Williams County

Multi-Hazard Mitigation Plan

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FEMA

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EMERGENCY MANAGEMENT HOMELAND SECURITY WILLIAMS COUNTY WILLISTON

KLJ

Multi-Hazard Mitigation Plan

Williams County, ND

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Executive Summary

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.

Hazard mitigation planning involves two main elements:

- Hazard profiles that include an assessment of community risks and vulnerabilities
- A mitigation strategy that identifies actions to reduce or eliminate the impact of hazards on the community

A list of priority hazards was developed through historic data analysis and public input. A summary of hazard risk in Williams County, as well as key issues for each priority hazard, can be found below.

Williams County Risk Summary								
	Rural County	**Alamo**	**Epping**	**Grenora**	**Ray**	**Tioga**	**Wildrose**	**Williston**
Drought	M	M	M	M	M	M	M	M
Flood	L	L	M	L	M	H	H	L
Geologic Hazards	M	M	M	M	M	M	M	M
Severe Summer Weather	H	H	H	H	H	H	H	H
Severe Winter Weather	H	H	H	H	H	H	H	H
Wildland Fire	M	M	M	M	M	M	M	L
Communicable Disease	L	L	L	L	L	L	L	L
Dam Failure	L	L	L	L	L	M	L	M
Hazardous Materials Release	H	H	H	H	H	H	L	H
Homeland Security Incident	L	L	L	L	L	L	L	L
Urban Fire	L	L	L	L	L	L	L	L

H = High, M = Moderate, L = Low

Drought Key Issues

- Energy development and population growth in recent years have significantly increased demand for water in the county. This growth is expected to continue for at least the next several years.
- Agriculture is a key component of the county's economy. A significant drought has the potential to greatly affect the industry and the county as a whole.

Flood Key Issues

- Williams County experiences about one flood event every two years. Flood events in the county include riverine flooding and flash flooding.
- Many roads in the county are commonly washed-out or inundated during flooding events.
- The Wildrose wastewater treatment lagoon is inundated due to rising water levels in the area.
- Growth is creating new flooding issues in several cities as new development has altered drainage patterns. Additionally, much of the new development is located outside of areas studied by FEMA, so their floodplain status is unknown.

Geologic Hazards Key Issues

- Much of the county is within a moderate susceptibility/low incidence landslide hazard area as defined by USGS. Small landslides are common during periods of increased moisture.
- There is no history of a major earthquakes in the county, but a minor earthquake could damage old or poorly-built structures.

Severe Summer Weather Key Issues

- Williams 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.
- Williams County has many residents living in temporary housing units who may not have access to adequate shelter or notification during a summer storm event.
- The former grain elevator in Epping loses pieces of its metal sheathing during strong wind events. The sheathing sometimes blows through the city at a rapid speed and is a risk to people and property.

Severe Winter Weather Key Issues

- Williams County averages approximately five days per year with a winter storm event. Severe winter weather events in the county include winter storm, high wind, heavy snow, blizzard, extreme cold/wind chill and ice storm.
- A winter storm event that causes a power outage may make it difficult for residents to heat their homes. Elderly residents and residents in temporary housing are the most vulnerable to extreme cold temperatures. Approximately 2,600 residents in the county are elderly and there are 18,000 permitted temporary housing units. Power loss occasionally occurs in the county during winter storm events.

Wildland Fire Key Issues

- Williams County experiences a wildfire greater than 100 acres approximately once every two to three years. Most large wildfires in the county cause minimal property damage.

Communicable Disease Key Issues

- Human and agricultural disease have the potential to greatly impact the health and economy of the county.

Dam Failure Key Issues

- Fort Peck Dam in Montana would have a significant impact on Williston in the event of failure, and Tioga Dam would have an impact on Tioga in the event of failure.

Hazardous Materials Incident Key Issues

- Hazardous materials incidents are common in Williams County, and nearly all residents live, work or travel within a potential hazard area.

Homeland Security Incident Key Issues

- Terrorism and violence are an ongoing concern, but it is unlikely that a large-scale event will occur in the county.

Urban Fire Key Issues

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

The mitigation strategy was developed by identifying actions that will help to resolve key issues. The strategy is summarized in the following table. Also included in the table are several preparedness and response action items that were discussed during the planning process.

Rural Williams County Action Items, 2016-2020					
ID	**Priority**	**Action**	**Hazard**	**Cost**	**Time Frame**
A	High	Road flood mitigation	Flooding	Varies	Ongoing
B	High	Road landslide mitigation	Geologic Hazards	Varies	Ongoing
C	Moderate	Conduct NFIP workshop	Flooding	Staff Time	2016
D	Moderate	Floodplain mapping upgrades	Flooding	Staff Time	2016
E	Low	Public education	Multiple Hazards	Staff Time	Ongoing
F	Low	Participate in NFIP training	Flooding	Staff Time	Ongoing
G	Low	Administer Firewise Program and implement best practices during wildfire season	Wildfire	Staff Time	Ongoing

Alamo Action Items, 2016-2020					
ID	**Priority**	**Action**	**Hazard**	**Cost**	**Time Frame**
H	High	Generator at Fire Hall	Multiple Hazards	$25,000 - $50,000	2016
I	High	New culvert on Main Street	Flooding	$15,000 - $25,000	2017
J	Low	Winter storm mitigation along ND Highway 50	Severe Winter Weather	Varies	2020
E	Low	Public education	Multiple Hazards	Staff Time	Ongoing

Epping Action Items, 2016-2020					
ID	**Priority**	**Action**	**Hazard**	**Cost**	**Time Frame**
H	High	Generator at Fire Hall/City Hall/Senior Citizens Center/Shelter	Multiple Hazards	$25,000 - $50,000	2016
K	High	New culvert and road elevation at intersection of School Avenue and 1st Street	Flooding	$20,000 - $30,000	2016
L	High	Improved drainage at 1st and Main	Flooding	$20,000 - $30,000	2017
M	Moderate	New emergency siren	Multiple Hazards	$10,000 - $25,000	2017
N	Moderate	Remove former grain elevator	Severe Summer Weather	$50,000 - $100,000	2018
H	Low	Generator at church/secondary shelter	Multiple Hazards	$25,000 - $50,000	2018
O	Moderate	Snow fence along Highway 42	Severe Winter Weather	$50 - $150 per linear foot	2019
E	Low	Public education	Multiple Hazards	Staff Time	Ongoing

Grenora Action Items, 2016-2020					
ID	**Priority**	**Action**	**Hazard**	**Cost**	**Time Frame**
P	High	New culvert on Main Street	Flooding	$15,000 - $25,000	2016
H	High	Generator for water tower	Multiple Hazards	$25,000 - $50,000	2017
E	Low	Public education	Multiple Hazards	Staff Time	Ongoing

Ray Action Items, 2016-2020					
ID	**Priority**	**Action**	**Hazard**	**Cost**	**Time Frame**
Q	High	Flood mitigation on east side of town	Flooding	Varies	2016
D	Moderate	Floodplain mapping upgrades	Flooding	Staff Time	2016
H	High	Generators at designated shelters: senior citizens center and school gym	Multiple Hazards	$25,000 - $50,000 per generator	2017
F	Low	Participate in NFIP training	Flooding	Staff Time	Ongoing
E	Low	Public education	Multiple Hazards	Staff Time	Ongoing

Tioga Action Items, 2016-2020					
ID	**Priority**	**Action**	**Hazard**	**Cost**	**Time Frame**
R	High	New culvert at Gilbertson Street South	Flooding	$15,000 - $25,000	2016
S	High	New drainage ditch along 67th Street	Flooding	$50,000 - $100,000	2017
D	Moderate	Floodplain mapping upgrades	Flooding	Staff Time	2016
F	Low	Participate in NFIP training	Flooding	Staff Time	Ongoing
E	Low	Public education	Multiple Hazards	Staff Time	Ongoing

Wildrose Action Items, 2016-2020					
ID	**Priority**	**Action**	**Hazard**	**Cost**	**Time Frame**
T	High	Wastewater treatment lagoon mitigation	Flooding	$2 - $5 million	2016
U	Moderate	Drainage ditch enlargement	Flooding	$50,000 - $300,000	2018
H	Moderate	Generators at lift station, Fire Hall and water tower	Multiple Hazards	$25,000 - $50,000 per generator	2019
V	Moderate	New culverts across town	Flooding	$15,000 - $25,000 per culvert	2020
E	Low	Public education	Multiple Hazards	Staff Time	Ongoing

Williston Action Items, 2016-2020					
ID	**Priority**	**Action**	**Hazard**	**Cost**	**Time Frame**
W	High	Construct and/or identify community storm shelters	Multiple Hazards	Varies	2016
D	Moderate	Floodplain mapping upgrades	Flooding	Staff Time	2016
F	Low	Participate in NFIP training	Flooding	Staff Time	Ongoing
E	Low	Public education	Multiple Hazards	Staff Time	Ongoing

Chapter 1: Introduction

Hazard Mitigation Planning

Natural and human-caused hazards have a direct impact on residents and property in Williams 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.
- Communication priorities to state and federal officials.
- Aligning risk reduction with other community objectives.

The plan includes a risk and vulnerability assessment that residents, organizations, local governments and other interested participants can utilize when planning for hazards. The plan also includes 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 Grant Program (HMGP), Pre-Disaster Mitigation (PDM) program and Flood Mitigation Assistance (FMA) program to help fund the implementation of mitigation projects.

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 Williams County's 2009 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
Williams County	10-3-17
City of Alamo	10-9-17
City of Epping	10-11-17
City of Grenora	10-23-17
City of Ray	10-9-17
City of Tioga	6-19-17
City of Wildrose	10-10-17
City of Williston	10-10-17
Williston Public School District	10-9-17
Grenora Public School District	11-1-17
Ray Public Schools	10-17-17
Tioga Public Schools	10-23-17
Trenton Public School District	10-16-17
Williams County School District 8	10-24-17
Williston Public School District	10-9-17
Grenora Public School District	11-1-17

The Planning Process

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

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

The 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, two public meetings, and a public survey. Local planning documents were also reviewed and incorporated into the document when applicable. Detailed information about the planning process can be found 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 Hazard Mitigation Grant 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

Williams County is located in northwest North Dakota, along the Montana border. Its total area is 1,374,720 acres, making it nearly twice as large as the state's median county size of 739,000 acres. The county includes seven incorporated cities: Alamo, Epping, Grenora, Ray, Tioga, Wildrose and Williston. Williston is the county seat and has the largest population. The county also has several unincorporated communities. They do not have significant populations and 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 US Highways 2 and 85, and State Highways 40, 42, 50 and 1804. The Burlington Northern Santa Fe (BNSF) Railroad passes through the county, connecting the cities of Williston, Spring Brook, Epping, Ray and Tioga.

Lake Sakakawea, a reservoir on the Missouri River, forms the southern border of the county. The confluence of the Missouri and Yellowstone Rivers occurs south of Buford. Lewis and Clark State Park is located along Lake Sakakawea. The 490-acre park includes a marina, campgrounds, cabins and picnic shelters.

Clockwise from left: The Buffalo Trails Museum in Epping, Alamo grain elevator, downtown Tioga, Wildrose water tower.

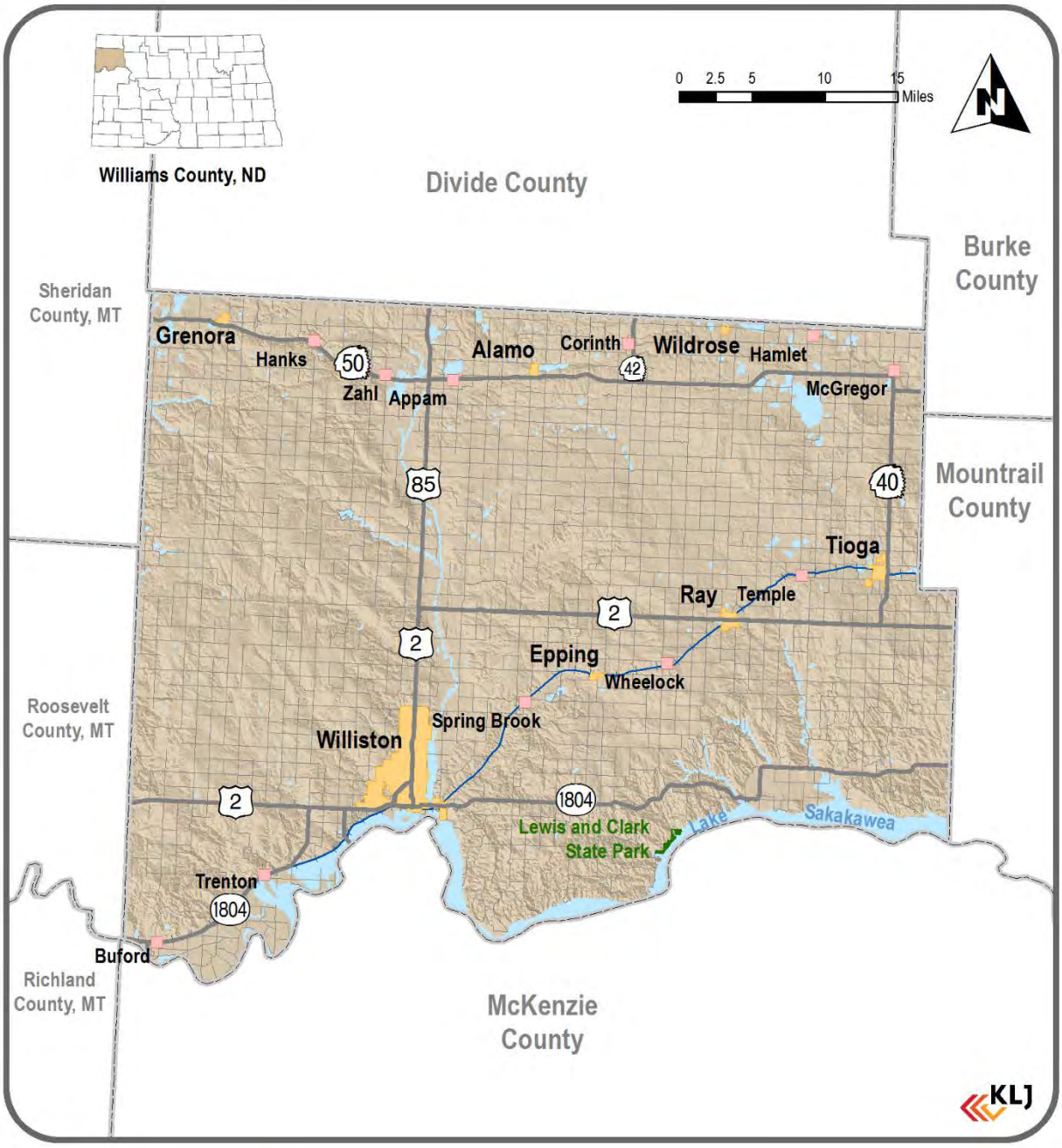

Figure 2.1
Study Area

Incorporated Cities

Unincorporated Communities

Source:
ND GIS Hub

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Population and Demographics

Summarized demographic information for Williams County and North Dakota is shown in Table 2.1. The county is generally younger than the state overall, with a median age of 34.6 and only 10.2 percent of residents at least 65 years of age. The county's population density of 14.2 persons per square mile is higher than the statewide rate. Nearly all residents identify themselves as White not Hispanic.

The county's poverty level is lower than the state average, and median income is significantly higher. Other demographic indicators for the county are roughly comparable to the state.

Table 2.1 – Williams County Demographics

	Williams County	North Dakota
Population	29,595	723,393
Persons under 5 years	7.6%	6.7%
Persons under 18 years	24.7%	22.5%
Persons 65 years and over	10.2%	14.2%
Median Age	34.6	36.4
Persons per square mile	14.2	10.5
White not Hispanic	91.3%	87.3%
Hispanic or Latino	4.4%	2.9%
American Indian or Alaska Native	3.8%	5.4%
Other	6.9%	7.6%
Language other than English spoken at home	4.0%	5.3%
Median household income	$76,210	$53,741
Persons below poverty level	8.6%	11.9%
Average household size (persons)	2.34	2.31

Source: US Census Bureau; 2013 Annual Estimate used for population, age and race/ethnicity;
2009-2013 American Community Survey used for other demographic information

Population trends for the county and each jurisdiction are shown in Figures 2.2 and 2.3. The Bakken-related energy boom has resulted in a rapid increase of the county's population in recent years. Williston, Tioga, Ray and Grenora have all experienced growth since 2010, led by Williston with a gain of 6,134 residents (42 percent growth) in three years. Unincorporated areas of the county grew by 548 residents (10 percent) between 2010 and 2013.

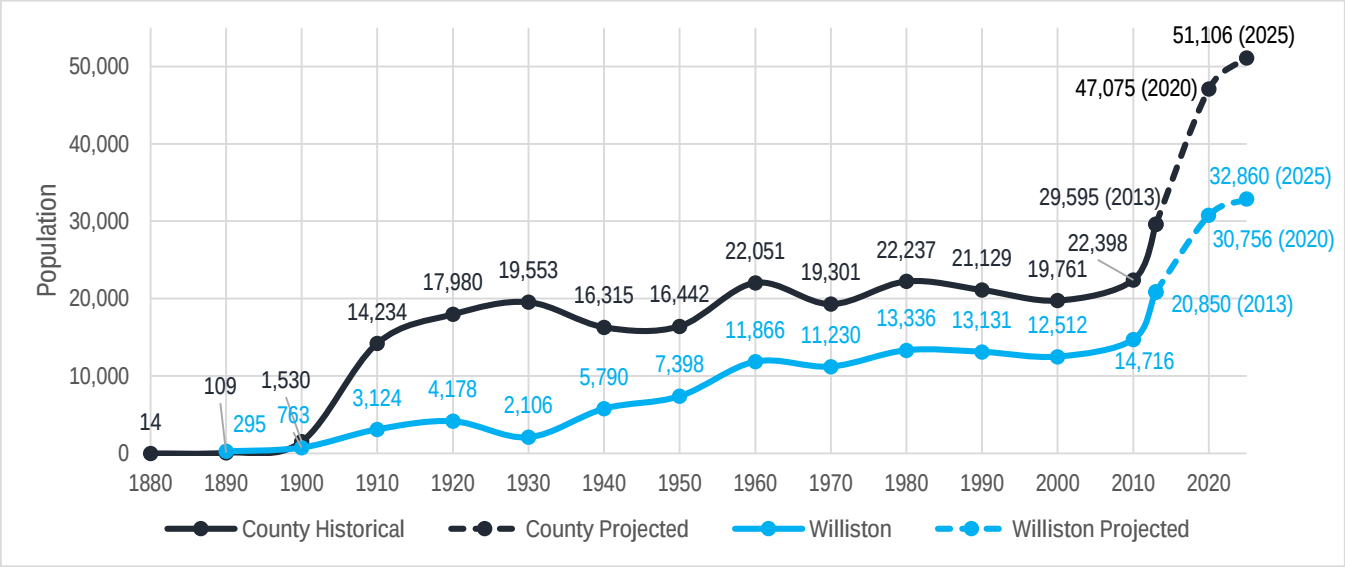
Estimates from the NDSU Department of Agribusiness and Applied Economics indicate that this rapid population growth will continue through at least 2025. The projections shown in Figure 2.2 are from 2012 and only include permanent population.

A study completed by NDSU in 2014 suggests that the population of Williams County is significantly higher than census estimates would suggest. The study estimated that total population (permanent and temporary) in Williams County was 70,402 in 2014, and is projected to reach 95,641 by 2019. Many of these temporary residents work in energy-related industries and live in apartments, workforce lodging facilities, hotels, mobile homes or RVs.

Workforce lodging facilities are intended to provide housing for temporary workers. These facilities typically contain pre-manufactured housing units, with individual "cabins" or multi-unit skid buildings. These facilities often include meals, recreational activities and other services for their residents. They are intended to be temporary facilities and in almost all cases the structures do not include permanent foundations. Workforce lodging facilities are permitted by the state Health Department. There are 190 permitted workforce lodging facilities in Williams County with a total maximum occupancy of 18,235. This occupancy is highly variable based on the economic climate. The permitting of new workforce lodging facilities is currently suspended in Williams County and Williston.

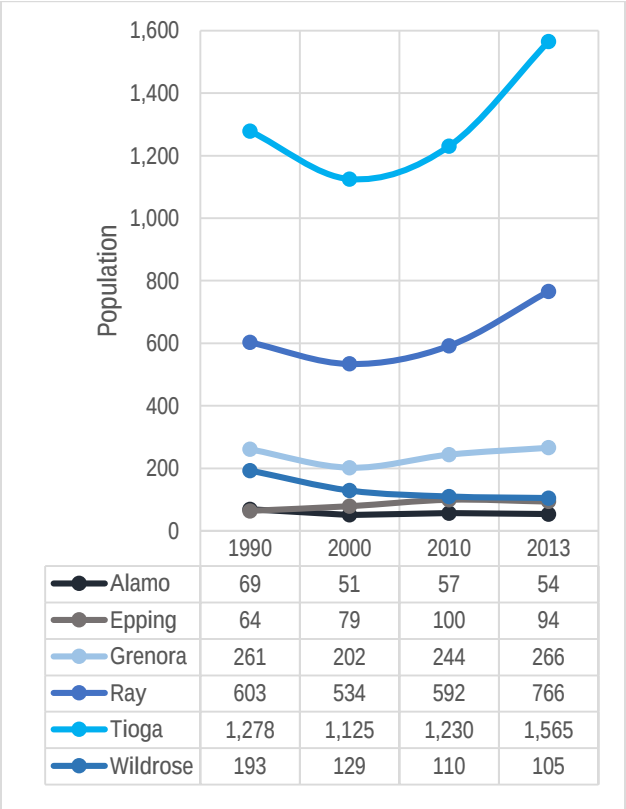
Workforce lodging facilities in Tioga (top right) and Williston (top left, bottom).
Source: Bing Images, Google Earth

Figure 2.2 – Williams County and Williston, Historical and Projected Population, 1880-2025



Source: US Census Bureau (Historical); North Dakota Statewide Housing Needs Assessment, NDSU Department of Agribusiness and Applied Economics, released September 2012 (Projected)

Figure 2.3 – Jurisdictions below 2,000 Persons, Historical Population, 1990-2013



	1990	2000	2010	2013
Alamo	69	51	57	54
Epping	64	79	100	94
Grenora	261	202	244	266
Ray	603	534	592	766
Tioga	1,278	1,125	1,230	1,565
Wildrose	193	129	110	105

Source: US Census Bureau

Population density is shown in Figure 2.4. A majority of the county's population is located near Williston. Most of the county is very low density, with two or fewer persons per acre.

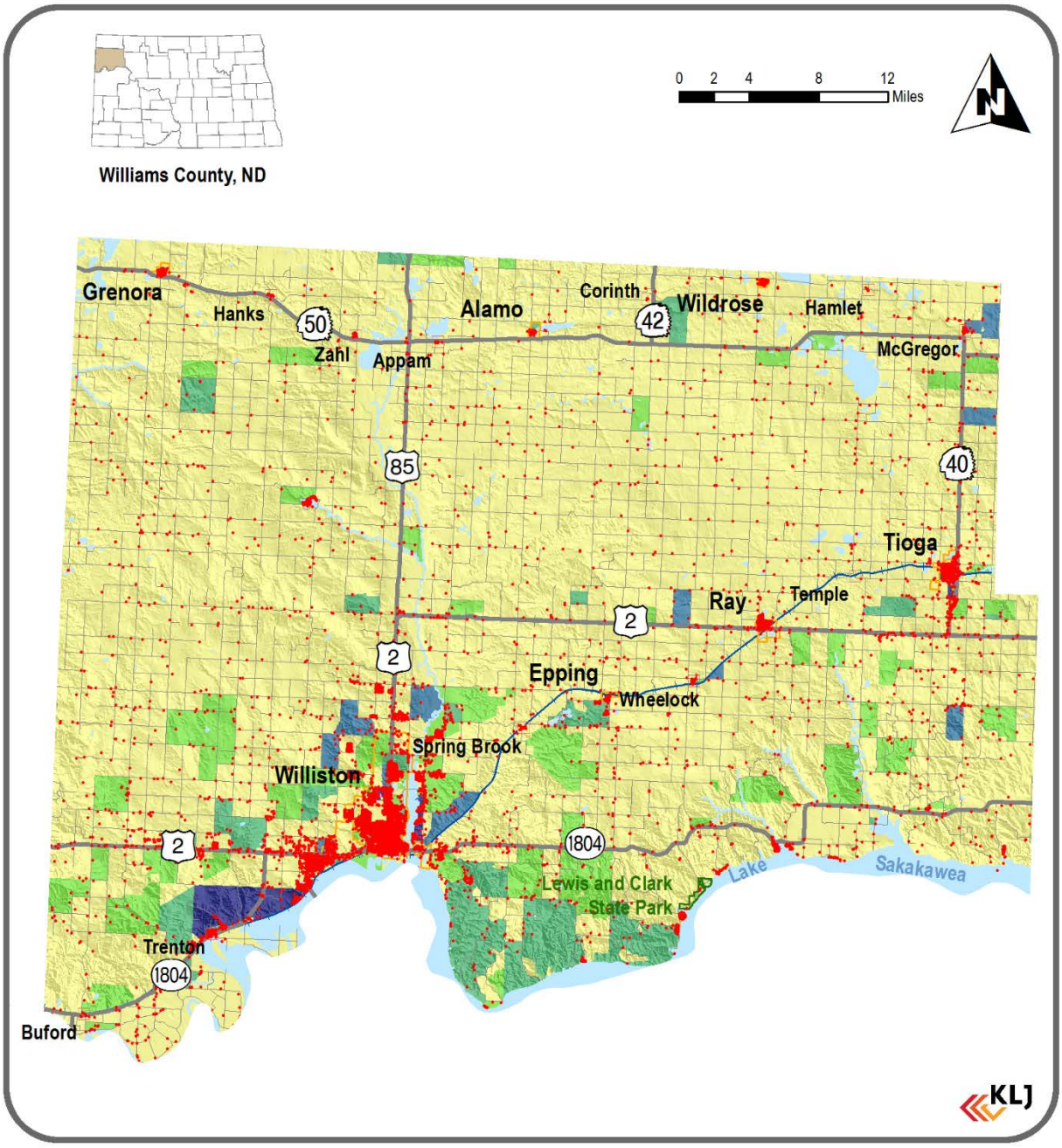


Figure 2.4
Population Density

Source:
US Census Bureau
2010 Decennial Census

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Persons per Acre (2010)
- 0.0 - 2.0
- 2.1 - 4.0
- 4.1 - 6.0
- 6.1 - 8.0
- Greater than 8.0

Addresses

Climate and Weather

Aggregated weather statistics for the county are shown in Table 2.2. Weather extremes in the county are shown in Table 2.3. The NWS Cooperative Network Weather Station in Tioga is used for aggregate data because it has the longest available period of record in the county. Additional weather statistics can be found in Appendix C.

