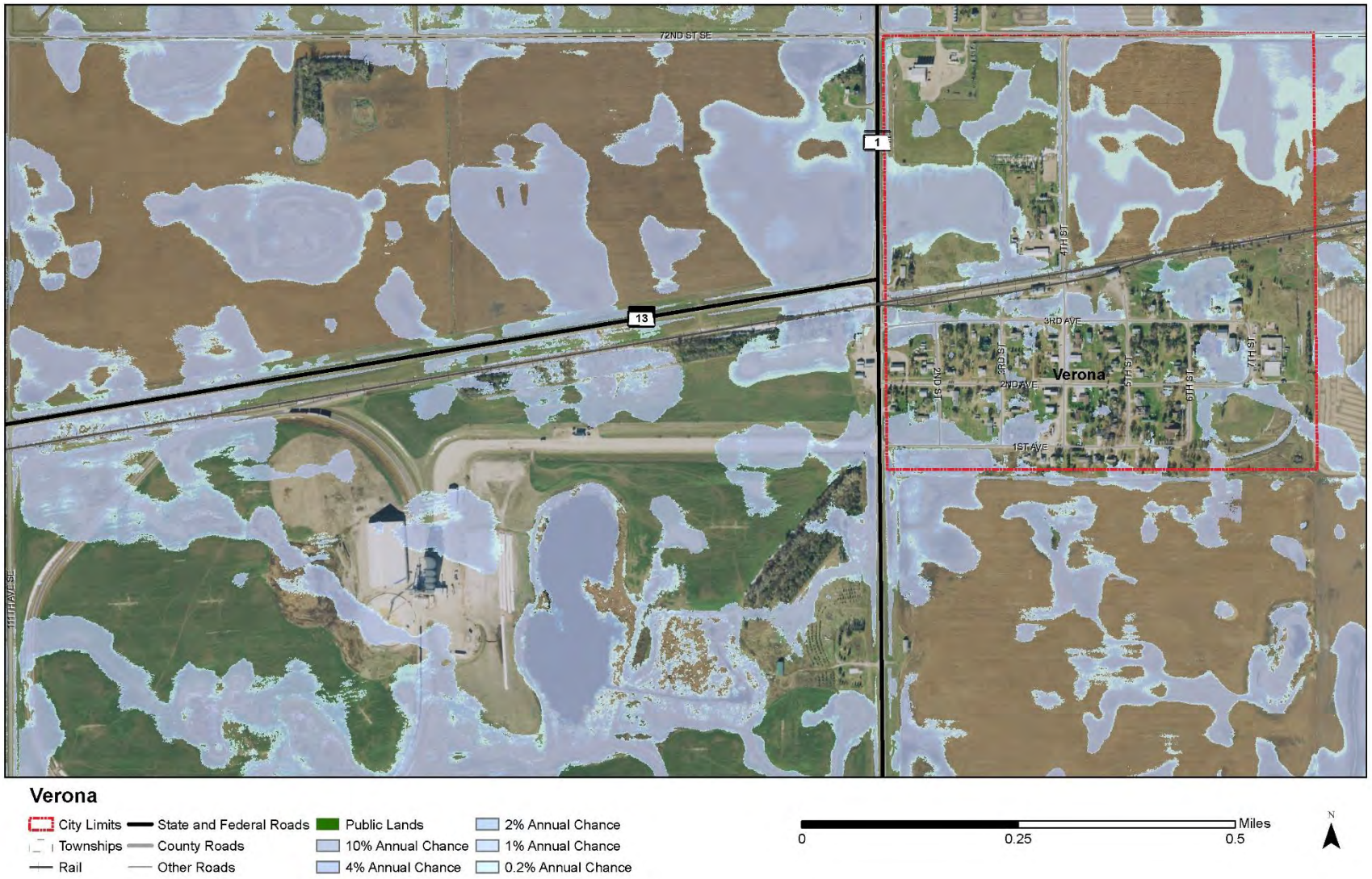
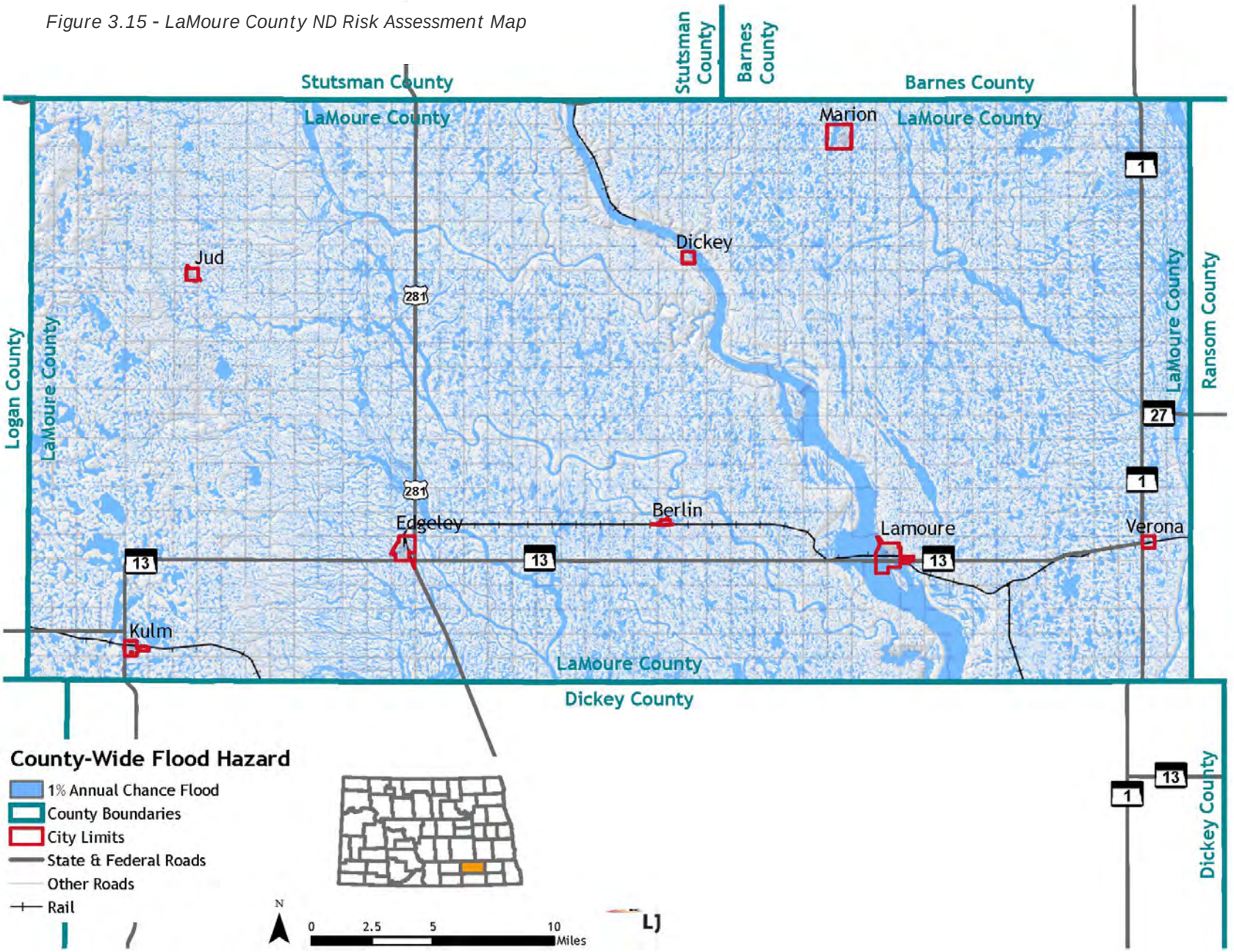


Figure 3.15 - LaMoure County ND Risk Assessment Map



Vulnerability

Population

- The Cities of Edgeley, LaMoure and Marion have Flood Insurance Rate Maps (FIRMs). Approximately 6% of the residential area of Edgeley and 25% of the residential area of LaMoure are identified as having a 1% annual chance of flooding. None of the 1% annual chance area of Marion is residential. If residential density were equal throughout these cities, this would mean approximately 257 people are at risk from a 1% annual chance event. See Appendix C for additional details.

- All 8 cities of LaMoure County have areas with a 1% annual chance of flooding according to the new ND Risk Assessment Map (NDRAM) data. (See Figures 3.7-3.15.) Using the same methodology as applied for FIRM maps above, there are 588 people at risk from a 1% chance event. Additional residences located in rural LaMoure County are also located within a NDRAM 1% annual chance area. See Appendix C for additional details.

- Flash flooding events can be potentially dangerous, particularly if people try to travel during an event. In 1997, two people were killed when their vehicle crashed into a deep washout on a township road.

Critical Facilities

- The FIRMs for jurisdictions participating in the National Flood Insurance Program indicate 2-3 sites of critical infrastructure or buildings at risk from a 1% annual chance event.

- The NDRAM information indicates at least 5 sites of critical infrastructure or buildings would be affected by a 1% annual chance event. This includes the City of LaMoure Emergency Response Center, LaMoure County Highway Shop, and several businesses that provide critical resources such as fuel and food.

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 LaMoure County from 2003 to 2012 totaled $98.1 million**. Based on a statewide rate of 89 percent of crops being insured, **total estimated damages for the county were $110.2 million**. Over a ten-year period this results in an annualized loss of $11,000,000.

- The most significant flooding event in terms of recorded damages since 1996 was snowmelt runoff in spring 2009 that resulted in $1.7 million of damage to homes and rural roads along the James River. A flash flooding event in May 2018 resulted in damages of $350,000 to cars and homes in Edgeley.

- Repetitive loss properties are tracked for communities that participate in the NFIP. **There are no repetitive loss properties in LaMoure County.**

- FIRMs indicate less than 5% of homes in the mapped communities of Edgeley, LaMoure, and Marion would be affected in a 1% annual chance event.

- According to NDRAM data an estimated 15% of homes in cities and the rural parts of LaMoure County could be affected by flooding in a 1% annual chance event. The number of other structures in rural LaMoure County located in NDRAM 1% chance areas has not been determined.

- Within the eight cities of LaMoure County, the collective residential area located in NDRAM 1% chance areas is approximately 26% of the total residential area. The at-risk area for non-residential structures has not been determined.

Future Development

- The cities of Edgeley, LaMoure, and Marion, Grand Rapids Township, and LaMoure County have been participants in the NFIP and have floodplain regulations that limit future growth in high risk areas.

- The remaining jurisdictions are not participants in the NFIP. Typically, these remaining jurisdictions are not as susceptible to major flood risks, but they are still susceptible to localized flooding from rapid snowmelt or heavy rainfall events. Those

areas that historically have flooded could potentially be developed or redeveloped because no regulation addresses the issue.

Existing Capabilities

- The NFIP participating jurisdictions have floodplain ordinances, but floodplain administration needs improvement to prevent construction in locations at risk from flooding. The recently completed Risk MAP project in North Dakota provides additional information about areas potentially at risk from flooding, and can be used as best available information to limit development in flood-prone areas.

Key Issues and Potential Action Items

- *Key Issue*: LaMoure County experiences approximately one flood event every two years. Flood events in the county are primarily related to heavy rainfall and snowmelt runoff.
  - *Potential Action Item*: Conduct NFIP workshop to educate public about benefits of flood insurance.
  - *Potential Action Item*: Improve municipal drainage in cities prone to localized flooding by identifying areas of localized flooding, and completing projects to reduce the impact.
  - *Potential Action Item*: Consider opportunities to reduce flooding of residential property in cities by moving impacted mobile homes or by creating minor dikes to keep water away from residences.
  - *Potential Action Item*: Non-participating jurisdictions consider joining the NFIP.
  - *Potential Action Item*: Use results of Risk MAP project to identify potential flooding risks to roads and property, and evaluate opportunities to mitigate potential impacts

- *Key Issue*: Roads and bridges in the county are sometimes washed-out or inundated during flooding events.
  - *Potential Action Item*: Adopt policy for minimum culvert size to help prevent washouts.
  - *Potential Action Item:* Elevate commonly-impacted roads and bridges.
  - *Potential Action Item:* Upsize culverts at road locations with higher risk of inundation or washing out.

Geologic Hazards

All Jurisdictions	*Overall Risk:* Low *Probability:* Unlikely (the county is in a low probability area for a significant earthquake and a low susceptibility landslide area; sinkhole risk is undefined) *Impact:* Negligible (no identified risk locations; no history of recorded damages)
Seasonal Pattern	None
Primary Impacts	Property damage or loss Economic loss Human loss and injuries Increased stress on medical services

Hazard Description

Geologic hazards include earthquakes, landslides, and sinkholes.

An earthquake is defined by the US Geological Survey (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.

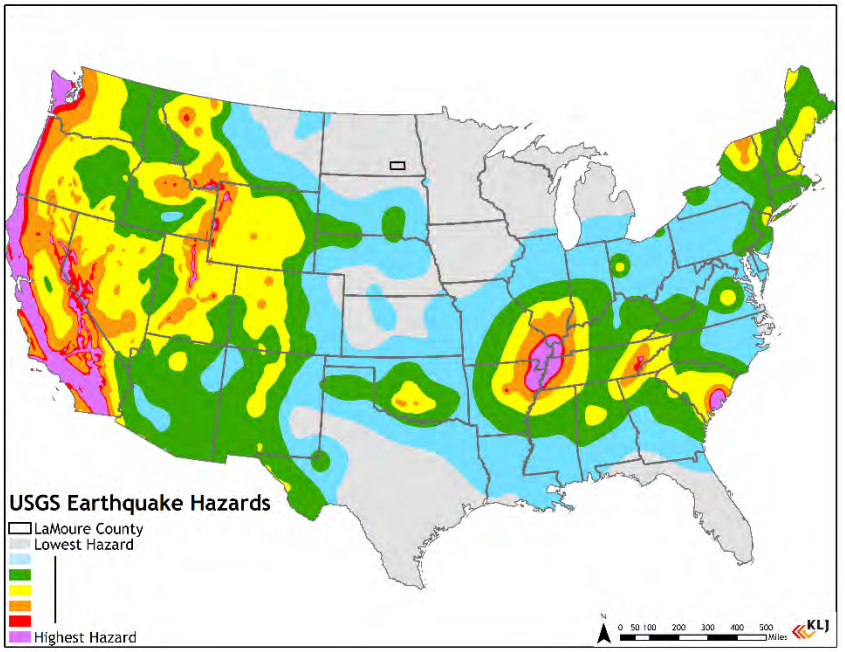
The USGS defines a landslide as a movement of rock, soil, artificial fill, or a combination thereof on a slope in a downward or outward direction. The primary causes of landslides are slope saturation by water from intense rainfall, snowmelt, or changes in groundwater levels on primarily steep slopes,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

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.

Location, Extent, Past Occurrences, and Future Probability

- Figure 3.16 shows potential earthquake hazard areas in the contiguous United States. There is no significant earthquake history in the county. **LaMoure County has a two-percent probability of exceeding a peak ground acceleration of 0.02 to 0.04 in the next 50 years**. According to the Pacific Northwest Seismic Network, a ground acceleration of 0.014 to 0.039 can result in a **light perceived shaking and no damages**.

- *Figure 3.16 Earthquake Hazards Map*



- Figure 3.17 illustrates that LaMoure County is in **a low incidence landslide** area according to the USGS. It is important to note that these areas are delineated at a national scale and not intended for precise analysis. There is no history of a landslide in LaMoure County causing significant damage.

- There are no known sinkholes or locations susceptible to sinkholes in LaMoure County.

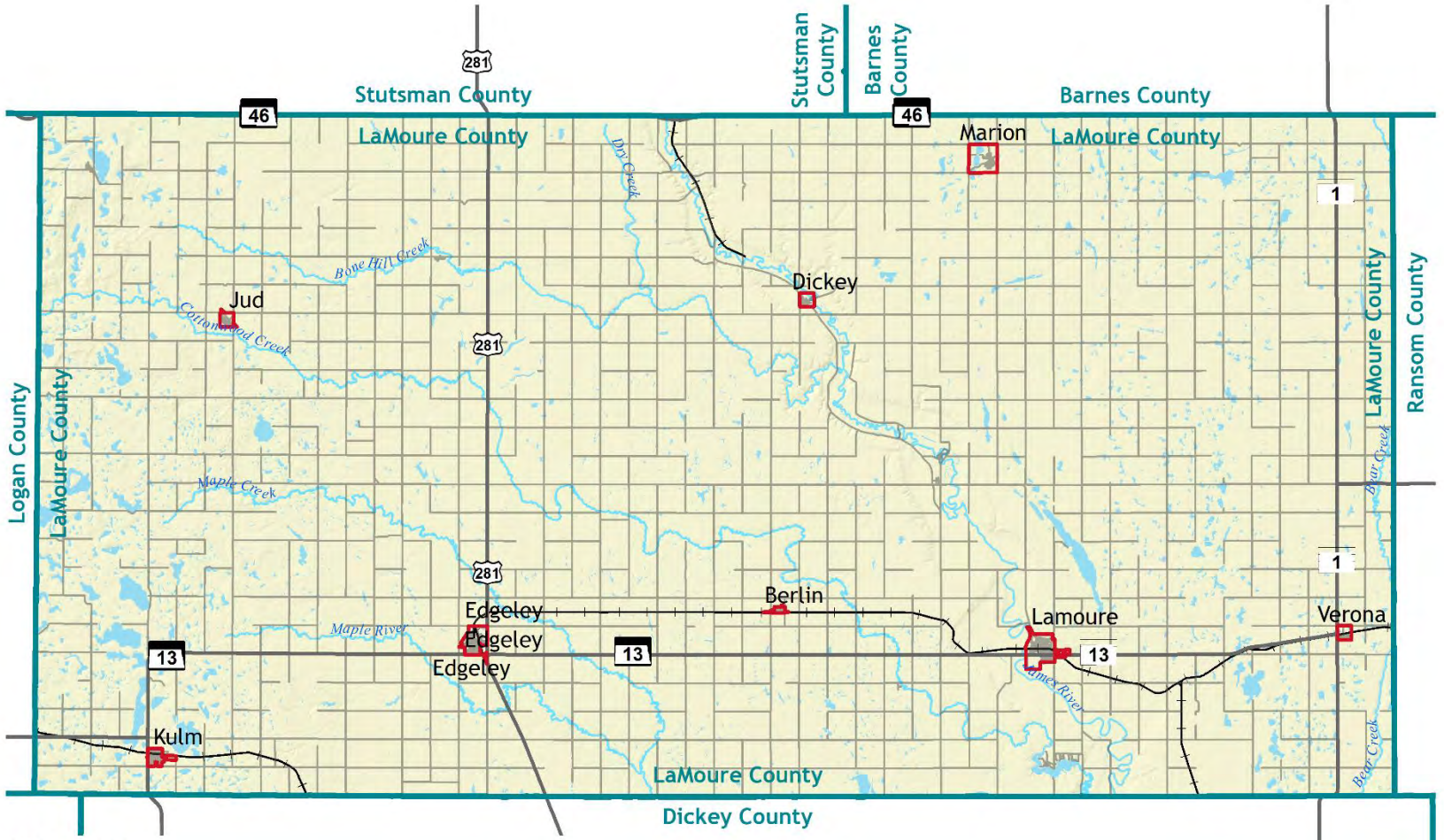
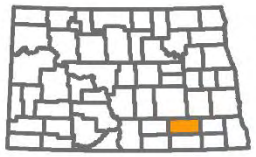


Figure 3.17
Landslide Hazards

- 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



N

0 2.5 5 10 Miles

KLJ

Vulnerability

Population

- No earthquake event in the county has resulted in injuries or fatalities, and according to the USGS the probability of a significant earthquake in the county is very low. In the event of a significant earthquake, residents in very old structures may be the most vulnerable. According to the 2000 Decennial Census an estimated 933 housing units in the county were built before 1939. Applying the county and each city's 2010 average household size to the estimated occupied very old housing units, **there are approximately 2,116 persons in the county with an enhanced vulnerability to earthquakes.** Note that this analysis does not include structure information for workplaces, which would have a large impact on potential vulnerability for an earthquake during daytime hours. The estimated number of structures built before 1939 and vulnerable residents for each city is summarized below.
  - Berlin: 6 (17 residents, 50.0%)
  - Dickey: 8 (17 residents, 40.0%)
  - Edgeley: 116 (249 residents, 44.3%)
  - Jud: 13 (22 residents, 31.0%)
  - Kulm: 91 (180 residents, 50.8%)
  - LaMoure: 140 (316 residents, 35.5%)
  - Marion: 27 (56 residents, 42.2%)
  - Verona: 11 (25 residents, 28.9%)

- All 4,139 residents live within the moderate-low susceptibility landslide area. It is important to note that this area is delineated at a national scale and not intended for precise analysis. None of the cities in the County have terrain where landslides are considered feasible.

- There are no known instances of sinkholes in LaMoure County. Therefore, 0% of the population is assumed vulnerable to sinkholes.

Critical Facilities

- According to the USGS Earthquake Hazard Area map shown in Figure 3.16, a potential earthquake in LaMoure County would most likely only result in a light perceived shaking and no damages. The oldest facilities in each jurisdiction would be most likely to experience some damages. There is no history of earthquakes in the county causing structure damage.

- The moderate-low susceptibility landslide hazard area identified in Figure 3.17 does not adequately identify risk to critical facilities. There is no history of landslides in the county causing structure damage. The LEPC estimates that no critical facilities have potential to be affected by a landslide.

- Since there are no known instances of sinkholes in the County, the assumed critical facility vulnerability to sinkholes is nil.

Property

- According to the USGS Earthquake Hazard Area map shown in Figure 3.16, a potential earthquake in LaMoure County would most likely only result in a light perceived shaking and no damages. If damages were to occur, it is likely that only the county's oldest structures would be impacted. According to 2000 Decennial Census an estimated 933 housing units in the county were built before 1939. Age information is not available for other types of structures in the county. The impact on property from earthquakes is believed to be negligible.

- No primary structures are believed to be vulnerable to landslides. There is no history of landslides in the county causing structure damage.

- No structures are believed to be vulnerable to sinkholes.

Future Development

- Regardless of whether local jurisdictions have adopted the State Building Code, construction is supposed to be consistent with its provisions. It includes the 2015 International Building Code, International Residential Code, International Mechanical Code and International Fuel Gas Code published by the International Code Council. The Code includes provisions that prohibit construction on areas with steep slopes and provides general standards that contribute to earthquake resiliency. If enforced, these Codes should limit potential impacts on future development.

Existing Capabilities

- Cities, townships, and counties that elect to enforce a building code are responsible for adopting and enforcing the State Building Code, but may amend the Code to conform to local needs. Three jurisdictions have adopted the State Building Code. Five jurisdictions require building permits for significant construction activity. None of the jurisdictions have a designated building inspector/building codes enforcement officer.

- The State Building Code prohibits construction on steep slopes and provides general standards that contribute to earthquake resiliency.

Key Issues and Potential Action Items

- *Key Issue*: The county is in an area of minimal hazard for earthquakes.
  - *Potential Action Item*: The cities that have not already done so adopt the North Dakota State Building Code.

- *Key Issue*: Much of county is within a moderate susceptibility/low incidence landslide hazard area as defined by USGS.
  - *Potential Action Item*: Identify characteristics of high susceptibility landslide hazard areas and create a landslide hazard susceptibility document for distribution to relevant jurisdictions and organizations within the county.
  - *Potential Action Item*: Improve base material, elevate or relocate roads that may be impacted.

Severe Summer Weather

All Jurisdictions	*Overall Risk:* High *Probability:* Highly Likely (Approximately seven event days per year countywide) *Impact:* Critical (Potential for damages totaling millions of dollars and many fatalities)
Seasonal Pattern	May - October
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 Description

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 includes ratings from zero (65 to 85 MPH wind speeds) to five (wind speeds over 200 MPH).