Table 2.2 – Williams County Aggregated Weather Statistics

	Tioga			
	Temperature (°F)		Precipitation (In.)	Snow Fall (In.)
	Avg Daily Max	*Avg Daily Min*	*Avg Monthly*	*Avg Monthly*
Jan	16.6	-3.8	0.45	6.3
Feb	22.6	1.7	0.40	5.0
Mar	35.2	14.0	0.52	5.1
Apr	52.6	28.0	1.07	3.5
May	65.7	39.6	1.92	0.9
Jun	74.7	49.4	2.80	0.0
Jul	81.5	53.9	2.08	0.0
Aug	81.4	51.7	1.72	0.0
Sep	68.8	40.7	1.36	0.4
Oct	54.7	28.9	0.83	2.4
Nov	35.2	14.7	0.48	5.1
Dec	21.9	1.9	0.48	6.4
Ann	*50.9*	*26.7*	*14.11*	*35.0*

Note: Aggregated Monthly Statistics 1/1/1905-2/28/2013
Source: NWS Cooperative Network Weather Station, Tioga 328737 (High Plains Regional Climate Center)

Table 2.3 – Williams County Weather Extremes

Highest Max Temperature	108° F	7/7/1981 7/24/2007
Lowest Min Temperature	-30° F	12/24/1983
Highest Daily Precipitation	4.3"	8/22/1993
Greatest Snowfall	20.0”	4/28/1984

Note: Aggregated Monthly Statistics 1/1/1905-2/28/2013
Source: NWS Cooperative Network Weather Station, Tioga 328737 (High Plains Regional Climate Center)

Economy

The agriculture industry has traditionally been the driving force of the Williams County economy. The industry is tracked by annual survey through the National Agricultural Statistics Service. Spring wheat is the most common crop, accounting for more than 90 percent of the county’s harvested acreage in 2014. Cattle and calves virtually make up the entirety of the county’s livestock industry. The USDA Census of Agriculture indicates that in 2012 the total value of crops sold in the county was $167,572,000 and the total value of livestock was $11,131,000.

Table 2.4 - Williams County Agriculture Summary, 2014

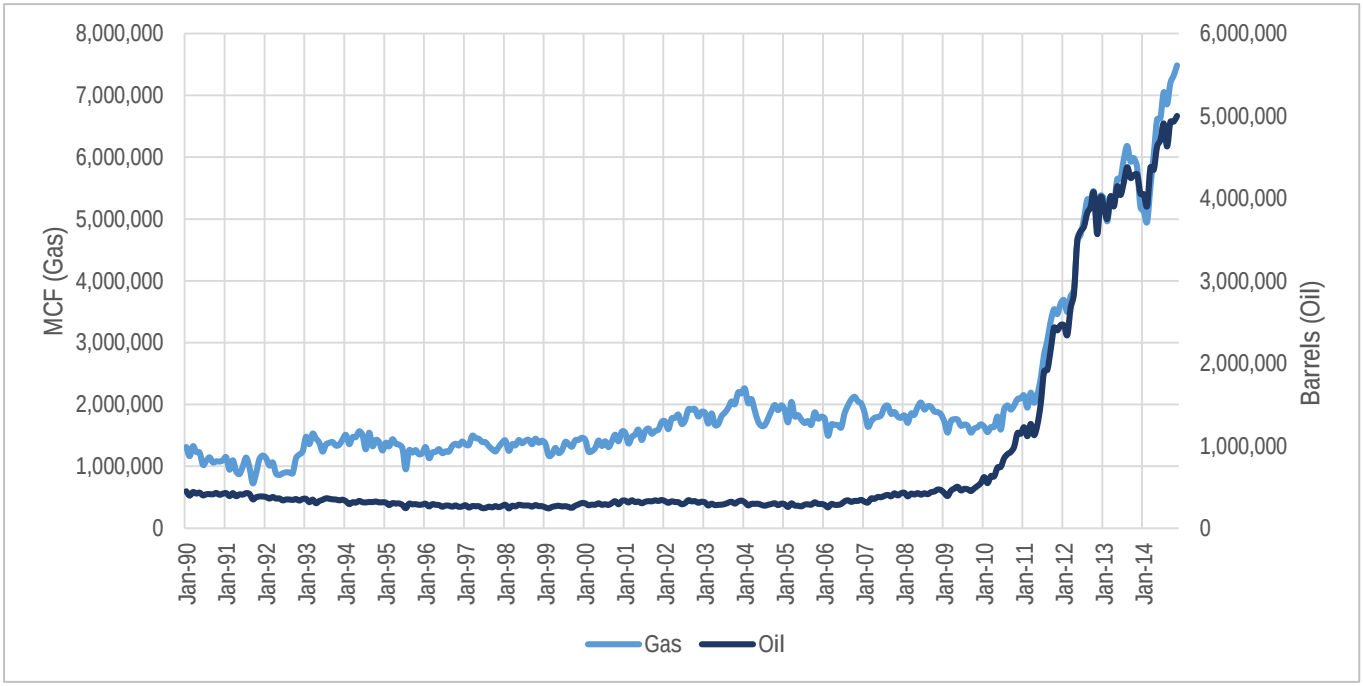
Crop	Acres Harvested	Production
Spring Wheat (Durum)	294,500	9,288,000 bu
Spring Wheat (excl Durum)	115,400	4,428,000 bu
Barley	24,300	1,464,000 bu
Winter Wheat	13,500	500,000 bu
Livestock	**Inventory**	
Cattle and Calves	22,500	

Source: USDA National Agricultural Statistics Service annual survey

Energy development is the most significant growth industry in the county. As shown in Figure 2.5, oil production in the county has dramatically increased in recent years. This production is primarily resulting from hydraulic fracturing in the Bakken/Three Forks formation. Hydraulic fracturing is a well stimulation technique in which rock is fractured by hydraulically pressurized liquid, which releases oil and gas that is otherwise difficult to obtain using traditional methods.

Williams County wells produced 4,999,719 barrels of oil and 7,486,427 thousand cubic feet (MCF) of natural gas in November 2014, the most recent month with available data. Projections of future production are variable based on market prices, but high levels of oil and gas production in the county are expected to continue for the foreseeable future.

Figure 2.5 – Williams County Oil and Gas Production



Source: North Dakota Department of Mineral Resources, Oil and Gas Division

Countywide workforce data is compiled by the Job Service North Dakota Labor Market Information Center. The county's largest employers are shown in Table 2.5. A majority of the top employers in 2013 were from energy-related industries.

Table 2.5 – Williams County Largest Employers, 2013

Rank	Employer	Industry
1	Halliburton Energy Services	Support Activities for Mining
2	Nabors Drilling USA	Support Activities for Mining
3	(Nondisclosable)	(Nondisclosable)
4	(Nondisclosable)	(Nondisclosable)
5	Sanjel USA	Support Activities for Mining
6	Williston Public School District	Educational Services
7	(Nondisclosable)	(Nondisclosable)
8	Mercy Medical Center	Hospitals
9	(Nondisclosable)	(Nondisclosable)
10	(Nondisclosable)	(Nondisclosable)

Source: 2013 Quarterly Census of Employment and Wages, Job Service ND, Labor Market Information Center

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.
- 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 Williams County can be found in Appendix D. The facilities found in the appendix are a revised version of the facilities list found in the 2009 plan. Critical facilities are discussed in each hazard profile found in Chapter 3.

Chapter 3: Hazard Risks and Vulnerabilities

Hazards Overview

Williams County is subject to numerous natural and human-caused hazards. Many hazards are capable of creating significant levels of damage and having a negative effect on the local economy. Figure 3.1 illustrates the total losses from natural hazard events by county in North Dakota, from 1960 to 2009. Williams County is within the range of $102 million to $149 million, placing it above the median for total losses.

Figure 3.1 – Economic Losses from Hazard Events, 1960-2009

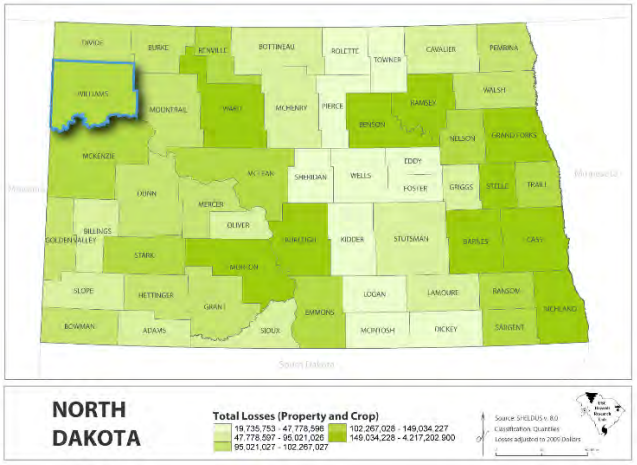


Table 3.1 lists Presidential Disaster Declarations for Williams County from 1989 to 2014. There were 32 Presidential Disaster Declarations in North Dakota during the period, and Williams County was designated for 10 of them. The most recent declared disasters were the flooding and winter storm events of 2011.

Table 3.1 – Williams County Presidential Disaster Declarations, 1989-2014

Year	Declaration	Hazard(s)
2011	DR 1986	Winter Storms
2011	DR 1981	Flooding
2009	DR 1829	Severe Storms, Flooding
2005	DR 1616	Winter Storms
2000	DR 1353	Winter Storms
1999	DR 1279	Severe Storms, Tornadoes, Snow and Ice, Flooding, Ground Saturation, Landslides and Mudslides
1997	DR 1174	Severe Storms, Flooding
1997	DR 1157	Severe Winter Storms
1994	DR 1032	Flooding, Severe Storms
1993	DR 1001	Flooding, Severe Storms

Source: FEMA

The 2014 North Dakota Multi-Hazard Mitigation Plan served as the basis for selecting the hazards profiled in this chapter. Shortage or Outage of Critical Materials or Infrastructure, Structure Collapse, Transportation Accident and Windstorm are profiled as separate hazards in the statewide plan; however, in this plan the risks and impacts associated with those hazards are discussed in other applicable hazard profiles and do not receive individual recognition.

Profiled natural hazards:

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

Profiled human-caused/technological hazards:

- Communicable Disease
- Dam Failure
- Hazardous Materials Release
- Homeland Security Incident
- Urban Fire

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 magnitude of each event to determine overall hazard risk. Probability is the chance that the hazard event will occur within the county in the next year. Magnitude is the percentage of residents and property that could be significantly affected by the hazard event in a worst-case scenario. Criteria used to determine probability, magnitude and overall risk class are shown below. Historical data from previous events was utilized to determine probability and magnitude when possible. Risk class is determined for the rural county (unincorporated areas) and each incorporated city.

Probability

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

Magnitude

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

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 Williams County, the database includes information about flooding, severe summer weather and severe winter weather. Statistics for other hazards are provided by a variety of sources, as noted in each corresponding profile.

Risk Class Determination Criteria				
		Magnitude		
		Low	**Moderate**	**High**
Probability	**Low**	Low	Low	Moderate
	Moderate	Low	Moderate	High
	High	Moderate	High	High

Drought

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

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

Duration
Months/Years

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

Hazard Profile

Drought is generally defined as a deficiency of precipitation over an extended period. If severe enough, this deficiency has potential to reduce soil moisture and water below the minimum necessary for sustaining plant, animal and human life systems. It is a normal, recurrent phenomenon that takes place in nearly all climate zones. Droughts appear gradually, and it is often difficult to pinpoint their beginning and end. Droughts can last multiple years, and even persist over decades. Significant droughts in North Dakota occur approximately once per decade. Previous droughts include the 1930s, 1950s, early 1960s, mid 1970s, early 1980s, 1988 through 1991, 2002 through 2004 and 2006.

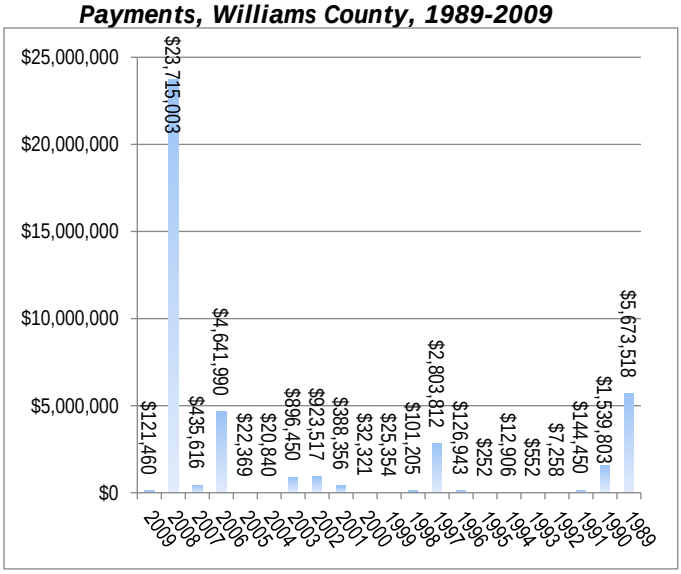
Droughts are often measured by impacts, most notably agricultural damage and municipal water supply shortage. The impacts are highly variable based on time of year, amount of stored water in the soil, and meteorological factors such as temperature, humidity and wind. Impacts are also greatly affected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

Local Risk

- 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 14.11 inches** as recorded by the National Weather Service Cooperative Network weather station in Tioga. The county's **lowest annual precipitation is 5.86 inches**, which was recorded in 1934. It is important to note, however, that numerous factors beyond rainfall contribute to drought status, which can make it difficult to predict and classify droughts.

- Historical drought occurrences can be measured by looking at impacts. Federal indemnity programs provide financial assistance to help reduce the impact drought-related agricultural losses. Figure 3.2 shows indemnity payments for Williams County from 1989-2009. The figure shows that **2008 had the largest drought indemnity payments** during the time period. Drought losses occurred during the late 1980s and late 1990s, and were scattered throughout the 2000s. Based on previous regional trends, a severe drought can be expected approximately once per decade.

Figure 3.2 – Drought-Related Federal Indemnity Payments, Williams County, 1989-2009



Source: National Drought Mitigation Center

Vulnerability

Population

- Drought has no direct impact on human life, but it **greatly increases the risk of wildfire**, which is a potentially life-threatening hazard. Drought accompanied by high temperatures can **increase the threat of heat-related illness** for persons who spend a significant amount of time outdoors or do not have adequately-cooled homes. The

highest recorded temperature in the county (at the Tioga monitoring station) is 108 degrees Fahrenheit recorded in July 1981 and July 2007. Elderly persons are at increased risk of heat-related illness. Approximately **3,020 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.

- Alamo: 5 residents (6 percent)
- Epping: 9 (10 percent)
- Grenora: 35 (18 percent)
- Ray: 78 (11 percent)
- Spring Brook: 0 (0 percent)
- Tioga: 300 (28 percent)
- Wildrose: 7 (7 percent)
- Williston: 2,200 (13 percent)

- **Prolonged drought could affect water supplies**. Bottled water could be brought in as an emergency measure, but a lack of household water could create health and sanitation issues for residents. All municipalities in the County, except Grenora, are a part of the Williams Rural Water District and are supplied with water from the Western Area Water Supply Project. The domestic water supply coming from the Missouri River is treated at the Williston Regional Water Treatment Plant. This water source is supplemented by groundwater treated by the R&T Water Supply Commerce Authority's Water Treatment Plan in Ray. Even at peak demands under current year drought conditions WAWS has capacity to serve 30% more domestic water demand than it currently experiences. Grenora has its own municipal water supply coming from a large ground water aquifer. There are no concerns with water source limitations for Grenora even under current year drought conditions. However, rural water wells for individual rural development sites and stock tanks or stock ponds have a less certain supply.

Critical Facilities

- No critical facility in the county is 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 2008, with $24 million paid by the USDA to reduce the economic impact of drought.** Agriculture is the primary economic driver in the county, and the economic success of each city ultimately relies on a healthy agriculture industry.

- The statewide Multi-Hazard Mitigation Plan includes information about crop insurance payments from the USDA Risk Management Agency. Drought-related **crop insurance payments in Williams County from 2003 to 2012 totaled $31.9 million**. Based on a statewide rate of 89 percent of crops being insured, **total estimated damages for the county were $35.9 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 wildfire and may create water shortages** that inhibit adequate fire response. Structure vulnerability from wildfire is discussed in more detail in the wildland fire section of this chapter.

Future Development

- Population growth in recent years has significantly increased demand for potable water in the county. 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. In the event that significant additional population growth occurs, the Western Area Water Supply Project has the ability to add additional water treatment capacity to serve Williams County.

- Energy development in the county could be a potential risk to future water supplies if not pursued in a sustainable manner. Fracing is a water-intensive use that could compete with local water supplies during times of drought. Additionally, spills of oil and byproducts from oil extraction could jeopardize county aquifers and rivers. A large spill that pollutes an aquifer or river could result in a health crisis for residents and significant economic damages for agricultural producers. The impacts of a spill could be exacerbated during times of drought when water supplies are scarce.

Existing Capabilities

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

- Williams County is a participant in the North Dakota Cloud Modification Project (NDCMP), which is administered by the State Water Commission. The goal of the program is to seed clouds to increase rainfall and reduce hail damage in the region. According to the State Water Commission, cloud seeding produces an estimated 5 to 10 percent rainfall increase in western North Dakota.

Key Issues and Potential Action Items

- *Key Issue*: Energy development and population growth in recent years have significantly increased demand for water in the county. This growth is expected to continue for at least the next several years.
  - *Potential Action Item*: Expand municipal water storage.
  - *Potential Action Item*: Educate residents in each community about water saving techniques to help preserve water supplies.
  - *Potential Action Item*: Increase the supply of treated water that could be available for industrial applications.

- *Key Issue*: Agriculture is a key component of the county's economy. A significant drought has the potential to greatly affect the industry and the county as a whole.
  - *Potential Action Item*: Continue supporting the USDA Farm Service Agency and North Dakota State University Extension and provide assistance as needed to local farmers and ranchers.
  - *Potential Action Item*: Develop emergency response plan that includes coordination with local livestock producers.

Flood

Rural County, including Spring Brook
Overall Risk: Low
Probability: Low (approximately one event day every two years countywide)
Magnitude: Low (4.6 percent of total population, 2.1 percent of total addresses)

Alamo
Overall Risk: Low
Probability: Low (approximately one event day every two years countywide)
Magnitude: Moderate (modeled floodplain - 12.9 percent of total population, 15.7 percent of total addresses, minimal history of flooding damages)

Epping
Overall Risk: Moderate
Probability: Moderate (localized flooding is common during heavy rains)
Magnitude: Moderate (flooding primarily affects local roadways)

Grenora
Overall Risk: Low
Probability: Low (approximately one event day every two years countywide)
Magnitude: Low (no floodplain in developed areas of city, wastewater treatment lagoons within potential floodplain but has no history of damages)

Ray
Overall Risk: Moderate
Probability: Moderate (six flood events from 1996 to 2013)
Magnitude: Moderate (no identified floodplain in developed areas of city, history of localized flooding in east area of town primarily affecting roads)

Tioga
Overall Risk: High
Probability: Moderate (localized flooding is common during heavy rain events)
Magnitude: High (20.1 percent of total population, 16.2 percent of total addresses, two critical facilities, additional impacts from localized flooding during heavy rain and snowmelt)

Wildrose
Overall Risk: High
Probability: Moderate (localized flooding is common during heavy rain events, wastewater treatment lagoons currently inundated by rising water levels in area)
Magnitude: High (not located in identified floodplain, history of impacts from flash flooding and rising water levels in area)

Williston
Overall Risk: Low
Probability: Low (approximately one event day every two years countywide)
Magnitude: Low (no population within floodplain, 0.03 percent of total addresses)

Seasonal Pattern
March – October

Duration
One week

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

Hazard Profile

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

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

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

Local Risk

- NFIP participation is summarized in Table 3.2. The identified Townships are still participants in the NFIP, but floodplain administration is handled through the Williams County Development Services Department. The County and municipalities each have a floodplain administrator and enforced floodplain management ordinances. Action items to strengthen the NFIP compliance of the jurisdictions are included in Chapter 4.

Table 3.2 - NFIP Participation in Williams County

Jurisdiction	Total Participating Properties	Insured Value of Participating Properties
Williams County	0	$0
City of Ray	0	$0
City of Tioga	30	$3,934,600
City of Williston	0	$0
Buford Township	0	$0
Sauk Valley Township	0	$0
Trenton Township	0	$0

Note: Policy information as of 2/28/2015

- Williams County was included in **five flood-related Presidential Disaster Declarations** between 1989 and 2014.

- Floodplain maps for the county and each applicable city are shown in Figures 3.3 through 3.9. FEMA Flood Insurance Rate Maps (FIRMs) are available for Ray, Tioga, Williston and some townships near the Missouri River. Zones A and AE (also known as a 100-year floodplain or Special Flood Hazard Area) present a one percent annual chance of flooding. The Floodway is the channel of a drainage and any adjacent floodplain areas that must be preserved in order to prevent elevation of upstream floodplain areas. Zone X areas shown on the map (also known as a 500-year floodplain or Non-Special Flood Hazard Area) present a 0.2 percent annual chance of flooding.

  Additional floodplain modeling for the county was completed with Hazus-MH 2.1 software developed by FEMA. Hazus-MH uses topography to determine estimated floodplain areas. Hazus floodplains are not regulatory and are intended for planning purposes only.

- A 2010 flood insurance study summarizes the primary flooding issues for **Williston**. Sand Creek is a small stream that meanders north and west of the city. **Flooding along Sand Creek mainly occurs during the spring season, typically caused by snowmelt runoff flowing over frozen soil**. There is no historical documentation of flood damages from this stream due to limited surrounding development.

  An additional flooding issue is Williston is related to runoff from upland tributaries that travels from northwest to southeast through the city. **Ponding occurs in lowland areas following heavy precipitation**. Both businesses and private residents are affected by this problem; however, damages from flooding in Williston have historically been minimal.

- A 1988 flood insurance study summarizes the primary issues for **Tioga**. An unnamed tributary of the White Earth River drains through Tioga. Flooding can occur from high intensity rainfall during the summer and rapid snowmelt during the spring.

  Rapid growth experienced in town over the last several years has intensified flooding issues. The city's FIRM was updated in 1988, but it appears that the map no longer reflects the local flooding situation. A new Hess rail park facility to the west of town has created flooding issues as water drains from the site. Several homes along 67th Street have seen increased water flows through their property since the facility was built. The facility is outside city limits and the city was not involved with the siting or permitting process.

  A new housing subdivision on the north side of town is also causing flooding issues. The site of the homes formerly functioned as a water storage area that could be utilized during times of increased moisture to slow the flow of water into town. The homes prevent the area from being utilized as a storage area, which results in more water flowing through town during moisture events.

  An old concrete dam is located across the primary drainage on the south end of town near 67th Street. The dam causes water to back-up in town (water travels north to south through the area). The street is being upgraded soon and the dam will be removed, which should improve drainage in town.

- The east side of **Ray** experiences flooding issues during heavy rain events due to inadequate drainage. The city recently completed an engineering study to identify specific projects to address the flooding.

- **Alamo** experiences some localized flooding during heavy rain events due to a collapsed culvert along Main Street.

- Flooding along Main Street in **Grenora** often occurs during heavy rain events due to inadequate drainage.

- Flooding in **Wildrose** is caused by heavy rainfall and spring snowmelt. There is no identified floodplain in town, but poor localized drainage results in street flooding and some property damage during times of increased moisture. The city estimates that 80 percent of the culverts in town are not functional; many are filled with silt and debris, and some are completely degraded and need replaced or enlarged. Additionally, many of the drainage ditches in town need to be enlarged to help move water away from roadways and structures.

  The city's lagoon is surrounded by a shallow lake/wetland due to rising water levels over recent years. An image of the city's lagoon can be found in Appendix C. **A small breach has occurred in the lagoon, allowing outside water to flow into the treatment ponds**. The city is assembling funding sources to construct a new lagoon away from the flooding hazard.

- **Epping** experiences localized ponding on several roadways during heavy rain events.

- No specific flooding issues were identified for **Spring Brook**.

- Several rural roads in the county experience flooding due to inadequate drainage or rising sloughs. Specific roads with flooding issues are shown in Appendix C.

- Recent flood events in Williams County are shown in Table 3.3. **The county averages nearly two flood events per year**. Flood event classification criteria and a detailed listing of events can be found in Appendix C.

Table 3.3 - Flood Events in Williams County,1996-2014

Flood Events	Event Days*	Annual Probability	Event Days per Year
Total	*9*	*47.4%*	*0.5*
Flood	7	36.8%	0.4
Flash Flood	2	10.5%	0.1

**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 Williams County are summarized below. **Localized road and culvert washouts are the most common identified impacts of flood events in the county,** although some events resulted in more significant impacts.
  - *July 5, 1998*. Heavy rain flooded numerous roads in Williston, sections of Highways 2 and 85 and parts of Spring Brook.
  - *March 2006*. Melting snow and ice jams, combined with heavy rains, brought the Missouri River above flood stage. Numerous homes received water damage and some families near Blacktail Dam had to be evacuated by boat. Total damages were estimated at $300,000.
  - *June 1, 2014*. Heavy rain resulted in damaged culverts and roads in northwest Williams County. Deep water was standing in fields and some crops were damaged. Total damages were estimated at $130,000.

- The US Army Corps of Engineers Cold Regions Research and Engineering Laboratory (CRREL) tracks ice jams in Williams County. **CRREL has recorded 55 ice jams in the county since 1930**. All of the reported ice jams were near Williston along the Missouri River or a local tributary. Impacts from ice jams in recent decades have been limited to localized road flooding.

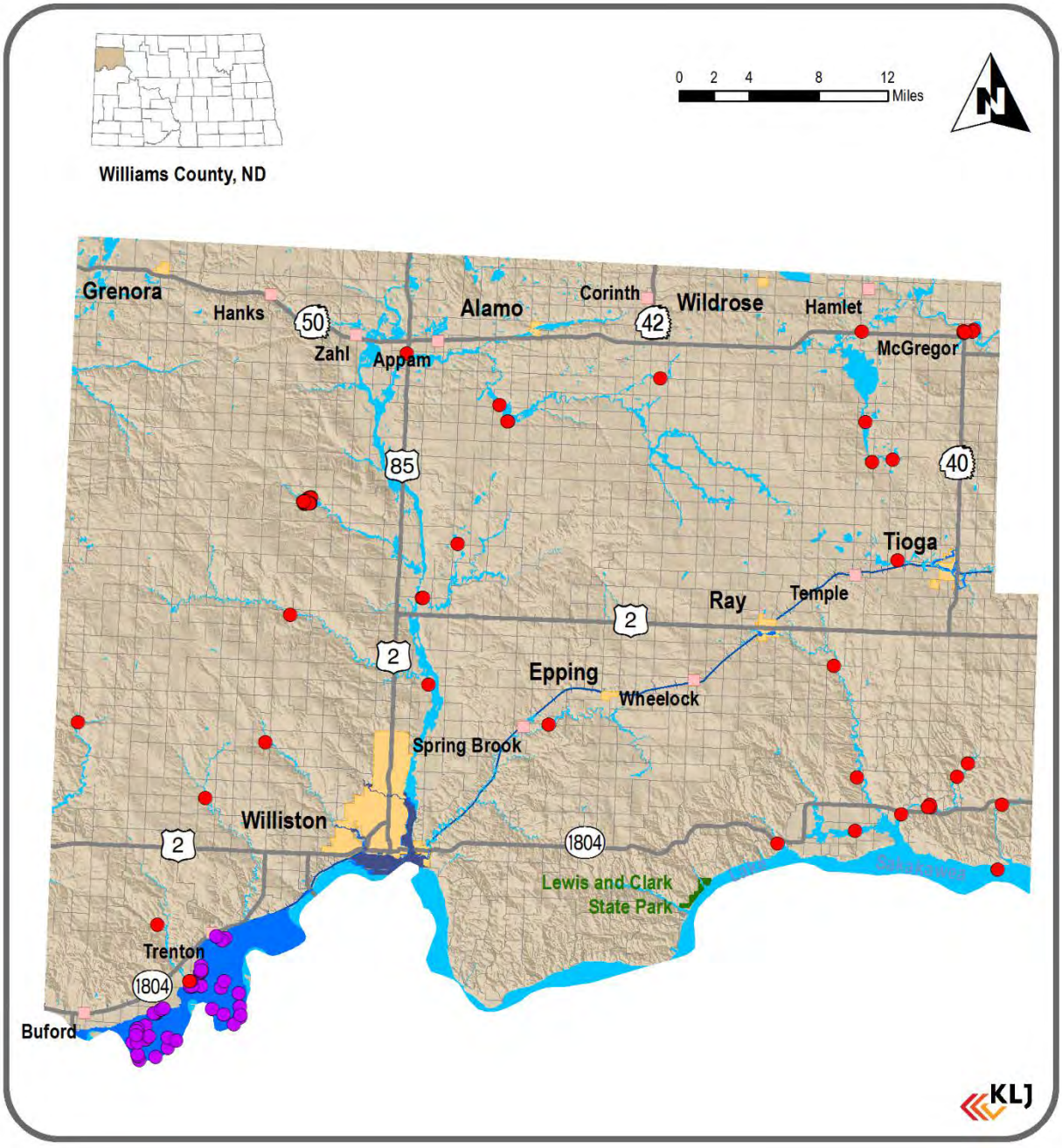


Figure 3.3
Floodplains
Williams County

Source:
FEMA FIRM effective 8-5-2010, 4-5-1988, 11-4-1987, 4-29-1980
Hazus-MH 2.1 Flood Modeling Software
ND GIS Hub

For Planning Purposes Only

- 2010 FEMA Zones A & AE (100-Year Floodplain)
- 1980-1988 FEMA Zone A (100-Year Floodplain)
- Modeled 100-Year Floodplain
- Rural Addresses within FEMA Zone A
- Rural Addresses within 50 feet of Modeled 100-Year Floodplain
- Incorporated Cities
- Unincorporated Communities

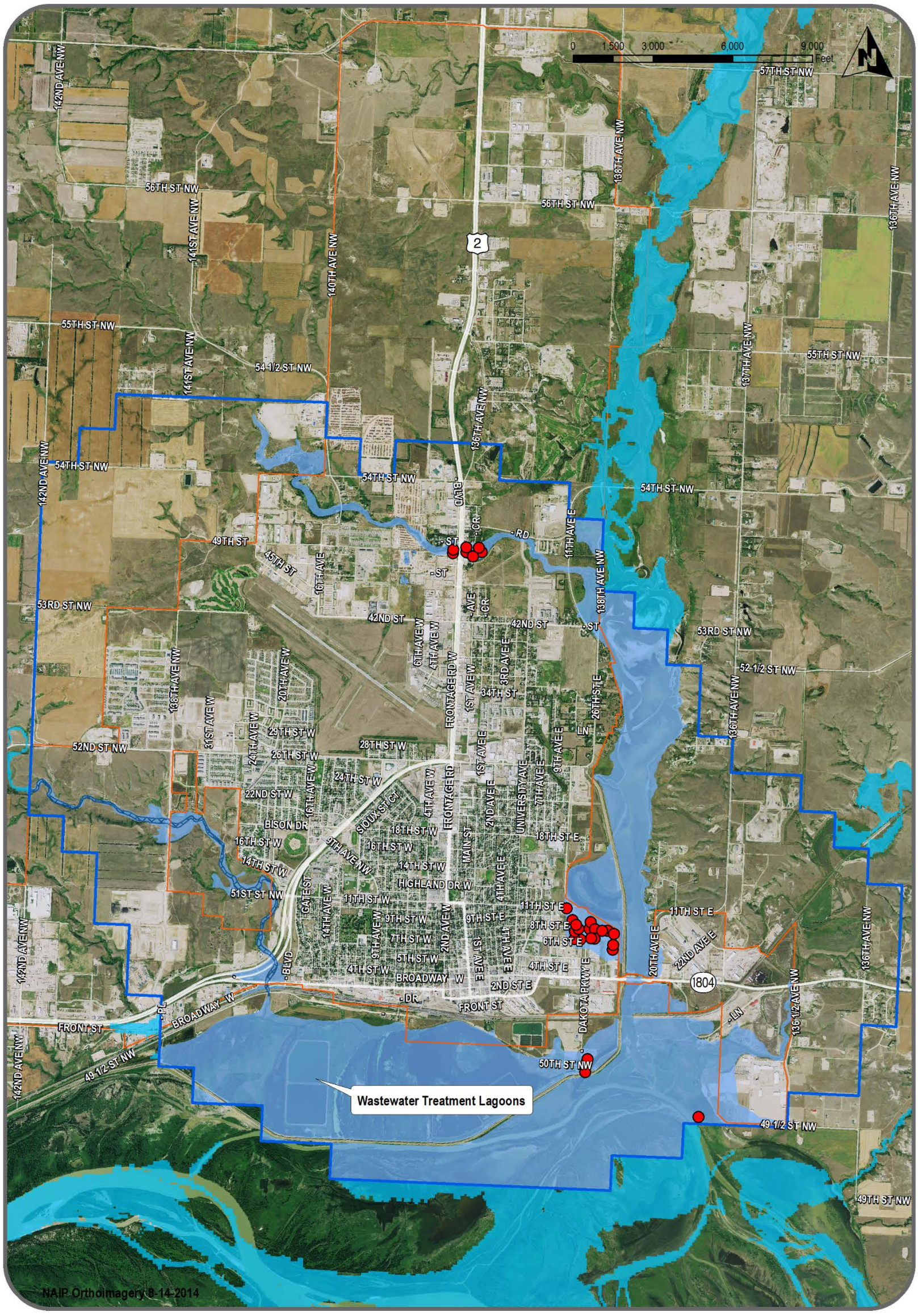


Figure 3.4 Floodplains Williston

Source:
FEMA FIRM effective 8-5-2010
Hazus-MH 2.1 Flood Modeling Software
ND GIS Hub

For Planning Purposes Only

FEMA Flood Zones

- Floodway
- Zones A & AE (100-Year Floodplain)
- Extent of FIRM
- Modeled 100-Year Floodplain
- Addresses within Zones A & AE
- City Limits

KLJ

Figure 3.5
Floodplain
Tioga

Source:
FEMA FIRM effective 4-5-1988
ND GIS Hub

For Planning Purposes Only

- Zone A (100-Year Floodplain)
- Zone X (500-Year Floodplain)
- Addresses within Zone A
- City Limits

KLJ

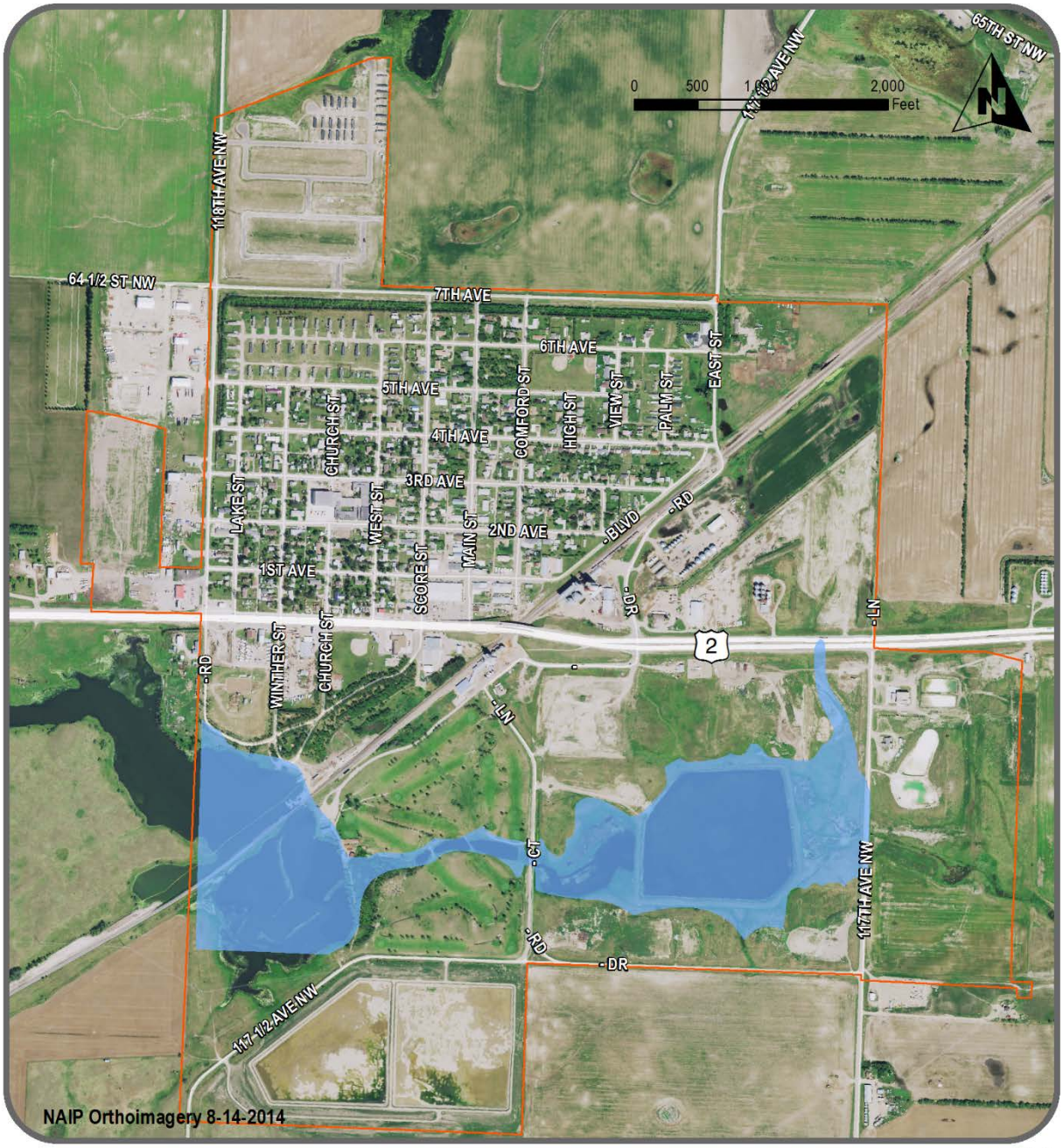


Figure 3.6
Floodplain
Ray

Zone A (100-Year Floodplain)
City Limits

Source:
FEMA FIRM effective 4-29-1980
ND GIS Hub

For Planning Purposes Only

Figure 3.7
Floodplain
Alamo

Modeled 100-Year Floodplain
Addresses within 50 feet of Modeled 100-Year Floodplain
City Limits

Source:
Hazus-MH 2.1 Flood Modeling Software
ND GIS Hub

For Planning Purposes Only

KLJ

Figure 3.8
Floodplain
Grenora

Modeled 100-Year Floodplain
City Limits

Source:
Hazus-MH 2.1 Flood Modeling Software
ND GIS Hub

For Planning Purposes Only

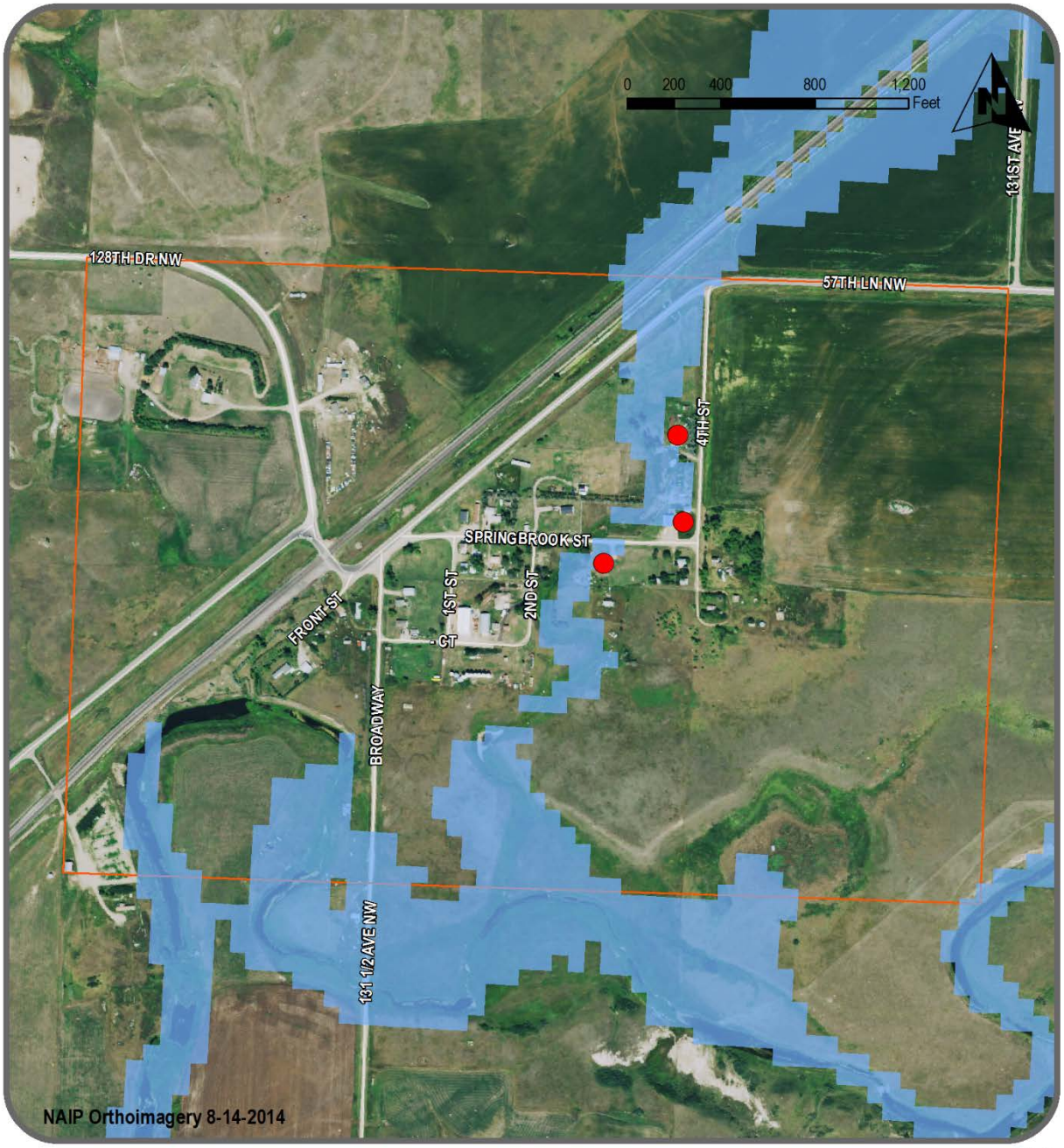


Figure 3.9
Floodplain
Spring Brook

Modeled 100-Year Floodplain

Addresses within 50 feet of Modeled 100-Year Floodplain

City Limits

KLJ

Source:
Hazus-MH 2.1 Flood Modeling Software
ND GIS Hub

For Planning Purposes Only

Vulnerability

Population

- Vulnerable population can be estimated by identifying the intersection of address points and identified floodplains. Associated land use information is not available, but structure use can be estimated by reviewing aerial imagery. All vulnerable residential address points are multiplied by the county's average household size of 2.34 to determine population. Vulnerable population is shown in Table 3.4. Note that this analysis does not include flash flooding or other non-riverine events.

Table 3.4 – Williams County Population within Identified Floodplain

	Residential Addresses in Floodplain	Population in Floodplain	% of Total Population
Rural County	115*	269	4.6%
Alamo	3	7	12.9%
Epping	0	0	0%
Grenora	0	0	0%
Ray	0	0	0%
Spring Brook	3	7	0.9%
Tioga	135	315	20.1%
Wildrose	0	0	0%
Williston	0	0	0%
Total	*256*	*598*	*2.0%*

**Many of the addresses southwest of Williston are vacated farmsteads; however, it is unclear how many are no longer functioning as a residence, so all addresses are included in this analysis.*
Note: Floodplain area from FEMA FIRM (Zones A & AE) or Hazus-MH 100-Year Floodplain (50-foot buffer applied to Hazus floodplain due to generalized nature of the delineation)
Source: Williams County GIS, US Census Bureau

Critical Facilities

- Critical facilities within identified floodplains are shown in Figures 3.3 through 3.9. There are no critical facilities within identified floodplains in Epping, Ray, Spring Brook or rural areas of the county.

- Alamo:
  - Calvary Lutheran Church

- Grenora:
  - Wastewater treatment lagoons

- Tioga:
  - Senior Citizens Center
  - Fire/EMS

- Wildrose:
  - Wastewater treatment lagoons (not within identified floodplain, but currently being inundated by rising water levels in the area)

- Williston:
  - Wastewater treatment lagoons (within identified floodplain but have no history of flooding damages)

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 Williams County from 2003 to 2012 totaled $64.5 million**. Based on a statewide rate of 89 percent of crops being insured, **total estimated damages for the county were $72.5 million**. Over a 10-year period this results in an annualized loss of $7.2 million.

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

- Vulnerable property can be estimated by analyzing the intersection of county addresses and identified floodplains. Associated land use information is not available, but structure use can be estimated by reviewing aerial imagery. Vulnerable properties are summarized in Table 3.5. Note that this analysis does not include flash flooding or other non-riverine events.

- Sixty-five oil wells in the county are located within a FEMA-designated 100-year floodplain. Thirty-nine additional wells are located within a floodplain modeled in Hazus-MH. On-site berms and pad elevations may have effectively removed many of these wells from the floodplain area. A flooded oil well that is not contained could result in contamination of surrounding waterways. If flooding is anticipated, well operators can temporarily shut down the wells to prevent a release.

Table 3.5 – Williams County Properties within Identified Floodplain				
	Residential Addresses in Floodplain	**Non-Residential Addresses in Floodplain**	**Total Addresses in Floodplain**	**% of Total Addresses**
Rural County	115*	6	121	2.1%
Alamo	3	5	8	15.7%
Epping	0	0	0	0%
Grenora	0	0	0	0%
Ray	0	0	0	0%
Spring Brook	3	0	3	14.3%
Tioga	135	24	159	16.2%
Wildrose	0	0	0	0%
Williston	0	28	28	0.3%
Total	*256*	*63*	*319*	*1.9%*

**Many of the addresses southwest of Williston are vacated farmsteads; however, it is unclear how many are no longer functioning as a residence, so all addresses are included in this analysis.*
Note: Floodplain area from FEMA FIRM (Zones A & AE) or Hazus-MH 100-Year Floodplain (50-foot buffer applied to Hazus floodplain due to generalized nature of the delineation)
Source: Williams County GIS

Future Development

- All communities in the county with a history of flooding participate in the NFIP and have floodplain regulations that limit future growth into high risk areas.
- Williston and Tioga's existing FIRMs do not include some future growth areas for each city, and recent development may have altered the existing floodplain in certain areas.

Existing Capabilities

- Williams County, Ray, Tioga, Williston and three townships have floodplain administrators and floodplain ordinances that are actively enforced.

Key Issues and Potential Action Items

- *Key Issue*: Williams County experiences about one flood event every two years. Flood events in the county include riverine flooding and flash flooding.
  - *Potential Action Item*: Conduct NFIP workshop to educate public about benefits of flood insurance.
  - *Potential Action Item*: Improve natural stream function to reduce overflow volume in floodplain area.
  - *Potential Action Item*: Place riprap on river banks to help prevent erosion.
  - *Potential Action Item*: Construct additional flood protection levees.
  - *Potential Action Item*: Acquire and remove high risk properties in the floodplain.
  - *Potential Action Item*: Consider joining the NFIP Community Rating System (CRS) program.
  - *Potential Action Item*: Install sewer backflow prevention valves on select facilities.
- *Key Issue*: Many roads in the county are commonly washed out or inundated during flooding events.
  - *Potential Action Item*: Adopt policy for minimum culvert size to help prevent washouts.
  - *Potential Action Item*: Identify areas that could use enlarged culverts.
  - *Potential Action Item:* Elevate commonly-impacted roads or bridges.
- *Key Issue*: The Wildrose wastewater treatment lagoon is inundated due to rising water levels in the area.
  - *Potential Action Item*: Elevate or relocate lagoon away from inundated area.
- *Key Issue*: Growth is creating new flooding issues in several cities as new development has altered drainage patterns. Additionally, much of the new development is located outside of areas studied by FEMA, so their floodplain status is unknown.
  - *Potential Action Item*: Improve floodplain mapping within high-growth NFIP communities.
  - *Potential Action Item*: Improve floodplain regulations to include additional analysis of areas suspected of being significant drainages but are not mapped on existing FIRMs.

Geologic Hazards

All Jurisdictions
Overall Risk: Moderate
Probability: Moderate (small landslides generally occur once per year, significant earthquake is extremely unlikely)
Magnitude: Moderate (damages from landslides in the county are limited to rural roads, no history of damages from earthquakes)

Seasonal Pattern
May - October

Duration
A few minutes to six hours

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

Hazard Profile

Geologic hazards include landslide, earthquake and mining.

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

An earthquake is defined by USGS as a sudden movement of the earth, caused by the abrupt release of strain that has accumulated over a long time. North Dakota is not an area known for earthquake activity; however, many small earthquakes may occur throughout the state.

Mining hazards are related to mine, drilling and energy production disasters. The mining hazard in North Dakota is focused primarily in the Bakken region in the western part of the state.

Local Risk

- T**he Geologic Hazard risk in Williams County is primarily focused on landslides and earthquakes**. Potential issues relating to energy production are discussed in the Hazardous Materials Release profile found later in this plan.

- Much of the county is in a **moderate susceptibility/low incidence landslide** area according to the USGS. The hazard area is shown in Figure 3.10. **Landslide deposits are found throughout the southern portion** of the county according to the North Dakota Geological Survey.

- **Small landslides can occur throughout the county during periods of significant moisture.** Several roads throughout the county have been impacted by landslides. The most common impact is temporary closure. Specific roads that have experienced repeated landslide issues are shown in Appendix C.

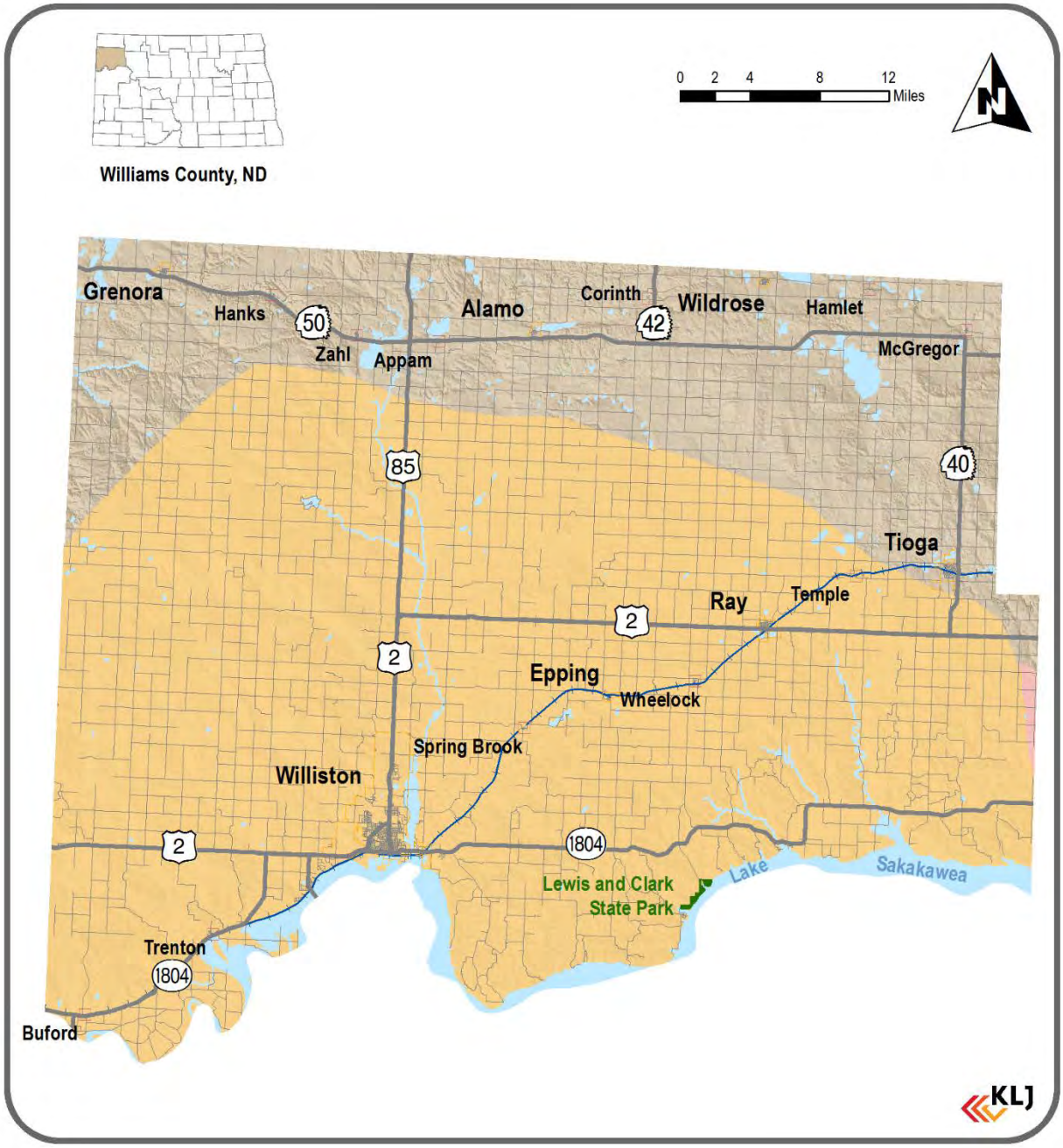


Figure 3.10
Landslide Hazard Areas

Source:
US Geological Survey
ND GIS Hub

For Planning Purposes Only

Landslide Hazard Areas

- High Incidence/Susceptibiliity
- High Incidence
- Moderate Incidence
- High Susceptibility
- Moderate Susceptibility

- Figure 3.11 shows potential earthquake hazard areas in the contiguous United States. **A majority of Williams County has a two-percent probability of exceeding a peak ground acceleration of 0.02 to 0.04 in the next 50 years**. The northwest corner of Williams County has a two-percent probability of exceeding a peak ground acceleration of 0.04 to 0.06 in the next fifty 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**. A ground acceleration of 0.04 to 0.092 can result in a **moderately perceived shaking and very light damage**. Earthquake risk is higher in Williams County than most areas of North Dakota, but it is very low compared to other regions of the country.