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 1959-2018. Florida led the nation from 1959-2013 with 471 lightning fatalities. Livestock deaths and property damage are the most common lightning-related threats in North Dakota.

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 Description, the scale of its elements can vary widely, and the location of their occurrences are unpredictable.

Extent, Historical Occurrences, and Future Probability

- LaMoure County was included in **5 severe summer storm-related Presidential Disaster Declarations** between 1993 and 2019.
- The most significant severe summer weather issues in the county are tornadoes and hailstorms. Tornadoes pose the largest risk to human life and injury, and hailstorms pose a major risk to crops and property.
- Severe summer weather events in LaMoure County are summarized in Table 3.4. **On average, a severe summer weather event occurs in the county approximately seven days per year.**

Summer weather classification criteria and a detailed listing of events can be found in Appendix C.

Table 3.4 - Severe Summer Weather Events in LaMoure County, 1996-2018

Summer Storm Events	Event Days*	Annual Probability	Event Days per Year
Total	*158*	*687.0%*	*6.9*
Hail	80	347.8%	3.5
High Wind/Thunderstorm	58	252.2%	2.5
Tornado/Funnel Cloud	17	73.9%	0.7
Lightning	3	13.0%	0.1
Excessive Heat	2	8.7%	0.1

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

- A severe hail event is defined as a storm producing hailstones greater than 0.75 inches in diameter. According to the National Climatic Data Center, **the largest hailstone recorded in Lamoure County from 1996 to 2018 is 2.75 inches in diameter**, which occurred in July 2011. 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 LaMoure County from 1996 to 2018 is 91 kts (~105 MPH)**, which occurred in May 2010. Common impacts from severe winds include broken trees and limbs, damaged agricultural structures and damaged power poles.

- Historical tornadoes in the county are shown in Figure 3.18**.** There were 17 tornadoes/funnel clouds reported in the county between 1996 and 2018, a majority of which were rated at EF0 or EF1. These tornadoes generally resulted in minimal damage, but the impact would be devastating if a large tornado were to directly strike a city or populated area.

- Lightning presents an ongoing risk to people and property in the county. **From 1996 to 2018 there were three lightning events in LaMoure County.** Lightning has been documented as a cause of wildland fires and property damage in rural areas of the county.

- The National Climatic Data Center Storm Events Database includes brief summaries of significant storm events. A selection of recent summer storm events within LaMoure County are summarized below.
  - *June 26, 1998*. Severe hail measuring 1.25 in. in diameter destroyed crops near Verona. Total damages estimated at $5.2 million.
  - *July 15, 2007*. An EF1 tornado touched down north of Edgeley as part of a larger thunderstorm causing a total of $900,000 in damages.
  - *May 24, 2010*. Extreme straight-line winds destroyed farm buildings north of Kulm. Damages totaling $1.5 million occurred.
  - *July 14, 2010*. High winds felled trees in LaMoure and the village of Grand Rapids. Damages were estimated at $950,000
  - *July 17, 2011*. A confirmed EF3 tornado touched down southeast of Nortonville and traveled towards Berlin. Several farmsteads were severely damaged along with one reported injury. Damages totaled $750,000.
  - *September 19, 2017*. Strong straight-line winds destroyed a grain bin with $200,000 in damages.

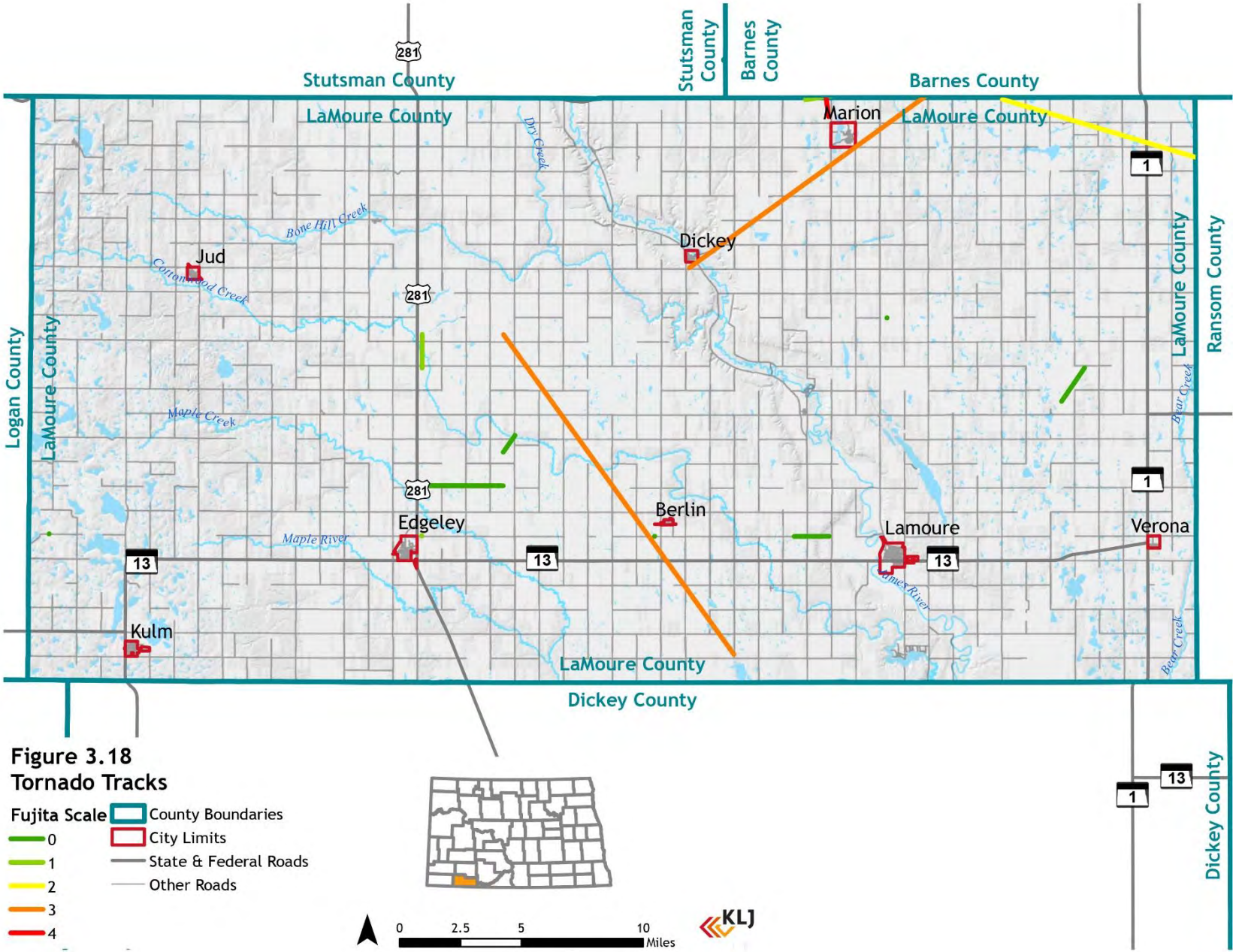


Figure 3.18
Tornado Tracks

Vulnerability

Population

- The entire population is vulnerable to a severe summer storm event. Residents living in homes without a basement or permanent foundations are particularly vulnerable to tornado and wind events. There are approximately 109 mobile homes in LaMoure County according to recent American Community Survey Estimates. Applying the county's average household size to the estimated number of mobile homes, **there are approximately 243 persons in the county with an enhanced vulnerability to severe summer weather.** The estimated number of mobile homes and vulnerable residents for each city (based on each city's average household size) is summarized below. Additional mobile homes are located in rural areas.
  - Berlin: 2 mobile homes (6 residents, 16.7%)
  - Dickey: 0 (0, 0%)
  - Edgeley: 2 (4, 0.8%)
  - Jud: 7 (12, 16.7%)
  - Kulm: 1 (2, 0.6%)
  - LaMoure: 18 (41, 4.6%)
  - Marion: 3 (6, 4.7%)
  - Verona: 3 (7, 7.9%)

- Major recreation areas in the county include Lake LaMoure south of LaMoure, Memorial Park just north of Grand Rapids, Kulm Campground and Edgeley Campground. All of these facilities are especially vulnerable to severe summer weather impacts such as tornadoes because they do not have emergency shelters for such events.

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 event facilities.

Property

- The most damaging summer storm event recorded by the National Climatic Data Center since 1996 is a hail storm event in July 1998 that caused an estimated $5.2 million in damages near Verona.
- Since 1996 over $9.5 million in damages resulting from severe summer weather events have been documented by the National Climatic Data Center.

Future Development

- Three jurisdictions in LaMoure County have adopted the State Building Code. The Code includes a provision that buildings must be constructed to withstand a wind load of 75 MPH constant velocity and three-second gust of 90 MPH. Regardless of whether local jurisdictions have adopted the state building code, construction is supposed to be consistent with its provisions. If enforced, the Building Code should limit potential impacts on future development.

Existing Capabilities

- All jurisdictions have at least one early warning siren. Berlin's warning siren is weak and should be replaced with a louder siren. Additionally, the Lake LaMoure recreational and camping facilities does not have a warning siren.

- All jurisdictions have an identified emergency shelter.

Key Issues and Potential Action Items

- *Key Issue*: LaMoure County averages approximately seven 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.
  - *Potential Action Item*: Cover windows in select critical facilities with shatter-resistant film.
  - *Potential Action Item*: Offer information about weather-resistant building best practices.
  - *Potential Action Item*: Install and maintain surge protection on critical equipment.
  - *Potential Action Item*: Identify or construct emergency shelters for mobile home residents in the cities and recreation areas.

Severe Winter Weather

All Jurisdictions	*Overall Risk:* High *Probability:* Highly Likely (Approximately six event days per year countywide) *Magnitude:* Catastrophic (Potential for damages totaling millions of dollars with fatalities)
Seasonal Pattern	October - April
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 crashes

Hazard Description

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.

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.

Extent, Historical Occurrences, and Future Probability

- LaMoure County was included in one winter storm-related Presidential Disaster Declarations between 1993 and November 2018.
- The most significant severe winter weather issues are blocked roads and power outages. This is a major concern for emergency services access to individuals needing assistance.
- A summary of the severe winter weather events in LaMoure County is shown in Table 3.5. **On average, a severe winter weather event occurs in the county approximately six days per year.** Generally classified "winter storm" and extreme cold/wind chill events are most common. Winter weather classification criteria and a detailed listing of events can be found in Appendix C.

Table 3.5 - Severe Winter Weather Events in LaMoure County, 1996-2019			
Winter Storm Events	**Event Days***	**Annual Probability**	**Event Days per Year**
Total	*75*	*573.9%*	*5.7*
Blizzard	37	160.9%	1.6
Extreme Cold/Wind Chill	26	113.0%	1.1
High Wind	24	104.3%	1.0
Heavy Snow	21	91.3%	0.9
Winter Storm	21	87.0%	0.9
Winter Weather	3	13.0%	0.1
Ice Storm	1	4.3%	0.0

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

- Blowing snow resulting in road hazards and blocked roads preventing essential transportation were commonly identified impacts.

- Power loss happens occasionally throughout the county during severe winter storms.

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.** There are approximately 109 mobile homes in LaMoure County according to recent American Community Survey Estimates. Applying the county's average household size to the estimated number of mobile homes, **there are approximately 243 persons in the county with an enhanced vulnerability to severe winter weather.** The estimated number of mobile homes and vulnerable residents for each city (based on each city's average household size) is summarized below. Additional mobile homes are located in rural areas.
  - Berlin: 2 mobile homes (6 residents, 16.7%)
  - Dickey: 0 (0, 0%)
  - Edgeley: 2 (4, 0.8%)
  - Jud: 7 (12, 16.7%)
  - Kulm: 1 (2, 0.6%)
  - LaMoure: 18 (41, 4.6%)
  - Marion: 3 (6, 4.7%)
  - Verona: 3 (7,7.9%)

- **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. approximately **1,022 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.
  - Berlin: 9 residents (26.5%)
  - Dickey: 8 residents (19.0%)
  - Edgeley: 162 residents (28.8%)
  - Jud: 17 residents (23.6%)
  - Kulm: 114 residents (32.2%)
  - LaMoure: 233 residents (26.2%)
  - Marion: 39 residents (29.3%)
  - Verona: 19 residents (22.4%)

- **People required to travel on a daily basis face increased road hazards**. According to the Job Service North Dakota Labor Market Information Center, **the labor force in LaMoure County is approximately 2,135 people (52 percent of the total population)**.
- **Stranded motorists are another vulnerable population**. Closed roads and whiteout conditions force them to stop driving and look for temporary shelter.

Critical Facilities

- A winter storm event that "traps" fire and ambulance responders within the facility or without access to the facility would severely limit the emergency response capability of the county.

- 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.

- Power outages and loss of heating could impact the elderly and populations that require assistance for daily living who are located in special care facilities.

Property

- It is difficult to estimate the impact of winter storms on property in the County. **The most likely damages involve roof collapse due to heavy snow loads and vehicle accidents**. Roof collapse is most likely for older structures. According to the 2000 Decennial Census estimates, there are approximately 933 housing units in the county that were built before 1939. Age information is not available for other types of structures in the county.

- 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.

- A severe winter storm can cause significant livestock fatalities. According to the 2017 Census of Agriculture, the **market value of livestock sold in LaMoure County was $33.5 million**. Losses vary based on storm severity and duration, but losses to unprotected livestock can be significant following a major storm event. Winter storms in the spring season have the potential to affect calving operations.

Future Development

- The potential vulnerability to winter weather in the county is not expected to change in the foreseeable future.

Existing Capabilities

- Number of facilities with backup generators include:
  - Berlin: 0
  - Dickey: 0
  - Edgeley: 2
  - Jud: 3
  - Kulm: 3
  - LaMoure: 3
  - Marion: 2
  - Verona: 2

- Snow removal on rural and city roads is generally timely and effective. Emergency Snow routes are identified and prioritized.

Key Issues and Potential Action Items

- *Key Issue*: LaMoure 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.
  - *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*: Evaluate opportunities to relocate to optimal locations those critical facilities that are most important to maintain operational readiness during severe winter weather.

- *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. Approximately 1300 residents in the county are elderly or live in a mobile home.
  - *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:* Identify and acquire backup generators for all critical facilities in a prioritized manner.

Wildland Fire

Rural County	*Overall Risk:* High *Probability:* Highly Likely *Impact:* Critical (even though a large wildland fire might cover only a small part of the county, it could potentially cause damages totaling millions of dollars and put human lives at risk)
All Cities	*Overall Risk:* Moderate *Probability:* Possible *Impact:* Limited
Seasonal Pattern	March - November
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

Hazard Profile

A wildland fire is an unplanned fire, a term which includes grass fires, forest fires and scrub fires either human-caused or natural in origin. Many of the fires occurred in or near urban/suburban areas.

Wildland fires 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 wildland fires 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.

Location

- The entire non-urbanized part of the County is at some level of risk from wildland fire. Each city's wildland-urban interface is also at risk from wildland fire.

Extent, Historical Occurrences and Future Probability

- Figure 3.19 shows fuel types in LaMoure 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 wildland fire risk. **The most prevalent fuel in the county is the grass group**. The fuel generally burns with a low intensity but can spread quickly. Grass fuel is widely distributed throughout the county. There is very little timber fuel in the county.

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

- On Sunday, October 11, 2015, a dry fall and extremely windy conditions led to a day of grassfires in LaMoure County as well as other parts of North Dakota. Every fire department in LaMoure County was dispatched to at least one fire - many departments had to split their equipment and crews to help others fight fires. In LaMoure County, no homes were destroyed yet one home in neighboring Stutsman County was lost. (See picture on following page of farm saved yet acres burned northeast of Edgeley).

- 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 LaMoure 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 wildland fire. There are approximately 4,139 residents in the county; of these, an estimated 1,967 live outside of an incorporated city and are at increased vulnerability to wildland fire. Assuming an average of 10 percent of residents in incorporated cities live along or near the wildland-urban interface, 217 additional residents are vulnerable to wildland fire. Using these estimates **approximately 2,184 residents (53% of total population) in the county are vulnerable to wildland fire.**

Critical Facilities

- Although nearly all of the county's key facilities are within urbanized areas, which are considered defensible space for wildland fire, **several critical facilities are located along the edges of cities near the wildland-urban interface or in rural areas**.

Property

- The statewide Multi-Hazard Mitigation Plan includes information about crop indemnity payments from the USDA Risk Management Agency. There were **no wildland fire-related crop indemnity payments** in LaMoure County between 2003 and 2012.

- All residences in the wildland-urban interface are potentially vulnerable to wildland fire. The following list summarizes for each city their location of highest vulnerability, an estimate of the percentage of their perimeter considered to be highly vulnerable, and an estimate of fire department response time:

  - Berlin - north and south sides, 50%, response time 15-20 minutes
  - Dickey - north and west sides, 35%, response time 15-20 minutes
  - Edgeley - north and west sides, 30%, response time 5 minutes
  - Jud - south and west sides, 50%, response time 5-10 minutes
  - Kulm - north and east sides, 50%, response time 5 minutes
  - LaMoure - north side, 50%, response time 5 minutes
  - Marion - north and south sides, 60%, response time 5-10 minutes
  - Verona - north and south sides, 50%, response time 5-10 minutes

Future Development

- There are no requirements for defensible space, adequate water supply, road access, or other measures which might help reduce potential wildland fire risk of future development.

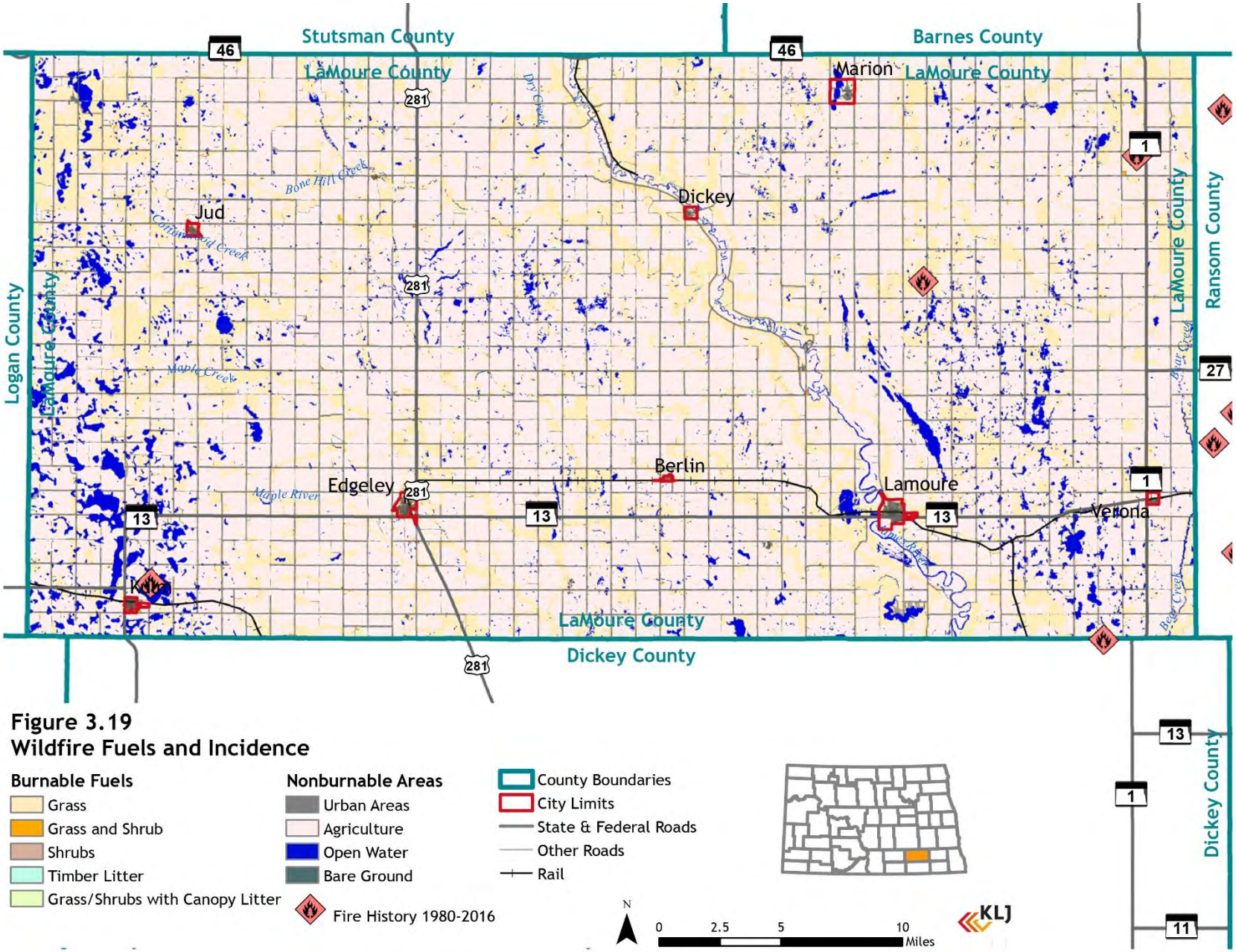


Figure 3.19
Wildfire Fuels and Incidence

Existing Capabilities

- The county website emergency management page provides wildland fire safety notices.
- Local fire protection districts and departments each have adequate equipment to fight wildland fires, and have mutual aid agreements to bring in additional resources when needed.
- Wildland fire response in the county is coordinated by several fire districts/departments. Their boundaries are shown in Figure 3.13.
  - Jud Fire Protection District
  - Kulm Rural Fire Department
  - Edgeley Rural Fire Department
  - Marion Rural Fire Department
  - LaMoure Rural Fire Department
  - Litchville Rural Fire Department
  - Verona Rural Fire Department

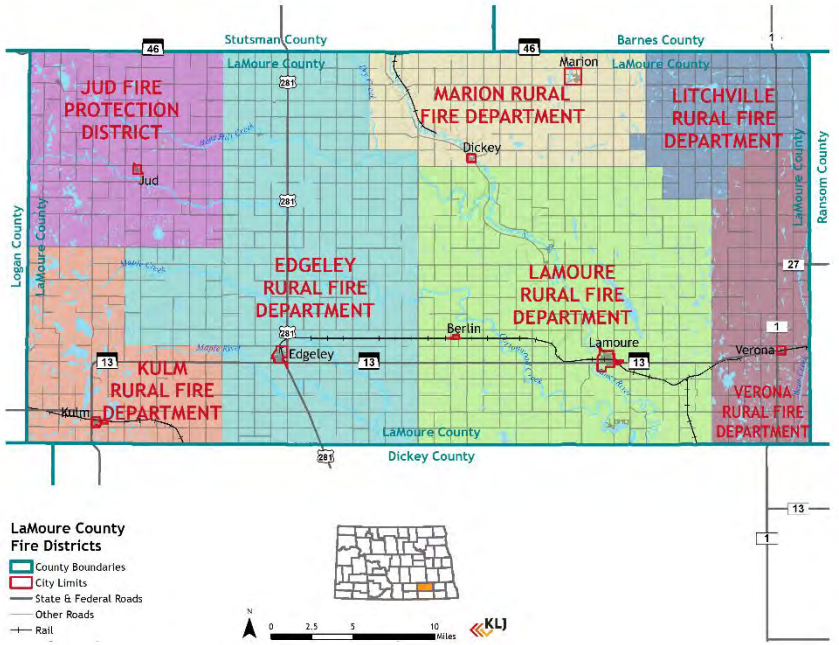


Figure 3.20 - LaMoure County Fire District Boundaries

Key Issues and Potential Action Items

- *Key Issue*: LaMoure County experiences a wildland fire greater than 50 acres approximately once per year. Most wildland fires 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 wildland fire hazard areas.
  - *Potential Action Item*: Incorporate wildland urban interface guidelines into the county's subdivision regulations.