- Significant earthquake events in Williams County are shown in Figure 3.12. Earthquake severity can be measured by looking at magnitude and intensity. Magnitude is based on the area of the fault plane and amount of slip, and it can be measured using the Richter scale. An earthquake below Richter magnitude 5.0 rarely causes damage. **All reported earthquakes in Williams County had a magnitude below 4.0**. Intensity is based on how strong the shock is felt and the degree of damage at a given location. It can be measured using the modified Mercalli scale. Damage usually occurs with earthquakes of intensity level V or higher. **The greatest reported intensity for an earthquake in the county was IV, which can be felt as light shaking that results in disturbance of dishes, windows and doors.**

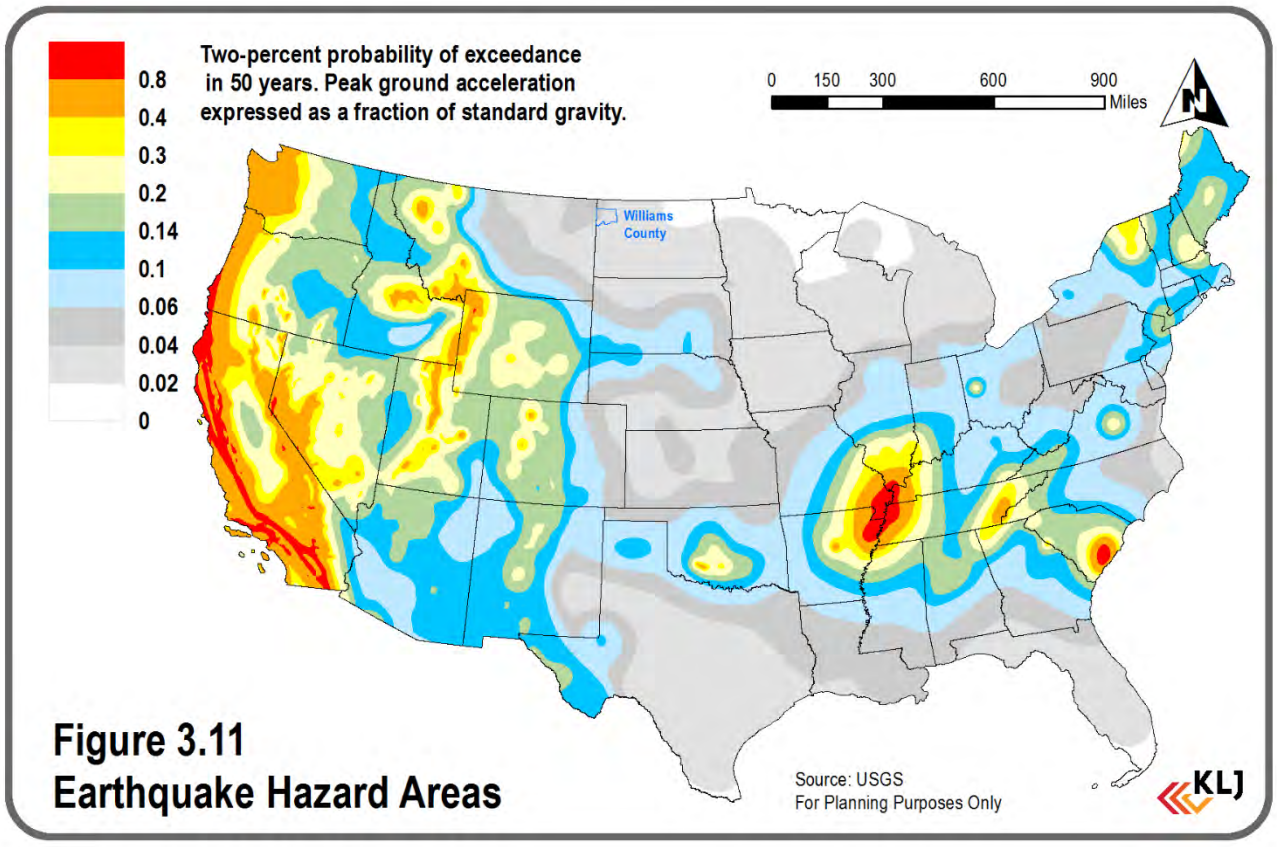


Figure 3.11
Earthquake Hazard Areas

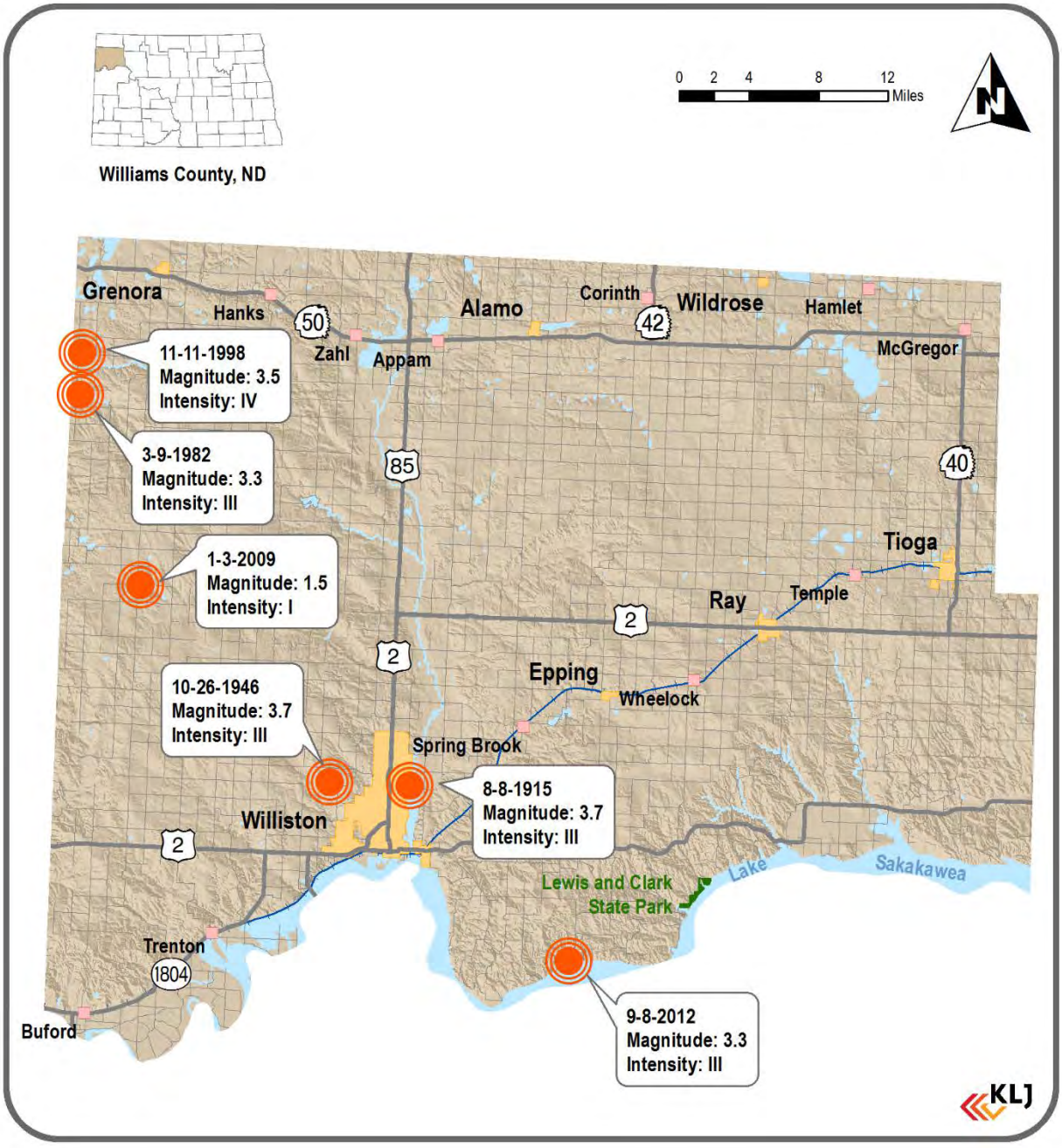


Figure 3.12
Reported Earthquakes

Reported Earthquakes

Note:
First detailed report in state was 1909.
Data current through October 2012.

Source:
ND Geological Survey
ND Dept of Mineral Resources
ND GIS Hub

For Planning Purposes Only

Vulnerability

Population

- The southern two-thirds of the county is within the moderate susceptibility landslide hazard area as defined by the USGS. The area includes the entire cities of Epping, Spring Brook, Ray and Williston; additionally, approximately 60 percent of the county's rural area is included. It is important to note that this area is delineated at a national scale and not intended for precise analysis. The number of residents actually vulnerable to landslide is most likely significantly lower. **There is no history of injuries or fatalities in the county related to landslide.**

- 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 most recent American Community Survey estimates, approximately 1,600 housing units in the county (12.5 percent of total) were built before 1939. Applying the county's average household size of 2.34 persons, **there are approximately 3,750 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.
  - Alamo: 19 residential structures built before 1939 (44 residents, 81 percent)
  - Epping: 22 (51 residents, 54 percent)
  - Grenora: 43 (101 residents, 38 percent)
  - Ray: 74 (173 residents, 23 percent)
  - Spring Brook: 0 (0 residents, 0 percent)
  - Tioga: 89 (208 residents, 13 percent)
  - Wildrose: 22 (51 residents, 49 percent)
  - Williston: 797 (1,865 residents, 11 percent)

Critical Facilities

- According to the USGS Earthquake Hazard Area map shown in Figure 3.11, a potential earthquake in Williams County would most likely only result in a light perceived shaking and no damages. The oldest facilities in each jurisdiction, including city halls, churches and grain elevators, would be most likely to experience some damages. There is no history of earthquakes in the county causing structure damage.

- The moderate susceptibility landslide hazard area identified in Figure 3.10 includes 50 critical facilities. The hazard area is very generalized, and it is likely that very few of these facilities are actually vulnerable to landslide. There is no history of landslides in the county causing structure damage.

Property

- The southern two-thirds of the county is within the moderate susceptibility landslide hazard area as defined by the USGS. The hazard area is generalized, and it is likely that very few of the properties in the area are vulnerable. The greatest impact of landslides has been temporary road closure.

- No earthquakes in Williams County have resulted in significant reported damages. The highest intensity earthquake in the county was a level IV on the modified Mercalli scale, **w**hich can be felt as light shaking that results in disturbance of dishes, windows and doors. According to the USGS, a potential earthquake in the 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 the most recent American Community Survey estimates, there are approximately 1,600 housing units in the county that were built before 1939. Information for each city is found in the population section of this profile. Age information is not available for other types of structures in the county.

Future Development

- Williams County, Williston, Ray and Tioga have adopted the North Dakota state building code. The state building code consists of the 2012 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.

- The 2012 comprehensive plan for Williams County includes a policy that development should not occur on lands at risk for severe erosion or on steep slopes.

Existing Capabilities

- State building code prohibits construction on steep slopes and provides general standards that contribute to earthquake resiliency. Williams County, Williston, Ray and Tioga have adopted the state building code.

Key Issues and Potential Action Items

- *Key Issue*: Much of the county is within a moderate susceptibility/low incidence landslide hazard area as defined by USGS. Small landslides are common during periods of increased moisture.
  - *Potential Action Item*: Define detailed high susceptibility landslide hazard areas based on soil type and topography, and incorporate into county subdivision regulations.
  - *Potential Action Item*: Improve base material, elevate or relocate roads that may be impacted.

- *Key Issue*: There is no history of a major earthquake in the county, but a minor earthquake could damage old or poorly-built structures.
  - *Potential Action Item*: Increase adoption of the State Building Code to all cities in the county. County staff could be utilized to assist cities without the resources to administer the building code.

Severe Summer Weather

All Jurisdictions
Overall Risk: High
Probability: High (Approximately 7 event days per year countywide)
Magnitude: High (Potential for damages totaling millions of dollars and many fatalities)

Seasonal Pattern
May - October

Duration
A few minutes to six hours

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

Hazard Profile

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

Tornadoes are the most destructive weather phenomenon on earth. They can produce winds ranging from 65 MPH to more than 300 MPH, and pose severe danger to life and property. Peak tornado season is from June to August, and most occur during evening hours. Tornadoes typically travel from southwest to northeast at a speed between 30 and 70 MPH, and are generally on the ground for less than 10 minutes; however, tornado characteristics are highly unpredictable and can change rapidly.

Tornado severity is recorded with the Enhanced Fujita (EF) Scale, which replaced the Fujita (F) Scale in 2007. Wind speed estimates are determined by the damage created by a tornado. The EF Scale is shown below.

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

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

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

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

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

Local Risk

- Williams County was included in five summer storm-related Presidential Disaster Declarations between 1989 and 2014.

- Severe summer weather events in Williams County are summarized in Table 3.6. **Hail and wind events both occur approximately three times per year on average**. Summer weather classification criteria and a detailed listing of events can be found in Appendix C.

Table 3.6 - Severe Summer Weather Events in Williams County, 1996-2014			
Summer Storm Events	**Event Days***	**Annual Probability**	**Event Days per Year**
Total	*135*	*710.5%*	*7.1*
Hail	63	331.6%	3.3
High/Thunder storm Wind	61	321.1%	3.2
Tornado/ Funnel Cloud	9	47.4%	0.5
Lightning	3	15.8%	0.2
Excessive Heat	1	5.3%	0.1
Dust Devil	1	5.3%	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 Weather Service, **the largest hailstone recorded in Williams County from 1996 to 2014 is 2.75 inches in diameter**, which occurred in July 2012. **July is the most common month for severe hail in the county, accounting for 43 percent of all reported hail events between 1996 and 2014**. 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 Williams County from 1996 to 2014 is 98 kts (113 MPH)**, which occurred in July 1998. **July is the most common month for high wind in the county, accounting for 44 percent of all reported wind events between 1996 and 2014**. Common impacts from severe winds include broken trees and limbs, damaged agricultural structures and damaged power poles.

- Tornadoes are rare in the county, as shown in Figure 3.13**.** There were nine tornadoes/funnel clouds reported in the county between 1996 and 2014; however, a majority were rated at EF0 or EF1 meaning they caused minimal damage to property. The impact would be devastating if a large tornado were to directly strike a city.

- Lightning presents an ongoing risk to people and property in the county. **From 1996 to 2014 there were two lightning events in Williams County that caused more than $20,000 in property damage.** Lightning has been documented as a cause of wildfires and oil well/storage tank fires.

- The National Climatic Data Center Storm Events Database includes brief summaries of significant storm events. A selection of recent summer storm events within Williams County are summarized below.
  - *July 5, 1998*. Estimated wind gusts of 70 kts damaged 21 manufactured homes near Black Tail Dam. Roofs were torn off, windows were broken, trees were knocked over and manufactured homes were moved off their foundations.
  - *August 8, 1999*. Hail with an estimated diameter of 1.5 inches damaged 30 homes, 150 vehicles and numerous crops near Ray. Total damages were estimated at $600,000.
  - *May 7, 2006*. A dust devil/whirlwind blew through Trenton. A four year old girl was injured as the trampoline she was playing on was lifted 25 feet into the air. The trampoline landed on the ground 60 feet from its original position, and the girl was found underneath.
  - *July 23, 2007*. Estimated wind gusts of 65 kts caused significant damage to the Williston Airport, including three aircraft hangars, three storage buildings and three aircraft. Total damages were estimated at $450,000.
  - *July 29, 2010*. Hail with an estimated diameter of 2.5 inches resulted in $50,000 of window damage in Epping. Lighting from this same event struck a manufactured home in Williston, causing a fire and $25,000 in damages.
  - *July 6, 2014*. Hail with an estimated diameter of 2.0 inches caused property damage of $125,000 and crop damage of $75,000 in the Alamo area.
  - *September 3, 2014*. Estimated winds of 70 kts accompanied by large hail resulted in significant damage in the Williston area. Large trees were snapped and uprooted, fences were destroyed and vehicles were crushed by falling trees. The high winds lasted for 10 minutes. Total property damages were estimated at $1 million and total crop damages at $500,000.

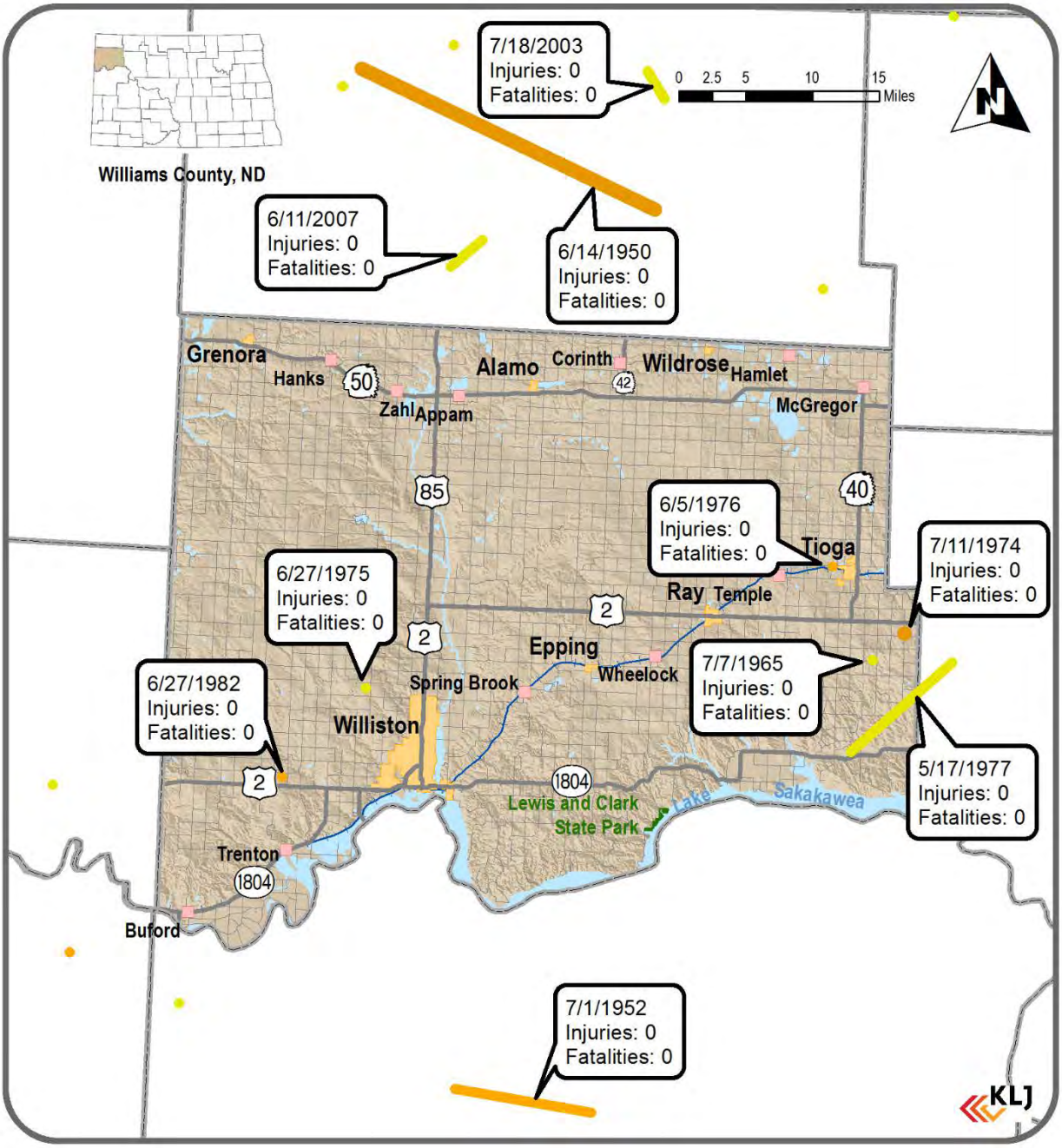


Figure 3.13
Tornado Tracks
1950-2014

Fujita Scale
1
2
3
4
5

Note:
Tornadoes after 2008 are categorized using the Enhanced Fujita Scale

Source:
NWS Storm Prediction Center
ND GIS Hub

For Planning Purposes Only

Vulnerability

Population

- The entire population is vulnerable to a severe summer storm event. Residents living in homes without a basement are particularly vulnerable to tornado and wind events. There are 190 workforce lodging facilities permitted in the county with a total maximum occupancy of 18,235 residents. Permitted workforce lodging includes:
  - 2 facilities in Alamo (11 residents)
  - 3 facilities in Grenora (45 residents)
  - 4 facilities in Ray (22 residents)
  - 18 facilities in Tioga (2,526 residents)
  - 121 facilities in Williston (10,807 residents)
  - 42 facilities in rural areas of the county (4,824 residents)

- On May 26, 2014 a tornado struck an RV camp near Watford City (approximately 40 miles southeast of Williston). The tornado had estimated winds of 120 MPH and was rated on the Enhanced Fujita Scale as an EF2. Nine people were injured, one critically. Fifteen RVs and trailers were damaged. If a tornado were to hit a large workforce housing facility or mobile home park in Williams County the impact could be much more devastating. Five workforce lodging facilities in the county have a permitted maximum occupancy of at least 500 residents.

An EF2 tornado destroyed a small RV camp near Watford City in May 2014. Nine people were injured, including one critically.
Source: Dan Yorgason/AP

- Lewis and Clark State Park features 101 campsites and 3 large picnic shelters. The park has concrete restroom facilities that may be utilized as an emergency storm shelter.

Critical Facilities

- All critical facilities are vulnerable to a severe summer storm event. Facilities with an increased vulnerability include schools, special care centers and event facilities.

- Rural areas of the county:
  - Trenton Grain Elevator
  - Two Public Schools

- Alamo:
  - Calvary Lutheran Church
  - Senior Citizens Center

- Epping:
  - Prairie States Coop Terminal
  - Senior Citizens Center

- Grenora:
  - Church
  - Farmers Union Elevator
  - School
  - Senior Citizens Center
  - Water Tower

- Ray:
  - Catholic Church
  - Grain Elevator
  - Lutheran Church
  - Mall
  - School
  - Senior Citizens Center
  - Water Tower

- Tioga:
  - Five Churches
  - Grain Elevator
  - School
  - Senior Citizens Center
  - Water Tank

- Wildrose:
  - School
  - Senior Citizens Center
  - Two Churches
  - Water Tower

- Williston:
  - Airport
  - Eight Public Schools
  - Hospital
  - Water Tower
  - Williston State College

Property

- The 2014 statewide Multi-Hazard Mitigation Plan documents claims paid to cover damages on local government facilities and property insured by the state. From 1989 to 2013, claims were paid for the following hazards in Williams County.
  - Hail: $13,757
  - Lightning: $13,022
  - Wind: $75,730

- The 2014 statewide Multi-Hazard Mitigation Plan also documents damage claims for public school facilities. From 1989 to 2013, claims were paid for the following hazards in Williams County.
  - Hail: $24,936
  - Lightning: $9,100
  - Wind: $42,799

- The most damaging summer storm event recorded by the National Climatic Data Center since 1996 is a wind and hail event in September 2014 that caused an estimated $1.5 million of combined crop and property damage in the county.

- The former grain elevator in Epping loses pieces of its metal sheathing during strong wind events. The sheathing sometimes blows through the city at a rapid speed and is a risk to people and property.

Future Development

- Williams County, Williston, Ray and Tioga have adopted the state building code. The North Dakota State Building Code consists of the 2012 International Building Code, International Residential Code, International Mechanical Code and International Fuel Gas Code published by the International Code Council. The code includes a provision that buildings must be constructed to withstand a wind load of 75 MPH constant velocity and three-second gusts of 90 MPH.

- Williams County is no longer permitting new workforce housing facilities, but they may still be permitted within each city.

Existing Capabilities

- Each city has at least one tornado siren. The county's Emergency Management Department is currently upgrading sirens throughout the county.

- Williams County is a participant in the North Dakota Cloud Modification Project (NDCMP), which is administered by the State Water Commission. The goal of the program is to seed clouds to increase rainfall and reduce hail damage in the region. According to the State Water Commission, cloud seeding reduces hail-related crop damages by 45 percent in western North Dakota.

Key Issues and Potential Action Items

- *Key Issue*: Williams 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.

- *Key Issue*: Williams County has many residents living in temporary housing units who may not have access to adequate shelter or notification during a summer storm event.
  - *Potential Action Item*: Require new workforce housing facilities/manufactured home parks/RV parks to have sheltering plan or shelter on site.
  - *Potential Action Item*: Identify locations for new warning sirens.

- *Key Issue*: The former grain elevator in Epping loses pieces of its metal sheathing during strong wind events. The sheathing sometimes blows through the city at a rapid speed and is a risk to people and property.
  - *Potential Action Item*: Remove the former grain elevator in Epping.

Severe Winter Weather

All Jurisdictions
Overall Risk: High
Probability: High (Approximately 8 event days per year countywide)
Magnitude: High (Potential for damages totaling millions of dollars with fatalities)

Seasonal Pattern
October - April

Duration
One to three days

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

Hazard Profile

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

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

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

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

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

Local Risk

- Williams County was included in four winter storm-related Presidential Disaster Declarations between 1989 and 2014.

- A summary of the severe winter weather events in Williams County is shown in Table 3.7. On average, **a severe winter weather event occurs in the county approximately five 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 3.7 - Severe Winter Weather Events in Williams County, 1996-2014

Winter Storm Events	Event Days*	Annual Probability	Event Days per Year
Total	*95*	*500.0%*	*5.0*
Winter Storm	27	142.1%	1.4
Extreme Cold/Wind Chill	26	136.8%	1.4
Blizzard	22	115.8%	1.2
Heavy Snow	11	57.9%	0.6
High Wind	5	26.3%	0.3
Winter Weather	3	15.8%	0.2
Ice Storm	1	5.3%	0.1

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

- The most common impact identified during Planning Team and public meetings was **road closure.** The area most often cited as a blowing snow hazard was ND Highway 50 south of Alamo. The grade elevation of an abandoned railroad track produces increased winds and drifting snow along the highway, which often makes travel hazardous during the winter.

- **Power loss happens occasionally** throughout the county during severe winter storms, but electricity is generally restored quickly.

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 190 workforce lodging facilities permitted in the county with a total maximum occupancy of 18,235 residents. Permitted workforce lodging includes:
  - 2 facilities in Alamo (11 residents)
  - 3 facilities in Grenora (45 residents)
  - 4 facilities in Ray (22 residents)
  - 18 facilities in Tioga (2,526 residents)
  - 121 facilities in Williston (10,807 residents)
  - 42 facilities in rural areas of the county (4,824 residents)

- Wind, ice, heavy snow and cold temperatures can combine to create hazardous conditions and **"trap" residents in their homes without heat or electricity**. Elderly residents may be especially vulnerable to this hazard as they are more likely to have limited mobility, especially in the event of hazardous road conditions. The estimated number of permanent residents age 65 or older for each jurisdiction are summarized below.
  - Alamo: 5 residents (6 percent)
  - Epping: 9 (10 percent)
  - Grenora: 35 (18 percent)
  - Ray: 78 (11 percent)
  - Spring Brook: 0 (0 percent)
  - Tioga: 300 (28 percent)
  - Wildrose: 7 (7 percent)
  - Williston: 2,200 (13 percent)

- **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 Williams County is approximately 39,736 people**. The average commute time to work for residents in the county as recorded in the most recent American Community Survey is 17.5 minutes.

Critical Facilities

- A winter storm event that "traps" fire and ambulance responders within the facility would severely limit the emergency response capability of the County.

- 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.