Space Weather

All Jurisdictions	*Overall Risk:* Moderate *Probability:* Possible (recent history of major incidents) *Impact:* Limited (magnitude could vary widely)
Seasonal Pattern	None
Primary Impacts	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

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.

Location

- Space weather events from the sun or asteroids can impact any place on earth, and can be expected to have impacts that affect the entire geographical area of the county.

Extent, Previous Occurrences, and Future Probability

There are no recorded catastrophic space weather effects in 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 magnitude, a space weather event occurred in July 2012 that was not directed toward Earth. If it had been, the effects would have very 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. Especially significant potential impacts of major space weather events in LaMoure County include:

- Electrical power for rural LaMoure County runs through six substations. The cities of LaMoure County each have their own substations. It is estimated that it would require from three to six weeks to replace a destroyed substation if the necessary resources were available. A major space weather event would place fixing these substations far down the list of priorities, and the replacement time would 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 LaMoure County. Mitigation measures to protect or replace these electronic systems are not in place.

- Emergency communications systems and all other communications systems are critical to emergency notification and response functions in LaMoure County, and could be disrupted or destroyed by a major space weather event. Mitigation measures to protect or replaced these communications systems are not in place.

Vulnerability

It is assumed that space weather hazards may occur at varying levels of intensity. In lesser levels of intensity some electronic or electrical systems which are more sensitive may fail, but others may continue to function. In greater levels of intensity, more or most electronic or electrical systems may fail. Vulnerability at greater levels of intensity may include loss of all unhardened or unprotected electrical or electronic systems.

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 or all of the LaMoure County 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 a long time could result in the inability to sustain life in LaMoure County as we know it.

Critical Facilities

- All critical facilities in LaMoure County rely on electrical power to function properly. Most of these critical facilities do not have a backup power source. If these backup power sources were not affected by a space weather event, the critical facilities they support could function in the short term. However, in the case of a high intensity space weather event it is probable that fuel outages would result in the eventual loss of function for all critical facilities. The resulting impacts in each jurisdiction are as follows:

  - Berlin – No critical facilities are located in Berlin.
  - Dickey – No critical facilities are located in Dickey.
  - Edgeley – The city is served by three different power sources, and does not have any emergency generators. A high intensity space weather event is assumed to disrupt the power supply from all three sources thus leaving all critical facilities without power.
  - Jud – All the critical facilities in Jud have emergency power available: a standby generator installed at the fire hall, a high-powered mobile generator for sewer and water systems, and an additional mobile generator for other needs.
  - Kulm – Both Kulm's lift stations have standby generators that would keep them operational in the event of a power outage, and an additional standby generator is in place at the community center. The remaining critical facilities do not have emergency power available.
  - LaMoure – In LaMoure, the courthouse, nursing home, and public school each has a standby generator installed. The remaining critical facilities do not have emergency power available.
  - Marion – Marion's primary sanitary lift station has a standby generator, and its fire hall has a mobile generator. The remaining critical facilities do not have emergency power available.

- Verona – Verona's primary sanitary lift station has a standby generator, as does its community center. The remaining critical facilities do not have emergency power available.

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.

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 LaMoure County to mitigate the impacts of space weather events.

Key Issues and Potential Action Items

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

Dam Failure

Rural County	*Overall Risk:* Low *Probability:* Unlikely (no history of significant failure) *Magnitude:* Limited (1 homestead possibly within inundation area)
All Cities	*Overall Risk:* Low *Probability:* Unlikely (not within inundation area) *Magnitude:* Negligible (not within inundation area)
Seasonal Pattern	None
Primary Impacts	Agricultural loss (crops) Blocked or damaged roads Economic loss

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.

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.

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.

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 State Water Commission maintains a database of all dams in the county. T**here are 30 dams in LaMoure County; one is classified as significant hazard: Cottonwood Creek Dam,**

also known as Lake LaMoure. All dam locations in the county are shown in Figure 3.21. Table 3.6 identifies key information about the significant hazard dams affecting LaMoure County.

Extent, Previous Occurrences, and Future Probability

- In 2009, Cottonwood Creek Dam, was at risk of complete failure. The earthen dam was being overtopped and eroded. Emergency efforts, including helicoptering large barriers to help stabilize the situation, were undertaken. Since then the dam has been rebuilt with a concrete spillway and changes to the downstream outflow area to provide a better buffer for high water release situations.

- Cottonwood Creek Dam is located on the approximately 4 miles south of the City of LaMoure. Failure of the dam would result in water draining primarily southward and following the streambed of Cottonwood Creek for approximately 2.5 miles until it reaches the James River. The Creek runs under County Road 60 and a township road en route to the James River. It also runs adjacent to one rural homestead. There is no emergency action plan in place for this dam. Possible consequences of dam failure include erosion of the Cottonwood Creek channel, damage to bridge structures at the two road crossings noted above, and crop or pasture land flooding.

- The remaining 29 dams are classified as low hazard dams, which generally means that the impact of their failure may be damage to agricultural land, crops and scattered farm buildings. There may also be minor road inundation for short time periods. But no loss of life or damage to residences is anticipated from the failure of this class of dam

Table 3.6 - LaMoure County Significant Hazard Dams

Dam Name	Action Plan	Owner	Type	Year Built	Max Storage (acre-feet)
Cottonwood Creek Dam	no	City of LaMoure	Recreation	1973	16,839

Source: ND State Water Commission

Vulnerability

Population

- There are no cities located in the vicinity or inundation area of Cottonwood Creek Dam. Until an Emergency Action Plan is completed for this dam it is uncertain how far the impact of a dam failure may reach. There is one rural homestead that could possibly be affected by the dam failure.

Critical Facilities

- County Road 60 is a significant route serving the area south of the City of LaMoure. Dam failure could possibly wash out the County Road in the vicinity of Cottonwood Creek. No critical facilities are in the inundation path.

Property

- There is one rural homestead that could possibly be affected by the failure of Cottonwood Creek Dam.

Future Development

- There are no development regulations that specifically address dam failure inundation areas.

Existing Capabilities

- There is no existing completed emergency action plan for dam failure of the significant hazard rated dams in LaMoure County.

Key Issues and Potential Action Items

- *Key Issue*: Cottonwood Creek Dam failure would be a significant regional event, but the magnitude of impacts are not defined because no emergency action plan has been completed.
  - *Potential Action Item*: Complete an Emergency Action Plan for Cottonwood Creek Dam failure.
  - *Potential Action Item*: Restrict future development in the downstream and low-lying areas between Cottonwood Creek Dam and the James River.

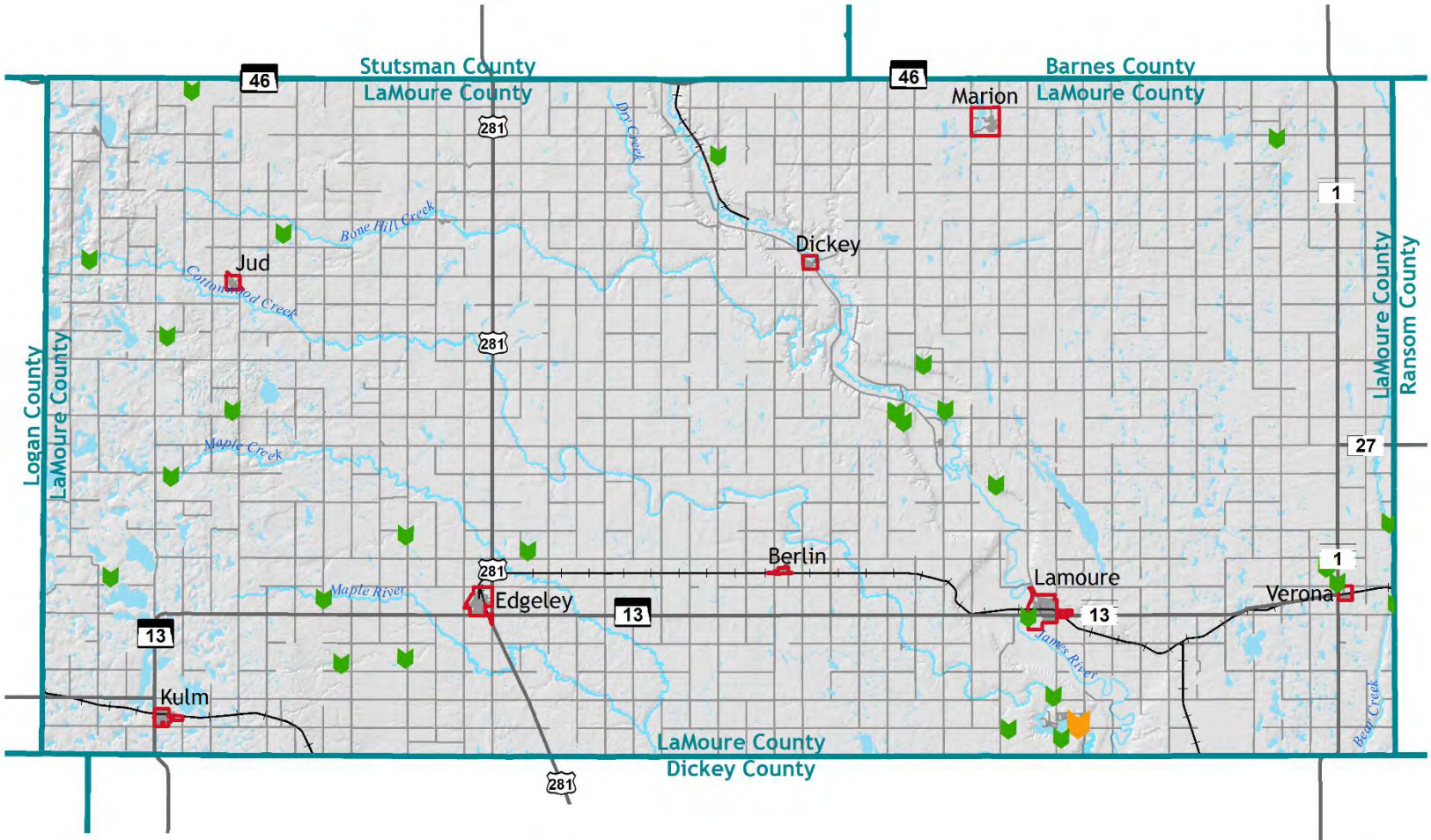


Figure 3.21
Dam Locations & Ratings

Federal Hazard Class
- High
- Significant
- Low

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

N

0 2.5 5 10 Miles

KLJ

Hazardous Materials Release

Rural County
Overall Risk: Moderate
Probability: Likely (approximately two reported incidents 2000-2018)
Impact: Negligible (impact area would represent a very small part of the county)

Berlin
Overall Risk: High
Probability: Possible (no reported incidents in Berlin)
Impact: Catastrophic (entire city within hazard area)

Dickey
Overall Risk: Moderate
Probability: Possible (no reported incidents in Dickey)
Impact: Limited (city not within hazard area)

Edgeley
Overall Risk: High
Probability: Possible (no reported incidents in Edgeley)
Impact: Catastrophic (entire city within hazard area)

Jud
Overall Risk: Moderate
Probability: Possible (no reported incidents in Jud)
Impact: Limited (city not within hazard area)

Kulm
Overall Risk: High
Probability: Possible (no reported incidents in Kulm)
Impact: Catastrophic (entire city within hazard area)

LaMoure
Overall Risk: High
Probability: Possible (no reported incidents in LaMoure)
Impact: Catastrophic (entire city within hazard area)

Marion
Overall Risk: Moderate
Probability: Possible (no reported incidents in Marion)
Impact: Limited (city not within hazard area)

Verona
Overall Risk: High
Probability: Possible (no reported incidents in Verona)
Impact: Catastrophic (entire city within hazard area)

Seasonal Pattern
None

Primary Impacts
Blocked roads
Economic loss
Human loss and injuries
Increased stress on medical services
Localized evacuation

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.

Table 3.7 - Hazardous Materials Incidents in LaMoure County 2000-2017

Material	# of Incidents
Liquid Oxygen	1
Train Strike	1
Total	*2*

Source: National Response Center, PHMSA Incident Reports Database

Location

- **Transportation routes present the most significant risk for a hazardous materials release in LaMoure County**. Highways and railroads are the primary transportation routes through the county. US Highway 281 is a major north-south route that experiences moderate traffic volumes, including trucks carrying hazardous materials. Other highways in the county also experience truck traffic. Materials transported on truck through the county include fuel and anhydrous ammonia. Red River Valley & Western Railroad and Dakota Missouri Valley and Western Railroad run through the county roughly along to ND Highway 13 and along a northern portion of the James River. Figure 3.22 illustrates these higher risk locations.
- 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.

Extent, Previous Occurrences, and Future Probability

- 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. 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. Table 3.7 summarizes reported hazardous materials incidents in LaMoure County reported to the National Response Center and PHMSA between 2000 and 2017. **There were 2 reported incidents during the time period. One was along a road and one at a railway/road interface.** These releases were minor and resulted in minimal impacts.

- Figure 3.22 shows major transportation corridors in the county, with evacuation areas of 1/2 mile and 1 mile. Tier II facilities and pipelines are not shown on the map due to security concerns, although their hazard areas are utilized to calculate risks and vulnerabilities. Recommendations for initial evacuation in the case of fire for common hazardous materials are shown below:
  - Crude oil, petroleum and diesel fuel: 1/2 mile evacuation
  - Propane, natural gas: 1 mile evacuation
  - Anhydrous ammonia: 1 mile evacuation
  - Chlorine: 1/2 mile evacuation
  - Ammonium nitrate fertilizers: 1/2 mile evacuation

Vulnerability

Population

- Vulnerable population can be estimated by identifying the intersection of 2010 US Census Blocks and the identified hazard

areas in Figure 3.15. Census blocks in rural areas are generally large, which makes detailed estimates difficult. The total population located within 1 mile of the hazardous materials transportation routes in Figure 3.15 is 2,739.
  - Kulm, Edgeley, Berlin, LaMoure, Verona are all completely within buffer areas identified in Figure 3.15.
  - Approximately 2,007 city residents (92 percent of all city residents) are within 1 mile of a major highway or railroad
  - Approximately 732 rural residents (37 percent of all rural residents) are within 1 mile of a major highway or railroad

Critical Facilities

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

Property

- Nearly the entirety of each incorporated city is within the 1/2 mile hazard area.

- No significant property damage stemming from a hazardous materials release has been reported since 2000.

Future Development

- The county's vulnerability to hazardous materials is not expected to change in the foreseeable future.

Existing Capabilities

- Local emergency responders have limited capabilities to respond to hazardous materials releases. Their primary objective and response is to cordon off and evacuate the hazard areas.

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

Key Issues and Potential Action Items

- *Key Issue*: Many residents in the county, including all city residents, live in a potential hazard area for a hazardous materials incident. There were 2 reported hazardous materials incidents in the county between 2000 and 2017.
  - *Potential Action Item*: Survey the number and types of hazardous materials passing through the county.
  - *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*: Explore the possibility of bypasses around populated areas when possible.
  - *Potential Action Item*: Consider limiting development in areas with greatest proximity to potential hazardous materials incidents

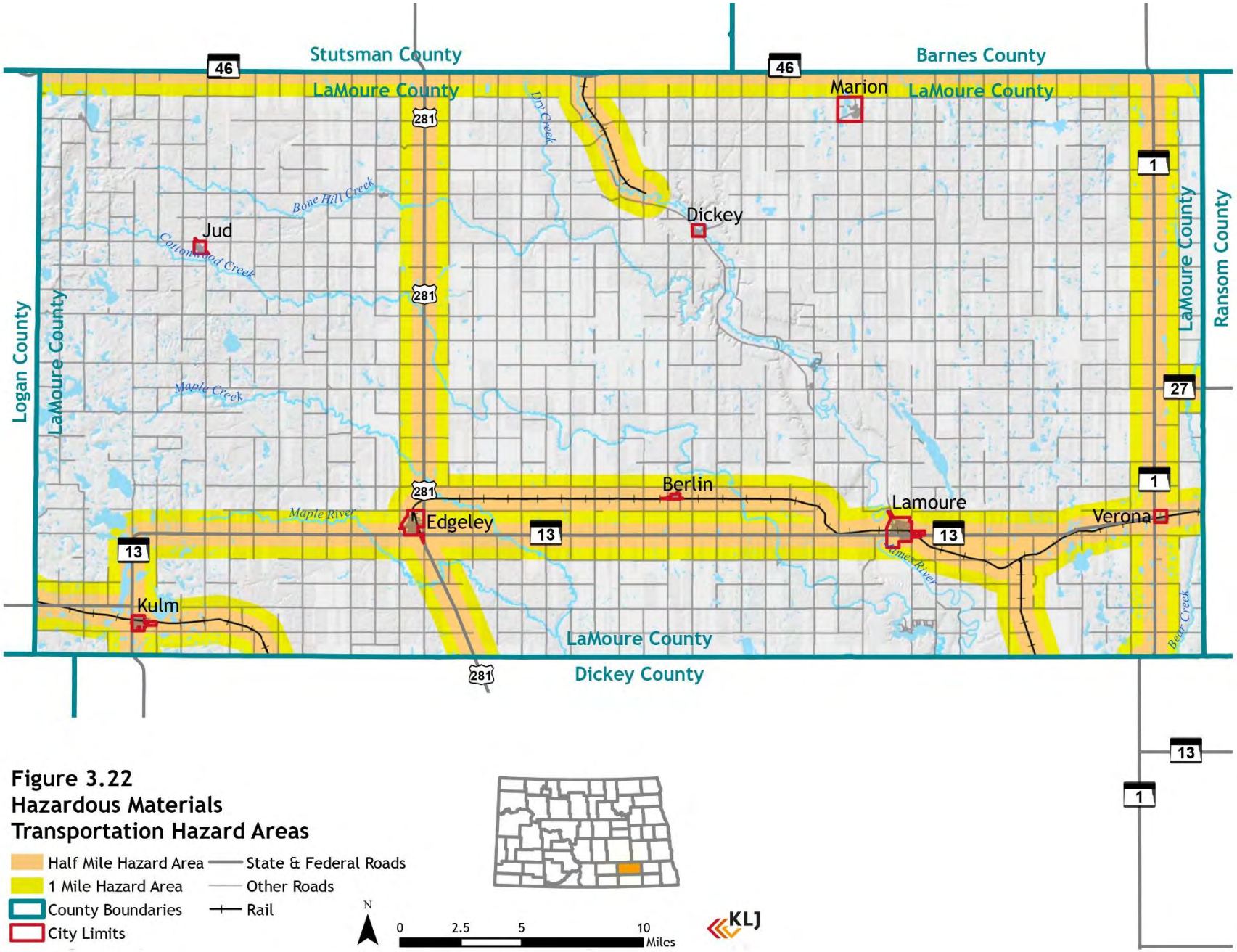


Figure 3.22
Hazardous Materials
Transportation Hazard Areas

Half Mile Hazard Area
1 Mile Hazard Area
County Boundaries
City Limits
State & Federal Roads
Other Roads
Rail

N
0 2.5 5 10 Miles

KLJ

Urban Fire

All Jurisdictions	*Overall Risk:* Moderate *Probability:* Possible (history of major incidents) *Impact:* Limited (area of impact could vary widely)
Seasonal Pattern	None
Primary Impacts	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.

Location

- Urban fire events can happen across all the cities in LaMoure County.

Extent, Previous Occurrences, and Future Probability

- 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. The largest recorded urban fire in the County occurred in downtown Edgeley in the 1952 when an explosion caused a fire to break out and spread to five wooden buildings on the west side of Main Street in Edgeley. One resident was badly burned but survived the fire.

- In February 2011, the LaMoure School had a fire. The fire was during a cold winter night and several departments were called to help fight the blaze. One classroom had to be completed redone and the entire high school had smoke damage that caused relocation of the students to the Bear Creek Lodge (former Verona School) for several weeks.

- Agricultural facilities, such as grain elevators and dryers, are also at risk for significant fires. An example of this kind of fire occurred at the CHS Feed Plant building in Edgeley in April of 2018.

Vulnerability

Population

- All residents in urban areas of the county are vulnerable to an urban fire event. The county's eight cities contain approximately 2,172 residents (52% of total population in the county).

Critical Facilities

- Critical facilities in historic downtowns generally have a greater vulnerability to urban fire because of close building proximity. Grain elevators and electric substations are often located within cities and may also be vulnerable to fire.

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.

Future Development

- Three jurisdictions have adopted the North Dakota State Building Code.

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 history of large-scale urban fire in the county.
  - *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 structures that could be a target for arson.
  - *Potential Action Item*: Adopt the North Dakota state building code throughout the county.

Infectious Diseases and Pest Infestation

All Jurisdictions	*Overall Risk:* Moderate *Probability:* Possible (No incidence of major disease outbreak in recent decades) *Impact:* Limited (Although 46 percent of the population is under 18 or over 65 years of age, fatality rates for most modern diseases in North Dakota are significantly lower than one percent; agricultural losses could total millions of dollars)
Seasonal Pattern	None
Primary Impacts	Agricultural loss (crops, livestock) Economic loss Human loss and injuries Increased stress on medical services Localized evacuation School closure

Hazard Profile

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

There are numerous ways for Infectious 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.

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.

Location, Extent, Historical Occurrences, Future Probability

- Infectious disease and pest infestations can happen anyplace in LaMoure County.
- Populations throughout the world are susceptible to epidemics and national pandemics, and LaMoure County residents are no exception, although **the generally low population density of the area makes rapid transmission of infectious disease less likely**.
- There is **no recent history of major crop, animal or human epidemic disease or contamination** in the county.

Vulnerability

Population

- Elderly and young persons are most at risk for Infectious disease. The estimated number of residents age 65 or older are summarized below for each jurisdiction.
  - Berlin: 9 residents (26.5%)
  - Dickey: 8 residents (19.0%)
  - Edgeley: 162 residents (28.8%)
  - Jud: 17 residents (23.6%)
  - Kulm: 114 residents (32.2%)
  - LaMoure: 233 residents (26.2%)
  - Marion: 39 residents (29.3%)
  - Verona: 19 residents (22.4%)
- The estimated number of residents under age five are summarized below for each jurisdiction.
  - Berlin: 0 residents (0.0%)

- Dickey: 1 residents (2.4%)
- Edgeley: 34 residents (6.0%)
- Jud: 3 residents (4.2%)
- Kulm: 24 residents (6.8%)
- LaMoure: 42 residents (4.7%)
- Marion: 5 residents (3.8%)
- Verona: 5 residents (5.9%)

- According to the North Dakota Department of Health, the death rate for foodborne illnesses in the state was 31.7 per 100,000 population in 2011. Since 2005, the lowest death rate was 55 and the highest was 78. **The death rate of 78 per 100,000 equates to approximately three foodborne illness deaths in LaMoure County over a one-year period.**

- According to the North Dakota Department of Health, the death rate for influenza in the state was 55 per 100,000 population in 2011. Since 2005 the lowest death rate was 27.1 and the highest was 61.7. **The death rate of 61.7 per 100,000 equates to approximately three influenza death in LaMoure County over a one-year period.**

- 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 LaMoure County this would equate to 1,242 **ill, 10 requiring hospitalization and 2 deaths from a medium level influenza pandemic**.

Critical Facilities

- Assisted living facilities, hospitals and schools have an increased vulnerability to infectious disease due to the high density and demographics of occupants. Other places of public assembly may also contribute to disease spread. Jurisdictions with these facilities are summarized below.