- Rural areas of the county:
  - Trenton Fire and Ambulance
  - Two Public Schools

- Alamo:
  - Calvary Lutheran Church
  - Fire Hall
  - Senior Citizens Center

- Epping:
  - Fire Hall
  - Senior Citizens Center

- Grenora:
  - Ambulance Department
  - Church
  - Fire Department
  - School
  - Senior Citizens Center

- Ray:
  - Catholic Church
  - Fire Hall
  - Lutheran Church
  - School
  - Senior Citizens Center

- Tioga:
  - Five Churches
  - School
  - Senior Citizens Center
  - Water Tank

- Wildrose:
  - Fire Department
  - School
  - Senior Citizens Center
  - Two Churches

- Williston:
  - Airport
  - Eight Public Schools
  - Fire/EMS
  - Hospital
  - Williston State College

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**. 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 2012 Census

of Agriculture, the **market value of livestock in Williams County was $11 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

- Electricity is generally restored quickly in the event of power loss.

Key Issues and Potential Action Items

- *Key Issue*: Williams County averages approximately five 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.

- *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 temporary housing are the most vulnerable to extreme cold temperatures. Approximately 2,600 residents in the county are elderly and there are 18,000 permitted temporary housing units. Power loss occasionally occurs in the county during winter storm events.
  - *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.

Wildland Fire

Rural County, including Spring Brook
Overall Risk: Moderate
Probability: Moderate (four fires greater than 100 acres from 1992 to 2012)
Magnitude: Moderate (a large wildfire could potentially cause damages totaling millions of dollars and put human lives at risk; however, the largest wildfire reported from 1992 to 2012 was 620 acres)

Alamo
Overall Risk: Moderate
Probability: Low (no history of wildfire impacting city)
Magnitude: High (estimated 60 percent of city could be directly impacted)

Epping
Overall Risk: Moderate
Probability: Low (no history of wildfire impacting city)
Magnitude: High (estimated 40 percent of city could be directly impacted)

Grenora
Overall Risk: Moderate
Probability: Low (no history of wildfire impacting city)
Magnitude: High (estimated 20 percent of city could be directly impacted)

Ray
Overall Risk: Moderate
Probability: Low (no history of wildfire impacting city)
Magnitude: High (estimated 15 percent of city could be directly impacted)

Tioga
Overall Risk: Moderate
Probability: Low (no history of wildfire impacting city)
Magnitude: High (estimated 10 percent of city could be directly impacted)

Wildrose
Overall Risk: Moderate
Probability: Low (no history of wildfire impacting city)
Magnitude: High (estimated 20 percent of city could be directly impacted)

Williston
Overall Risk: Low
Probability: Low (no history of wildfire impacting city)
Magnitude: Moderate (estimated 5 percent of city could be directly impacted)

Seasonal Pattern
March – November

Duration
Hours to weeks

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

Hazard Profile

A wildfire is an unplanned fire, a term which includes grass fires, forest fires and scrub fires either human-caused or natural in origin. In 2013 an estimated 4.3 million acres burned (47,579 fires) across the United States due to wildfires, according to the National Interagency Fire Center. This number is well below the 10-year average, due in part to weather conditions. Although there were fewer acres burned and fewer fires, 2013 was one of the deadliest years for firefighters with the loss of 34 lives. Many of the fires occurred in or near urban/suburban areas.

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

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

Local Risk

- Figure 3.14 shows fuel types in Williams County. Predominate fuel types are classified using the 13 standard fuel models for fire behavior by Anderson. **Much of the county is agricultural land, which the Anderson models do not consider to be a significant fuel**; however, in times of drought or during harvest season agricultural fields may present a wildfire risk. **The most prevalent fuels on the county are of the grass and brush groups**. These fuels generally burn with a low intensity, but can spread quickly. Grass and shrub fuels are most heavily concentrated in the southern portion of the county. Timber fuels are scattered along Lake Sakakawea.

- Figure 3.14 also shows incidence of wildfires over 100 acres. The information is from the Interagency Fire Program Analysis fire-occurrence database, compiled by Karen C. Short of the USDA Forest Service, Rocky Mountain Research Station. The database is sourced from multiple reporting agencies; however, due to reporting limitations, it should not be considered an all-inclusive list. According to the database, **Williams County had four wildfires over 100 acres between 1992 and 2012 with an average fire size of 400 acres. The largest wildfire reported during the time period was 620 acres.**

- There were **two wildfires greater than 1,000 acres** in Williams County reported to the National Interagency Fire Center between 1980 and 2012.

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

- 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 Williams County and structures along the edges of each city.

- The energy industry's rapid growth within the county has resulted in significantly increased activity in rural areas. Activities that may increase wildfire risk include well flaring, construction and truck transport.

Vulnerability

Population

- Residents of non-urbanized areas (in the wildland-urban interface) are generally at a higher risk of wildfire. According to 2013 Census Bureau estimates, there are approximately 29,595 residents in the county; of these, 5,870 live outside of an incorporated city and are at increased vulnerability to wildfire. Assuming approximately 10 percent of residents in incorporated cities live along or near the wildland-urban interface, 2,375 additional residents are vulnerable to wildfire. Using these estimates, **approximately 8,275 residents (28 percent of total population) in the county are vulnerable to wildfire.**

- Workforce lodging facilities include temporary residents who are not included in estimates from the US Census Bureau. There are **42 permitted workforce lodging facilities in rural areas of the county with a total maximum occupancy of 4,824 residents**.

Critical Facilities

- Although nearly all of the county's critical facilities are within urbanized areas, which are considered defensible space for wildfire, **several critical facilities are located along the edges of cities near the wildland-urban interface or in rural areas**. Facilities within 100 yards of the edge of town, or within non-urbanized rural areas are listed below.

- Rural areas of the county:
  - McGregor Post Office
  - Trenton Community Clinic
  - Trenton Fire and Ambulance
  - Trenton Post Office
  - Two Public Schools

- Alamo:
  - Calvary Lutheran Church

- Epping:
  - City Hall
  - Fire Hall
  - Senior Citizens Center
  - Wastewater Treatment Lagoons

- Grenora:
  - Ambulance Department
  - Farmers Union Elevator
  - School
  - Wastewater Treatment Lagoons

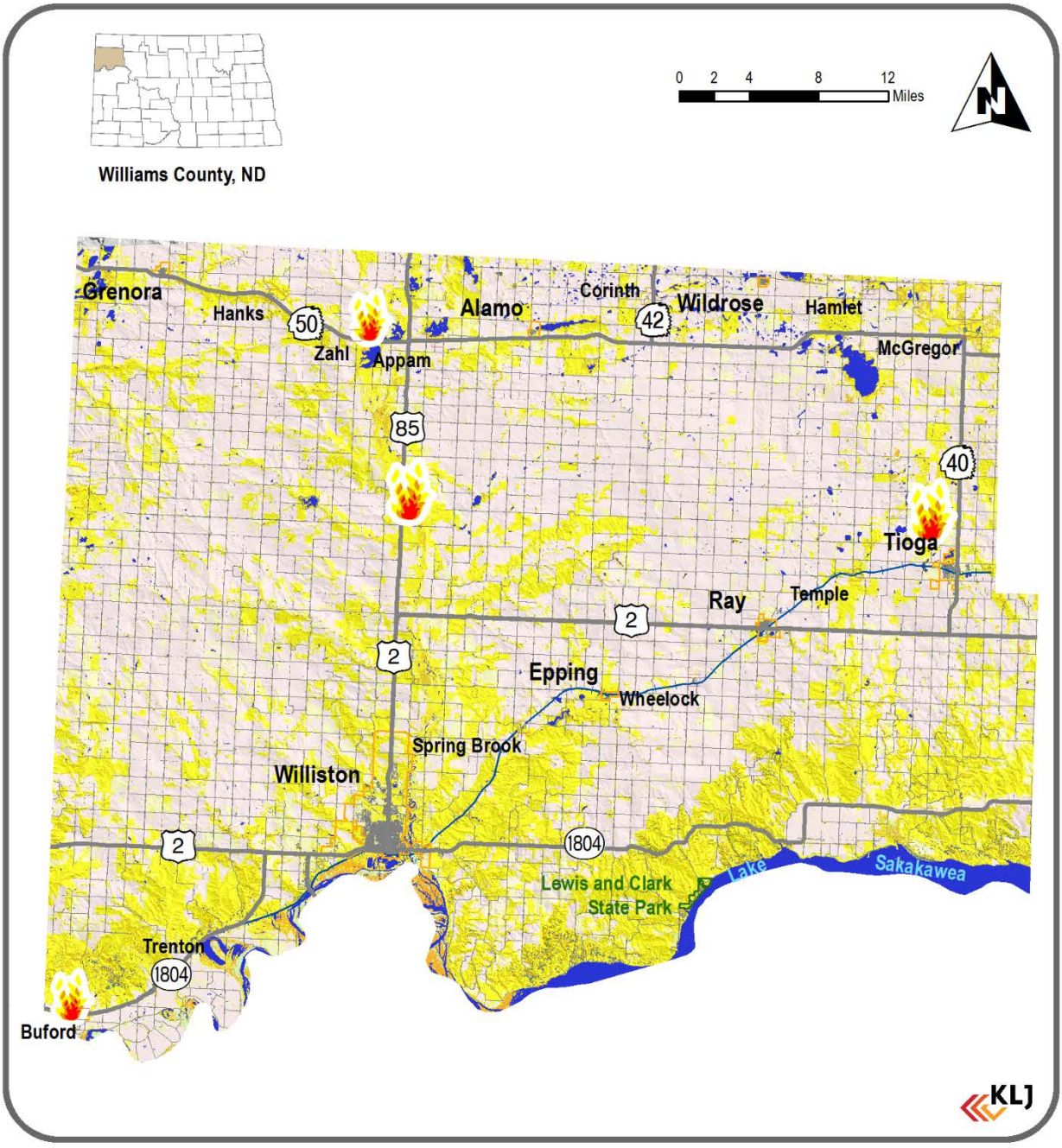


Figure 3.14 Wildfire Fuels & Incidence

13 Anderson Wildfire Fuel Models

Source:
USGS LANDIRE 2010 (fuels)
Karen C. Short, Fire Program Analysis fire-occurrence database (incidence)
ND GIS Hub

For Planning Purposes Only

Grass Fuels
- 1: Short grass (1 foot)
- 2: Timber (grass and understory)
- 3: Tall grass (2.5 feet)

Brush Fuels
- 5: Brush (2 feet)
- 6: Dormant brush, hardwood slash

Timber Fuels
- 8: Closed timber litter
- 9: Hardwood litter

Not Considered a Fuel Source
- Urban
- Agriculture
- Water
- Barren

Wildfires >100 Acres (1992-2012)

- Ray:
  - Grain Elevator
  - Wastewater Treatment Lagoons
  - Water Tower
- Tioga:
  - Medical Center
  - School
  - Wastewater Treatment Lagoons
  - Water Tower
- Wildrose:
  - Fire Department
  - Two Churches
  - Wastewater Treatment Lagoons
  - Water Tower
- Williston:
  - Wastewater Treatment Lagoons

Property

- The statewide Multi-Hazard Mitigation Plan includes information about crop indemnity payments from the USDA Risk Management Agency. There was **$8,655 of wildfire-related crop indemnity payments** in Williams County between 2003 and 2012.
- There is no instance of recorded widespread property loss in Williams County due to wildfire. **The largest wildfire in North Dakota between 1992 and 2012 is 51,600 acres according to the National Interagency Fire Occurrence Database**. The wildfire occurred in Richland County in 1999. A wildfire of similar size in Williams County would affect approximately four percent of the county's total land area.
- Table 3.8 shows scenarios for a 50,000-acre wildfire near each city and a rural area of the county. Affected areas for each city include an estimated wildland-urban interface area along the edges of the city's urbanized area. Smaller communities have a larger proportion of their properties along the wildland-urban interface because they have a smaller centralized urban area. Note that this analysis does not include infrastructure damage or the cost of suppression. Land use information for addresses is not available, but they include residential, commercial, industrial and any other property that has a registered address with the county.

Table 3.8 – Williams County Wildfire Scenarios

	Addresses in Hazard Area	% of Total Addresses
Wildfire in Rural County	234	4%
Wildfire near Alamo	31	60%
Wildfire near Epping	25	40%
Wildfire near Grenora	40	20%
Wildfire near Ray	89	15%
Wildfire near Spring Brook	13	60%
Wildfire near Tioga	98	10%
Wildfire near Wildrose	31	20%
Wildfire near Williston	425	5%

Note: Based on 50,000-acre wildfire. Hazard area for cities is determined by size of urbanized area.
Source: Williams County GIS

Future Development

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

Existing Capabilities

- Wildfire response in the county is coordinated by several fire districts. District boundaries are shown in Figure 3.15.
  - Alamo Fire Protection District
  - Epping Fire Protection District
  - Grenora Fire Protection District
  - Ray Fire Protection District
  - Tioga Rural Fire Department
  - Trenton Fire Protection District
  - Wildrose Fire Protection District
  - Williston Fire Protection District

Key Issues and Potential Action Items

- *Key Issue*: Williams County experiences a wildfire greater than 100 acres approximately once every two to three years. Most large wildfires in the county cause minimal property damage.
  - o *Potential Action Item*: Perform fuel reduction activities in high-risk rural areas.
  - o *Potential Action Item*: Educate residents about defensible space best practices.
  - o *Potential Action Item*: Encourage the use of non-combustible materials (stone, brick, stucco, etc.) for new construction in wildfire hazard areas.
  - o *Potential Action Item*: Incorporate wildland-urban interface guidelines into the county's zoning and subdivision regulations.

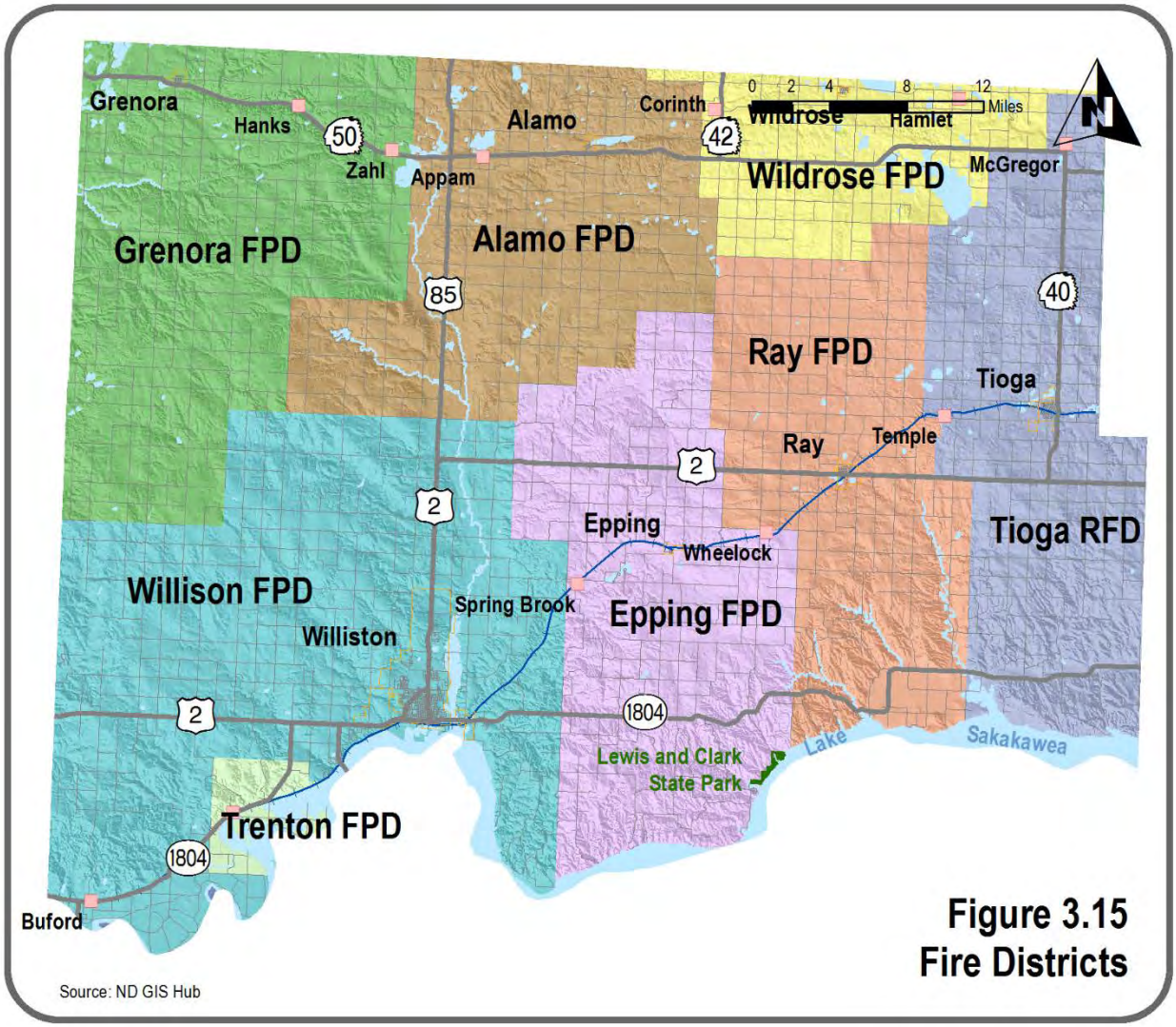


Figure 3.15
Fire Districts

Communicable Disease

All Jurisdictions
Overall Risk: Low
Probability: Low (No incidence of major disease outbreak in recent decades)
Magnitude: Moderate (Approximately 18 percent of 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

Duration
Varies

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

Hazard Profile

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

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

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.

Local Risk

- Populations throughout the world are susceptible to epidemics and national pandemics, and Williams County residents are no exception, although **the generally low population density of the area makes rapid transmission of communicable 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 communicable disease. Approximately **10.2 percent, or 3,020 of the county's permanent residents, are 65 years of age or older**. The estimated number of permanent residents age 65 or older for each jurisdiction are summarized below.
  - Alamo: 5 residents (6 percent)
  - Epping: 9 (10 percent)
  - Grenora: 35 (18 percent)
  - Ray: 78 (11 percent)
  - Spring Brook: 0 (0 percent)
  - Tioga: 300 (28 percent)
  - Wildrose: 7 (7 percent)
  - Williston: 2,200 (13 percent)

- Approximately **7.6 percent, or 2,250 of the county's permanent residents, are under five years of age**. The estimated number of permanent residents under age five for each jurisdiction are summarized below.
  - Alamo: 6 residents (7 percent)
  - Epping: 11 (12 percent)
  - Grenora: 22 (11 percent)
  - Ray: 41 (6 percent)
  - Spring Brook: 2 (15 percent)
  - Tioga: 32 (3 percent)

- Wildrose: 5 (57 percent)
- Williston: 1,350 (8 percent)

- 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 23 foodborne illness deaths in Williams County over a one-year period.** This estimate only includes permanent population and would be significantly higher if temporary residents were included.

- 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 18 influenza deaths in Williams County over a one-year period.** This estimate only includes permanent population and would be significantly higher if temporary residents were included.

- 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 Williams County this would equate to **8,879 ill, 71 requiring hospitalization and 18 deaths from a medium level influenza pandemic**. This estimate only includes permanent population and would be significantly higher if temporary residents were included.

- Workforce lodging facilities include a high density of occupants, which can increase disease transmission. There are 190 workforce lodging facilities permitted in the county with a total maximum occupancy of 18,235 residents. Permitted workforce lodging includes:
  - 2 facilities in Alamo (11 residents)
  - 3 facilities in Grenora (45 residents)
  - 4 facilities in Ray (22 residents)
  - 18 facilities in Tioga (2,526 residents)
  - 121 facilities in Williston (10,807 residents)
  - 42 facilities in rural areas of the county (4,824 residents)

Critical Facilities

- Gathering places and facilities that have a high density of occupants have the greatest vulnerability to communicable disease.

- Rural areas of the county:
  - Trenton Community Clinic
  - Two Public Schools

- Alamo:
  - Calvary Lutheran Church

- Epping:
  - Senior Citizens Center

- Grenora:
  - Church
  - School
  - Senior Citizens Center

- Ray:
  - School
  - Senior Citizens Center
  - Two Churches

- Tioga:
  - Five Churches
  - Medical Center
  - School
  - Senior Citizens Center

- Wildrose:
  - Two Churches
  - Senior Citizens Center

- Williston:
  - Eight Public Schools
  - Hospital
  - Law Enforcement Center
  - Williston State College

Property

- The statewide Multi-Hazard Mitigation Plan estimated that communicable disease could impact 20 percent of crop and livestock values. According to the 2012 Census of Agriculture the market value of crops in Williams County was $168 million and the market value of livestock was $11 million. **Estimating 20 percent loss for each sector results in $34 million in communicable disease-related crop loss and $2 million livestock loss**.

Future Development

- The growing energy industry has resulted in an influx of young workers who are generally less susceptible to disease given their age; however, the high density living conditions experienced by many of these workers, especially those in workforce housing facilities, could make rapid disease transmission more likely. This trend of young workers entering the county and residing in high density facilities is expected to continue for the near future.

Existing Capabilities

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

Key Issues and Potential Action Items

- *Key Issue*: Human and agricultural disease have the potential to greatly impact the health and economy of the county.
  - *Potential Action Item:* Continue supporting the efforts of the USDA Farm Service Agency and NDSU Extension.

Dam Failure

Rural County, including Spring Brook
Overall Risk: Low
Probability: Low (no history of significant dam failure)
Magnitude: Low (approximately two percent of rural county within dam failure inundation area)

Alamo
Overall Risk: Low
Probability: Low (no history of significant dam failure)
Magnitude: Low (not located in potential inundation area)

Epping
Overall Risk: Low
Probability: Low (no history of significant dam failure)
Magnitude: Low (not located in potential inundation area)

Grenora
Overall Risk: Low
Probability: Low (no history of significant dam failure)
Magnitude: Low (not located in potential inundation area)

Ray
Overall Risk: Low
Probability: Low (no history of significant dam failure)
Magnitude: Low (not located in potential inundation area)

Tioga
Overall Risk: Moderate
Probability: Low (no history of significant dam failure)
Magnitude: High (approximately 20 percent of city within potential dam failure inundation area)

Wildrose
Overall Risk: Low
Probability: Low (no history of significant dam failure)
Magnitude: Low (not located in potential inundation area)

Williston
Overall Risk: Moderate
Probability: Low (no history of significant dam failure)
Magnitude: High (approximately 70 percent of city within potential dam failure inundation area)

Although there are small dams in Williams County in the vicinity of Alamo, Epping, Grenora, and Ray, related dam failures would only impact agricultural areas, and not the municipalities.

Duration
24 hours

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

Hazard Profile

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

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

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

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.

Local Risk

- The North Dakota State Water Commission maintains a database of all dams in the county. T**here are 166 dams in Williams County; two are classified as high hazard and four are classified as significant hazard.** High hazard dams present the greatest risk for people and property in the event of failure. High hazard dams in the county are described in Table 3.9 and shown in Figure 3.16.

Table 3.9 – Williams County High Hazard Dams

Dam Name	Action Plan	Owner	Type	Year Built	Max Storage (acre-feet)
McGregor Dam	No	ND Game & Fish	Rolled Earth	1967	1,490
Tioga Dam	Yes	City of Tioga	Rolled Earth	1963	1,630

Source: ND State Water Commission

- McGregor Dam is located southwest of the unincorporated community of McGregor. Failure of the dam would result in the water draining to the northeast and following the low-lying areas in and around McGregor. Minor flooding would result, causing damage to residential and commercial properties.

- Tioga Dam is located directly north of Tioga. The dam failure inundation area shown in the dam's emergency action plan roughly follows the FEMA 100-year floodplain. Flooding would occur in the east and central portions of Tioga, including the downtown commercial area.

- **Fort Peck Dam on the Missouri River is a high hazard dam that could impact the county in the event of failure**. The dam is located 155 river miles upstream of Williston in Valley County, MT and is owned by the US Army Corps of Engineers. Williston would be significantly impacted in the event of a dam failure. The dam failure inundation area identified in the dam's emergency action plan includes approximately 70 percent of the city. It would take approximately 1.4 days for floodwaters to arrive in Williams County, with peak flood elevations occurring in 2.2 days. A Fort Peck Dam failure inundation map for Williston is shown in Appendix C.

- According to Stanford University's National Performance of Dams Database there were no dam incidents in Williams County between 1970 and 2013.

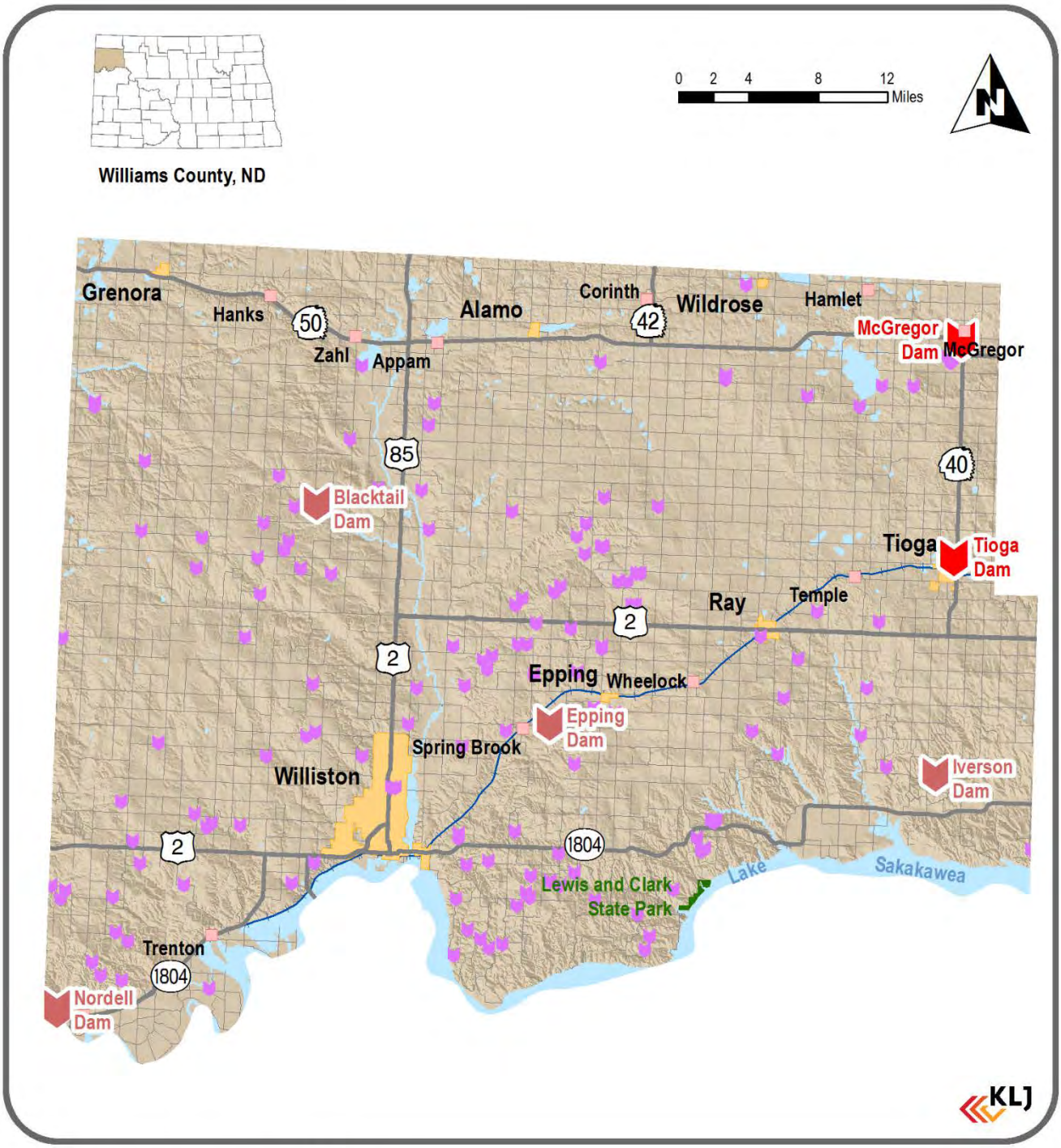


Figure 3.16
Dams

Source:
ND State Water Commission
ND GIS Hub

For Planning Purposes Only

Hazard Rating
- High
- Significant
- Low

Vulnerability

Population

- **The dam failure inundation area for Fort Peck Dam includes approximately 70 percent of Williston (14,600 permanent residents)**. It would take approximately 1.4 days for floodwaters to arrive in Williams County, so nearly all residents would be evacuated from the area prior to inundation. Dam failure inundation modeling is not available for other areas of the county, so the FIRM and Hazus-MH floodplains along the Missouri River can be used to estimate vulnerability. There are approximately 40 rural addresses located in the floodplain adjacent to the Missouri River. Utilizing the county's average household size of 2.34, it can be estimated that **93 rural residents (1.6 percent of total rural population) live within the flood inundation area for Fort Peck Dam.**

- Tioga Dam is the only high hazard dam in the county with an emergency action plan. The dam failure inundation area in the emergency action plan roughly corresponds to the FIRM floodplain in Tioga. **Approximately 315 residents (20.1 percent of Tioga's population) live within the inundation area**.