- LaMoure:
  - Rosewood Court - 12 units
  - Grandview Heights - 19 units
  - Peace Garden-St. Rose Care Center - 12 units
  - LaMoure Public School
- Edgeley:
  - Manor St. Joseph - 40 units
  - Edgeley Public School
- Kulm:
  - Kulm Public School
- Marion:
  - Litchville-Marion High School

Property

- The statewide Multi-Hazard Mitigation 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 LaMoure County was $192.5 million and the market value of livestock was $33.5 million. **Estimating 20 percent loss for each sector results in $38.5 million in Infectious disease-related crop loss and $6.7 million livestock loss**.

Future Development

- Any minor future development that may occur is not expected to affect the county's physical vulnerability to Infectious disease. Potential future development is expected to primarily be low density single-family housing.

Existing Capabilities

- The USDA Farm Service Agency has a field office located in LaMoure, and North Dakota State University Extension has a field office also located in LaMoure. Both agencies offer technical assistance to farmers and ranchers for the prevention and treatment of agricultural diseases.

- LaMoure County Public Health is located in LaMoure and serves anyone depending on individual program requirements.

- There are three general service clinics offering health care in LaMoure County: Sandford Health Clinic located in LaMoure, Sanford Health Clinic in Edgeley, and Kulm Clinic operated by Wishek Hospital all provide a variety of health care services.

- There are two veterinary services in LaMoure County: Hovland Veterinary Service in LaMoure, and Edgeley Veterinary Service in Edgeley.

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.

- *Key Issue*: Some areas of the county have large amounts of standing water during the spring and summer months, which can attract potentially disease-carrying insects.
  - *Potential Action Item:* Develop insect control system during periods of standing water.

Transportation Incident

All Jurisdictions	*Overall Risk:* Moderate *Probability:* Possible (recent history of major incidents) *Impact:* Limited (magnitude could vary widely)
Seasonal Pattern	None
Primary Impacts	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

"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 a magnitude that overtaxes the ability of local resources to adequately respond." [p271 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. 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.

Location

Transportation incidents can happen anyplace in the County, but are more likely to occur along major highways, along railroad lines, and near airports. There are three airports located in LaMoure County.

Extent, Previous Occurrences, and Future Probability

There are only two reported transportation incidents in LaMoure County in the last 20 years, and these were both relatively minor.

There are 150 miles of state and federal highways in LaMoure County and 60 miles of RRVW or DMVW railroad lines. While the presence of these major transportation facilities in the county are a basis for local risk, this risk is compounded because hazardous materials are transported regularly along the state highways and the railroad. Additionally:

- There are three airports in LaMoure County. They are located near Edgeley, Kulm, and LaMoure. An aircraft crash is statistically more likely to take place during takeoffs or landings at these airports than elsewhere.
- Railroad crossings are another significant point of risk for transportation incidents when a collision between motor vehicles and trains takes place.

Vulnerability

Population

- The population of LaMoure County is not generally vulnerable to transportation incidents. The largest potential vulnerability stems from inhabited structures located close to railroads and major roadways.

Critical Facilities

- Several critical facilities are located along state highways and railroads. 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.

Property

- Potential property damage from a transportation incident is most likely when a major transportation route is situated close to major structures. A review of structures situated very close to major roadways in LaMoure County found that there are:
  - 2 structures at risk in Kulm
  - 8 structures at risk in LaMoure
  - 1 structure at risk in Verona

- A review of structures situated very close to main rail lines in LaMoure County found that (not including grain handling facilities) there are:
  - 3 structures at risk in Berlin
  - 5 structures at risk in Edgeley
  - 4 structures at risk in Kulm
  - 1 structure at risk in LaMoure
  - 2 structures at risk in Verona

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 LaMoure County includes seven ambulances provided by three EMT certified ambulance squads and one substation ambulance.
- All local fire departments have CPR/First Aid/Light Rescue and fire response certifications. Additionally, the Edgeley, Kulm, and LaMoure fire departments are certified in Heavy Rescue and have additional training in grain bin rescue.
- The Oakes and Jamestown hospitals have emergency rooms but are classified as Level V and Level IV trauma centers, respectively. The nearest Level II trauma centers are located in Bismarck and Fargo.

Key Issues and Potential Action Items

- *Key Issue*: LaMoure County's very rural setting results in limited resources being available to respond to transportation incidents.
  - *Potential Action Item*: Develop a plan to increase the ambulance responder level of training and equipment.
  - *Potential Action Item*: Develop a plan to reward emergency response staff in ways the encourage them to stay in LaMoure County and to increase their skill levels.

Civil Disturbance

All Jurisdictions	*Overall Risk:* Moderate *Probability:* Possible (recent history of major incidents) *Impact:* Limited (magnitude could vary widely)
Seasonal Pattern	None
Primary Impacts	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

Civil Disturbance 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 ND Enhanced Mitigation Mission Area Operations Plan]

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.

Location, Extent, Historical Occurrences, Future Probability

Location of a civil disturbance could theoretically happen any place in LaMoure County. Events that can be classified as civil disturbances have been very limited in North Dakota. There have been two 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.

Despite the very rural location of both these 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.

Vulnerability

Population

- Since the two documented civil disturbances in North Dakota happened in very rural settings, it is not safe to assume that they will not happen in LaMoure County. With the right provocation or initiative such an incident can happen anywhere. Therefore, the entire population of LaMoure County could be considered vulnerable.

Critical Facilities

- Similarly, because of the historical precedence in North Dakota, it is not safe to rule out any location or critical facility as being potentially impacted by a civil disturbance.

Property

- Similarly, because of the historical precedence in North Dakota, it is not safe to rule out any property as being potentially impacted by a civil disturbance.

Future Development

- Potential future development property damage from a civil disturbance is not anticipated to be concern.

Existing Capabilities

- The DAPL incident provided a lot of information being used in North Dakota to be prepared for similar events. Local law enforcement officials have participated in planning at a regional level for responses to civil disturbances.

Key Issues and Potential Action Items

- *Key Issue*: The key issue for civil disturbance is unpredictability.
  - *Potential Action Item*: Assuming resource availability will always be a factor, the chief actionable strategy is to be able to gain access to outside resources in a timely manner. Therefore, the action item is to develop collaborative approach to needed resources and to assessing risk.
  -

Cyber Attack

All Jurisdictions	*Overall Risk:* Moderate *Probability:* Possible (recent history of major incidents) *Impact:* Limited (magnitude could vary widely)
Seasonal Pattern	None
Primary Impacts	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

"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 e 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 ND Enhanced Mitigation Mission Area Operations Plan]

Location, Extent, Historical Occurrences, Future Probability

Cyber attacks can happen anyplace in LaMoure County where there is internet access. There were three known large scale cyber attacks in North Dakota in recent years.

- 2016 DAPL event doxing. Discovery and release of personally identifiable information.
- 2017 UND website distributed denial of service. Discovery and release of personally identifiable information.
- 2018 phishing attack on a North Dakota company. Discovery and release of personally identifiable information.

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 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.

Critical Facilities

- Cyber attacks can disrupt electronic operations or functions of critical facilities resulting in potentially catastrophic direct and indirect consequences.

Property

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

Future Development

- Cyber attacks are not anticipated to impact future development patterns or levels.

Existing Capabilities

- Standard cyber attack protection is in place through the County's internet service provider.

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.

Criminal Terrorist National Attack

All Jurisdictions	*Overall Risk:* Moderate *Probability:* Possible (recent history of major incidents) *Impact:* Limited (magnitude could vary widely)
Seasonal Pattern	None
Primary Impacts	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/State Attack includes chemical attacks, biological attacks, radiological attacks, nuclear attacks, explosive attacks, food/food production attacks, and armed assaults. These can broadly be defined as any intentional adversarial human-caused incident, domestic or international, that causes mass casualties, large economic losses, [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, ND Enhanced Mitigation Mission Area Operations Plan]

The magnitude of 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. Illustrating this range in magnitude are the following examples.

- September 11, 2001 attack on the World Trade Center and the Pentagon. This attacked 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.

Location, Extent, Historical Occurrences, Future Probability

Location of these kinds of events can theoretically be anywhere in LaMoure County. Historically in the United States, a higher likelihood exists at places of public assembly or on critical facilities or infrastructure. Threats to or in North Dakota of Criminal Terrorist Nation/State 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, ND Enhanced Mitigation Mission Area Operations Plan] Examples of these potential Criminal Terrorist Nation Attacks include bomb threats and an oil pipeline shutoff.

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 LaMoure 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 LaMoure County. However, criminal attacks may result from different motivations, be less predictable, and more likely in rural areas like LaMoure County. The active shooter type incident is completely unpredictable and could happen at any location.

Critical Facilities

- Terrorist and Nation/State attacks are commonly aimed at targets with national significance, and are extremely unlikely in LaMoure County due to a lack of such targets. Some types of such attacks may have nation-wide impacts that do affect LaMoure County However, criminal attacks may result from different motivations, be less predictable, and more likely in rural areas like LaMoure 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.

Property

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

Future Development

- As noted previously Criminal Terrorist Nation/State Attacks are not likely to be focused on rural places like LaMoure County. Therefore, such attacks are not anticipated to impact potential future development patterns.

Existing Capabilities

- The primary response capability in LaMoure County is the Sheriff's Department. As noted previously there are ongoing efforts to organize coordinated responses in North Dakota in the case of city disturbances and criminal terrorist nation/state attacks.

Key Issues and Potential Action Items

- *Key Issue*: The most likely Criminal Terrorist Nation/State Attack incident affecting LaMoure County is likely to be 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.

Summary

There are 15 priority hazards identified for LaMoure 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 3.8.

Table 3.8 - LaMoure County Risk Summary

	Rural County	Berlin	Dickey	Edgeley	Jud	Kulm	LaMoure	Marion	Verona
Drought	M	M	M	M	M	M	M	M	M
Flood	H	M	H	H	M	M	H	H	M
Geologic Hazards	L	L	L	L	L	L	L	L	L
Severe Summer Weather	H	H	H	H	H	H	H	H	H
Severe Winter Weather	H	H	H	H	H	H	H	H	H
Wildland Fire	H	M	M	M	M	M	M	M	M
Dam Failure	L	L	L	L	L	L	L	L	L
Hazardous Materials Release	M	H	M	H	M	H	H	M	H
Urban Fire	M	M	M	M	M	M	M	M	M
Infectious Disease & Pest Infestation	M	M	M	M	M	M	M	M	M
Space Weather	M	M	M	M	M	M	M	M	M
Transportation Incident	M	M	M	M	M	M	M	M	M
Civil Disturbance	M	M	M	M	M	M	M	M	M
Cyber Attack	M	M	M	M	M	M	M	M	M
Criminal, Terrorist, Nation/State Attack	M	M	M	M	M	M	M	M	M

Note: H = High, M = Moderate, L = Low

Drought

- 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.

Flood

- LaMoure County experiences approximately one flood event every five years. Flood events in the county are primarily related to heavy rainfall and snowmelt runoff.
- Roads and bridges in the county are sometimes washed-out or inundated during flooding events.

Geologic Hazards

- The county is in an area of minimal hazard for earthquakes.
- Much of county is within a moderate susceptibility/low incidence landslide hazard area as defined by USGS.
- The county has no known susceptibility to sinkholes.

Severe Summer Weather

- LaMoure County averages approximately seven 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

- LaMoure 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 mobile homes are the most vulnerable to extreme cold temperatures. Approximately 1,200 residents in the county are elderly or live in a mobile home.

Wildland Fire

- LaMoure County experiences a wildland fire greater than 50 acres approximately once per year. Most wildfires in the county cause minimal property damage. However, several critical facilities are at risk from wildland fire.

Dam Failure

- Cottonwood Creek Dam failure would be a significant regional event, but there are limited downstream buildings at risk. An emergency action plan for this dam needs to be completed to better understand impacts within the dam failure inundation area.

Hazardous Materials Release

- Many residents in the county, including nearly all city residents, live in a potential hazard area for a hazardous materials incident.

Urban Fire

- There is history of large-scale urban fire in the county. Anticipated impact of urban fire is limited.

Infectious Diseases and Pest Infestation

- Human and agricultural disease have the potential to greatly impact the health and economy of the county.
- Some areas of the county have large amounts of standing water during the spring and summer months, which can attract potentially disease-carrying insects.

Space Weather

- Widespread, long term loss of electrical power would lead to loss of life and disruption of life as we know it in LaMoure County.

Transportation Incident

- LaMoure County's very rural setting results in limited resources being available to respond quickly to transportation incidents.

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 included a Planning Team meeting, city council/commission meetings and a community survey. Goals were identified to guide the development of 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 Capabilities

- *Zoning Ordinance*. Berlin, Edgeley, Kulm, LaMoure, & Verona have zoning ordinances.
- *Comprehensive Plan*. Berlin & Edgeley have a comprehensive plan.
- *Floodplain Ordinance*. Edgeley, LaMoure, and LaMoure County have floodplain ordinances.
- *Building Code*. Edgeley, Kulm & Marion have adopted the North Dakota State Building Code.

Administrative and Technical Capabilities

- LaMoure County has an Emergency Management Department that oversees mitigation, response and recovery activities county-wide.
- Edgeley, Kulm, LaMoure, Marion & Verona require building permits.

Fiscal Capabilities

- LaMoure County and each incorporated jurisdiction are eligible for a variety of federal grants, including Community Development Block Grants.
- LaMoure County and each incorporated jurisdiction has the ability to issue bonds and levy taxes.

The County and each incorporated jurisdiction have limited resources and would have difficulty implementing a wide range of comprehensive mitigation actions. The action items contained in this plan are generally small in scope and specific to each community's biggest issues. Funding/financing mechanisms for large projects are the greatest element that limits the capability of each jurisdiction. The County has a small tax base, and any financing mechanism that increases the public tax burden is not desired by residents. As a result, many of the projects identified in this plan have a minimal cost and can be completed by local staff. Outside funding sources and technical assistance would need to be acquired to help fund and complete the large projects identified in this plan.

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 impacts of severe summer and winter weather to people and property.
- Reduce impacts of drought and wildland fires to people and property.
- Reduce impacts of human-caused threats to people and property.

Previous Mitigation Actions

Mitigation actions from the 2014 LaMoure County Multi-Hazard Mitigation Plan are shown in Appendix D. The plan included 46 actions. 3 actions were completed (or partially completed). Nineteen actions are ongoing and incorporated into this plan. Nine actions were

substantially retained although slightly modified for inclusion in this plan. Eight actions were no longer considered significant to include in this plan. The status of seven actions 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

LaMoure 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 Pre-Disaster Mitigation (PDM) 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 action items for the participating jurisdictions, identified in Tables 4.1 – 4.9 are recommendations developed through discussion with local officials, stakeholders and other interested members of the public. A broad range of potential mitigation activities were considered; many of these potential activities are listed in Chapter 3 with the applicable hazard. The Planning Team discussed each activity in order to develop a list of priority projects that will have the greatest benefit. Further explanation of the mitigation activity selection process can be found in Appendix E. Several preparedness and response actions discussed during the planning process are also included in the plan.

The activities list found in this section provides a roadmap for targeting and implementing mitigation projects over the next five years. Project costs 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 funds.

Table 4.1 – LaMoure County Action Items					
ID	**Priority**	**Action**	**Hazard**	**Cost**	**Time Frame**
A	M	Conduct NFIP workshop to educate public about benefits of flood insurance	Flooding	Staff time	2020
B	H	Complete FIRM and establish floodplain management to prevent development in at risk areas	Flooding	Staff time	2023
C	H	Have a contact list to ensure residents along the James River can be contacted during rising water	Flooding	Staff time	2020
D	M	Elevate commonly flood impacted roads and bridges, and evaluate and pursue further opportunities to mitigate potential impacts to roads and property	Flooding	High	Ongoing
E	M	Use hydrology and hydraulic studies to properly understand flow in the county's watersheds and make roadway improvements per study findings	Flooding	Moderate	2023
G	M	Increase official government social media presence in the County to keep residents informed of flood waters and actions	Flooding	Staff time	Ongoing
I	M	Further implement the county road open/closed map so residents can see the status of roads in winter storm and flood events	Severe winter weather; flooding	Staff time	Ongoing
J	H	Encourage utility provider to bury electric power lines when undergoing upgrades or repair	Severe winter weather	High	Ongoing
K	H	Establish an ordinance on temporary/camping permits and direct access to storm shelters	Severe summer weather	Staff time	2021
L	M	Install and maintain surge protection on critical equipment	Severe summer weather	Moderate	2020
M	L	Identify or construct emergency shelters for community parks/campgrounds	Severe summer weather	High	2022
O	L	Maintain ongoing training and equipment upgrades to fight urban and wildland fires, and hazardous materials releases	Multiple hazards	Moderate	Ongoing
P	L	Administer Firewise program and implement best practices during wildfire season (Priority Jud and Dickey)	Wildland fire	Staff time	Ongoing
Q	M	Develop a strategy to determine prioritized locations and optimum volumes of water storage for fire fighting	Wildland fire	Staff time	2022
T	L	Encourage new business with TIER II materials to locate outside city limits	Hazardous materials release	Staff time	Ongoing
V	L	Survey the number and type of hazardous materials passing through LaMoure County	Hazardous materials release	Staff time	2021
W	L	Continue supporting the USDA Farm Service Agency and North Dakota State University Extension and provide assistance to local farmers and ranchers	Infectious disease; drought	Staff time	Ongoing
X	L	Develop an emergency response plan that includes coordination with local livestock producers	Infectious disease; drought	Staff time	2022

Table 4.1 continued – LaMoure County Action Items					
ID	**Priority**	**Action**	**Hazard**	**Cost**	**Time Frame**
Z	H	If need is established, restrict future development in the impact area of potential significant dam failures	Dam failure	Staff time	2022
AA	M	Develop an insect control system during periods of standing water	Infectious disease and pest	High	2021
BB	M	Obtain drone or similar technology and certified staff that can be used to access visual context for multiple hazards	Multiple hazards	Moderate	2023
CC	L	Develop and maintain data system backup on a regular basis	Cyber attack and space weather	Low	Ongoing
DD	L	Harden electrical components and systems for critical facilities (especially emergency response services) against the anticipated impacts of a space weather event	Space weather	Moderate	2022
EE	L	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 LaMoure County	Space weather	Staff time	2021
FF	M	Public Education	Multiple hazards	Staff time	Ongoing
GG	H	Establish a robust communication system for all elements of the LaMoure County emergency response team	Multiple hazards	High	2021
HH	M	Ensure County has a communication tool to reach all cell phones locally or county wide to inform of CTN attack or other significant emergencies	Multiple hazards	Moderate	Ongoing
II	M	Develop a plan to increase the First Responder level of training and equipment	Multiple hazards	Staff time	2021
JJ	M	Establish a table top training program on a rotating annual basis to address response to critical incidents: transportation incidents, infectious diseases, and cyber attack	Multiple hazards	Staff time	2020
SS	H	Road improvements to maintain access to Twin Lakes properties	Flooding	High	2020
XX	M	Organize a floodplain management workshop to be presented by the ND NFIP Coordinator for all NFIP participating community floodplain managers	Flooding	Staff time	2021

Table 4.2 – Berlin Action Items					
ID	**Priority**	**Action**	**Hazard**	**Cost**	**Time Frame**
F	6	Improve municipal drainage in cities prone to localized flooding by identifying risk areas, and completing projects to reduce the impact	Flooding	High	2022
J	8	Encourage utility provider to bury electric power lines when undergoing upgrades or repair	Severe winter weather	High	Ongoing
L	7	Install and maintain surge protection on critical equipment	Severe summer weather	Moderate	Ongoing
P	12	Administer Firewise program and implement best practices during wildfire season (Priority Jud and Dickey)	Wildland fire	Staff time	Ongoing
S	5	Explore shelter and evacuation options in case of hazardous materials releases	Hazardous materials release	Staff time	2021
T	11	Encourage new business with TIER II materials to locate outside city limits	Hazardous materials release	Staff time	Ongoing
U	9	Use hazardous materials transport routes around cities and not through them whenever possible	Hazardous materials release	Staff time	Ongoing
W	10	Continue supporting the USDA Farm Service Agency and North Dakota State University Extension and provide assistance to local farmers and ranchers	Infectious disease; drought	Staff time	Ongoing
AA	3	Develop an insect control system during periods of standing water	Infectious disease and pest	High	2021
CC	15	Develop and maintain data system backup on a regular basis	Cyber attack and space weather	Low	Ongoing
DD	14	Harden electrical components and systems for critical facilities (especially emergency response services) against the anticipated impacts of a space weather event	Space weather	Moderate	2022
EE	13	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 LaMoure County	Space weather	Staff time	2021
LL	4	Construct community shelter in Berlin with potential to meet multiple functions including city government, maintenance and fire equipment storage	Multiple hazards	High	2022
OO	1	Replace warning siren in Berlin with louder siren	Multiple hazards	Moderate	2020
QQ	2	Acquire and install a new portable generator in Berlin	Multiple hazards	Moderate	2021

Table 4.3 – Dickey Action Items					
ID	**Priority**	**Action**	**Hazard**	**Cost**	**Time Frame**
F	M	Improve municipal drainage in cities prone to localized flooding by identifying risk areas, and completing projects to reduce the impact	Flooding	High	2022
J	L	Encourage utility provider to bury electric power lines when undergoing upgrades or repair	Severe winter weather	High	Ongoing
N	L	Remove abandoned structures that could harbor pests and be high risks for urban fire	Infectious disease and pest; urban fire	Moderate	Ongoing
P	H	Administer Firewise program and implement best practices during wildfire season (Priority Jud and Dickey)	Wildland fire	Staff time	Ongoing
T	L	Encourage new business with TIER II materials to locate outside city limits	Hazardous materials release	Staff time	Ongoing
W	H	Continue supporting the USDA Farm Service Agency and North Dakota State University Extension and provide assistance to local farmers and ranchers	Infectious disease; drought	Staff time	Ongoing
AA	M	Maintain an insect control system during periods of standing water	Infectious disease and pest	Low	Ongoing
CC	L	Develop and maintain data system backup on a regular basis	Cyber attack and space weather	Low	Ongoing
DD	L	Harden electrical components and systems for critical facilities (especially emergency response services) against the anticipated impacts of a space weather event	Space weather	Moderate	2022
EE	L	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 LaMoure County	Space weather	Staff time	Ongoing
TT	H	Hold a flood risk meeting for property owners in the City of Dickey	Flooding	Staff time	2023

Table 4.4 – Edgeley Action Items					
ID	**Priority**	**Action**	**Hazard**	**Cost**	**Time Frame**
F	3	Improve municipal drainage in cities prone to localized flooding by identifying risk areas, and completing projects to reduce the impact	Flooding	High	2022
H	4	Identify and acquire backup generators for all critical facilities in a prioritized manner	Multiple Hazards	Moderate	2020-2024
J	8	Encourage utility provider to bury electric power lines when undergoing upgrades or repair	Severe winter weather	High	Ongoing
L	11	Install and maintain surge protection on critical equipment	Severe summer weather	Moderate	Ongoing
M	7	Identify or construct emergency shelters for community parks/campgrounds	Severe summer weather	High	2022
N	2	Remove abandoned structures that could harbor pests and be high risks for urban fire	Infectious disease and pest; urban fire	Moderate	Ongoing
O	17	Maintain ongoing training and equipment upgrades to fight urban and wildland fires, and hazardous materials releases	Multiple hazards	Moderate	Ongoing
P	16	Administer Firewise program and implement best practices during wildfire season (Priority Jud and Dickey)	Wildland fire	Staff time	Ongoing
S	5	Explore shelter and evacuation options in case of hazardous materials releases	Hazardous materials release	Staff time	2021
T	10	Encourage new business with TIER II materials to locate outside city limits	Hazardous materials release	Staff time	Ongoing
U	9	Use hazardous materials transport routes around cities and not through them whenever possible	Hazardous materials release	Staff time	Ongoing
W	15	Continue supporting the USDA Farm Service Agency and North Dakota State University Extension and provide assistance to local farmers and ranchers	Infectious disease; drought	Staff time	Ongoing
AA	6	Develop an insect control system during periods of standing water	Infectious disease and pest	High	2021
CC	13	Develop and maintain data system backup on a regular basis	Cyber attack and space weather	Low	Ongoing
DD	12	Harden electrical components and systems for critical facilities (especially emergency response services) against the anticipated impacts of a space weather event	Space weather	Moderate	2022
EE	14	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 LaMoure County	Space weather	Staff time	2021
MM	1	Replace existing culvert by school and outlet culvert by park with larger culverts in Edgeley	Flooding	Moderate	2021
XX		Organize a floodplain management workshop to be presented by the ND NFIP Coordinator for all NFIP participating community floodplain managers	Flooding	Staff time	2021