- McGregor Dam does not have an emergency action plan or estimated inundation area. There are four residential properties directly downstream of the dam in the Hazus-MH modeled floodplain. Utilizing the county's average household size of 2.34, it can be estimated that **nine people live within the flood inundation area for McGregor Dam.**

Critical Facilities

- Ten critical facilities are located within the Fort Peck Dam failure inundation area. All identified facilities are located in Williston.
  - Amtrak Station
  - Five Public Schools
  - Fire/EMS
  - Hospital
  - Law Enforcement Center
  - Library
  - Public Works
  - Senior Citizens Center
  - Wastewater Treatment Lagoons
  - Williston State College

- Two critical facilities are located within the Tioga Dam failure inundation area. Both identified facilities are located in Tioga.
  - Senior Citizens Center
  - Fire/EMS

- No critical facilities are located within the McGregor Dam inundation area.

Property

- The dam failure inundation area for Fort Peck Dam includes approximately 70 percent of Williston (5,945 addresses) and two percent of the rural county (40 addresses).

- The dam failure inundation area for Tioga Dam includes 159 addresses (16.2 percent of total addresses in the city).

- The dam failure inundation area for McGregor Dam includes 6 addresses (0.1 percent of total rural addresses).

Future Development

- Floodplain regulations limit development within the 100-year floodplain in Williston, Tioga and rural areas of the county. There are no development provisions that specifically address dam failure inundation areas.

Existing Capabilities

- An emergency action plan is available for Blacktail Dam, Epping Dam, Fort Peck Dam and Tioga Dam.

Key Issues and Potential Action Items

- *Key Issue*: Fort Peck Dam in Montana would have a significant impact on Williston in the event of failure, and Tioga Dam would have an impact on Tioga in the event of failure.
  - *Potential Action Item*: Restrict future development in flood-stage dam failure inundation areas.
  - *Potential Action Item*: Consider dam failure inundation areas when locating future critical facilities.

Hazardous Materials Release

Rural County, including Spring Brook
Overall Risk: High
Probability: Moderate (five "significant" incidents countywide 2010 to 2014)
Magnitude: High (approximately 30 percent of population and 53 percent of property within potential hazard area)

Alamo
Overall Risk: High
Probability: Moderate (five "significant" incidents countywide 2010 to 2014)
Magnitude: High (entire city within potential hazard area)

Epping
Overall Risk: High
Probability: Moderate (five "significant" incidents countywide 2010 to 2014)
Magnitude: High (entire city within potential hazard area)

Grenora
Overall Risk: High
Probability: Moderate (five "significant" incidents countywide 2010 to 2014)
Magnitude: High (entire city within potential hazard area)

Ray
Overall Risk: High
Probability: Moderate (five "significant" incidents countywide 2010 to 2014)
Magnitude: High (entire city within potential hazard area)

Tioga
Overall Risk: High
Probability: Moderate (five "significant" incidents countywide 2010 to 2014)
Magnitude: High (entire city within potential hazard area)

Wildrose
Overall Risk: Low
Probability: Moderate (five "significant" incidents countywide 2010 to 2014)
Magnitude: Low (city not within potential hazard area)

Williston
Overall Risk: High
Probability: Moderate (five "significant" incidents countywide 2010 to 2014)
Magnitude: High (nearly entire city within potential hazard area)

Seasonal Pattern
None

Duration
1-10 hours

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

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.

Local Risk

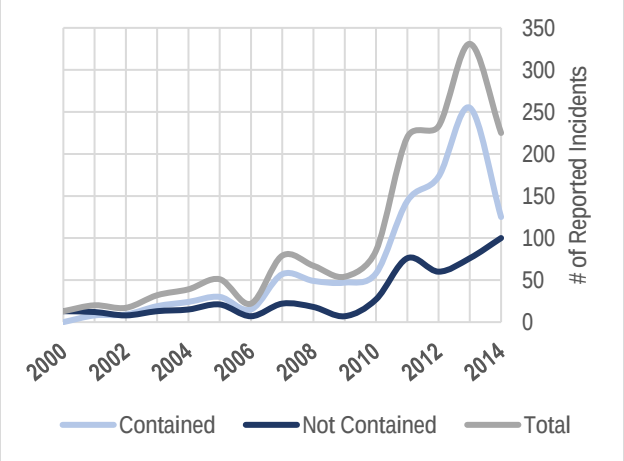
- **Transportation routes present a risk for a hazardous materials release in Williams County**. Highways and railroads are the major transportation routes through the county. Materials transported through the county on truck and rail include fuel and anhydrous ammonia.

- The Emergency Planning and Community Right-to-Know Act (EPCRA) requires that operators of facilities containing hazardous materials and chemicals must identify themselves to appropriate state and local agencies. North Dakota requires that all hazardous materials operators submit Tier II Chemical Inventory Reports to the county's Local Emergency Planning Committee (LEPC) on an annual basis. Typical Tier II facilities include bulk fuel plants, anhydrous ammonia plants, propane plants, agricultural processing plants and energy producing sites. **There were 1,018 Tier II-reporting facilities in the county in 2014**.

- The Pipeline and Hazardous Materials Safety Administration (PHMSA) monitors all transportation-related hazardous materials incidents in the United States. **There were 27 incidents reported to the PHMSA during the time period. Twenty-five (93 percent) of the incidents occurred after 2009.** A majority of the releases were minor and resulted in minimal impacts. **Five incidents were classified as "serious" by the PHMSA** and are summarized in Table 3.10. A "serious" incident occurs when the release of a hazardous material results in one or more of the following: death, major injury resulting in a hospitalization, an evacuation of 25 or more persons, closure of a major transportation artery, alteration of an aircraft flight plan or operation, failure of a Type B radioactive packaging, release of over 11.9 gallons or 88.2 pounds of a severe marine pollutant, or release of a bulk quantity (over 119 gallons or 882 pounds) of a hazardous material.

- All hazardous materials incidents relating to the energy industry are reported to the Oil and Gas Division of the ND Department of Mineral Resources. Reported incidents are summarized in Figure 3.17. **There were 1,488 reported hazardous materials incidents between 2000 and 2014**; 475 (32 percent) of those incidents were not contained to the incident site. The year 2013 had the most reported incidents with 331. The number of total incidents declined between 2013 and 2014, but the number of non-contained incidents increased.

Figure 3.17 – Energy Production Hazardous Materials Incidents



Source: ND Department of Mineral Resources, Oil and Gas Division; ND Department of Health

- The National Response Center is an interagency effort managed by the US Coast Guard that catalogs all reported hazardous materials incidents in the United States. **There were 102 hazardous materials incidents in Williams County reported to the National Response Center from 2000 to 2014.** Sixty-five occurred at fixed sites, 26 were transportation-related and 11 were at pipelines.

Table 3.10 – PHMSA Serious Incidents in Williams County, 2000-2014						
Nearest City	**Date**	**Quantity Released**	**Commodity**	**Fatalities/ Injuries**	**Total Damages**	**Description of Events**
Williston	10/26 2010	3780 LGA	Petroleum Crude Oil	0	$45,000	A truck with a mounted tank and attached pup trailer was struck by a train five miles outside Williston. As a result of the accident the truck and mounted tank caught fire and were severely damaged. A majority of the released product was consumed in the fire and the remaining entered the soil near the tracks.
Alamo	12/21 2011	420 LGA	Petroleum Crude Oil	0	$0	A trailer tank was left unattended while being filled, resulting in a tank overfill that left product in the loading area.
Williston	1/29 2012	1000 LGA	Diesel Fuel	0	$123,200	A transport vehicle slid into a ditch and overturned. The resulting leak was contained in the road ditch.
Williston	1/28 2013	336 LGA	Petroleum Crude Oil	0	$2,570	A snow chain broke on a transport vehicle. The chain impacted the back valve that caused a 2 inch hole in the valve. Product was distributed along the roadway for approximately 100 yards.
Epping	9/1 2014	125 LGA	Compound Cleaning Fluid	0	$0	A carrier was off-loading product and overfilled a bulk tank. The tank was located within a duck pond (contained rubberized pond).

Source: Pipeline and Hazardous Materials Safety Administration

- Sixty-five oil wells in the county are located within a FEMA-designated 100-year floodplain. Thirty-nine additional wells are located within a floodplain modeled in Hazus-MH. On-site berms and pad elevations may have effectively removed many of these wells from the floodplain area. A flooded oil well that is not contained could result in contamination of surrounding waterways. If flooding is anticipated, well operators can temporarily shut down the wells to prevent a release.

- Figure 3.18 shows major transportation corridors in Williams County, with evacuation areas of 1/2 mile and 1 mile. Tier II facilities and pipeline locations are not shown on the map due to security concerns. Hazard distances are from the 2012 Emergency Response Guidebook. 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

Flooded well leaking oil at the confluence of the Missouri and Yellowstone Rivers in March 2013.
Source: ND Department of Health

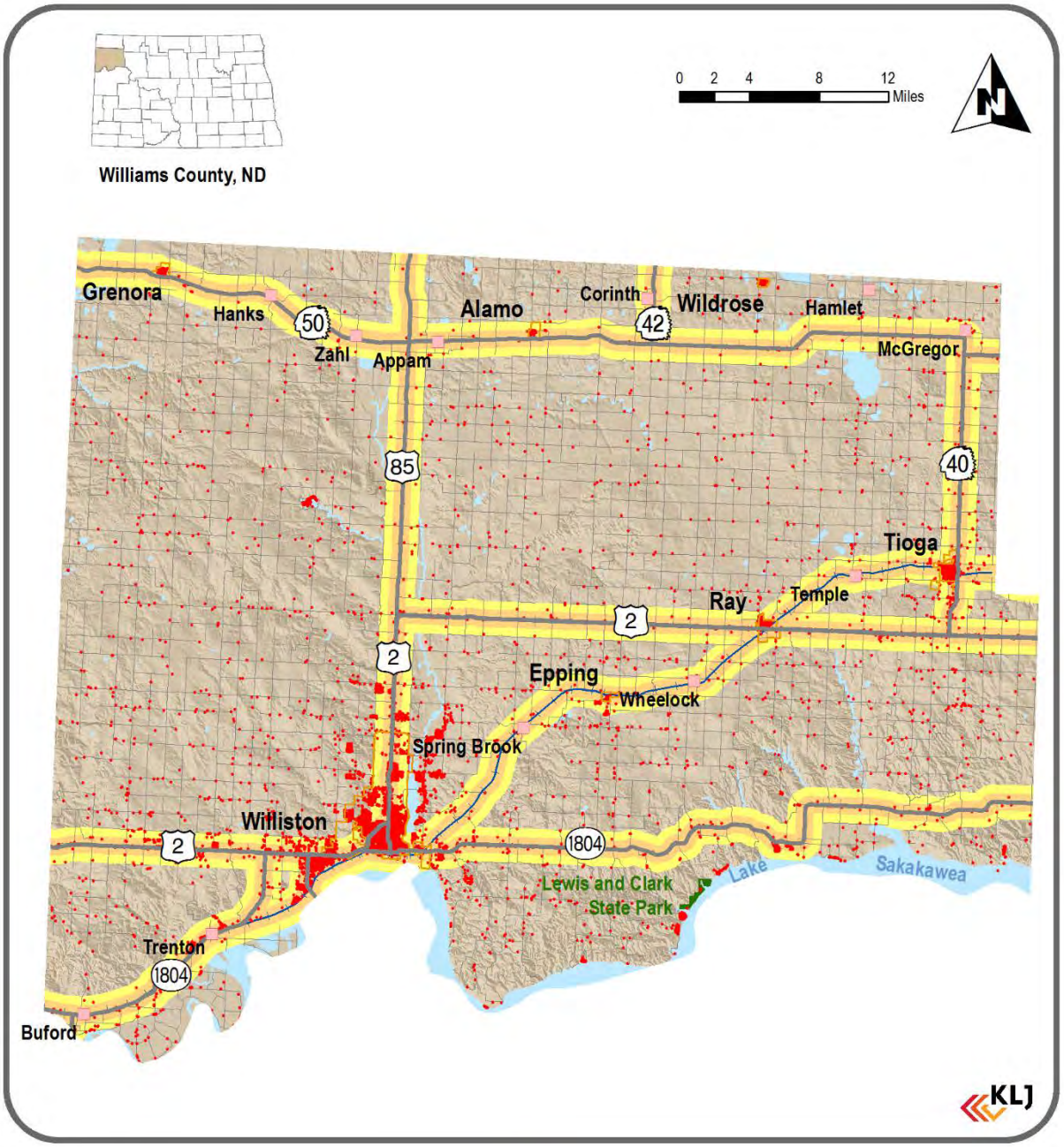


Figure 3.18
Hazardous Materials Transportation Hazard Areas

Source:
ND GIS Hub

For Planning Purposes Only

- 0.5 Mile Hazard Area
- 1 Mile Hazard Area
- Incorporated Cities
- Unincorporated Communities
- Addresses

Vulnerability

Population

- Vulnerable population to transportation incidents can be estimated by identifying the intersection of 2010 US Census Blocks and the identified hazard areas in Figure 3.18. Census blocks in rural areas are generally large, which makes detailed estimates difficult. For purposes of this analysis, only census blocks that have their centroid within the hazard area are included; however, it is important to note that this analysis does not consider the exact location of residential structures within each census block. Vulnerable population estimates are shown in Table 3.11. Note that this analysis does not include population vulnerable to fixed site incidents due to the difficulty in cataloging all fixed site facilities.

Table 3.11 – Williams County Population within Transportation Hazard Area

	Population in 1/2 Mile Hazard Area	% of Total Population	Population in 1 Mile Hazard Area	% of Total Population
Rural County	1,620	30.4%	1,850	34.8%
Alamo	57	100%	57	100%
Epping	100	100%	100	100%
Grenora	244	100%	244	100%
Ray	592	100%	592	100%
Spring Brook	27	100%	27	100%
Tioga	1,230	100%	1,230	100%
Wildrose	0	0%	0	0%
Williston	12,350	83.9%	14,716	100%
Total	*16,220*	*72.4%*	*18,816*	*84.0%*

Note: Only includes 2010 permanent population (most recent census block data available)
Source: US Census Bureau

- There is no history of a hazardous materials incident causing severe injuries or fatalities in Williams County.

Critical Facilities

- Nearly all critical facilities in the county are within the 1/2 mile and 1 mile hazard areas. Wildrose is the only community not within a hazard area.

Property

- Addresses within the hazard area are shown in Figure 3.18 and summarized in Table 3.12. Land use information for addresses is not available, but they include residential, commercial, industrial and any other property that has a registered address with the county. The entirety of Alamo, Epping, Grenora, Ray, Spring Brook and Tioga are all within the one-half mile hazard area for transportation incidents.

Table 3.12 – Williams County Addresses within Transportation Hazard Area

	Addresses in 1/2 Mile Hazard Area	% of Total Addresses	Addresses in 1 Mile Hazard Area	% of Total Addresses
Rural County	2,491	42.6%	3,113	53.2%
Alamo	51	100%	51	100%
Epping	63	100%	63	100%
Grenora	200	100%	200	100%
Ray	591	100%	591	100%
Spring Brook	21	100%	21	100%
Tioga	982	100%	982	100%
Wildrose	0	0%	0	0%
Williston	5,794	68.2%	7,706	90.7%
Total	*10,193*	*62.1%*	*12,727*	*77.6%*

Source: Williams County GIS

- No reported incident in the county since 2000 has resulted in more than $1,500 in damages.

Future Development

- The Williston, Tioga and Ray zoning ordinances restrict the future location of certain high risk hazardous materials facilities within city limits.

Existing Capabilities

- Many first responders in the county are hazardous materials trained at the awareness level.
- Hazardous materials operators are responsible for clean-up and reclamation of incident sites.

Key Issues and Potential Action Items

- *Key Issue*: Hazardous materials incidents are common in Williams County, and nearly all residents live, work or travel within a potential hazard area.
  - *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*: Prohibit the construction of facilities containing hazardous materials within floodplain areas.

Homeland Security Incident

All Jurisdictions
Overall Risk: Low
Probability: Low (no history of major incidents)
Magnitude: Moderate (magnitude could vary widely)

Seasonal Pattern
None

Duration
Varies

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

Hazard Profile

A homeland security incident is any intentional adversarial human-caused incident, domestic or intentional, that causes mass casualties, large economic losses or widespread panic in the county. Terrorism is an example of an intentional adversarial human-caused incident. Terrorism is defined by the Code of Federal Regulations as "the unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives." Terrorist attacks are generally premeditated and motivated by a political and social methodology.

Local Threat

- The North Dakota Critical Infrastructure Program (CIP) collects data on critical infrastructure and key resources (CIKR) that exist in the state. CIKR facilities are divided into seven sectors. Each sector and their presence in Williams County is summarized in Table 3.13.

Table 3.13 – Critical Infrastructure and Key Resources in Williams County

CIKR Resource	Description	# in Williams County
Food/Agriculture	Major food distribution	0
Energy	Power generation and chemical facilities	3
Public Health	Hospitals and public health offices	1
Transportation	Bridges and major highways	4
Emergency Services	Police, fire and dispatch centers	4
Communications	Major communications towers	2
Water	Treatment facilities	2

Source: North Dakota Critical Infrastructure Program, 2014 North Dakota Multi-Hazard Mitigation Plan

Vulnerability

Population

- The number of residents vulnerable to a terrorist attack is highly variable based on time of day and extent of the attack. A large-scale incident, such as an attack on a municipal water supply, would have **the potential for hundreds of injuries or fatalities**.
- High density populations are generally more susceptible to large-scale terrorism events. The overall population density in Williams County is 14.2 persons per square mile, although the density of certain population centers is significantly higher. Figure 2.4 shows population density throughout the county. **The largest concentration of high density population can be found in Williston**.

Critical Facilities

- Local government facilities, including the county courthouse and each city hall, may be attractive targets. Other potential targets include schools, the county fairgrounds and energy production and transport facilities.

Property

- The North Dakota Tornado and Fire Fund compensates for losses related to vandalism and theft at various essential facilities. **Between 1989 and 2013, Williams County received $4,624 for local government facility losses and $77,963 for school facility losses.**

Future Development

- The county's overall vulnerability to homeland security incidents is not expected to change in the foreseeable future.

Existing Capabilities

- The county courthouse has security cameras.

Key Issues and Potential Action Items

- *Key Issue*: Terrorism and violence are an ongoing concern, but it is unlikely that a large-scale event will occur in the county.
  - *Potential Action Item*: Continue general surveillance of suspicious persons or activities within the county.
  - *Potential Action Item*: Review evacuation plans that could be utilized in the event of a terrorist attack.
  - *Potential Action Item*: Continue education and review of school response procedures for all schools in the county.
  - *Potential Action Item*: Enhance security measures at critical facilities.

Urban Fire

All Jurisdictions
Overall Risk: Low
Probability: Low (no history of major incidents)
Magnitude: Moderate (magnitude could vary widely)

Seasonal Pattern
None

Duration
Varies

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

Hazard Profile

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

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

Local Risk

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

Vulnerability

Population

- All residents in urban areas of the county are vulnerable to an urban fire event. The county's eight cities contain approximately 23,725 residents (80 percent of the county's total population).

- Workforce lodging facilities contain a high density of occupants and can be a fire risk, particularly in the winter months when residents may be using a variety of heating sources. There are 190 workforce lodging facilities permitted in the county with a total maximum occupancy of 18,235 residents. Permitted workforce lodging includes:
  - Two facilities in Alamo (11 residents)
  - Three facilities in Grenora (45 residents)
  - Four facilities in Ray (22 residents)
  - 18 facilities in Tioga (2,526 residents)
  - 121 facilities in Williston (10,807 residents)
  - 42 facilities in rural areas of the county (4,824 residents)

Critical Facilities

- Critical facilities in historic downtowns, listed below for each jurisdiction, generally have a greater vulnerability to fire.

- Rural areas of the county:
  - Trenton Grain Elevator
  - Trenton Township Hall

- Alamo:
  - City Hall
  - Fire Hall
  - Lutheran Church
  - Post Office
  - Senior Citizens Center

- Epping:
  - City Hall
  - Fire Hall
  - Prairie States Coop Terminal
  - Senior Citizens Center

- Grenora:
  - Ambulance Department
  - Church
  - City Hall

  - Farmers Union Elevator
  - Fire Department
  - Grocery Store
  - Post Office
  - Senior Citizens Center

- Ray:
  - Catholic Church
  - Grain Elevator
  - Lutheran Church
  - Mall
  - School
  - Senior Citizens Center
  - Water Tower

- Tioga:
  - City Hall
  - Fire/EMS
  - Grain Elevator
  - Post Office
  - Senior Citizens Center

- Wildrose:
  - City Hall
  - Clinic
  - Post Office
  - Senior Citizens Center

- Williston:
  - City Hall
  - County Courthouse
  - Law Enforcement Center
  - Post Office
  - Senior Citizens Center

Property

- The North Dakota Tornado and Fire Fund compensates for losses related to smoke damages at various essential facilities. Between 1989 and 2013, **Williams County received $4,604 for local government facility smoke damages and $94,265 for school facility smoke damages**.

Future Development

- The North Dakota State Building Code consists of the 2012 International Building Code, International Residential Code, International Mechanical Code and International Fuel Gas Code published by the International Code Council. Williams County, Williston, Ray and Tioga have adopted the 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 no history of large-scale urban fire in the county, but it is an ongoing concern.
  - *Potential Action Item*: Provide education about fire prevention best practices for local business owners and residents.
  - *Potential Action Item*: Continue response preparation with local fire districts.
  - *Potential Action Item*: Remove abandoned properties that could be a target for arson.

Summary

There are 10 priority hazards identified for Williams County. The key issues for each hazard are summarized below. Hazards are summarized for the county overall and listed alphabetically within priority class. Hazard risk for each jurisdiction is summarized in Table 3.14.

Table 3.14 – Williams County Risk Summary

	Rural County	Alamo	Epping	Grenora	Ray	Tioga	Wildrose	Williston
Drought	M	M	M	M	M	M	M	M
Flood	L	L	M	L	M	H	H	L
Geologic Hazards	M	M	M	M	M	M	M	M
Severe Summer Weather	H	H	H	H	H	H	H	H
Severe Winter Weather	H	H	H	H	H	H	H	H
Wildland Fire	M	M	M	M	M	M	M	L
Communicable Disease	L	L	L	L	L	L	L	L
Dam Failure	L	L	L	L	L	M	L	M
Hazardous Materials Release	H	H	H	H	H	H	L	H
Homeland Security Incident	L	L	L	L	L	L	L	L
Urban Fire	L	L	L	L	L	L	L	L

H = High, M = Moderate, L = Low

Drought

- Energy development and population growth in recent years have significantly increased demand for water in the county. This growth is expected to continue for at least the next several years.
- Agriculture is a key component of the county's economy. A significant drought has the potential to greatly affect the industry and the county as a whole.

Flood

- Williams County experiences about one flood event every two years. Flood events in the county include riverine flooding and flash flooding.
- Many roads in the county are commonly washed-out or inundated during flooding events.
- The Wildrose wastewater treatment lagoon is inundated due to rising water levels in the area.
- Growth is creating new flooding issues in several cities as new development has altered drainage patterns. Additionally, much of the new development is located outside of areas studied by FEMA, so their floodplain status is unknown.

Geologic Hazards

- Much of the county is within a moderate susceptibility/low incidence landslide hazard area as defined by USGS. Small landslides are common during periods of increased moisture.
- There is no history of a major earthquake in the county, but a minor earthquake could damage old or poorly-built structures.

Severe Summer Weather

- Williams 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.
- Williams County has many residents living in temporary housing units who may not have access to adequate shelter or notification during a summer storm event.
- The former grain elevator in Epping loses pieces of its metal sheathing during strong wind events. The sheathing sometimes blows through the city at a rapid speed and is a risk to people and property.

Severe Winter Weather

- Williams County averages approximately five days per year with a winter storm event. Severe winter weather events in the county include winter storm, high wind, heavy snow, blizzard, extreme cold/wind chill and ice storm.
- A winter storm event that causes a power outage may make it difficult for residents to heat their homes. Elderly residents and residents in temporary housing are the most vulnerable to extreme cold temperatures. Approximately 2,600 residents in the county are elderly and there are 18,000 permitted temporary housing units. Power loss occasionally occurs in the county during winter storm events.

Wildland Fire

- Williams County experiences a wildfire greater than 100 acres approximately once every two to three years. Most large wildfires in the county cause minimal property damage.

Communicable Disease

- Human and agricultural disease have the potential to greatly impact the health and economy of the county.

Dam Failure

- Fort Peck Dam in Montana would have a significant impact on Williston in the event of failure, and Tioga Dam would have an impact on Tioga in the event of failure.

Hazardous Materials Incident

- Hazardous materials incidents are common in Williams County, and nearly all residents live, work or travel within a potential hazard area.

Homeland Security Incident

- Terrorism and violence are an ongoing concern, but it is unlikely that a large-scale event will occur in the county.

Urban Fire

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

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, discussions with each city council, community survey and public meeting. 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*. Each incorporated city, as well as the unincorporated county, has a zoning ordinance.
- *Floodplain Ordinance*. The County, Ray, Tioga, Williston, Buford Township, Sauk Valley Township and Trenton Township have floodplain ordinances that are actively enforced.
- *Building Code*. The County, Williston, Ray and Tioga have adopted the State Building Code.