Table 4.5 – Jud Action Items					
ID	**Priority**	**Action**	**Hazard**	**Cost**	**Time Frame**
J	5	Encourage utility provider to bury electric power lines when undergoing upgrades or repair	Severe winter weather	High	Ongoing
L	10	Install and maintain surge protection on critical equipment	Severe summer weather	Moderate	Ongoing
O	3	Maintain ongoing training and equipment upgrades to fight urban and wildland fires, and hazardous materials releases	Multiple hazards	Moderate	Ongoing
P	11	Administer Firewise program and implement best practices during wildfire season (priority Jud and Dickey)	Wildland fire	Staff time	Ongoing
S	12	Explore shelter and evacuation options in case of hazardous materials releases	Hazardous materials release	Staff time	2021
T	13	Encourage new business with TIER II materials to locate outside city limits	Hazardous materials release	Staff time	Ongoing
U	7	Use hazardous materials transport routes around cities and not through them whenever possible	Hazardous materials release	Staff time	Ongoing
W	6	Continue supporting the USDA Farm Service Agency and North Dakota State University Extension and provide assistance to local farmers and ranchers	Infectious disease; drought	Staff time	Ongoing
AA	4	Develop an insect control system during periods of standing water	Infectious disease and pest	High	2021
CC	8	Develop and maintain data system backup on a regular basis	Cyber attack and space weather	Low	Ongoing
DD	14	Harden electrical components and systems for critical facilities (especially emergency response services) against the anticipated impacts of a space weather event	Space weather	Moderate	2022
EE	9	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 LaMoure County	Space weather	Staff time	2021
NN	2	Upgrade equipment with a new tanker/pumper fire truck in Jud	Urban fire; wildland fire	High	2022
PP	1	Acquire and install a new fixed generator in Jud	Multiple	Moderate	2021

Table 4.6 – Kulm Action Items					
ID	**Priority**	**Action**	**Hazard**	**Cost**	**Time Frame**
F	3	Improve municipal drainage in cities prone to localized flooding by identifying risk areas, and completing projects to reduce the impact	Flooding	High	2022
H	2	Identify and acquire backup generators for all critical facilities in a prioritized manner	Multiple Hazards	Moderate	2020-2024
J	13	Encourage utility provider to bury electric power lines when undergoing upgrades or repair	Severe winter weather	High	Ongoing
L	14	Install and maintain surge protection on critical equipment	Severe summer weather	Moderate	Ongoing
M	9	Identify or construct emergency shelters for community parks/campgrounds, such as Kulm City Campground and Swimming Pool	Severe summer weather	High	2022
N	4	Remove abandoned structures that could harbor pests and be high risks for urban fire	Infectious disease and pest; urban fire	Moderate	Ongoing
O	6	Maintain ongoing training and equipment upgrades to fight urban and wildland fires, and hazardous materials releases	Multiple hazards	Moderate	Ongoing
P	10	Administer Firewise program and implement best practices during wildfire season (Priority Jud and Dickey)	Wildland fire	Staff time	Ongoing
S	5	Explore shelter and evacuation options in case of hazardous materials releases	Hazardous materials release	Staff time	2021
T	15	Encourage new business with TIER II materials to locate outside city limits	Hazardous materials release	Staff time	Ongoing
U	7	Use hazardous materials transport routes around cities and not through them whenever possible	Hazardous materials release	Staff time	Ongoing
W	11	Continue supporting the USDA Farm Service Agency and North Dakota State University Extension and provide assistance to local farmers and ranchers	Infectious disease; drought	Staff time	Ongoing
AA	8	Develop an insect control system during periods of standing water	Infectious disease and pest	High	2021
CC	12	Develop and maintain data system backup on a regular basis	Cyber attack and space weather	Low	Ongoing
DD	16	Harden electrical components and systems for critical facilities (especially emergency response services) against the anticipated impacts of a space weather event	Space weather	Moderate	2022
EE	17	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 LaMoure County	Space weather	Staff time	2021
RR	1	Acquire and install a new fixed generator for Kulm water tower	Multiple	High	2021

Table 4.7 – LaMoure Action Items					
ID	**Priority**	**Action**	**Hazard**	**Cost**	**Time Frame**
F	2	Improve municipal drainage in cities prone to localized flooding by identifying risk areas, and completing projects to reduce the impact	Flooding	High	2022
H	1	Identify and acquire backup generators for all critical facilities in a prioritized manner	Multiple Hazards	Moderate	2020-2024
J	7	Encourage utility provider to bury electric power lines when undergoing upgrades or repair	Severe winter weather	High	Ongoing
L	11	Install and maintain surge protection on critical equipment	Severe summer	Moderate	Ongoing
M	10	Identify or construct emergency shelters for community parks/campgrounds	Severe summer weather	High	2022
N	3	Remove abandoned structures that could harbor pests and be high risks for urban fire	Infectious disease and pest; urban fire	Moderate	Ongoing
O	12	Maintain ongoing training and equipment upgrades to fight urban and wildland fires, and hazardous materials releases	Multiple hazards	Moderate	Ongoing
P	15	Administer Firewise program and implement best practices during wildfire season (Priority Jud and Dickey)	Wildland fire	Staff time	Ongoing
S	9	Explore shelter/evacuation options in case of hazardous materials releases	Hazardous materials release	Staff time	2021
T	13	Encourage new business with TIER II materials to locate outside city limits	Hazardous materials release	Staff time	Ongoing
U	8	Use hazardous materials transport routes around cities and not through them whenever possible	Hazardous materials release	Staff time	Ongoing
W	14	Continue supporting the USDA Farm Service Agency and North Dakota State University Extension and provide assistance to local farmers and ranchers	Infectious disease; drought	Staff time	Ongoing
Y	4	Complete Emergency Action Plan for Lake LaMoure Dam failure	Dam failure	Staff time	2021
Z	5	If need is established, restrict future development in the impact area of potential significant dam failures	Dam failure	Staff time	2022
AA	6	Develop an insect control system during periods of standing water	Infectious disease	High	2021
CC	18	Develop and maintain data system backup on a regular basis	Multiple hazards	Low	Ongoing
DD	17	Harden electrical components and systems for critical facilities (especially emergency response services) against the anticipated impacts of a space weather event	Space weather	Moderate	2022
EE	19	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 LaMoure County	Space weather	Staff time	2021
KK	16	Install warning siren at Lake LaMoure	Multiple	Moderate	2020
XX		Organize a floodplain management workshop to be presented by the ND NFIP Coordinator for all NFIP participating community floodplain managers	Flooding	Staff time	2021

Table 4.8 – Marion Action Items					
ID	**Priority**	**Action**	**Hazard**	**Cost**	**Time Frame**
F	1	Improve municipal drainage in cities prone to localized flooding by identifying risk areas, and completing projects to reduce the impact	Flooding	High	2022
J	3	Encourage utility provider to bury electric power lines when undergoing upgrades or repair	Severe winter weather	High	Ongoing
L	7	Install and maintain surge protection on critical equipment	Severe summer weather	Moderate	Ongoing
O	8	Maintain ongoing training and equipment upgrades to fight urban and wildland fires, and hazardous materials releases	Multiple hazards	Moderate	Ongoing
P	4	Administer Firewise program and implement best practices during wildfire season (Priority Jud and Dickey)	Wildland fire	Staff time	Ongoing
S	5	Explore shelter and evacuation options in case of hazardous materials releases	Hazardous materials release	Staff time	2021
T	10	Encourage new business with TIER II materials to locate outside city limits	Hazardous materials release	Staff time	Ongoing
U	9	Use hazardous materials transport routes around cities and not through them whenever possible	Hazardous materials release	Staff time	Ongoing
W	11	Continue supporting the USDA Farm Service Agency and North Dakota State University Extension and provide assistance to local farmers and ranchers	Infectious disease; drought	Staff time	Ongoing
AA	6	Develop an insect control system during periods of standing water	Infectious disease and pest	High	2021
CC	13	Develop and maintain data system backup on a regular basis	Cyber attack and space weather	Low	Ongoing
DD	12	Harden electrical components and systems for critical facilities (especially emergency response services) against the anticipated impacts of a space weather event	Space weather	Moderate	2022
EE	14	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 LaMoure County	Space weather	Staff time	2021
VV	2	Acquire and install a new fixed generator in Marion	Multiple	High	2021
XX	M	Organize a floodplain management workshop to be presented by the ND NFIP Coordinator for all NFIP participating community floodplain managers	Flooding	Staff time	2021
YY		Evaluate the effectiveness of the authorized short term emergency drain and the benefit/cost of a permanent drain to protect city infrastructure from impacts of continued rising waters along Marion's western edge	Flooding	High	2022

Table 4.9 – Verona Action Items					
ID	**Priority**	**Action**	**Hazard**	**Cost**	**Time Frame**
J	2	Encourage utility provider to bury electric power lines when undergoing upgrades or repair	Severe winter weather	High	Ongoing
L	8	Install and maintain surge protection on critical equipment	Severe summer weather	Moderate	Ongoing
N	3	Remove abandoned structures that could harbor pests and be high risks for urban fire	Infectious disease and pest; urban fire	Moderate	Ongoing
O	4	Maintain ongoing training and equipment upgrades to fight urban and wildland fires, and hazardous materials releases	Multiple hazards	Moderate	Ongoing
P	9	Administer Firewise program and implement best practices during wildfire season (Priority Jud and Dickey)	Wildland fire	Staff time	Ongoing
T	10	Encourage new business with TIER II materials to locate outside city limits	Hazardous materials release	Staff time	Ongoing
U	5	Use hazardous materials transport routes around cities and not through them whenever possible	Hazardous materials release	Staff time	Ongoing
W	7	Continue supporting the USDA Farm Service Agency and North Dakota State University Extension and provide assistance to local farmers and ranchers	Infectious disease; drought	Staff time	Ongoing
AA	6	Develop an insect control system during periods of standing water	Infectious disease and pest	High	2021
CC	11	Develop and maintain data system backup on a regular basis	Cyber attack and space weather	Low	Ongoing
DD	12	Harden electrical components and systems for critical facilities (especially emergency response services) against the anticipated impacts of a space weather event	Space weather	Moderate	2022
EE	13	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 LaMoure County	Space weather	Staff time	2021
UU	1	Resolve operational issues with lift station generator in Verona	Multiple	High	2021
WW	14	Develop and implement a plan to eliminate flooding at Verona’s west end	Flooding	High	2022

Notes for Action Items

The LaMoure 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 responsible for overseeing implementation of mitigation projects for each jurisdiction is listed as part of each project summary. This individual was identified during the planning process. The actual person performing the project may be different than the responsible party.

A: Conduct NFIP workshop to educate public about benefits of flood insurance

Workshops would be targeted at educating residents not required to buy flood insurance but still at risk for flooding. Technical assistance for a workshop is available from the North Dakota State Water Commission. A workshop could be conducted by the County in a central location, or rotating workshops could be held in each participating NFIP community. Funds are available for public awareness or education campaigns under the HMGP 5% Initiative.

Responsible party: LaMoure County Emergency Manager

B: Complete FIRM and establish floodplain management to prevent development in at risk areas

A flood insurance rate mapping project is expected to be completed within five years for certain areas primarily in the James River Valley. Additionally, the recently completed Risk MAP project has identified certain areas that may be at risk while not being within the FIRM study area.

Responsible party: County and city floodplain managers

C: Have a contact list to ensure residents along the James River can be contacted during rising water

Recent James River flooding has highlighted the importance of being able to alert residents of rising water.

Responsible party: LaMoure County Emergency Manager

D: Elevate commonly flood impacted roads and bridges, and evaluate and pursue further opportunities to mitigate potential impacts to roads and property

County officials have identified a large number of locations where roads are at risk from flooding that disrupts transportation and could cause property damage. The Risk MAP project also identified potential flooding risk locations. Taking these preventative measures can save money and eliminate transportation disruptions. Localized flood mitigation projects are eligible for FEMA funds through the HMGP, PDM and FMA grant programs.

Responsible party: LaMoure County Road Supervisor and LaMoure County Emergency Manager

E: Use hydrology and hydraulic studies to properly understand flow in the county's watersheds and make roadway improvements per study findings

Recent flooding impacts have been inconsistent with forecasts and currently available data. The anticipated James River FIS should provide an updated hydrology of the main stem and selected tributaries. However, the extent of the FIS may not address the reaches of some creeks, and additional analysis may be required to identify additional road and bridge mitigation actions. Hydrology and hydraulic studies that analyze the coincidence of tributary and main stem flooding will address this. Localized flood mitigation projects are eligible for funds through the HMGP, PDM and FMA grant programs.

Responsible party: LaMoure County Commission, Road Supervisor, and Emergency Manager

F: Improve municipal drainage in cities prone to localized flooding by identifying risk areas, and completing projects to reduce the impact

LaMoure, Edgeley, Marion, Berlin, and Kulm have areas which flood during spring melt, during heavy rains or major flood events.

Responsible party: Public works staff of each city

G: Increase official government social media presence in the County to keep residents informed of flood waters and actions

Local government communication via social media needs to be clearly identified as official communication, and used judiciously so that it will be taken seriously.

Responsible party: LaMoure County governing bodies, emergency management and public safety officials

H: Identify and acquire backup generators for all critical facilities in a prioritized manner

Blizzards, other severe winter weather, and severe summer weather can cause power outages that may last for days. Power loss can result in equipment or building damage as well as loss of function of critical facilities. Funds are available for generators under the HMGP and PDM programs.

Responsible party: LaMoure County Emergency Manager, critical facility owners

I: Further implement the county road open/closed map so residents can see the status of roads in winter storm and flood events

Blizzards, severe winter weather, and flooding can cause blocked or washed out roads and result in stranded motorists.

Responsible party: County road supervisor

J: Encourage utility provider to bury electric power lines when undergoing upgrades or repair

Power outages may cause some critical facilities and some residences to be without heat or electricity for essential functions for extended time periods.

Responsible party: Governing bodies of all local jurisdictions

K: Establish an ordinance on temporary/camping permits and direct access to storm shelters

LaMoure County Memorial Park has 65 tent/RV sites, but no system for tracking what sites are in use and enabling emergency response. Several city campgrounds are in a similar situation. A permitting system can also enable storm shelter awareness.

Responsible party: LaMoure County governing bodies

L: Install and maintain surge protection on critical equipment

Lightning strikes can cause significant damage to essential equipment and data.

Responsible party: Critical facility owners

M: Identify or construct emergency shelters for community parks/campgrounds

High winds, hailstorms and tornadoes can overturn or damage mobile homes and RVs and cause personal injury. Properly designed structures on permanent foundations are preferred alternatives.

Responsible party: LaMoure County governing bodies, emergency management and public safety officials

N: Remove abandoned structures that could harbor pests and be high risks for urban fire.

Abandoned and dilapidated structures are a potential fire risk identified in the cities of Dickey, Edgeley, Kulm, LaMoure, & Verona.

Responsible party: LaMoure, Verona, Dickey governing bodies

O: Maintain ongoing training and equipment upgrades to fight urban and wildland fires, and hazardous materials releases

Urban and wildland fires and hazardous materials releases have the potential to impact a large share of LaMoure County population.

Responsible party: Relevant fire departments

P. Administer Firewise program and implement best practices during wildfire season (priority Jud and Dickey)

Firewise is a nationwide program produced by the National Fire Protection Association. Within North Dakota the program is operated by the state Forest Service. Firewise focuses on education for individual homeowners to help prepare homes for wildfire resistance. Each jurisdiction's role within this program is to educate residents about wildfire risks and mitigation activities they can do to reduce their individual risk. Jud and Dickey's small, strong, independent community character make them ideal jurisdictions to pursue this mitigation action at a community level.

In addition to public education, the county and each city should evaluate opportunities for fuel reduction activities during wildfire season.

More information about Firewise can be found at:
http://www.firewise.org/
http://www.ag.ndsu.edu/ndfs/documents/firewise-standard.pdf/view
http://www.firewise.org/usa-recognition-program/state-liaison-list.aspx?sso=0

Additional resources may be required to implement fuel reduction activities. Wildfire fuels reduction is eligible for funding through the FEMA HMGP and PDM grant programs.

Responsible party: County and city governing bodies (coordinating with local fire districts)

Q: Develop a strategy to determine prioritized locations and optimum volumes of water storage for fire fighting.

Fighting wildfires is hampered by lack of available water. This action paves the way for the reduction of property loss and potentially eliminating the threat of fire at the wildland-urban interface.

Responsible party: Each rural fire department

S: Explore shelter and evacuation options for each city in case of hazardous materials releases

Most of the area within each city is susceptible to impacts from hazardous materials release. Appropriate shelter locations and evacuation routes should be re-evaluated and publicized.

Responsible party: LaMoure County Emergency Manager, governing bodies of each city

T: Encourage new business with TIER II materials to locate outside city limits

Most of the area within each city is susceptible to impacts from hazardous materials release resulting in risk to the county's population centers. Separation of sites with TIER II materials from population centers will avoid increasing this risk.

Responsible party: City governing bodies

U: Use hazardous materials transport routes around cities and not through them whenever possible.

Hazardous materials transport happens regularly within and through LaMoure County. Identifying and establishing routes and regulations to minimize risk through the population centers is a low cost way to mitigate this risk.

Responsible party: LaMoure County Emergency Manager, governing bodies of each city

V: Survey the number and type of hazardous materials passing through LaMoure County

Hazardous materials travel through the county by rail and by truck. Identifying the amount and type of materials passing through can allow better preparation for a potential hazardous material release.

Responsible party: LaMoure County Emergency Manager

W: Continue supporting the USDA Farm Service Agency and North Dakota State University Extension and provide assistance to local farmers and ranchers

Agriculture is a key component of the county's economy. Significant droughts, pest infestations, winter storms, summer storms, and flooding all affect the industry and the economy of the entire county.

Responsible party: Governing bodies in LaMoure County

X: Develop an emergency response plan that includes coordination with local livestock producers

Potential issues include loss of water supply in droughts, infectious diseases, severe summer heat, and severe winter weather. One particular concern is appropriate animal disposal in the event of multiple deaths.

Responsible party: Local FSA and USDA staff

Y: Complete Emergency Action Plan for Cottonwood Creek Dam failure

A Cottonwood Creek Dam failure may cause property damage or even loss of life in its impact area. The Action Plan is needed to identify potential impacts. This will allow more responsive mitigation efforts to be completed.

Responsible party: City of LaMoure governing body

Z: If need is established, restrict future development in the impact area of potential significant dam failures

Although significant impact is thought only to be likely for a Cottonwood Creek Dam failure, it is wise to limit development downstream of any significant dam. Completion of Cottonwood Creek Dam Emergency Action Plan will establish level of need for the most significant area of concern.

Responsible party: City of LaMoure governing body, and LaMoure County Emergency Manager

AA: Develop an insect control system during periods of standing water.

Infectious diseases transmitted by mosquitos are an ongoing hazard. Treating insect habitat can effectively reduce the risk of infectious disease.

Responsible party: LaMoure County Emergency Manager, local governing bodies

BB: Obtain drone or similar technology and certified staff that can be used to access visual context for multiple hazards

Drones are proving their value to safely provide critical information in a timely manner. This requires both equipment and trained staff.

Responsible party: LaMoure County governing bodies, emergency management and public safety officials

CC: Develop and maintain data system backup on a regular basis.

Loss of critical data can be an expensive or irreparable problem for local governments, critical facilities, and businesses. Data backup systems are a cost-effective solution when properly implemented.

Responsible party: local governing bodies

DD: Harden electrical components and systems for critical facilities (especially emergency response services) against the anticipated impacts of a space weather event

Loss of critical facilities electrical systems and functionality from a space weather event could have catastrophic consequences.

Responsible party: Critical facility owners/operators

EE: 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 LaMoure County

Widespread, long term loss of electrical power could lead to loss of life, and disruption of life as we know it in LaMoure County

Responsible party: LaMoure County Emergency Manager

FF: Public Education

Hazard-related public education campaigns should include a wide variety of topics. Potential topics include:

- Hazardous materials awareness/shelter-in-place for residents
- Summer and winter weather safety
- Weather resistant building best practices
- Flood safety and NFIP promotion
- Fire weather notifications and fire prevention best practices
- Water conservation techniques
- Household preparation for space weather events
- Security measures against cyber attacks
- Hardening electrical and electronic systems
- Infectious disease, and pest control
- ND Vision Zero programs

Funds are available for public awareness or education campaigns under the HMGP 5% Initiative.

Responsible party: LaMoure County Emergency Manager

GG: Establish a robust communication system for all elements of the LaMoure County emergency response team

State level communications backbone and system decisions have been made. Now it is vital that all emergency responders in the county obtain and install a robust system that allows high quality radio/cellular communications internally and with the statewide system.

Responsible party: LaMoure County Emergency Manager

HH: Ensure County has a communication tool to reach all cell phones locally or county wide to inform of criminal terrorist nation attacks or other significant emergencies

Prompt alerts to significant emergencies are critical to saving lives and protecting property. The County emergency response operations should have a tool in place to issue such alerts to the appropriate geographic areas of the County.

Responsible party: LaMoure County Emergency Manager

II: Develop a plan to increase the First Responder level of training and equipment.

The responders closest to the scene of a criminal terrorist nation attack or a transportation incident (especially those involving hazardous materials) may not be those typically equipped to handle these incidents. Increasing training and equipment availability for them can potentially limit the level of property loss or injury from such incidents.

Responsible party: LaMoure County Emergency Manager

JJ: Establish a table top training program on a rotating annual basis to address response to critical incidents: transportation incidents, infectious diseases, cyber attacks, and other hazards.

Table top training has been demonstrated to be an effective low-cost way to train for many emergency events.

Responsible party: LaMoure County Emergency Manager

KK: Install warning siren at Lake LaMoure.

Hundreds of people gather at Lake LaMoure during the summer and have no warning system in place.

Responsible party: City of LaMoure governing body

LL. Construct community shelter in Berlin with potential to meet multiple functions including city government, maintenance and fire equipment storage

Berlin has begun fundraising for a community building with multiple functions. A community shelter designed to be a multi-functional building will allow maximum grant and fund-raising options and maximize efficiency. And it supports the city's vision of its own fire department.

Responsible party: City of Berlin governing body

MM: Replace existing culvert by school and outlet culvert by park with larger culverts in Edgeley

Both these locations are prone to flooding.

Responsible party: City of Edgeley governing body

NN: Upgrade equipment with a new pumper/tanker fire truck in Jud

Existing equipment is aging out, and a new pumper/tanker truck is the highest priority.

Responsible party: Jud Fire Department

OO: Upgrade warning siren in Berlin with louder siren

The current Berlin siren cannot be heard throughout the city.

Responsible party: Berlin governing body

PP: Acquire and install a new fixed generator in Jud

A new fixed generator will address limited capacity to maintain power to critical facilities.

Responsible party: Jud governing body

QQ: Acquire a new portable generator in Berlin

It is envisioned that a new fixed generator will be installed in the proposed fire hall/community shelter. Until then a large portable generator will meet current needs while offering future flexibility.