Administrative and Technical Capabilities

- Williams County has an Emergency Management Department that oversees mitigation, response and recovery activities countywide.
- Williams County's Local Emergency Planning Committee (LEPC) includes County officials (commissioners, fire, police, emergency management, health, social services), professional services (physicians, nurses, EMTs) and volunteers (organizations and individuals).
- Ray, Tioga, Williston and the County have a floodplain administrator.

Fiscal Capabilities

- Williams County and each incorporated jurisdiction are eligible for a variety of state and federal grants.
- Williams County and each incorporated jurisdiction have the ability to issue bonds and levy taxes.

Williston is the largest city in the county and has the most resources to implement mitigation actions. The County and other cities 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 is the greatest element that limits the capability of each jurisdiction. The County's tax base has rapidly grown over the past several years, but so has its expenses. Any financing mechanism that increases the public tax burden is not desired by residents. As a result, only the highest priority projects are likely to receive significant funding from local sources. A majority of lower priority projects identified in this plan have a minimal cost and can be completed by local staff.

The County has significantly upgraded its governance capabilities in recent years. Williams County updated their multi-jurisdictional comprehensive plan in 2012 and Williston updated their plan in 2010. The zoning and subdivision regulations for each jurisdiction have been updated in recent years to address the area's changing economic climate.

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 2014 state-wide Multi-Hazard Mitigation Plan was used to guide goal creation. 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 2009 Williams County Multi-Hazard Mitigation Plan are shown in Appendix E. The plan included 22 actions. Eleven actions were completed, eight actions are ongoing or in-progress and three actions were not completed and included in

this plan. Eight actions from the previous update are included in this plan.

The greatest challenge to completing mitigation activities has been the limited resources (time and money) of the County and each jurisdiction. Williston is the only jurisdiction with the staff and resources to implement a comprehensive range of mitigation actions. Most local governments in the county are run by a small number of people, some part-time. The area's rapid population growth since 2009 also directed resources away from mitigation and into projects that were felt to be a higher priority.

A majority of 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

Williams 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 identified in Tables 4.1 – 4.8 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; each of these potential activities is 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. 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. Costs listed in this document are for planning purposes only. The implementation timeline for each project may be highly variable based on the availability of funds.

Table 4.1 – Rural Williams County Action Items, 2016-2020					
ID	**Priority**	**Action**	**Hazard**	**Cost**	**Time Frame**
A	High	Road flood mitigation	Flooding	Varies	Ongoing
B	High	Road landslide mitigation	Geologic Hazards	Varies	Ongoing
C	Moderate	Conduct NFIP workshop	Flooding	Staff Time	2016
D	Moderate	Floodplain mapping upgrades	Flooding	Staff Time	2016
E	Low	Public education	Multiple Hazards	Staff Time	Ongoing
F	Low	Participate in NFIP training	Flooding	Staff Time	Ongoing
G	Low	Administer Firewise Program and implement best practices during wildfire season	Wildfire	Staff Time	Ongoing
BBB	Moderate	Develop Emergency Response Plans for Dam Failure – MacGregor Dam & Fort Peck Dam	Dam Failure	Staff Time	2018

Table 4.2 – Alamo Action Items, 2016-2020					
ID	**Priority**	**Action**	**Hazard**	**Cost**	**Time Frame**
H	High	Generator at Fire Hall	Multiple Hazards	$25,000 - $50,000	2016
I	High	New culvert on Main Street	Flooding	$15,000 - $25,000	2017
J	Low	Winter storm mitigation along ND Highway 50	Severe Winter Weather	Varies	2020
E	Low	Public education	Multiple Hazards	Staff Time	Ongoing

Table 4.3 – Epping Action Items, 2016-2020					
ID	**Priority**	**Action**	**Hazard**	**Cost**	**Time Frame**
H	High	Generator at Fire Hall/City Hall/Senior Citizens Center/Shelter	Multiple Hazards	$25,000 - $50,000	2016
K	High	New culvert and road elevation at intersection of School Avenue and 1st Street	Flooding	$20,000 - $30,000	2016
L	High	Improved drainage at 1st and Main	Flooding	$20,000 - $30,000	2017
M	Moderate	New emergency siren	Multiple Hazards	$10,000 - $25,000	2017
N	Moderate	Remove former grain elevator	Severe Summer Weather	$50,000 - $100,000	2018
H	Low	Generator at church/secondary shelter	Multiple Hazards	$25,000 - $50,000	2018
O	Moderate	Snow fence along Highway 42	Severe Winter Weather	$50 - $150 per linear foot	2019
E	Low	Public education	Multiple Hazards	Staff Time	Ongoing

Table 4.4 – Grenora Action Items, 2016-2020					
ID	**Priority**	**Action**	**Hazard**	**Cost**	**Time Frame**
P	High	New culvert on Main Street	Flooding	$15,000 - $25,000	2016
H	High	Generator for water tower	Multiple Hazards	$25,000 - $50,000	2017
E	Low	Public education	Multiple Hazards	Staff Time	Ongoing

Table 4.5 – Ray Action Items, 2016-2020					
ID	**Priority**	**Action**	**Hazard**	**Cost**	**Time Frame**
Q	High	Flood mitigation on east side of town	Flooding	Varies	2016
D	Moderate	Floodplain mapping upgrades	Flooding	Staff Time	2016
H	High	Generators at designated shelters: senior citizens center and school gym	Multiple Hazards	$25,000 - $50,000 per generator	2017
F	Low	Participate in NFIP training	Flooding	Staff Time	Ongoing
E	Low	Public education	Multiple Hazards	Staff Time	Ongoing

Table 4.6 – Tioga Action Items, 2016-2020					
ID	**Priority**	**Action**	**Hazard**	**Cost**	**Time Frame**
R	High	New culvert at Gilbertson Street South	Flooding	$15,000 - $25,000	2016
S	High	New drainage ditch along 67th Street	Flooding	$50,000 - $100,000	2017
D	Moderate	Floodplain mapping upgrades	Flooding	Staff Time	2016
F	Low	Participate in NFIP training	Flooding	Staff Time	Ongoing
E	Low	Public education	Multiple Hazards	Staff Time	Ongoing

Table 4.7 – Wildrose Action Items, 2016-2020					
ID	**Priority**	**Action**	**Hazard**	**Cost**	**Time Frame**
T	High	Wastewater treatment lagoon mitigation	Flooding	$2 - $5 million	2016
U	Moderate	Drainage ditch enlargement	Flooding	$50,000 - $300,000	2018
H	Moderate	Generators at lift station, Fire Hall and water tower	Multiple Hazards	$25,000 - $50,000 per generator	2019
V	Moderate	New culverts across town	Flooding	$15,000 - $25,000 per culvert	2020
E	Low	Public education	Multiple Hazards	Staff Time	Ongoing

Table 4.8 – Williston Action Items, 2016-2020					
ID	**Priority**	**Action**	**Hazard**	**Cost**	**Time Frame**
W	High	Construct and/or identify community storm shelters	Multiple Hazards	Varies	2016
D	Moderate	Floodplain mapping upgrades	Flooding	Staff Time	2016
F	Low	Participate in NFIP training	Flooding	Staff Time	Ongoing
E	Low	Public education	Multiple Hazards	Staff Time	Ongoing
X	High	Plant Intake Failure Plan	Damaged or Disabled Intake	$300,000	2016-2020
Y	Moderate	Walking access across train crossing	Train Collision, Hazard Material Event	$500,000	2016-2020
Z	High	Provide Shelter for Employees at Critical Facilities	Snow Storms, Floods	$15,000	2016-2020
AA	Moderate	Relocation of Public Work Office and Shop	Floods	$40,000	When Needed
BB	Moderate	Purchase dedicated generators for lift stations	Floods, Winter Storms, Lightning, Extreme Heat	$150,000	2016-2020
CC	Moderate	Provide wiring and switches for emergency generators	Floods, Winter Storms, Lightning, Extreme Heat	$200,000	2016-2020
DD	Low	Develop an all hazard public education and awareness program	Lightning, Winter Storms, Extreme Heat, Floods, Haz Materials	$30,000	2016-2020
EE	Low	Provide covered shelter for Public Works vehicles	Hail, Severe Winters, Extreme Heat	$100,000	2016-2020
FF	Moderate	Develop a MOU with privately owned gasoline facilities to provide fuel for emergency and critical vehicles during times of power outages	Winter Storms, Hazardous Materials, Floods	Undetermined	2016-2020
GG	Moderate	Relocation of Sewer Treatment Plant Operations	Floods, Levee Break, Hazardous Materials	$25,000	When Needed
HH	Low	Construct new/replacement bridge on Riverside Drive	Loss of Access to Sewer Treatment Plant	$5 mil	2016-2020
II	Moderate	Ring Dike around Sewer Treatment Plant	Floods	$2 mil	2016-2020
JJ	Moderate	Provide water pumps for flood control	Floods	$300,000	2016-2020
BBB	Moderate	Develop Emergency Response Plan for Fort Peck Dam Failure	Dam Failure	Staff time	2018

Table 4.9 – District 8 Public Schools Action Items, 2016-2020					
ID	**Priority**	**Action**	**Hazard**	**Cost**	**Time Frame**
KK	Low	Have media program to educate stakeholders on Hazards	Multiple Hazards	Varies	Ongoing
LL	Low	Install water saving fixtures throughout district	Drought	$25,500	Ongoing
MM	Moderate	Outdoor PA System	Multiple Hazards	Approx. $80,000	Ongoing
NN	High	Backup generators for each school building	Multiple Hazards	$30,000 to $80,000 each	1-5 Years
OO	Moderate	Snow removal equipment	Winter Storms	$100,000	Ongoing
PP	Low	Energy efficient windows	Heat, Winter Storms	$3,000 per window	Ongoing
QQ	Moderate	Steel reinforced doors	Multiple Hazards	$1,000 per door	Ongoing
RR	Low	Two way radio – VHF system	Multiple Hazards	Varies	Ongoing
SS	Moderate	Installation of NOAA weather radios in School facilities	Multiple Hazards	$75 per radio	2017
TT	High	Construct dual purpose community safe room to serve campus during both emergency and non-emergency times	Multiple Hazards	Varies	Ongoing
UU	Moderate	Install shatter resistant glass in school building windows	Multiple Hazards	Varies	Ongoing
VV	Low	Surge protectors and uninterruptable power sources for the school facilities.	Multiple Hazards	Varies	Ongoing
WW	Low	Weatherize existing facilities	Multiple Hazards	Varies	Ongoing
XX	High	Develop an emergency operations plan for all hazards	All Hazards	Staff Time	1-5 Years
YY	Moderate	Lightning hazard alert system for outdoor areas	Lightning	$50,000	1-5 Years
ZZ	High	Strengthen the school safety committees (district safety coordinator, additional school administrators, and other certified staff members)	Multiple Hazards	Staff Time	1-5 Years
AAA	Moderate	Install access control and video surveillance security system	Multiple Hazards	Varies	Ongoing

Table 4.10 – Grenora Public Schools Action Items, 2016-2020					
ID	**Priority**	**Action**	**Hazard**	**Cost**	**Time Frame**
KK	Low	Have media program to educate stakeholders on Hazards	Multiple Hazards	Varies	Ongoing
LL	Low	Install water saving fixtures throughout district	Drought	$25,500	Ongoing
MM	Moderate	Outdoor PA System	Multiple Hazards	Approx. $40,000	Ongoing
NN	High	Backup generators for each school building	Multiple Hazards	$30,000 to $80,000 each	1-5 Years WFA
OO	Low	Snow removal equipment	Winter Storms	$100,000	Ongoing
PP	Low	Energy efficient windows	Heat, Winter Storms	$3,000 per window	Ongoing
QQ	Moderate	Steel reinforced doors	Multiple Hazards	$1,000 per door	Ongoing
RR	Low	Two way radio – VHF system	Multiple Hazards	Varies	Ongoing
SS	High	Installation of NOAA weather radios in School facilities	Multiple Hazards	$75 per radio	2017
TT	High	Construct dual purpose community safe room to serve campus during both emergency and non-emergency times	Multiple Hazards	Varies	Ongoing
UU	Moderate	Install shatter resistant glass in school building windows	Multiple Hazards	Varies	Ongoing
VV	Moderate	Surge protectors and uninterruptable power sources for the school facilities.	Multiple Hazards	Varies	Ongoing
WW	Low	Weatherize existing facilities	Multiple Hazards	Varies	Ongoing
XX	High	Develop an emergency operations plan for all hazards	All Hazards	Staff Time	1-5 Years
YY	Moderate	Lightning hazard alert system for outdoor areas	Lightning	$50,000	1-5 Years
ZZ	High	Strengthen the school safety committees (district safety coordinator, additional school administrators, and other certified staff members)	Multiple Hazards	Staff Time	1-5 Years
AAA	Moderate	Install access control and video surveillance security system	Multiple Hazards	Varies	Ongoing

Table 4.11 – Ray Public Schools Action Items, 2016-2020					
ID	**Priority**	**Action**	**Hazard**	**Cost**	**Time Frame**
KK	Moderate	Have media program to educate stakeholders on Hazards	Multiple Hazards	Varies	Ongoing
LL	Low	Install water saving fixtures throughout district	Drought	$25,500	Ongoing
MM	Moderate	Outdoor PA System	Multiple Hazards	Approx. $40,000	Ongoing
NN	High	Backup generators for each school building	Multiple Hazards	$30,000 to $80,000 each	1-5 Years
OO	Moderate	Snow removal equipment	Winter Storms	$100,000	Ongoing
PP	Low	Energy efficient windows	Heat, Winter Storms	Varies	Ongoing
RR	Moderate	Two way radio – VHF system	Multiple Hazards	Varies	Ongoing
SS	High	Installation of NOAA weather radios in School facilities	Multiple Hazards	$75 per radio	2017
TT	High	Construct dual purpose community safe room to serve campus during both emergency and non-emergency times	Multiple Hazards	Varies	Ongoing
UU	Moderate	Install shatter resistant glass in school building windows	Multiple Hazards	Varies	Ongoing
VV	Moderate	Surge protectors and uninterruptable power sources for the school facilities.	Multiple Hazards	Varies	Ongoing
XX	High	Develop an emergency operations plan for all hazards	All Hazards	Staff Time	Ongoing
YY	Moderate	Lightning hazard alert system for outdoor areas	Lightning	Varies	Ongoing
ZZ	High	Strengthen the school safety committees (district safety coordinator, additional school administrators, and other certified staff members)	Multiple Hazards	Staff Time	Ongoing
AAA	Moderate	Install access control and video surveillance security system	Multiple Hazards	Varies	Ongoing

Table 4.12 – Tioga Public Schools Action Items, 2016-2020					
ID	**Priority**	**Action**	**Hazard**	**Cost**	**Time Frame**
KK	Moderate	Have media program to educate stakeholders on Hazards	Multiple Hazards	Varies	Ongoing
LL	Low	Install water saving fixtures throughout district	Drought	$25,500	Ongoing
MM	Moderate	Outdoor PA System	Multiple Hazards	Approx. $80,000	Ongoing
NN	High	Backup generators for each school building	Multiple Hazards	$50,000 to $100,000 each	1-5 Years
OO	Moderate	Snow removal equipment	Winter Storms	$100,000	Ongoing
PP	Low	Energy efficient windows	Heat, Winter Storms	Varies	Ongoing
QQ	Moderate	Steel reinforced doors	Multiple Hazards	$1,000 per door	Ongoing
RR	High	Two way radio – VHF system	Multiple Hazards	Varies	Ongoing
SS	High	Installation of NOAA weather radios in School facilities	Multiple Hazards	$75 per radio	2017
TT	High	Construct dual purpose community safe room to serve campus during both emergency and non-emergency times	Multiple Hazards	Varies	Ongoing
UU	Moderate	Install shatter resistant glass in school building windows	Multiple Hazards	Varies	Ongoing
VV	Moderate	Surge protectors and uninterruptable power sources for the school facilities.	Multiple Hazards	Varies	Ongoing
XX	High	Develop an emergency operations plan for all hazards	All Hazards	Staff Time	1-5 Years
YY	Moderate	Lightning hazard alert system for outdoor areas	Lightning	Varies	1-5 Years
ZZ	High	Strengthen the school safety committees (district safety coordinator, additional school administrators, and other certified staff members)	Multiple Hazards	Staff Time	1-5 Years
AAA	Moderate	Install access control and video surveillance security system	Multiple Hazards	Varies	Ongoing

Table 4.13 – Trenton Public Schools Action Items, 2016-2020					
ID	**Priority**	**Action**	**Hazard**	**Cost**	**Time Frame**
KK	Moderate	Have media program to educate stakeholders on Hazards	Multiple Hazards	Varies	Ongoing
LL	Low	Install water saving fixtures throughout district	Drought	$25,500	Ongoing
MM	Moderate	Outdoor PA System	Multiple Hazards	Approx. $40,000	Ongoing
NN	High	Backup generators for each school building	Multiple Hazards	$150,000	Ongoing
OO	Moderate	Snow removal equipment	Winter Storms	$100,000	Ongoing
PP	Low	Energy efficient windows	Heat, Winter Storms	Varies	Ongoing
QQ	Moderate	Steel reinforced doors	Multiple Hazards	$1,000 per door	Ongoing
RR	High	Two way radio – VHF system	Multiple Hazards	Varies	Ongoing
SS	High	Installation of NOAA weather radios in School facilities	Multiple Hazards	$75 per radio	2017
TT	Moderate	Construct dual purpose community safe room to serve campus during both emergency and non-emergency times	Multiple Hazards	Varies	Ongoing
UU	Moderate	Install shatter resistant glass in school building windows	Multiple Hazards	Varies	Ongoing
VV	Moderate	Surge protectors and uninterruptable power sources for the school facilities.	Multiple Hazards	Varies	Ongoing
WW	Low	Weatherize existing facilities	Multiple Hazards	Varies	Ongoing
XX	High	Develop an emergency operations plan for all hazards	All Hazards	Staff Time	1-5 Years
YY	Moderate	Lightning hazard alert system for outdoor areas	Lightning	Varies	1-5 Years
ZZ	High	Strengthen the school safety committees (district safety coordinator, additional school administrators, and other certified staff members)	Multiple Hazards	Staff Time	1-5 Years
AAA	Moderate	Install access control and video surveillance security system	Multiple Hazards	Varies	Ongoing

Table 4.14 – Williston Public Schools Action Items, 2016-2020					
ID	**Priority**	**Action**	**Hazard**	**Cost**	**Time Frame**
KK	Low	Have media program to educate stakeholders on Hazards	Multiple Hazards	Varies	Ongoing
LL	Low	Install water saving fixtures throughout district	Drought	$25,500	Ongoing
MM	Moderate	Outdoor PA System	Multiple Hazards	Approx. $40,000	Ongoing
NN	High	Backup generators for each school building	Multiple Hazards	$50,000 to $100,000 each	Ongoing
OO	Moderate	Snow removal equipment	Winter Storms	$100,000	Ongoing
PP	Low	Energy efficient windows	Heat, Winter Storms	Varies	Ongoing
QQ	Moderate	Steel reinforced doors	Multiple Hazards	$1,000 per door	Ongoing
RR	Low	Two way radio – VHF system	Multiple Hazards	Varies	Ongoing
SS	Moderate	Installation of NOAA weather radios in School facilities	Multiple Hazards	$75 per radio	2017
TT	High	Construct dual purpose community safe room to serve campus during both emergency and non-emergency times	Multiple Hazards	Varies	Ongoing
UU	Moderate	Install shatter resistant glass in school building windows	Multiple Hazards	Varies	Ongoing
VV	Low	Surge protectors and uninterruptable power sources for the school facilities.	Multiple Hazards	Varies	Ongoing
WW	Low	Weatherize existing facilities	Multiple Hazards	Varies	Ongoing
XX	High	Develop an emergency operations plan for all hazards	All Hazards	Staff Time	1-5 Years
YY	Moderate	Lightning hazard alert system for outdoor areas	Lightning	Varies	1-5 Years
ZZ	High	Strengthen the school safety committees (district safety coordinator, additional school administrators, and other certified staff members)	Multiple Hazards	Staff Time	1-5 Years
AAA	Moderate	Install access control and video surveillance security system	Multiple Hazards	Varies	Ongoing

Notes for Action Items

The Williams 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: Road flood mitigation

A mix of projects are identified to mitigate flooding throughout the county. Potential road projects are identified below, and specific segments are shown in Appendix C.

- 14th Avenue NW: Install culvert
- 61st Street NW: Road elevation
- 54th Street NW: Road elevation
- 81st Street NW: Road relocation
- 104th Avenue NW: Install box culvert

Funds for road mitigation are available through the FEMA HMGP, PDM and FMA grant programs.

Responsible party: Williams County Highway Superintendent

B: Road landslide mitigation

Shoulder re-grades are needed on several road segments in the county to prevent landslides affecting road service. Potential road projects are identified below, and specific segments are shown in Appendix C.

- 144 1/2th Avenue NW
- 119th Road NW
- 58th Street NW

Funds for road mitigation are available through the FEMA HMGP and PDM grant programs.

Responsible party: Williams County Highway Superintendent

C: Conduct NFIP workshop

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.

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

Responsible party: Williams County Emergency Manager

D: Floodplain mapping upgrades

FEMA conducted a RiskMAP Discovery Meeting in March 2015 to explore the possibility of DFIRM and other flood risk product upgrades for Williams County. The results of the meeting and initial data collection are being reviewed to determine if FEMA will continue the RiskMAP process in the county. If FEMA elects to continue, the process may take up to five years for new regulatory DFIRMs to be completed. Each jurisdiction's role in the process would primarily be to provide input as requested.

Responsible party: Williams County Emergency Manager, Tioga Water Superintendent, Williston City Engineer

E: Public education

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

- Hazardous materials awareness for residents
- Community shelter promotion
- Summer and winter weather safety
- Flood safety and NFIP promotion
- Fire weather notifications and fire prevention

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

Responsible party: Williams County Emergency Manager

F: Participate in NFIP training

Training would be targeted at floodplain administrators in NFIP-participating jurisdictions. Local on-site training can be requested from the North Dakota State Water Commission.

Responsible party: Williams County Emergency Manager

G. Administer Firewise program and implement best practices during wildfire season

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.

In addition to public education, the county 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: Williams County Emergency Manager

H: Emergency generators at critical facilities

Funding for generators is available through FEMA's HMGP and PDM grant programs.

Responsible party: Alamo Mayor, Epping Mayor, Grenora Mayor, Ray Mayor, Wildrose Mayor

I: New culvert on Main Street in Alamo

The project would be coordinated between the city and county because Main Street is County Highway 11. Culvert mitigation is eligible for FEMA funds through the HMGP, PDM and FMA grant programs.

Responsible party: Alamo Mayor, Williams County Highway Superintendent

J: Winter storm mitigation along ND Highway 50

The project would include moving or elevating segments of the highway, or re-grading the former railroad right-of-way to reduce blowing wind across highway. The project would fall within the jurisdiction of the ND Department of Transportation, and most likely utilize state funds; however, successful project completion would depend on coordination between the city, county and state.

Responsible party: Alamo Mayor, Williams County Highway Superintendent

K: New culvert and road elevation at intersection of School Avenue and 1st Street in Epping

Ponding at the intersection needs to be addressed with a culvert and minor road elevation. Culvert mitigation is eligible for FEMA funds through the HMGP, PDM and FMA grant programs.

Responsible party: Epping Mayor

L: Improved drainage at 1st Avenue and Main Street in Epping

Potential solutions include a culvert, road elevation, road re-grade or small levee. A detailed engineering analysis is required to identify a specific project. Localized flood mitigation projects are eligible for FEMA funds through the HMGP, PDM and FMA grant programs.

Responsible party: Epping Mayor

M: New warning siren in Epping

There are many different types of sirens, each with a different price point. Items to consider include fixed or rotating, duty rating, decibel ratings, sound circle and source of power. Warning sirens are not eligible for FEMA mitigation funding, but funding is periodically made available from North Dakota DES.

Responsible party: Epping Mayor

N: Remove former grain elevator in Epping

The metal sheathing from the elevator blows off during high wind events and creates a hazard for people and property.

Responsible party: Epping Mayor

O: Snow fence along Highway 42

A snow fence would relieve blowing snow along Highway 42 on the east side of town. Living snow fences are a long-tern solution to hazardous road sections. They generally last approximately 75 years and require little maintenance once roots are established in new plantings. A mature living snow fence can hold approximately 12 times as much snow as a similar-sized Wyoming-style slatted snow fence.

Responsible party: Epping Mayor

P: New culvert on Main Street in Grenora

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

Responsible party: Grenora Mayor

Q: Flood mitigation on the east side of Ray

An engineering study is currently being completed to address solutions for ponding on the east side of town. Localized flood mitigation projects are eligible for FEMA funds through the HMGP, PDM and FMA grant programs.

Responsible party: Ray Mayor

R: New culvert on Gilbertson Street South in Tioga

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

Responsible party: Tioga Mayor

S: New drainage ditch along 67th Street in Tioga

New development has overloaded existing drainage channels on the southwest side of town, resulting in neighborhood flooding during heavy rains. Localized flood mitigation projects are eligible for FEMA funds through the HMGP, PDM and FMA grant programs.

Responsible party: Tioga Mayor

T: Wastewater treatment lagoon mitigation in Wildrose

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

Responsible party: Wildrose Mayor

U: Drainage ditch enlargement in Wildrose

Flooding is common throughout town during heavy rains, and an improved drainage ditch system is one solution being evaluated. Localized flood mitigation projects are eligible for FEMA funds through the HMGP, PDM and FMA grant programs.

Responsible party: Wildrose Mayor

V: New culverts across town in Wildrose

Flooding is common throughout town during heavy rains, and more culverts are one solution being evaluated. Localized flood mitigation projects are eligible for FEMA funds through the HMGP, PDM and FMA grant programs.

Responsible party: Wildrose Mayor

W: Construct and/or identify community storm shelters

The large amount of residents living in Williston without adequate shelter has greatly increased the need for community shelters in recent years. Some facilities that would make suitable shelters may already exist in town, but they need to be designated and promoted to have functional value. In some cases new shelters may need to be constructed. Flooding is common throughout town during heavy rains, and more culverts are one solution being evaluated. Shelter construction or structural retrofits are eligible for FEMA funds through the HMGP and PDM grant programs.

Responsible party: Williston Mayor

X: Plant intake failure plan

Gives the Water Treatment Plant the ability to pump water from the river should the intake be damaged or disabled.

Responsible party: Administration

Y: Walking access across train crossing

A walking bridge would eliminate the unsafe act of crossing the train tracks. In the unlikely case of a train derailment, the walking bridge would give continued access to the pump house.

Responsible party: Administration

Z: Shelter for Employees at Critical Facilities

To maintain normal flow of city work during a snow or flood emergency.

Responsible party: Administration

AA: Relocation of Public Works Office and Shop

Maintain continuous level of service during flood events.

Responsible party: Public Works Staff

BB: Purchase dedicated generators for lift stations

Ensure that all lift stations have power in the event of an outage.

Responsible party: Public Works

CC: Provide wiring and switches for emergency generators at critical facilities

Provide uninterrupted operations during hazardous events.

Responsible party: Public Works

DD: Develop an all hazard public education and awareness program

To raise awareness.