Responsible party: Berlin governing body

RR: Acquire and install a new fixed generator in Kulm

A new fixed generator will address limited capacity to maintain power to critical facilities.

Responsible party: Kulm governing body

SS: Road improvements to maintain access to Twin Lakes properties

High water levels threaten access to many properties surrounding Twin Lakes.

Responsible party: LaMoure County Road Department

TT: Hold a flood risk meeting for property owners in the City of Dickey

An anticipated Flood Insurance Study for the James River and some of its tributaries will likely result in some parts of the City of Dickey being mapped as having a 1% annual chance flood risk. A meeting should be held to explain the results of mapping including flood insurance requirements and costs and alert property owners to opportunities to position themselves for favorable flood insurance rates.

Responsible party: LaMoure County Emergency Manager and the mayor of the City of Dickey.

UU: Resolve operational issues with lift station generator in Verona

Verona recently acquired a new backup generator for their lift station that has a recurring operational problem. This must be resolved to protect property from damage and potential health risks.

Responsible party: Verona governing body

VV: Acquire and install a new fixed generator in Marion

A new fixed generator will address limited capacity to maintain power to critical facilities.

Responsible party: Marion governing body

WW: Develop and implement a plan to eliminate flooding at Verona's west end

There is recurring flooding on 1st Avenue between 1st and 2nd Streets at the west end of Verona.

Responsible party: Verona governing body

XX. Organize a floodplain management workshop to be presented by the ND NFIP Coordinator for all NFIP participating community floodplain managers

The Cities of Edgeley, LaMoure, and Marion, Grand Rapids Township, and LaMoure County are all NFIP participating communities. Each has adopted floodplain regulations and designated a floodplain manager. However, the floodplain managers have a host of other responsibilities for their local governments, and floodplain management is not an every day activity. This workshop will refresh their understanding and enhance their floodplain management training, thus enhancing the level of floodplain management for their jurisdictions.

Responsible party: Floodplain managers for Cities of Edgeley, Lamoure, and Marion, Grand Rapids Township, and LaMoure County

YY. Evaluate the effectiveness of the authorized short term emergency drain and the benefit/cost of a permanent drain to protect city infrastructure from impacts of continued rising waters along Marion's western edge

The three lakes along Marion's western edge have been rising to the point they have become one lake. Continued water elevation increases will eventually cause flooding in the city which could damage structures, inundate sanitary sewer and storm sewer systems, and make some streets impassible. The recommended evaluation is the next step in developing permanent protection from flooding.

Responsible party: City of Marion governing body

Chapter 5: Plan Maintenance

This chapter details the plan maintenance process to make sure the LaMoure 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 (and uncompleted projects from previous periods)
- 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 for the project since the last meeting
- What obstacles, problems or delays the project encountered
- If the project needs to be changed or revised

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 LaMoure 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 a 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. The critical facilities list should also be reviewed to see if any additions or deletions need to be made. 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 winter storm and flooding impacts have been so significant in the county 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 LaMoure Chronicle and the Edgeley Mail sat in on Planning Team meetings, and would probably report on the Status Report findings. A copy of the Report could be sent to each local newspaper serving the County.

Although the Emergency Manager's 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 Countywide Planning Mechanisms

The County's 2014 Multi-Hazard Mitigation Plan includes no specific details about integrating the plan into existing mechanisms. It notes that each jurisdiction is encouraged to adopt the hazard mitigation plan and incorporate it into any existing mechanisms the jurisdiction

may have. Each participating jurisdiction adopted the plan; however, it was not incorporated into any other planning mechanisms.

Due to the limited resources of each jurisdiction, few planning mechanisms exist within the county. The county's population is not projected to see significant growth through 2030. This suggests 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.

The limited resources of each jurisdiction do not allow for many activities beyond the standard course of business, and mitigation can get overlooked. 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.

As noted in Chapter 4, some jurisdictions in the County lack zoning controls (Dickey, Jud, Marion) and only two jurisdictions in the County have a comprehensive plan (Berlin, Edgeley). This MHMP will be used to inform future updates of the Berlin and Edgeley existing comprehensive plans. Establishing zoning and completing a comprehensive plan could help ensure that some of the mitigation action items are more effectively implemented. The Planning Team will encourage incorporation of mitigation actions if Dickey, Jud, Kulm, LaMoure, Marion or Verona choose to develop a comprehensive plan, and establish or update their zoning regulations. The existing administrative function most likely to provide an opportunity for integrating the multi-hazard mitigation plan is through the building permit process, since all cities but Berlin and Dickey issue permits. One way to support this integration would be for cities to have a checklist of hazards and mitigation actions that are reviewed prior to issuing any permits.

The county will incorporate mitigation actions as it completes its update to the Emergency Operations Plan and THIRA. County level planning initiatives such as zoning and comprehensive plans are essentially not relevant to cities because the jurisdiction of cities and counties are mutually exclusive with regards to planning and zoning. More than half the townships in the County have established zoning. It may be that the County Emergency Manager could encourage integration of some mitigation actions with Township zoning controls as an alternative to the implementation of County zoning.

Some specific actions that would aid implementation of this plan in the cities are the following:

- Cities without zoning ordinances could establish a specific policy discouraging development in areas identified as susceptible to flooding.
- Cities with zoning could include an overlay to address areas with special building limitations or concerns such as areas susceptible to flooding or close to hazardous materials transport routes.
- Cities without an adopted building code could consider adopting the state building code and specifically adding snow load standards to reduce risk of structural collapse.

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

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

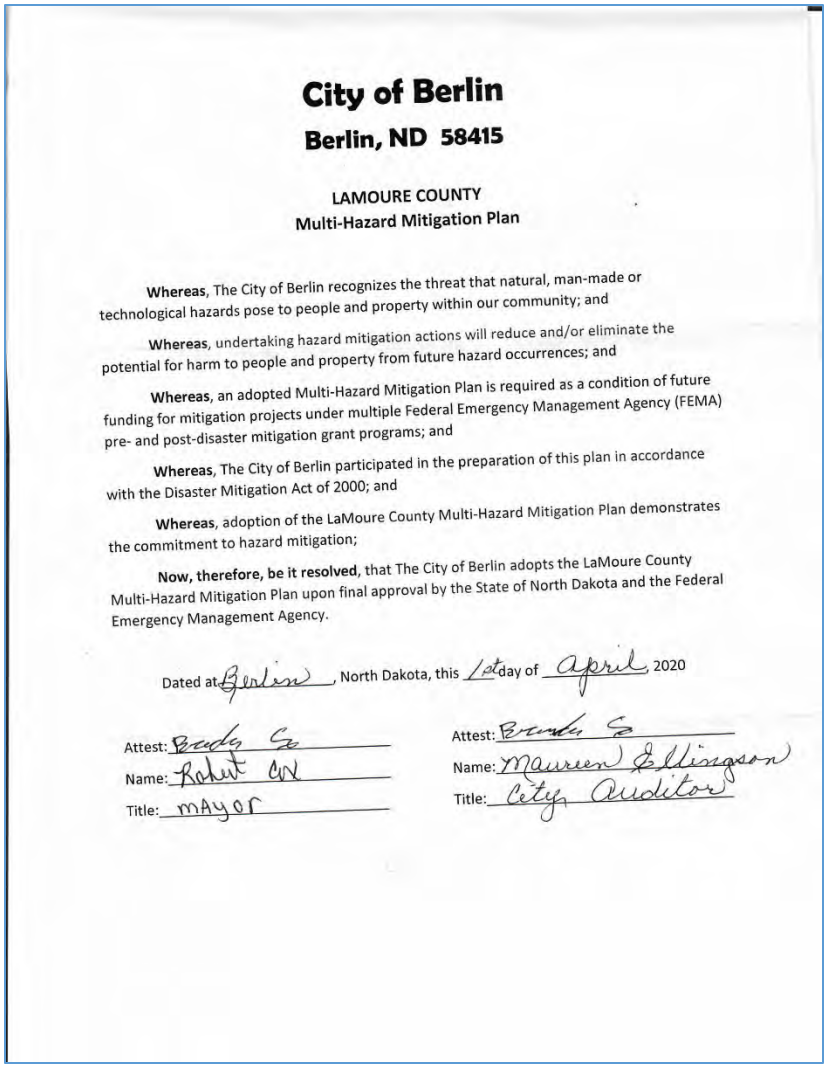
Updating the Plan

The LaMoure County Emergency Manager is responsible for overseeing the five-year update process. Ten to twelve months should be allowed for completion of the plan – six to nine 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 G. Funding opportunities from DES/FEMA may also be evaluated when determining

project scope. The Emergency Manager should also evaluate the possibility of contacting neighboring jurisdictions to join in the plan to achieve cost savings.

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: Approval and Adoption Documentation



City of Berlin

Berlin, ND 58415

LAMOURE COUNTY
Multi-Hazard Mitigation Plan

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

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

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

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

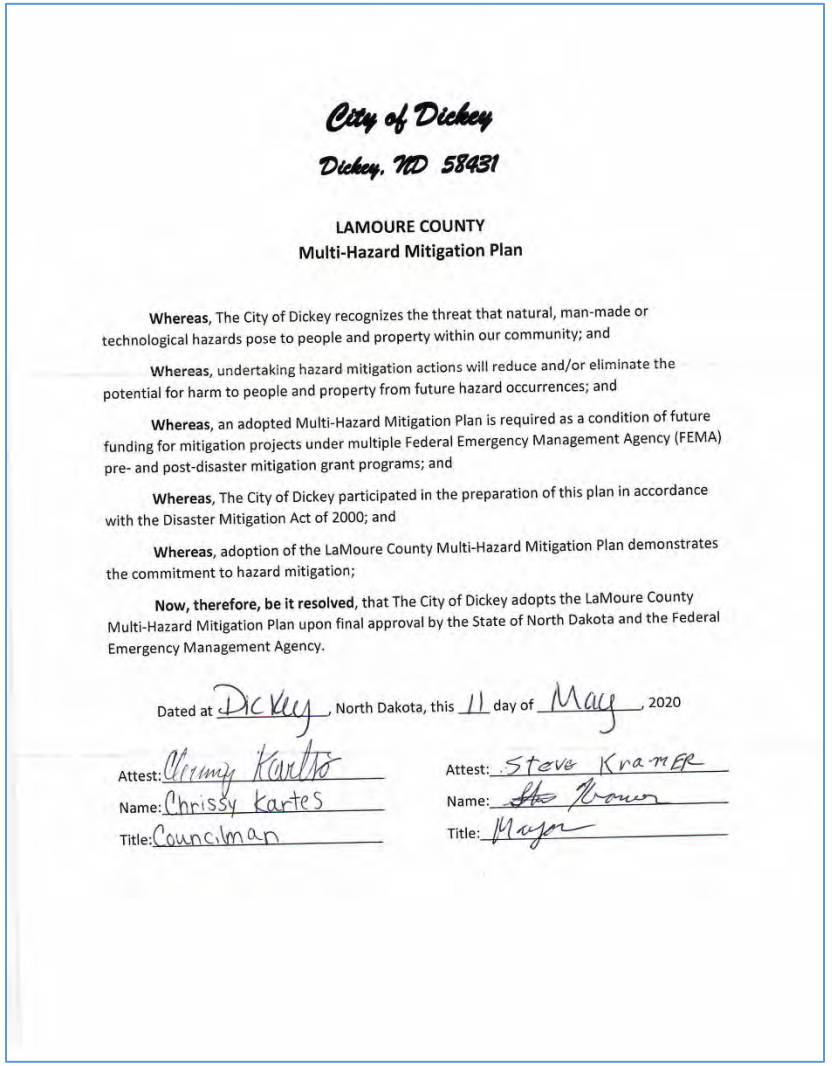
Whereas, adoption of the LaMoure County Multi-Hazard Mitigation Plan demonstrates the commitment to hazard mitigation;

Now, therefore, be it resolved, that The City of Berlin adopts the LaMoure County Multi-Hazard Mitigation Plan upon final approval by the State of North Dakota and the Federal Emergency Management Agency.

Dated at Berlin, North Dakota, this 1st day of April, 2020

Attest: Brenda Ga
Name: Robert Ott
Title: Mayor

Attest: Brenda Ga
Name: Maureen Gillingsson
Title: City Auditor



City of Dickey

Dickey, ND 58431

LAMOURE COUNTY
Multi-Hazard Mitigation Plan

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

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

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

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

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

Now, therefore, be it resolved, that The City of Dickey adopts the LaMoure County Multi-Hazard Mitigation Plan upon final approval by the State of North Dakota and the Federal Emergency Management Agency.

Dated at Dickey, North Dakota, this 11 day of May, 2020

Attest: Chrissy Kartes
Name: Chrissy Kartes
Title: Councilman

Attest: Steve Kramer
Name: Steve Kramer
Title: Mayor

City of EDGELEY
P.O. Box 205
519 Main Street
Edgeley, ND 58433

LAMOURE COUNTY
Multi-Hazard Mitigation Plan

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

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

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

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

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

Now, therefore, be it resolved, that _City Of Edgeley adopts the LaMoure County Multi-Hazard Mitigation Plan upon final approval by the State of North Dakota and the Federal Emergency Management Agency.

Dated at _____, North Dakota, this 4th day of May, 2020

Attest: Wayne A. Henderson
Name: Wayne A. Henderson
Title: Mayor

Attest: Joseph C. Weis
Name: Joseph C. Weis
Title: City Auditor

City of Jud
Jud, ND 58454

LAMOURE COUNTY
Multi-Hazard Mitigation Plan

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

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

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

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

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

Now, therefore, be it resolved, that The City of Jud adopts the LaMoure County Multi-Hazard Mitigation Plan upon final approval by the State of North Dakota and the Federal Emergency Management Agency.

Dated at Jud, North Dakota, this 24 day of April, 2020

Attest:
Name:
Title: Mayor

Attest:
Name:
Title: City Bd. Pres.

City of Kulm
Kulm, ND 58456

LAMOURE COUNTY
Multi-Hazard Mitigation Plan

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

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

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

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

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

Now, therefore, be it resolved, that The City of Kulm adopts the LaMoure County Multi-Hazard Mitigation Plan upon final approval by the State of North Dakota and the Federal Emergency Management Agency.

Dated at Kulm, North Dakota, this 13th day of April, 2020

Attest: Angie Holmgren
Name: Dale Gaeckle
Title: Mayor

Attest: Dale Gaeckle
Name: Angie Holmgren
Title: Kulm City Auditor

City of LaMoure
315 3rd Ave SE
LaMoure, ND 58458

LAMOURE COUNTY
Multi-Hazard Mitigation Plan

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

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

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

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

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

Now, therefore, be it resolved, that The City of LaMoure adopts the LaMoure County Multi-Hazard Mitigation Plan upon final approval by the State of North Dakota and the Federal Emergency Management Agency.

Dated at LaMoure, North Dakota, this 14th day of April, 2020

Attest: Kevin Wiley
Name: Kevin Wiley
Title: Mayor

Attest: Gina Haugen
Name: Gina Haugen
Title: auditor

City of Marion

Marion, ND 58466

LAMOURE COUNTY
Multi-Hazard Mitigation Plan

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

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

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

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

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

Now, therefore, be it resolved, that The City of Marion adopts the LaMoure County Multi-Hazard Mitigation Plan upon final approval by the State of North Dakota and the Federal Emergency Management Agency.

Dated at Marion, North Dakota, this 22 day of May, 2020

Attest: Gene Rode
Name: Gene Rode
Title: Mayor

Attest: Annetta Ihli
Name: Annetta Ihli
Title: Auditor

City of Verona

Verona, ND 58490

LAMOURE COUNTY
Multi-Hazard Mitigation Plan

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

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

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

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

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

Now, therefore, be it resolved, that The City of Verona adopts the LaMoure County Multi-Hazard Mitigation Plan upon final approval by the State of North Dakota and the Federal Emergency Management Agency.

Dated at Verona, North Dakota, this 13 day of April, 2020

Attest: Darin Wetzel
Name: Darin Wetzel
Title: Mayor

Attest: Kristy Maley
Name: Kristy Maley
Title: City Auditor

LaMoure County Department of Emergency Services
& Emergency Services Communication Systems
PO Box 128
LaMoure, ND 58458
Phone: (701) 883-6096
www.lamourecountynd.com

LAMOURE COUNTY
Multi-Hazard Mitigation Plan

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

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

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

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

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

Now, therefore, be it resolved, that LaMoure County adopts the LaMoure County Multi-Hazard Mitigation Plan upon final approval by the State of North Dakota and the Federal Emergency Management Agency.

Dated at LaMoure, North Dakota, this 17 day of March, 2020

Attest: Keith Heidinger
Name: Keith Heidinger
Title: Chairman

Attest: Janice Hamlin
Name: Janice Hamlin
Title: County Auditor

Appendix B: Planning Process

Project Schedule

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

Planning Team Meeting (August 23, 2018; 7:00 pm – 8:30 pm; Edgeley Ambulance Hall, Edgeley)

Kickoff meeting including discussion of website, draft questionnaire, recent issues, and mitigation action items from previous plan.

Planning Team Meeting (November 29, 2018; 7:00 pm – 9:00 pm; Edgeley Ambulance Hall, Edgeley)

Topics addressed at this meeting included Tier II and hazardous materials documentation, community capabilities and critical facilities, previous hazard events and past community level risk assessments.

Planning Team Meeting (February 28, 2019; 7:00 pm – 8:30 pm; Edgeley Ambulance Hall, Edgeley)

Initial review and discussion of hazards, especially hazards of concern for individual cities.

City Council-County Board-Public Meetings (2019)

A summary of the hazard profiles was presented, and the community survey was conducted with all meeting participants. Additionally, the project team led discussion with governing body and community members about significant hazard issues and potential mitigation actions for each jurisdiction. The dates and times of each meeting were as follows:

- Verona – February 11, 7:00 pm
- Edgeley – March 6, 5:00 pm
- Berlin – March 6, 6:30 pm
- Kulm – March 11, 7:00 pm
- LaMoure – March 12, 12:00 pm
- Jud – March 12, 2:00 pm
- Marion – May 6, 8:00 pm
- Dickey – January 15, 7:00 pm

Planning Team Meeting (May 2, 2019: 8:00 am – 9:00 am; Edgeley Ambulance Hall, Edgeley)

Only limited discussion of MHMP took place. The focus was on flooding impacts and response.

County Wide Public Meeting (June 13, 2019; 7:00 pm – 8:00 pm; Edgeley Ambulance Hall, Edgeley)

Hazard profiles and risks were presented. Discussion focused on results of the community meetings and potential mitigation actions.

Planning Team Meeting (August 14, 2019; 8:00 am – 9:40 am; Edgeley Ambulance Hall, Edgeley)

Only limited discussion of MHMP topics took place. The focus was on mitigation ideas for tornado shelters and a possible ordinance pertaining to managing crew camp situations that pose potential emergency response issues.

Planning Team Meeting (September 5, 2019; 12:00 pm – 1:30 pm; LaMoure County Courthouse, LaMoure)

Primary focus of the meeting was the review and refinement of mitigation actions.

Planning Team Meeting (October 18, 2019; 8:00 am – 9:00 am; Edgeley Ambulance Hall, Edgeley)

Primary focus of the meeting was reviewing and refining parts of the draft MHMP.

Planning Team Meeting (November 21, 2019; 7:00 pm – 8:00 pm; Edgeley Ambulance Hall, Edgeley)

Only limited discussion of MHMP topics took place. The focus was on questions pertaining to wildland and urban fire history and risk.

Community Survey

The community survey asked questions related to hazard prioritization and preferred strategies. The survey was available on the project website and in paper form at the emergency management office. It was also distributed at the meetings held in each community. Results from the community survey were utilized to help develop the risk assessment and mitigation strategy.

Natural hazards in order of frequency listed in top 3:	
Severe summer weather	93%
Severe winter weather	91%
Flooding	52%
Drought	31%
Wildland fire	22%
Communicable disease	22%

Technological or human-caused hazards in order of frequency listed in top 3:	
Hazardous material release	81%
Urban fire	70%
Shortage/outage of critical material	67%
Terrorist or active killer risk	46%
Dam failure	20%
Transportation incident	19%

Mitigation actions for flooding in order of frequency listed in top 3:	
Identify roads at risk and protect them	78%
Restrict development in high risk areas	65%
Riprap locations with high erosion potential	63%
Upgrade municipal drainage systems	48%
Build levees for protection	31%
Educate about benefits of flood insurance	19%

Mitigation actions for severe summer weather in order of frequency listed in top 3:	
Establish backup power supplies	74%
Provide warning sirens	61%
Provide cell phone alerts	48%
Install surge protection for critical facilities	30%
Education about summer storm hazards	30%
Ensure community shelters are available	22%
Building code enforcement	17%
Use weather radio to alert of hazards	11%
Require shelters for mobile home parks	7%
Install shatterproof windows -key facilities	6%

Reviewed Documents

Documents reviewed and incorporated into this plan include:

2014 LaMoure County Multi-Hazard Mitigation Plan
LaMoure County Risk MAP Study (risk assessment)
2018 North Dakota Draft Enhanced Multi-Hazard Mitigation Plan (risk assessment and mitigation ideas)

Neighboring Jurisdictions, Local and Regional Agencies

Representatives from North Dakota DES attended two LEPC/Planning Team Meetings. Other regional agencies/organizations that had a representative attend at least one meeting include the Central Valley Health Unit and Plains Grain & Agronomy. Local agencies represented included the Sheriff's Department and Road Department from LaMoure County, Jud, Edgeley, LaMoure, LaMoure Rural Fire Departments, LaMoure Public Works Department, and LaMoure and Edgeley Ambulance Services. Representatives of the Water Resource Board and the three Rural Water providers were also contacted to obtain information on flooding issues and water supply, respectively. Reporters from the Edgeley Mail also attended several Planning Team meetings.

Attendance

Representatives from each participating jurisdiction who attended at least one project meeting are listed below.

LaMoure County:
- Kimberly Robbins, Emergency Manager, County Floodplain Administrator
- Bob Flath, County Commission
- Robert Fernandes, Sheriff
- Jeff Fleck, Deputy Sheriff
- Josh Loegering, Road Superintendent
- Tony Hanson, County Health
- Bruce Klein, County Commission
- Jan Hamlin, Auditor

Berlin:
- Edward Quast, City Council
- Robert Cox, Mayor
- Christina Cox, City Council
- Maureen Ellingson, Auditor
- Dorothy Bandert, Resident

Dickey:
- Chrissy Kartes, Alderman
- Kelli Kuska, Auditor

Edgeley:
- Richard Gutschmidt, City Council
- Sally Gudille, City Council
- Lucas Madcke, City Council
- Jason Caudillo, Resident
- Wayne Henderson, City Council
- Christine Henderson, News Media
- Joseph Neis, Auditor
- Michelle Berry, City Council
- Dan Schlosser, City Council

Jud:
- Vicki McMahon, City Council
- Michelle Fernandes, Auditor
- Alan Nitschke, City Council
- Kimberly Robbins, LaMoure County DES

Kulm:
- Layton Johnson, City Council
- Josh Gackle, City Council
- Zeb Mahin, City Council
- Doug Hintzman, Kulm Fire Dept
- Katilyn Holmgren, News Media
- Victor Gackle, City Staff
- Angie Holmgren, Auditor
- Dale Gackle, Mayor
- Nathan Klusmann, City Council

LaMoure:
- Bob Flath, City Council, Fire Dept
- Jennifer Person, Auditor
- Kimberly Robbins, LaMoure County DES

Marion:
- Jason Bower, City Council
- David Holweg, City Council
- Gene Rode, Mayor
- Annetta Ihli, Auditor

Verona:

- Justin Domine, City Council
- Kristy Maley, Auditor
- Dave Maley, City Council
- Ron Maley, City Council
- Bruce Klein, County Commission

Project representatives met with the following city councils/commissions. The plan was discussed as an agenda item during the regularly-scheduled council or a specially scheduled meeting:

- Berlin, March 6
- Dickey, January 15
- Edgeley, March 6
- Jud, March 12
- Kulm, March 11
- LaMoure, March 12
- Marion, May 6
- Verona, February 11

People who participated in at least one Planning Team meeting or a special meeting as a Planning Team representative are identified in the following table.

Name	Title	Representing
Frank Balak	EPR Planner	Central Valley Health
Jeff Fleck	Deputy	LaMoure County Sheriff
Kimberly Robbins	Emergency Manager	LaMoure County DES
Robert Fernandes	Sheriff	LaMoure County Sheriff
Bob Flath	Commissioner	LaMoure County Comm
Todd Vogel	Manager	PGA - Industry
Mike Vogel	Fireman	LaMoure Fire Dept
Art Hageboch	Chief	LaMoure Fire Dept
Josh Loegering	Road Superintendent	LaMoure County Hiwy
Tony Hanson	Administrator	LaMoure County Health
Grant Mathern	Fireman	Edgeley Fire Dept
Alan Nitschke	Council Member	Jud Fire Dept, Council
Dustin Lien	Paramedic	Edgeley Ambulance
Bill Brown	Em Response Coord.	ND DES
Dave Maley	Council Member	Verona City Council
Heath Schaffer	Public Works Super.	City of LaMoure
Maureen Ellingson	Auditor	City of Berlin
Joe Neis	Auditor	City of Edgeley
Jan Hamlin	Auditor	LaMoure County
Jennifer Person	Auditor	City of LaMoure
Bruce Klein	Commissioner	LaMoure County
Wayne Henderson	Mayor	City of Edgeley
Josh Gackle	Council Member	City of Kulm
Doug Hintzman	Fire Chief	Kulm Fire Dept
JulieAnne Racine	County Agent	NDSU Extension
Chrissy Kartes	Alderman	City of Dickey
David Holweg	Council Member	City of Marion

LaMoure County
11-29-2018

Name	Representing
Joel Quanbeck	KLJ
[redacted]	
Frank Balak	Central Valley Health District
Jeff Fleck	LaMoure County S/O
Kimberly Robbins	LaMoure County DES
Todd Vogel	Industry Minot ND
Mike Voigt	LaMoure Fire Department
Art Hagebuck	LaMoure Fire Dept
Julianne Racine	Extension
Bob Flath	LaMoure County
Tony Hanson	LaMoure County Plt.
Grant Mathern	Edgeley Fire Dept
Alan Nitschke	Jud Fire Dept
Dustin Lien	Edgeley Ambulance
Doug Hintzman	Kulm Fire

LaMoure Co LEPC
6-13-2019

Name	Title	Organization
Joel Quanbeck	Planner	KLJ
Kimberly Robbins	Emergency Manager	LaMoure County
Julianne Racine	Extension Agent	NDSU Extension
Art Hagebuck	LaMoure Fire Dept. Chief	
Bob Flath	Commissioner	LaMoure County
Todd Vogel	Manager	Industry
Bill Brown		NDDES
Wayne Henderson	Edgeley Mayor	
Christie Henderson	Reporter	The Edgeley Mail

LaMoure County

5-Sep-19

Multi Hazard Mitigation Planning Meeting

LaMoure, ND

	Name	Representing	email address
1	Kimberly Robbins	LaMoure County DEMS	kimberly.robbins@co.lamoure.nd.us
2	Mike Vogel	LaMoure + Verona Fire Dept.	
3	Dave Maley	City of Verona	blademan@drtel.net
4	Heath Schaffer	City of LaMoure	lamourestreet@gmail.com
5	Robert Fernandes	LaMoure County SO	
6	Art Hagebock	LaMoure Fire Dept	
7	Patty Wood Bartle	Edgeley Mail	edgeleymail@drtel.net
8	Maureen Ellingson	Berlin City	mellng@drtel.net
9	Joel Quanbeck	KLJ	joel.quanbeck@kljeng.com
10	Jan Hamlin	LaMoure Co. Auditor	jan.hamlin@co.lamoure.nd.us
11	Jennifer Person	City of LaMoure	glamoure@drtel.net
12	Joe Neis	City of Edgeley	city@edgeley.com
13	Josh Luegenny	LCHD	josh.luegeny@co.lamoure.nd.us
14	Bruce Klein	LaMoure Co	
15	Bob Flath	LaMoure Co.	
16	Bill Brown	NDDES	babrown@nd.gov
17			
18			
19			
20			

LAMOURE LEPC

OCT 18-2019

Name	title	Representing
Kimberly Robbins	EM/DES LaMoure County	LaMoure County
Todd Vogel	manager PGA	Industry
Bob Flath	Commissioner	County
Josh Luegenny	Highway Super/Engineer	County
Maureen Ellingson	Auditor	City of Berlin
Josh Gackle	Council Member	City of Kulm
Wayne Henderson	Edgeley Mayor	Edgeley
Joseph Neis	Edgeley Auditor	Edgeley
Alan Nitschke	Council member	Jud
Tony Hanson	LaMoure Co. Public Health	LaMoure
Heath Schaffer	City of LaMoure Sup	LaMoure

LaMoure County Multi-Hazard Mitigation Plan

Community Meetings Sign-In Sheet BERLIN

NAME	EMAIL	REPRESENTING
Edward Zuast		City Counsel
Robert Cox		mAyor
Christina Cox		City Council
Maureen Ellingson		Auditor
Dorothy [illegible]		Visitor

LaMoure County Multi-Hazard Mitigation Plan

Community Meetings Sign-In Sheet EDGELEY

NAME	EMAIL	REPRESENTING
Richard Gutschmidt	rigutsch@gmail.com	City Council
[illegible]	[illegible]	[illegible]
Lucas Madcke	lucasmadcke@hotmail.com	City council
Jason [illegible]		citizen
Wayne Henderson	wchenderson94@gmail.com	City
Christine Henderson	edgeleymail@drtel.net	Newspaper
Joseph C. Neis	neis@drtel.net or city@edgeley.com	City Auditor
Michelle Berry	lamberry@outlook.com	City Council
Dan Schlosser	[illegible]@hotmail.com	City Council

LaMoure County Multi-Hazard Mitigation Plan

Community Meetings Sign-In Sheet Jud

NAME	EMAIL	REPRESENTING
Michelle Fernandez	Camichelle@live.com	city of Jud
Vicki McMahon	vicki.mcmahon@servicedogsforamerica.org	
ALAN WITSCHKE	alancoet45@yahoo.com	City of Jud
Kimberly Robbins	kimberly.robbins@lamoure.edus	LaMoure County

LaMoure County Multi-Hazard Mitigation Plan

Community Meetings Sign-In Sheet Kulm

NAME	EMAIL	REPRESENTING
Joel Quanbeck	joel.quanbeck@kljeng.com	KLJ
Dale Gackle	dale@dstel.net	city of Kulm
Nathan Klusmann	nsklusmann@yahoo.com	City of Kulm
Layton Johnson	layton-44@hotmail.com	City of Kulm
Josh GACKLE	gackleje@yahoo.com	City of Kulm
Zeb Mahin	Zebmahin@gmail.com	City of Kulm
Doug Hoffman		Kulm Fire
Kathlynn Holmgren		Kulm Messenger
Dietan Gackle		city of Kulm

LaMoure County Multi-Hazard Mitigation Plan

Community Meetings Sign-In Sheet LAMOURE

NAME	EMAIL	REPRESENTING
Joel Quanbeck	joel.quanbeck@kljeng.com	KLJ
Bob Flath	robertflath@drtel.net	LaMoure County
Jennifer Person	lamoure@drtel.net	City of LaMoure
Kimberly Robbins	kimberly.robbins@co.lamoure.nd.us	LaMoure County

LaMoure County Multi-Hazard Mitigation Plan

Community Meetings Sign-In Sheet Marion

NAME	EMAIL	REPRESENTING
Joel Quanbeck	joel.quanbeck@kljeng.com	KLJ
Jason Bauer	jasonbauer@kljd.nd.us	City of Marion
Dale Holweg	dholweg@hotmail.com	City of Marion
Dana Rogde	dmins@drtel.net	City of Marion
Annette Thiel	aihli12@hotmail.com	City of Marion

LaMoure County Multi-Hazard Mitigation Plan

Community Meetings Sign-In Sheet Verona FEB 11, 2019

NAME	EMAIL	REPRESENTING
Joel Quanbeck	joel.quanbeck@kljengr.com	KLJ
Justin Domine	jdomine_47@hotmail.com	council
Kristy Maley	macon@drtel.net	City auditor
Dave Maley	blodeman@drtel.net	council
Ron Maley		council
Bruce Klein	bkklein@drtel.net	County comm.

Dickey
1-15-2020

Name	Title	Representing
Chrissy Kartes	Aldermen	City of Dickey
Kelli Kaska	Auditor	City of Dickey

Publicity

The community survey and public meetings were advertised in the *Edgeley Mail, Marion Messenger, LaMoure Chronicle, and Litchville Bulletin,* and flyers were distributed at various locations throughout the county. Additional publicity to invite public participation included:

- Posting meeting information on the LaMoure County website
- Sending press releases to local news media
- Posting meeting information on the project website

Sample Notice in Local Newspapers

HELP REDUCE THE IMPACT OF LOCAL HAZARDS

The LaMoure County Local Emergency Planning Committee is updating the county's Multi-Hazard Mitigation Plan. The public is invited to attend the following meeting to offer comments on concerns, priorities, and solutions related to emergencies and disasters in LaMoure County.

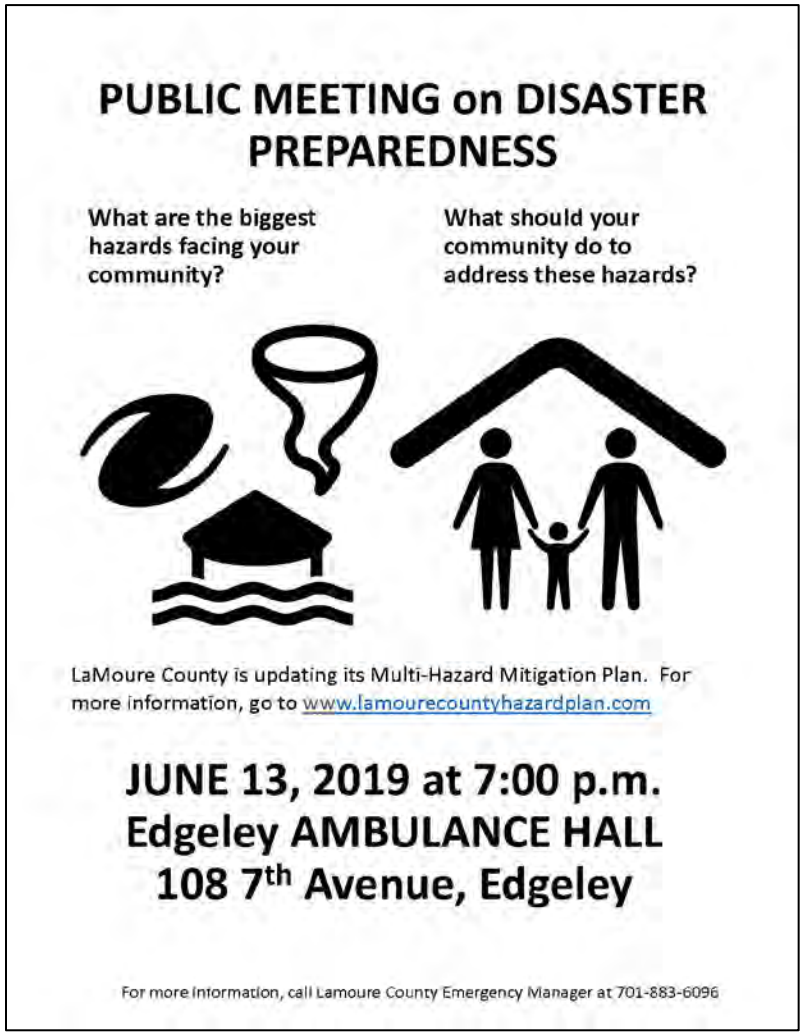
Jud – March 12 at 2 pm
Jud City Hall, 515 Logie Street

Additional meetings are being hosted at other LaMoure County cities in March as well.

For more information, contact LaMoure County Emergency Manager at **701-883-6096** or view the project website: **www.lamourecountyhazardplan.com**

Flyers

Flyers promoting community meetings and a county-wide public meeting were posted in the multiple locations throughout the county. A sample flyer is shown below.



Project Website

LaMoure County
Multi-Hazard Mitigation Plan

Take the SURVEY | Project Timetable | Submit Comments | Request Updates

The LaMoure County's Planning Team is preparing a Multi-Hazard Mitigation Plan. The county was successful in obtaining grant funds from the North Dakota Department of Emergency Services and FEMA to support this important planning project. KLJ, a multi-disciplinary planning and engineering firm, was selected to assist the county in developing the Multi-Hazard Mitigation Plan.

A Multi-Hazard Mitigation Plan presents a strategy for reducing the impacts of natural and human-caused hazards in the county and its communities.

This plan includes two primary elements:

Risk Assessment – Includes a description of all natural and human-caused hazards in the county and its communities. Each hazard is evaluated to determine community risks and vulnerabilities.

Mitigation Strategy – Includes mitigation actions to reduce the impact of priority hazards. The actions are organized into an implementation plan that includes priorities and a timeline.

Frequently Asked Questions

What is hazard mitigation?
Hazard mitigation is any sustained action taken to reduce property damage, loss of life, or otherwise minimize or eliminate the impact of hazards. These actions include planning, policy and regulation changes, educational programs, infrastructure projects and other activities. Mitigation actions are most effective when implemented under a comprehensive, long-term mitigation plan.

Why is this plan important?
All local governments that wish to be eligible for FEMA mitigation grant funding are required by the Federal Disaster Mitigation Act of 2000 to adopt a local multi-hazard mitigation plan. For a community to maintain eligibility each plan must be updated every five years.

How is a hazard mitigation plan assembled?
KLJ works with public officials and county residents, as well as researching regional and national data sources to identify the level of risk for a variety of hazards which may affect the county. After completing the risk assessment, mitigation strategies are developed in consultation with a Planning Team. The mitigation strategies come from identifying best practices that will reduce local hazard impacts, determining capacity of local communities to support the strategies, and assigning responsibilities for implementing the strategies.

How can the public become involved?
Public participation is very important to the planning process. A public survey is available on this website during the early stages of the project. Public meeting announcements and materials added to this website are sent to everyone that joins the mailing list. Public meetings are also advertised in local media outlets. Click on the Submit Comments button above to ask questions or submit comments, and click on the Request Updates button above to email a request to receive project update.

Public Meetings

Marion – March 4 at 6pm
Marion Community Hall, 303 Main Avenue

Dickey – March 4 at 8pm
Dickey Town Hall, 305 Main Street

Edgeley – March 6 at 5pm
Edgeley City Hall, 519 Main Street

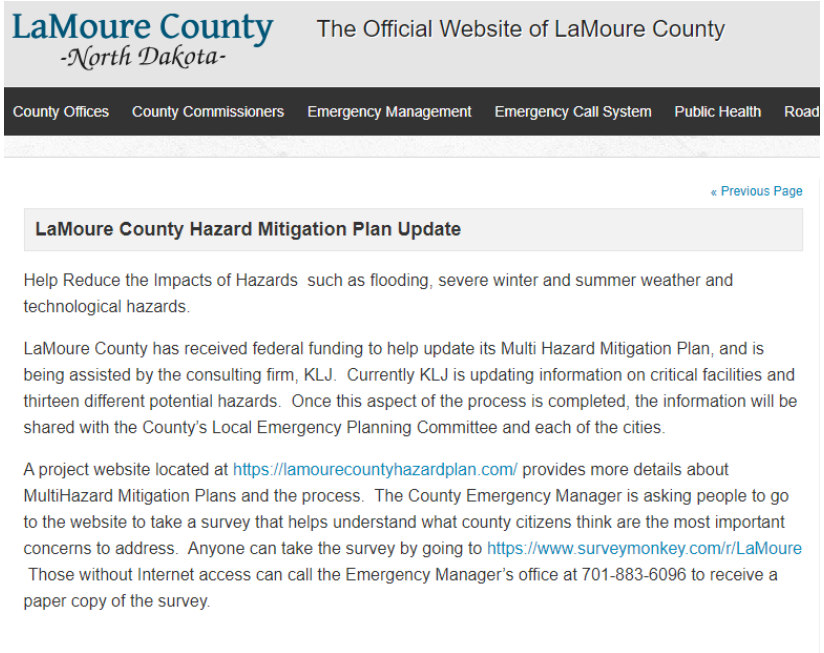
Berlin – March 6 at 6:30pm
Cox Standard, 204 1st Avenue N

Kulm – March 11 at 7pm
Kulm Community Center, 10 1st Street SW

LaMoure – March 12 at noon
LaMoure Civic Center, 33 Center Avenue E

Jud – March 12 at 2pm
Jud City Hall, 515 Logie Street

County Website



LaMoure County -North Dakota- The Official Website of LaMoure County

County Offices | County Commissioners | Emergency Management | Emergency Call System | Public Health | Road

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LaMoure County Hazard Mitigation Plan Update

Help Reduce the Impacts of Hazards such as flooding, severe winter and summer weather and technological hazards.

LaMoure County has received federal funding to help update its Multi Hazard Mitigation Plan, and is being assisted by the consulting firm, KLJ. Currently KLJ is updating information on critical facilities and thirteen different potential hazards. Once this aspect of the process is completed, the information will be shared with the County's Local Emergency Planning Committee and each of the cities.

A project website located at https://lamourecountyhazardplan.com/ provides more details about MultiHazard Mitigation Plans and the process. The County Emergency Manager is asking people to go to the website to take a survey that helps understand what county citizens think are the most important concerns to address. Anyone can take the survey by going to https://www.surveymonkey.com/r/LaMoure Those without Internet access can call the Emergency Manager's office at 701-883-6096 to receive a paper copy of the survey.

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 county. No storm events resulted in reported injury or death.

LaMoure County

Multi-Hazard Mitigation Plan

LaMoure County Hazard Events, 1996-2018							
Location	**Date**	**Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**
LaMoure (Zone)	1/17/1996	Blizzard		0	0		
LaMoure (Zone)	2/1/1996	Cold/Wind Chill		0	0		
LaMoure (Zone)	2/10/1996	High Wind	50 mph	0	0		
LaMoure (Zone)	2/26/1996	Blizzard		0	0		
LaMoure (Zone)	3/23/1996	Winter Storm		0	0		
Marion	7/28/1996	Thunderstorm Wind	70 mph	0	0	$80,000	
LaMoure (Zone)	11/5/1996	Winter Storm		0	0		
LaMoure (Zone)	12/16/1996	Blizzard		0	0		
LaMoure (Zone)	12/25/1996	Cold/Wind Chill		0	0		
LaMoure (Zone)	1/4/1997	Blizzard		0	0	$250,000	
LaMoure (Zone)	1/4/1997	Blizzard		0	0		
LaMoure (Zone)	1/9/1997	Blizzard		0	0	$1,530,000	
LaMoure (Zone)	1/15/1997	Blizzard		0	1	$900,000	
LaMoure (Zone)	1/21/1997	Blizzard		0	1	$790,000	
LaMoure (Zone)	3/12/1997	Winter Storm		0	0		
LaMoure (Zone)	3/21/1997	Flood		2	0	$600,000	
LaMoure (Zone)	4/4/1997	Blizzard		1	1	$1,520,000	
LaMoure	6/28/1997	Hail	1.75 in.	0	0		
Verona	6/28/1997	Hail	1.25 in.	0	0		
LaMoure	7/18/1997	Thunderstorm Wind	55 mph	0	0		
LaMoure County	6/26/1998	Flash Flood		0	0	$130,000	
Verona	6/26/1998	Hail	1.25 in.	0	0	$200,000	$5,000,000
LaMoure (Zone)	11/18/1998	Winter Storm		0	0		
LaMoure (Zone)	1/1/1999	Winter Storm		0	0		
LaMoure (Zone)	1/26/1999	Winter Storm		0	0		
LaMoure (Zone)	4/1/1999	Blizzard		0	0		
LaMoure (Zone)	4/3/1999	Winter Storm		0	0		
LaMoure	5/9/1999	Hail	0.75 in.	0	0		
Edgeley	6/22/1999	Hail	1.5 in.	0	0		

LaMoure County Hazard Events, 1996-2018							
Location	**Date**	**Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**
Kulm	6/22/1999	Hail	2 in.	0	0		
Kulm	7/27/1999	Hail	1 in.	0	0		
LaMoure	7/27/1999	Hail	1 in.	0	0		
LaMoure County	8/15/1999	Tornado	F2	0	0		
LaMoure (Zone)	11/1/1999	High Wind	55 mph	0	0		
LaMoure (Zone)	3/8/2000	Winter Storm		0	0		
LaMoure (Zone)	4/5/2000	High Wind	55 mph	0	0		
Edgeley	7/4/2000	Hail	1 in.	0	0		
Edgeley	7/4/2000	Thunderstorm Wind	57 mph	0	0		
Edgeley	7/4/2000	Tornado	F0	0	0		
Jud	7/4/2000	Hail	0.75 in.	0	0		
Berlin	7/11/2000	Thunderstorm Wind	52 mph	0	0		
LaMoure	7/11/2000	Thunderstorm Wind	61 mph	0	0		
LaMoure	7/12/2000	Hail	0.75 in.	0	0		
LaMoure	7/12/2000	Hail	1 in.	0	0		
LaMoure	7/12/2000	Hail	0.88 in.	0	0		
LaMoure	7/12/2000	Thunderstorm Wind	70 mph	0	0		
Verona	9/2/2000	Hail	0.75 in.	0	0		
LaMoure (Zone)	11/7/2000	Winter Storm		0	0		
LaMoure (Zone)	12/16/2000	Blizzard		0	0		
LaMoure (Zone)	4/22/2001	Heavy Snow		0	0		
Edgeley	5/31/2001	Hail	0.75 in.	0	0		
Marion	5/31/2001	Hail	0.75 in.	0	0		
Marion	6/20/2001	Hail	0.88 in.	0	0		
Nortonville	7/18/2001	Tornado	F1	0	0		
LaMoure (Zone)	8/5/2001	Heat		0	0		
Marion	8/8/2001	Hail	0.75 in.	0	0		
Marion	8/8/2001	Thunderstorm Wind	57 mph	0	0		
Jud	8/14/2001	Hail	0.75 in.	0	0		

LaMoure County Hazard Events, 1996-2018							
Location	**Date**	**Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**
LaMoure (Zone)	11/1/2001	High Wind	34 mph	0	0		
LaMoure (Zone)	12/22/2001	Blizzard		0	0		
LaMoure (Zone)	2/11/2002	High Wind	44 mph	0	0		
Kulm	6/15/2002	Lightning		0	0		
Marion	6/28/2002	Thunderstorm Wind	61 mph	0	0		
Berlin	7/9/2002	Hail	1.75 in.	0	0		
Berlin	7/9/2002	Hail	1 in.	0	0		
Berlin	7/9/2002	Thunderstorm Wind	70 mph	0	0		
Edgeley	7/9/2002	Thunderstorm Wind	52 mph	0	0		
Edgeley	8/16/2002	Thunderstorm Wind	52 mph	0	0		
LaMoure	9/18/2002	Thunderstorm Wind	52 mph	0	0		
LaMoure (Zone)	11/29/2002	High Wind	38 mph	0	0		
LaMoure (Zone)	12/17/2002	Winter Storm		0	0		
LaMoure (Zone)	2/11/2003	Blizzard		0	0		
LaMoure (Zone)	3/8/2003	Cold/Wind Chill		0	1		
Edgeley	6/11/2003	Hail	1 in.	0	0		
LaMoure	6/11/2003	Hail	0.75 in.	0	0		
Grand Rapids	6/24/2003	Thunderstorm Wind	61 mph	0	0		
Jud	6/27/2003	Hail	0.75 in.	0	0		
Edgeley	7/3/2003	Hail	0.75 in.	0	0		
Grand Rapids	7/20/2003	Hail	0.75 in.	0	0		
LaMoure County	7/20/2003	Thunderstorm Wind	70 mph	0	0		
Verona	7/20/2003	Tornado	F0	0	0		
LaMoure (Zone)	1/4/2004	Cold/Wind Chill		0	0		
LaMoure (Zone)	1/24/2004	Winter Storm		0	0		
LaMoure (Zone)	1/27/2004	Cold/Wind Chill		0	0		
LaMoure (Zone)	2/10/2004	Blizzard		0	0		
LaMoure (Zone)	2/10/2004	Winter Storm		0	0		
LaMoure (Zone)	3/10/2004	High Wind	47 mph	0	0		

LaMoure County

Multi-Hazard Mitigation Plan

LaMoure County Hazard Events, 1996-2018							
Location	**Date**	**Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**
LaMoure	5/11/2004	Hail	0.88 in.	0	0		
LaMoure	5/11/2004	Hail	1 in.	0	0		
LaMoure	5/11/2004	Hail	1 in.	0	0		
LaMoure	7/2/2004	Hail	0.75 in.	0	0		
Marion	7/2/2004	Hail	1 in.	0	0		
Marion	7/18/2004	Tornado	F0	0	0		
LaMoure (Zone)	12/11/2004	High Wind	40 mph	0	0		
LaMoure (Zone)	1/13/2005	Cold/Wind Chill		0	0		
LaMoure (Zone)	3/9/2005	High Wind	45 mph	0	0		
Edgeley	5/8/2005	Hail	1 in.	0	0		
Berlin	6/7/2005	Thunderstorm Wind	61 mph	0	0		
Edgeley	6/7/2005	Flash Flood		0	0	$350,000	
LaMoure	6/7/2005	Hail	1 in.	0	0		
Verona	6/7/2005	Lightning		0	0		
Jud	7/24/2005	Hail	0.75 in.	0	0		
LaMoure	8/8/2005	Thunderstorm Wind	52 mph	0	0		
Jud	8/17/2005	Hail	0.75 in.	0	0		
Northwest Lamoure County	8/17/2005	Flash Flood		0	0	$50,000	
LaMoure (Zone)	11/28/2005	Winter Weather		0	0		
LaMoure (Zone)	12/29/2005	Winter Storm		0	0		
LaMoure (Zone)	2/16/2006	Cold/Wind Chill		0	0		
LaMoure (Zone)	3/11/2006	Heavy Snow		0	0		
LaMoure	4/28/2006	Hail	0.88 in.	0	0		
LaMoure	4/28/2006	Tornado	F0	0	0		
Marion	4/28/2006	Tornado	F0	0	0		
Edgeley	6/23/2006	Tornado	F0	0	0		
Edgeley	6/23/2006	Tornado	F0	0	0		
Edgeley	7/26/2006	Thunderstorm Wind	52 mph	0	0		
LaMoure	8/9/2006	Thunderstorm Wind	60 mph	0	0		

LaMoure County Hazard Events, 1996-2018							
Location	**Date**	**Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**
Edgeley	8/16/2006	Hail	0.75 in.	0	0		
Edgeley	8/16/2006	Hail	0.75 in.	0	0		
Jud	8/16/2006	Hail	0.88 in.	0	0		
Jud	8/16/2006	Hail	0.88 in.	0	0		
Edgeley	8/20/2006	Hail	1 in.	0	0		
Edgeley	8/20/2006	Hail	1.75 in.	0	0		
Edgeley	8/20/2006	Hail	1.75 in.	0	0		
Edgeley	8/20/2006	Thunderstorm Wind	61 mph	0	0	$3,000	
Edgeley	8/20/2006	Thunderstorm Wind	74 mph	0	0	$25,000	
Between Edgeley And Lamoure	8/22/2006	Hail	2.5 in.	0	0		
Edgeley	8/22/2006	Hail	1.75 in.	0	1		
LaMoure (Zone)	12/30/2006	Heavy Snow		0	0		
LaMoure (Zone)	2/3/2007	Extreme Cold/Wind Chill		0	0		
LaMoure (Zone)	2/24/2007	Heavy Snow		0	0		
LaMoure (Zone)	2/28/2007	Winter Storm		0	0		
LaMoure (Zone)	3/1/2007	Winter Storm		0	0		
LaMoure (Zone)	3/2/2007	Blizzard		0	0		
LaMoure County	5/5/2007	Flash Flood		0	0	$200,000	
LaMoure	6/17/2007	Thunderstorm Wind	61 mph	0	0	$30,000	
Marion	6/25/2007	Hail	0.88 in.	0	0		
7N Edgeley	7/15/2007	Tornado	EF1	0	0	$500,000	$100,000
Edgeley	7/15/2007	Hail	1.75 in.	0	0	$20,000	
LaMoure County	7/15/2007	Thunderstorm Wind	78 mph	0	0	$200,000	$100,000
LaMoure (Zone)	1/29/2008	Extreme Cold/Wind Chill		0	0		
LaMoure (Zone)	2/9/2008	Blizzard		0	0		
LaMoure (Zone)	2/9/2008	Extreme Cold/Wind Chill		0	0		

LaMoure County Hazard Events, 1996-2018							
Location	**Date**	**Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**
LaMoure (Zone)	2/19/2008	Extreme Cold/Wind Chill		0	0		
LaMoure (Zone)	4/6/2008	Heavy Snow		0	0		
Edgeley	6/11/2008	High Wind	74 mph	0	0	$60,000	
Edgeley	6/24/2008	Thunderstorm Wind	52 mph	0	0		
LaMoure Rott Arpt	7/10/2008	Funnel Cloud		0	0		
Medberry	7/10/2008	Hail	0.75 in.	0	0		
LaMoure (Zone)	7/12/2008	High Wind	35 mph	0	0		
Edgeley	10/26/2008	High Wind	35 mph	0	0	$10,000	
LaMoure (Zone)	12/13/2008	Blizzard		0	0		
LaMoure (Zone)	12/14/2008	Extreme Cold/Wind Chill		0	0		
LaMoure (Zone)	12/20/2008	Extreme Cold/Wind Chill		0	0		
LaMoure (Zone)	12/29/2008	Heavy Snow		0	0		
LaMoure (Zone)	1/11/2009	Blizzard		0	0		
LaMoure (Zone)	1/16/2009	Winter Weather		0	0		
LaMoure (Zone)	1/31/2009	High Wind	35 mph	0	0		
LaMoure (Zone)	2/27/2009	Heavy Snow		0	0		
LaMoure County	3/6/2009	Flood		0	0	$1,770,000	
LaMoure (Zone)	3/10/2009	Blizzard		0	0		
LaMoure County	3/22/2009	Flash Flood		0	0	$5,000	
LaMoure (Zone)	3/29/2009	Blizzard		0	0		
LaMoure (Zone)	3/31/2009	Heavy Snow		0	0		
LaMoure County	4/1/2009	Flood		0	0	$123,000	
Edgeley	6/18/2009	Thunderstorm Wind	52 mph	0	0		
LaMoure	6/18/2009	Thunderstorm Wind	61 mph	0	0	$25,000	
LaMoure (Zone)	12/23/2009	Winter Storm		0	0		
LaMoure (Zone)	12/25/2009	Blizzard		0	0		
LaMoure (Zone)	1/5/2010	Winter Storm		0	0		

LaMoure County Hazard Events, 1996-2018							
Location	**Date**	**Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**
LaMoure (Zone)	1/7/2010	Extreme Cold/Wind Chill		0	0		
LaMoure (Zone)	1/22/2010	Winter Storm		0	0		
LaMoure (Zone)	1/25/2010	Blizzard		0	0		
LaMoure (Zone)	2/13/2010	Heavy Snow		0	0		
LaMoure (Zone)	4/28/2010	High Wind	55 mph	0	0	$30,000	
LaMoure (Zone)	5/6/2010	Winter Weather		0	0		
2N Kulm	5/24/2010	Thunderstorm Wind	91 mph	0	0	$1,000,000	
2N Kulm	5/24/2010	Thunderstorm Wind	78 mph	0	0	$150,000	
2N Kulm	5/24/2010	Thunderstorm Wind	78 mph	0	0	$250,000	
2N Kulm	5/24/2010	Thunderstorm Wind	78 mph	0	0	$100,000	
LaMoure (Zone)	6/18/2010	High Wind	35 mph	0	0		
Grand Rapids	7/14/2010	Thunderstorm Wind	91 mph	0	0	$650,000	$50,000
Grand Rapids	7/14/2010	Thunderstorm Wind	78 mph	0	0	$60,000	
LaMoure	7/14/2010	Thunderstorm Wind	78 mph	0	0	$250,000	
LaMoure County	7/14/2010	Thunderstorm Wind	70 mph	0	0		$50,000
LaMoure County	7/14/2010	Thunderstorm Wind	70 mph	0	0		$50,000
LaMoure County	7/14/2010	Thunderstorm Wind	70 mph	0	0		$50,000
LaMoure County	7/14/2010	Thunderstorm Wind	78 mph	0	0	$50,000	
Marion	7/14/2010	Thunderstorm Wind	61 mph	0	0	$8,000	
Verona	8/12/2010	Funnel Cloud		0	0		
LaMoure (Zone)	10/26/2010	High Wind	59 mph	0	0		
LaMoure (Zone)	11/22/2010	Heavy Snow		0	0		
LaMoure (Zone)	12/3/2010	Heavy Snow		0	0		
LaMoure (Zone)	12/15/2010	Heavy Snow		0	0		
LaMoure (Zone)	12/20/2010	Heavy Snow		0	0		
LaMoure (Zone)	12/30/2010	Blizzard		0	0		
LaMoure (Zone)	1/1/2011	Blizzard		0	0		
LaMoure (Zone)	2/1/2011	Extreme Cold/Wind Chill		0	0		

LaMoure County

Multi-Hazard Mitigation Plan

LaMoure County Hazard Events, 1996-2018							
Location	**Date**	**Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**
LaMoure (Zone)	2/8/2011	Extreme Cold/Wind Chill		0	0		
LaMoure (Zone)	2/13/2011	High Wind	50 mph	0	0	$20,000	
LaMoure (Zone)	2/20/2011	Blizzard		0	0		
LaMoure (Zone)	3/11/2011	Blizzard		0	0		
LaMoure (Zone)	3/22/2011	Winter Storm		0	0		
LaMoure (Zone)	4/14/2011	Heavy Snow		0	0		
LaMoure (Zone)	4/30/2011	High Wind	52 mph	0	0		
Edgeley	5/21/2011	Hail	0.75 in.	0	0		
LaMoure (Zone)	5/31/2011	High Wind	35 mph	0	0		
Grand Rapids	6/14/2011	Hail	0.75 in.	0	0		
LaMoure	6/17/2011	Funnel Cloud		0	0		
LaMoure	6/17/2011	Funnel Cloud		0	0		
Edgeley	6/26/2011	Hail	1 in.	0	0		
Edgeley	7/10/2011	Thunderstorm Wind	52 mph	0	0		
Edgeley	7/10/2011	Thunderstorm Wind	70 mph	0	0	$25,000	
LaMoure (Zone)	7/16/2011	Excessive Heat		0	0		
Berlin	7/17/2011	Hail	2.75 in.	0	0	$20,000	$20,000
Grand Rapids	7/17/2011	Hail	2 in.	0	0		
LaMoure	7/17/2011	Hail	1 in.	0	0		
LaMoure	7/17/2011	Lightning		0	0	$5,000	
Nortonville To Berlin	7/17/2011	Tornado	EF3	0	1	$500,000	$250,000
Adrian	7/24/2011	Hail	2 in.	0	0		
LaMoure	7/30/2011	Thunderstorm Wind	74 mph	0	0	$80,000	
Adrian	8/12/2011	Hail	0.88 in.	0	0		
Berlin	8/12/2011	Hail	1 in.	0	0		
LaMoure	8/12/2011	Hail	1 in.	0	0		
Marion	8/12/2011	Hail	1 in.	0	0		
Edgeley	8/22/2011	Hail	1 in.	0	0		

LaMoure County Hazard Events, 1996-2018							
Location	**Date**	**Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**
Edgeley	8/22/2011	Thunderstorm Wind	61 mph	0	0		
LaMoure (Zone)	9/20/2011	High Wind	35 mph	0	0		
LaMoure	10/7/2011	High Wind	52 mph	0	0	$15,000	
LaMoure (Zone)	1/18/2012	Extreme Cold/Wind Chill		0	0		
LaMoure (Zone)	2/28/2012	Heavy Snow		0	0		
Jud	5/22/2012	Hail	0.88 in.	0	0		
Nortonville	5/22/2012	Hail	0.75 in.	0	0		
Kulm	7/6/2012	Thunderstorm Wind	61 mph	0	0	$25,000	
Verona	7/22/2012	Hail	1.5 in.	0	0		
Verona	7/22/2012	Hail	1.75 in.	0	0		
LaMoure	8/3/2012	Hail	0.75 in.	0	0		
LaMoure (Zone)	10/17/2012	High Wind	35 mph	0	0		
LaMoure (Zone)	12/8/2012	Blizzard		0	0		
LaMoure (Zone)	1/11/2013	Heavy Snow		0	0		
LaMoure (Zone)	1/19/2013	High Wind	35 mph	0	0		
LaMoure (Zone)	1/20/2013	Extreme Cold/Wind Chill		0	0		
LaMoure (Zone)	1/28/2013	Heavy Snow		0	0		
LaMoure (Zone)	1/30/2013	Extreme Cold/Wind Chill		0	0		
LaMoure (Zone)	2/1/2013	Extreme Cold/Wind Chill		0	0		
LaMoure (Zone)	2/10/2013	Blizzard		0	0		
LaMoure (Zone)	3/18/2013	Blizzard		0	0		
LaMoure (Zone)	4/14/2013	Blizzard		0	0		
LaMoure (Zone)	4/14/2013	Winter Storm		0	0		
LaMoure County	6/20/2013	Flash Flood		0	0	$15,000	$25,000
LaMoure County	6/20/2013	Flash Flood		0	0	$6,000	$10,000
Edgeley	6/26/2013	Hail	0.88 in.	0	0		
LaMoure	9/9/2013	Thunderstorm Wind	52 mph	0	0		

LaMoure County Hazard Events, 1996-2018							
Location	**Date**	**Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**
LaMoure (Zone)	12/3/2013	Heavy Snow		0	0		
LaMoure (Zone)	12/6/2013	Extreme Cold/Wind Chill		0	0		
LaMoure (Zone)	12/28/2013	Blizzard		0	0		
LaMoure (Zone)	12/28/2013	Extreme Cold/Wind Chill		0	0		
LaMoure (Zone)	1/4/2014	Extreme Cold/Wind Chill		0	0		
LaMoure (Zone)	1/15/2014	Blizzard		0	0		
LaMoure (Zone)	1/22/2014	Extreme Cold/Wind Chill		0	0		
LaMoure (Zone)	1/26/2014	Blizzard		0	0		
LaMoure (Zone)	1/26/2014	Extreme Cold/Wind Chill		0	0		
LaMoure (Zone)	3/1/2014	Extreme Cold/Wind Chill		0	0		
LaMoure (Zone)	3/31/2014	Blizzard		0	0		
Edgeley	5/25/2014	Hail	1.5 in.	0	0	$10,000	
LaMoure	9/20/2014	Hail	1 in.	0	0		
Edgeley	5/25/2015	Funnel Cloud		0	0		
Berlin	5/28/2015	Hail	1 in.	0	0		
Lamoure County	5/28/2015	Thunderstorm Wind	65 mph	0	0	$6,000	$100,000
Verona	5/28/2015	Funnel Cloud		0	0		
Berlin	6/2/2015	Hail	2.25 in.	0	0	$50,000	$200,000
LaMoure	6/2/2015	Hail	1 in.	0	0		
Jud	6/27/2015	Hail	0.75 in.	0	0		
LaMoure	8/7/2015	Hail	0.88 in.	0	0		
Marion	8/7/2015	Hail	1.25 in.	0	0		
LaMoure (Zone)	10/11/2015	High Wind	50 mph	0	0		
LaMoure (Zone)	11/18/2015	High Wind	50 mph	0	0		
LaMoure (Zone)	12/15/2015	Heavy Snow		0	0		
LaMoure (Zone)	2/7/2016	High Wind	35 mph	0	0		

LaMoure County

Multi-Hazard Mitigation Plan

LaMoure County Hazard Events, 1996-2018							
Location	**Date**	**Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**
Edgeley	5/22/2016	Hail	0.88 in.	0	0		
Berlin	8/1/2016	Hail	1 in.	0	0		
Verona	8/18/2016	Thunderstorm Wind	52 mph	0	0		
LaMoure (Zone)	12/6/2016	Blizzard		0	0		
LaMoure (Zone)	12/25/2016	Ice Storm		0	0	$500,000	
LaMoure (Zone)	12/26/2016	Blizzard		0	0		
LaMoure (Zone)	1/2/2017	Heavy Snow		0	0		
LaMoure (Zone)	1/30/2017	High Wind	35 mph	0	0		
LaMoure (Zone)	3/7/2017	High Wind	52 mph	0	0		
Verona	7/21/2017	Hail	1 in.	0	0		
LaMoure	8/9/2017	Hail	0.75 in.	0	0		
Lamoure County	9/19/2017	Thunderstorm Wind	65 mph	0	0	$150,000	$50,000
Edgeley	9/19/2017	Hail	1.75 in.	0	0		
Edgeley	9/19/2017	Hail	1.75 in.	0	0		
Grand Rapids	9/19/2017	Thunderstorm Wind	65 mph	0	0		$75,000
Marion	9/19/2017	Thunderstorm Wind	61 mph	0	0	$30,000	
LaMoure (Zone)	10/26/2017	High Wind	50 mph	0	0		
LaMoure (Zone)	12/4/2017	Blizzard		0	0		
LaMoure (Zone)	3/5/2018	Heavy Snow		0	0		
LaMoure	6/5/2018	Thunderstorm Wind	52 kts. EG	0	0	$15,000	
Alfred	8/26/2018	Hail	1.00 in.	0	0		
LaMoure (Zone)	10/10/2018	Heavy Snow		0	0	$200,000	$200,000
LaMoure (Zone)	12/26/2018	Heavy Snow		0	0		
LaMoure (Zone)	12/26/2018	Heavy Snow		0	0		
LaMoure (Zone)	12/27/2018	Blizzard		0	0		
LaMoure (Zone)	1/29/2019	Extreme Cold/wind Chill		0	0		
LaMoure (Zone)	2/6/2019	Winter Storm		0	0		
LaMoure (Zone)	3/9/2019	Heavy Snow		0	0		
LaMoure (Zone)	3/13/2019	Blizzard		0	0		

LaMoure County Hazard Events, 1996-2018							
Location	**Date**	**Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**
LaMoure (Zone)	4/10/2019	Winter Storm		0	0		
LaMoure (Zone)	4/11/2019	Blizzard		0	0		
Jud	6/15/2019	Funnel Cloud		0	0		
LaMoure	7/3/2019	Hail	1.00 in.	0	0		
LaMoure	7/3/2019	Hail	1.00 in.	0	0		

Rural Road Flooding

As noted in Chapter 3, there has been substantial damage to roads and bridges and other public facilities caused by flooding in rural LaMoure County. Details regarding past damages are on file at the LaMoure County Emergency Manager's office and the Road Department Supervisor's office. The photographs below illustrate flooding and flood response activity in 2019.

Appendix D: Mitigation Action Determination

Mitigation activities were discussed at each community meeting and four of the LEPC/Planning Team meetings. The public was also able to provide input on mitigation actions with the community survey. Activity selection included multiple processes. First, a hierarchy of needs was defined. Second, past goals and mitigation action items were reviewed, and where appropriate incorporated into this plan. Third, the consultant provided a list of recommendations for new potential action items based on survey results, community meeting and LEPC/Planning Team comments. Fourth, each hazard was reviewed for level of priority and need for mitigation action items. Fifth, the potential mitigation action items were reviewed by the LaMoure County Emergency Manager and by the LEPC Planning Team for feasibility and appropriateness. If a potential mitigation action item was red-flagged for some reason it was not retained for the final mitigation action item list. Sixth, the retained mitigation action items were reviewed, refined, and prioritized by the LEPC/Planning Team and jurisdiction representatives to best fit LaMoure County's capacity and context.

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

LaMoure County

Multi-Hazard Mitigation Plan

2014 LaMoure County MHMP Mitigation Actions Status						
Index	**Mitigation Project**	**Complete**	**Ongoing**	**Retained**	**Dropped**	**Unknown**
1	Use LaMoure County websites to improve household disaster preparedness		x			
2	Increase awareness of drought tolerant practices in farming		x			
3	Increase awareness of drought tolerant practices in munipalities		x			
4	Make public aware of risk of shortage of critical materials/infrastructure		x			
5	Increase awareness of methods for prevention of communicable diseases		x			
6	Work with Dickey Rural Networks to implement cable scrolling hazard notices					x
7	Assure continuous and effective operation of Code Red and encourage sign-up		x			
8	Increase education and awareness of fire safety and prevention		x			
9	Increase education and awareness of fires from using additional heating sources		x			
10	Encourage farmers and general public to have appropriate insurance for hazards		x			
11	Encourage jurisdictions to review and implement ordinances		x			
12	Encourage jurisdictions to implement capital improvement plans for vulnerabilities		x			
13	Encourage jurisdictions to adopt state building code		x			
14	Assure LaMoure County has FEMA approved mitigation plan	x				
15	Encourage jurisdictions to develop water conservation plans and practices		x			
16	Strengthen building codes and land use regulations					x
17	Assure new development is built in areas with low risk to hazards		x			
18	Create post-disaster debris management plan					x
19	Work with local, state, and federal entities to map community hazard risk		x			
20	Remove existing structures from floodprone areas					x
21	Work with state and federal officials to have LaMoure County flood mapped	x				
22	Encourage residents to participate in NFIP		x			
23	review ordinances to assure jurisdictions are in compliance with NFIP					x
24	Establish flood control measures and improve infrastructure protection plans	x				
25	Create a plan identify alternative water sources for fire suppression			x		

2014 LaMoure County MHMP Mitigation Actions Status, Continued						
Index	**Mitigation Project**	**Complete**	**Ongoing**	**Retained**	**Dropped**	**Unknown**
26	Work with rural water to add taps and tanks at strategic locations			x		
27	Obtain firefighting equipment			x		
28	Relocate existing hazardous material storage away from high impact areas				x	
29	Maintain system for implementation and communication of burn bans		x			
30	Install electronic fire danger index signs along highways and roads				x	
31	Study loss of shelter belts and drain tiling impacts				x	
32	Create plans for loss of service					x
33	Install generators and quick connections for critical infrastructure			x		
34	Bury power lines			x		
35	Maintain partnership with utility companies to identify tree issues				x	
36	Raise road grades to prevent blockage		x			
37	Engineer or retrofit roads and bridges to withstand hazards		x			
38	Add living snow fences				x	
39	Map roads identifying community risk allowing for continuous updates			x		
40	Grade separate roads and highways from railroads				x	
41	Install solar powered stop signs and speed limit signage				x	
42	Truck routes - establish or improve signage			x		
43	Construct turning lanes on highways at strategic points					x
44	Relocate lagoon in city of LaMoure to south side of Highway 13				x	
45	Install generators and quick connections for shelters and critical facilities			x		
46	Install and maintain warning systems			x		

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

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?	

FEMA