Responsible party: Public Works

EE: Provide covered shelter for Public Works vehicles

Prevent damage to vehicles from hazardous events

Responsible party: Public Works

FF: Develop a MOU with privately owned gasoline facilities to provide fuel for emergency and critical vehicles during times of power outages

Able to provide priority fuel to emergency vehicles so that public works personnel can meet the needs of the community.

Responsible party: Public Works

GG: Relocation of Sewer Treatment Plant Operations

Maintain continuous level of service during disaster events.

Responsible party: Public Works Staff

HH: Construct new/replacement bridge on Riverside Drive

Improve response time in the event of emergency. Access to plant is limited by train traffic. This would allow faster access to the sewer treatment plant.

Responsible party: City Engineering, DOT, Burlington Northern.

II: Ring dike around sewer treatment plant

Protect the sewer treatment plant and keep it in constant operation in the event of a flood.

Responsible party: Public Works

JJ: Provide water pumps for flood control

Protect the sewer treatment plant and keep it in constant operation in the event of a flood.

Responsible party: Public Works

KK: Have media program to educate stakeholders on Hazards

Provide educational material to all stakeholders explaining potential hazards for the school district and individual campuses. This will be achieved by designing, purchasing and distributing a tri-fold colored brochure that provides information on all hazards.

Responsible party: Emergency Manager

LL: Install water saving fixtures throughout district

Participate in water conservation efforts while also reducing water costs throughout the year. This will be achieved by installing water saving fixtures on outdoor faucets or hydrants, toilets and urinals throughout the school district.

Responsible party: School Superintendent

MM: Outdoor PA Systems

Provide the school administration with a means to notify students, faculty, and staff of an impending hazard when outside of the regular classroom building. This will be accomplished by installing an outdoor public address system on all campuses.

Responsible party: School Superintendent

NN: Backup generators for each school building

Provide emergency backup power to each school building when electric service is interrupted. This will be achieved by the purchase and installation of

backup generators and transfer switches at each school building.

Responsible party: School Superintendent

OO: Snow removal equipment

Provide equipment to remove snow and ice accumulations from school property, for the safety of the students, faculty, staff and public. This will allow for quick and effective restoration of facility operation after a winter storm event.

Responsible party: School Superintendent

PP: Energy efficient windows

Replace out dated windows with energy efficient impact resistant glass windows. This will improve energy efficiency and safety in the school buildings. It will regulate the temperature better during extreme heat and extreme cold events.

Responsible party: School Superintendent

QQ: Steel reinforced doors

Replace any and all lighter weight and aging existing doors with reinforced energy efficiency steel doors. This will improve protective measures as well as energy efficiency for the school facilities.

Responsible party: School Superintendent

RR: Two way radio – VHF system

Provide a secondary communications system for each school building, school bus, and administration building. This allows for a quicker more direct means of communications between school personnel and the facilities during normal operations. It also allows for redundant communications in case of a failure of the primary system and is an alternative means of communications between the schools and emergency responders.

Responsible party: School Superintendent

SS: Installation of NOAA weather radios in School

Provide each school building with a NOAA weather radio. This will provide an increased awareness and improved warning for approaching hazardous events and improve hazard notification at school facilities.

Responsible party: School Superintendent

TT: Construct dual purpose community safe room

Build new or retrofit an existing building, so that it meets safe room standards and can be used for other activities aside from its safe room capabilities. This area would be located in or close to all public schools buildings to provide safe shelter for students and staff in the event of a hazardous event while school is in session and to the whole community during time that school is not in session. This project reduces the effects of the hazard, and provides a safe location for students and staff and citizens to shelter from the hazard.

Responsible party: School Superintendent

UU: Install shatter resistant glass in school building windows

Install impact resistant glass or impact resistant coating on all windows and doors in each school building. This project will reduce the hazardous effects of broken glass projectiles in the event of a catastrophic failure of the windows in the building.

Responsible party: School Superintendent

VV: Surge protectors and uninterruptable power sources for the school facilities

Install surge protectors to protect large mechanical power equipment and sensitive electronics, install uninterruptible power supplies to allow for proper shut down of sensitive electronic equipment in the event of a power failure.

Responsible party: School Superintendent

WW: Weatherize existing facilities

Retrofit existing school buildings and their interiors with materials and devices to protect from hazards. (keep the hazards outside the building) This will be accomplished by installing weather stripping, insulation, water proofing, and other devices to protect the buildings and its occupants.

Responsible party: School Superintendent

XX: Develop an emergency operations plan for all hazards

Develop an all hazards emergency operations plan for the school district and individual buildings. The plan will outline the procedures to take before, during and after an emergency event ranging from severe weather to building intruder.

Responsible party: Emergency Manager, LEPC, School Superintendent

YY: Lightning hazard alert system for outdoor areas

Provide an advanced warning system to outdoor areas in the school district. This will be accomplished by Installing lightning detection and warning equipment at outdoor venues where student, faculty, staff, and the public gather for events.

Responsible party: School Superintendent

ZZ: Strengthen the school safety committees

Form school emergency planning teams that will work closely with administrators to review the emergency operation and safety plans for the district and each building. This will be accomplished by selecting and training members from each school. They will review potential hazards and risks, conduct campus walk through, make recommendations, and provide relevant information to stake holders.

Responsible party: Emergency Manager, LEPC, School Superintendent

AAA: Install access control and video surveillance security system

Provide added safety and security to students, staff, and faculty inside their school buildings. This would be accomplished by installing video cameras in all areas of the buildings and installing access control devices on doors to protect from unauthorized personnel.

Responsible party: School Superintendent

BBB: Develop emergency response plans for dam failure – Fort Peck and MacGregor Dams

Identify or confirm impacted areas of potential dam failures, determine the level of impact, and identify appropriate action steps to safeguard life, health, and property to the maximum extent feasible. This will include reviewing all relevant existing documentation, developing/documenting procedures for evaluating conditions at the dam that could lead to failure, defining the circumstances under which the emergency response plan would be activated, establishing the mechanisms for communicating with downstream residents and property owners about dam failure and impending dam failure, and developing action steps to reduce the risk of property damage, personal injury, or loss of life.

Responsible party: MacGregor Dam - Williams County Emergency Manager, Fort Peck Dam – Williston City Engineer, Williston Public Works Director, and Williams County Emergency Manager

Chapter 5: Plan Maintenance

This chapter details the plan maintenance process to make sure the Williams 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 F. 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 Williams 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 key 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.

Integrating the Plan into Existing Planning Mechanisms

The County's 2009 Multi-Hazard Mitigation Plan noted that incorporated cities within the county should address hazards in updates to their zoning and other planning documents. The county's emergency services director was also assigned to assist local governments integrate their hazard mitigation plan into their capital improvements process. The rapid growth experienced in the county since 2009 resulted in a renewed interest in the value of planning. Williams County updated their multi-jurisdictional comprehensive plan in 2012 and Williston updated their plan in 2010. The zoning and subdivision regulations for several jurisdictions have been updated in recent years. These new capabilities were primarily developed to address population growth and a rapid expansion of industrial development; as a result, hazard mitigation was not a priority. Some mention of hazards is present in the Williams County and Williston Comprehensive Plans, but there was no specific integration with the Multi-Hazard Mitigation Plan. Capital improvements priorities were focused on basic infrastructure upgrades to accommodate an expanding population, and very little was allocated for mitigation.

The next several years present an opportunity for the county to enhance the integration between planning mechanisms and hazard mitigation. Efforts over the last several years have allowed local governments to somewhat "catch up" with growth, and jurisdictions in the county now have the tools to pursue objectives beyond the bare basics, such as hazard mitigation.

Williston and Williams County are currently creating a regional comprehensive plan. Items from this Multi-Hazard Mitigation Plan should be integrated into the

comprehensive plan when possible. Items to integrate include risk area delineations and mitigation action items. Additionally, some jurisdictions may decide to update their zoning and subdivision regulations in the next several years. Items relating to hazard mitigation, particularly addressing flooding, wildfire and landslide should be integrated into these plan updates.

Several projects identified in this plan are infrastructure-related. It is the role of each responsible party identified in Chapter 4 to be present at annual capital improvements budget meetings and advocate for consideration of mitigation projects.

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). The LEOP was last updated in 2008.

Updating the Plan

The Williams County Emergency Manager is responsible for overseeing the five-year update process. Nine months should be allowed for completion of the plan – six 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 one year 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 F. 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.

Williams County

Multi-Hazard Mitigation Plan

November 2017

Appendix

Appendix A

Approval and Adoption Documentation

Appendix B

Planning Progress

Appendix C

Additional Hazard Information

Appendix D

Critical Facilities

Appendix E

Mitigation Action Determination

Appendix F

Monitoring Forms

FEMA

KLJ

Appendix A: Approval and Adoption Documentation

Williams County
Multi-Hazard Mitigation Plan

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

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

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

DATED at Grenora, North Dakota this 1st day of Nov, 2017.

Attest: Troy Walters

Name: Troy Walters

Title: Superintendent

Attest: Lavern Johnson

Name: Lavern Johnson

Title: Board President

OFFICE OF EMERGENCY MANAGEMENT
Mike Smith, CFM
Director
PO Box 2047 | 4319 16th Ave. W. | Williston, ND 58802-2047 | Phone 701.577.4500 | www.wiliamsnd.com

Williams County
Multi-Hazard Mitigation Plan

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

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

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

DATED at Ray, North Dakota this 17th day of October 2017.

Attest: _____

Name: Benjie Foss

Title: School Board Member

Attest: _____

Name: RYAN OLSON

Title: SCHOOL BOARD MEMBER

OFFICE OF EMERGENCY MANAGEMENT
Mike Smith, CFM
Director
PO Box 2047 | 4319 16th Ave. W. | Williston, ND 58802-2047 | Phone 701.577.4500 | www.williamsnd.com

Williams County
Multi-Hazard Mitigation Plan

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

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

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

DATED at Tioga, North Dakota this 23 day of Oct., 2017.

Attest: _____

Name: Mark W. Schmidt

Title: Board President

Attest: Carolyn Eide

Name: Carolyn Eide

Title: Superintendent

OFFICE OF EMERGENCY MANAGEMENT
Mike Smith, CFM
Director
PO Box 2047 | 4319 16th Ave. W. | Williston, ND 58802-2047 | Phone 701.577.4500 | www.wiliamsnd.com

Williams County
Multi-Hazard Mitigation Plan

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

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

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

DATED at Trenton, North Dakota this 11th day of October 2017.

Attest: Anita J. Falcon
Name: Anita J. Falcon
Title: School Board, President

Attest: _____
Name: _____
Title: _____

OFFICE OF EMERGENCY MANAGEMENT
Mike Smith, CFM
Director
PO Box 2047 | 4319 16th Ave. W. | Williston, ND 58802-2047 | Phone 701.577.4500 | www.wiliamsnd.com

Williams County
Multi-Hazard Mitigation Plan

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

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

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

DATED at Williston Public School District Williston, North Dakota this 09 day of October 2017.

Attest: Michael D. Campbell

Name: Michael D. Campbell

Title: Superintendent of Schools

Attest: _____

Name: _____

Title: _____

OFFICE OF EMERGENCY MANAGEMENT
Mike Smith, CFM
Director
PO Box 2047 | 4319 16th Ave. W. | Williston, ND 58802-2047 | Phone 701.577.4500 | www.williamsnd.com

Williams County
Multi-Hazard Mitigation Plan

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

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

Now, therefore, be it resolved, that the Williams County School District 8 adopts the Williams County Multi-Hazard Mitigation Plan upon final approval by the State of North Dakota and the Federal Emergency Management Agency.

DATED at Williston, North Dakota this 24th day of Oct, 2017.

Attest: Jennifer Jorgenson

Name: Jennifer Jorgenson

Title: Board President

Attest:

Name: Rob Turner

Title: Superintendent

OFFICE OF EMERGENCY MANAGEMENT
Mike Smith, CFM
Director
PO Box 2047 | 4319 16th Ave. W. | Williston, ND 58802-2047 | Phone 701.577.4500 | www.wiliamsnd.com

Williams County
Multi-Hazard Mitigation Plan

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

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

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

DATED at Alamo, North Dakota this 9 day of Oct, 2017.

Attest: City of Alamo
Name: April Metz
Title: City Auditor

Attest: City of Alamo
Name:
Title: Mayor

OFFICE OF EMERGENCY MANAGEMENT
Mike Smith, CFM
Director
PO Box 2047 | 4319 16th Ave. W. | Williston, ND 58802-2047 | Phone 701.577.4500 | www.wiliamsnd.com

Williams County
Multi-Hazard Mitigation Plan

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

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

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

DATED at Epping, North Dakota this 11th day of October 2017.

Attest: Stacy Woodward
Name: Stacy Woodward
Title: Auditor

Attest: Jimmy W Barker II
Name: Jimmy Barker
Title: Mayor

OFFICE OF EMERGENCY MANAGEMENT
Mike Smith, CFM
Director
PO Box 2047 | 4319 16th Ave. W. | Williston, ND 58802-2047 | Phone 701.577.4500 | www.wiliamsnd.com

Williams County
Multi-Hazard Mitigation Plan

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

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

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

DATED at Grenora, North Dakota this 23rd day of Oct., 2017.

Attest: Jane D Christad

Name: Brad Thiel

Title: Mayor

Attest: _____

Name: _____

Title: _____

OFFICE OF EMERGENCY MANAGEMENT
Mike Smith, CFM
Director
PO Box 2047 | 4319 16th Ave. W. | Williston, ND 58802-2047 | Phone 701.577.4500 | www.wiliamsnd.com

Williams County
Multi-Hazard Mitigation Plan

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

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

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

DATED at Ray, North Dakota this 9 day of Oct, 2017.

Attest: Kenneth Munson
Name: Kenneth Munson
Title: Pres. Council

Attest: R J Rustad
Name: Ronda Rustad
Title: Auditor

OFFICE OF EMERGENCY MANAGEMENT
Mike Smith, CFM
Director
PO Box 2047 | 4319 16th Ave. W. | Williston, ND 58802-2047 | Phone 701.577.4500 | www.wiliamsnd.com

Resolution: #2017-12 **Agenda Item:**

Date: October 2, 2017

BE IT RESOLVED, by the City Commission of the City of Tioga, William County, North Dakota: **Williams County Multi-Hazzard Mitigation Plan**

Williams County
Multi-Hazard Mitigation Plan

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

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

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

Whereas, Williams County participated in the preparation of this plan in accordance with the Disaster M itigation Act of 2000; and

Whereas, adoption of the Williams County Multi-Hazard Mitigation Plan demonstrates the commitme nt to hazard mitigation; and

Now, therefore, be it resolved, that the City of Tioga, adopts the Williams County Multi-Hazard Mit igation Plan upon final approval by the State of North Dakota and the Federal Emergency Managem ent Agency.

Dated and adopted this 19th day of June, 2017

Moved by Tim Sundhagen Second by John Grubb to adopt.

Commission Action:	Yes	No	Pass	Absent
Sundhagen	Y			
Grubb	Y			
McClelland	Y			
Thompson	Y			
Weflen	Absent			X

Motion Carried

Drake McClelland, President

CERTIFICATE

I, Abby Salinas, City Auditor of said City hereby certify that at a meeting of the City Commission held on the above date, among other proceedings, the above was adopted.

IN WITNESS WHEREOF, I have hereunto set my hand the day and year above written.

Abby Salinas, City Auditor

Williams County
Multi-Hazard Mitigation Plan

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

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

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

DATED at Wildrose, North Dakota this 10th day of Oct, 2017.

Attest: Jess Homer
Name: Jess Homer
Title: Mayor

Attest: Tricia Pottinger
Name: Tricia Pottinger
Title: Auditor

OFFICE OF EMERGENCY MANAGEMENT
Mike Smith, CFM
Director
PO Box 2047 | 4319 16th Ave. W. | Williston, ND 58802-2047 | Phone 701.577.4500 | www.wiliamsnd.com

Williams County
Multi-Hazard Mitigation Plan

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

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

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

DATED at Williston, North Dakota this 3rd day of Oct., 2017.

Attest: _____
Name: Beth M. Innis
Title: Auditor

Attest: _____
Name: David Montgomery
Title: Chairman

OFFICE OF EMERGENCY MANAGEMENT
Mike Smith, CFM
Director
PO Box 2047 | 4319 16th Ave. W. | Williston, ND 58802-2047 | Phone 701.577.4500 | www.wiliamsnd.com

Resolution 17-038

Williams County
Multi-Hazard Mitigation Plan

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

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

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

Commissioner Piesik moved the adoption of the Resolution. Commissioner Cymbaluk seconded the motion and upon a vote being taken thereon, the following voted "AYE": Piesik, Cymbaluk, Bekkedahl, Klug and the following "NAY": None. Absent and not voting: Brostuen

Whereupon said motion was declared duly passed and declared atopted this 10th day of October 2017.

Attest: _____

Name: Howard Klug

Title: President, Board of Commissioners

Attest: _____

Name: John Kautzman

Title: City Auditor

OFFICE OF EMERGENCY MANAGEMENT
Mike Smith, CFM
Director
PO Box 2047 | 4319 16th Ave. W. | Williston, ND 58802-2047 | Phone 701.577.4500 | www.wiliamsnd.com

ND Department of Emergency Services

NDDES Homeland Security State Radio

PO Box 5511
Bismarck, ND 58506-5511

Tel: (701) 328-8100
Fax: (701) 328-8181

Email: nddes@nd.gov
Website: www.nd.gov/des

Ensuring a safe and secure homeland for all North Dakotans

November 7, 2017

David Montgomery, Chair
Williams County Commission
P.O. Box 2047
Williston, ND 58802

Dear Chair Montgomery:

Congratulations on successful efforts to increase your communities' resilience to emergencies and disasters through Williams County's recent comprehensive mitigation planning initiative, led by Emergency Manager Mike Smith.

The Federal Emergency Management Agency (FEMA) Region VIII, approved the Williams County Multi-Hazard Mitigation Plan (MHMP) November 2, 2017 through November 1, 2022 for Williams County and the Cities of Alamo, Epping, Grenora, Ray, Tioga, Wild Rose and Williston.

Now that your MHMP has been completed and approved by FEMA, please submit any eligible costs, in-kind documentation (if applicable), and proof of payments to Hazard Mitigation Specialist Gary Simmons for reimbursement. Gary will review the documentation and, if eligible, reimburse all costs as outlined in the approved scope of work and budget of the project. Gary's contact information is 701-328-8255, gsimmons@nd.gov.

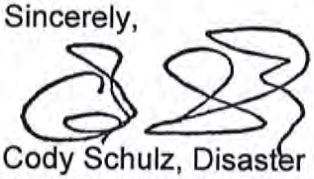
Once all costs have been reimbursed, the last step still required is project closeout. NDDES will forward a closeout letter template with examples for your use, which will include the final project costs. The county will simply need to copy this template onto its letterhead, sign the document, and resubmit the completed letter back to NDDES. If a final 404 quarterly report form had never been submitted, NDDES will request that as well showing the project is 100% completed with the final approval date including day, month and year. NDDES will submit all closeout paperwork to FEMA once it has been compiled.

During the next five years, we encourage the Williams County Planning Team to ensure the MHMP becomes a living document. We recommend the Planning Team begin that effort by ensuring periodic updates to content and by pursuing mitigation projects, as outlined in the plan. My staff and FEMA Region VIII mitigation planners provided comments and recommended revisions in the enclosed Plan Review Tool, which will help guide update efforts.

My staff can assist your Planning Team move forward with plan and project implementation. For information about potential sources of funding for mitigation projects, contact Justin Messner, State Hazard Mitigation Officer, at 701-328-8107, jmessner@nd.gov. Questions about mitigation planning can be directed to Kathleen Donahue, Mitigation Planning Officer, at 701-328-8113, kdonahue@nd.gov.

Thanks for all your hard work.

Sincerely,



Cody Schulz, Disaster Recovery Section Chief
N.D. Division of Homeland Security

Enclosures: November 2, 2017 FEMA Approval Letter, Plan Review Tool

cc: Williams County Emergency Manager

U.S. Department of Homeland Security
Region VIII
Denver Federal Center, Building 710
P.O. Box 25267
Denver, CO 80225-0267

FEMA

R8-MT

November 2, 2017

Mr. Cody Schulz
Disaster Recovery Chief
North Dakota Department of Emergency Services
Fraine Barracks Lane, Building 35
P.O. Box 5511
Bismarck, North Dakota 58502-5511

Dear Mr. Schulz:

We are pleased to inform you that the Williams County Multi-Hazard Mitigation Plan was approved on November 2, 2017. The plan approval extends to the following participating jurisdictions that have adopted the plan: Williams County and the Cities of Alamo, Epping, Grenora, Ray, Tioga, Wild Rose and Williston.

The approved jurisdictions are eligible for FEMA Hazard Mitigation Assistance grant programs. All requests for funding will be evaluated individually according to the specific eligibility and other requirements of the particular programs under which the application is submitted.

This plan is approved through November 1, 2022. A local jurisdiction must revise its plan to reflect changes in development, progress in local mitigation efforts, changes in priorities, and resubmit for approval within five years to continue to be eligible for mitigation project grant funding.

We have provided comments and recommended revisions on the enclosed Plan Review Tool. We wish to thank all the jurisdictions that participated in the planning process and commend your continued commitment to mitigation planning.

Sincerely,

Jeanine D. Petterson
Mitigation Division Director

Enclosure
cc: Kathleen Donahue, Deputy Recovery Chief, North Dakota Department of Emergency Services

www.fema.gov

Appendix B: Planning Process

Project Schedule

LEPC Meeting

March 16, Williston, Williams County Courthouse

Discussion topics included the purpose of the plan, the project schedule, and introductory information about each potential hazard.

Community Survey

May 1 – June 30

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.

Public Meeting

June 15, Williston, Broadway Commons

An overview of the project was presented. Topics included hazard risk in the county and potential mitigation actions.

City Council/Commission Meetings

Alamo, July 13
Epping, August 12
Grenora, June 8
Ray, May 11
Tioga, May 5
Wildrose, May 4
Williston, May 12
Williams County, May 5 & June 15

Representatives from the consulting team visited each participating jurisdiction. Topics of discussion included risk in each community and potential mitigation actions. The project was discussed as an agenda item at each meeting.

LEPC Meeting

July 20, Williston, Williams County Courthouse

A review of each community's identified mitigation actions was presented to the LEPC. Opportunity was provided for additional input on mitigation actions.

Community Survey

Results from the community survey were utilized to help develop the risk assessment and mitigation strategy; however, the low response rate meant that they were given a low priority.

1. Where do you live?

Answer Options	Response Percent	Response Count
Alamo	0.0%	0
Epping	0.0%	0
Grenora	0.0%	0
Ray	0.0%	0
Spring Brook	14.3%	1
Tioga	0.0%	0
Wildrose	0.0%	0
Williston	85.7%	6
Other within Williams County	0.0%	0
Outside Williams County	0.0%	0
	answered question	7

2. Choose the top three natural hazards that are a threat to your community.

Answer Options	Response Percent	Response Count
Drought	28.6%	2
Earthquake	0.0%	0
Flood	14.3%	1
Landslide	0.0%	0
Severe Summer Storm (hail, lighting, wind, tornado, heavy rain)	85.7%	6
Severe Winter Storm (ice, snow, wind)	85.7%	6
Wildfire	57.1%	4
Other (please specify)		1
	answered question	7

3. Choose the top two human-caused hazards that are a threat to your community.

Answer Options	Response Percent	Response Count
Communicable Disease (human, crop, livestock)	14.3%	1
Dam Failure	28.6%	2
Hazardous Materials Release	100.0%	7
Homeland Security Incident	14.3%	1
Urban Fire	42.9%	3
Other (please specify)		0
	answered question	7

4. Is your home located in a floodplain?

Answer Options	Response Percent	Response Count
Yes	0.0%	0
No	71.4%	5
I don't know	28.6%	2
	answered question	7

5. Do you have flood insurance?

Answer Options	Response Percent	Response Count
Yes	0.0%	0
No	100.0%	7
I don't know	0.0%	0
	answered question	7

6. If you do not have flood insurance, why not? (select all that apply)

Answer Options	Response Percent	Response Count
Not necessary because my property never floods	33.3%	2
Too expensive	0.0%	0
Not necessary because my property is elevated or otherwise protected	50.0%	3
Never considered it	16.7%	1
Other (please specify)		1
	answered question	6

7. Potential action items to mitigate the effects of flooding are shown below. Please identify up to 3 action items that you think the County should consider pursuing.

Answer Options	Response Percent	Response Count
Construct additional flood protection dikes in strategic locations	42.9%	3
Develop municipal storm sewer cleaning/inspection procedures	42.9%	3
Educate residents about the benefits of flood insurance	0.0%	0
Encourage all communities to join the National Flood Insurance Program (NFIP)	0.0%	0
Identify and protect commonly washed-out roads	57.1%	4
Install rip rap on river banks	0.0%	0
Install sewer backflow prevention valves on select facilities	28.6%	2
Property acquisition, relocation, and elevation	14.3%	1
Restrict development in high risk flood areas	57.1%	4

Treat invasive species to restore natural stream function	14.3%	1
Upgrade municipal storm water management infrastructure	14.3%	1
Other (please specify)		0
	answered question	7

8. Potential action items to mitigate the effects of severe summer storms (hail, lightning, wind, tornado, heavy rain) are shown below. Please identify up to 3 action items that you think the County should consider pursuing.

Answer Options	Response Percent	Response Count
Back-up power sources	71.4%	5
Building code enforcement	14.3%	1
Construction/designation of community shelters	57.1%	4
Distribute additional NOAA weather radios	0.0%	0
Installing shatter-resistant window film on key public facilities	0.0%	0
Installing surge protection on critical electronic equipment	14.3%	1
Installing new warning sirens	71.4%	5
Public education on summer storm safety	0.0%	0
Require sheltering plan for new mobile home parks	57.1%	4
Weather spotter training	0.0%	0
Other (please specify)		0
	answered question	7

9. Potential action items to mitigate the effects of severe winter storms (snow, ice, wind) are shown below. Please identify up to 3 action items that you think the County should consider pursuing.

Answer Options	Response Percent	Response Count
Back-up power sources	71.4%	5
Designation and advertisement of accessible heating centers during power outages	28.6%	2
Encourage homeowners to install carbon monoxide monitors and alarms	14.3%	1
Including safety strategies for severe weather in driver education classes and materials	14.3%	1
Identify critical routes to keep plowed	71.4%	5
Improve access to livestock during snowstorms	0.0%	0
Public education on winter weather safety	28.6%	2
Retrofitting public buildings to withstand snow loads and prevent roof collapse	14.3%	1
Snow fences/living snow fences	28.6%	2
Tree removal/maintenance near power lines	14.3%	1
Work with electric provider to bury power lines	0.0%	0
Other (please specify)		0
	answered question	7

10. Potential action items to mitigate the effects of wildfires are shown below. Please identify up to 3 action items that you think the County should consider pursuing.

Answer Options	Response Percent	Response Count
Construct water storage tanks in strategic rural areas	71.4%	5
Develop defensible space education for rural homeowners	14.3%	1
Ensure adequate water supplies for fire suppression	57.1%	4
Implement a brush/fuel removal program to create defensible zones around major streets, power lines, and other infrastructure systems	28.6%	2
Install dry hydrants at strategic locations	14.3%	1
Install water supply monitors at storage facilities	0.0%	0
Provide training and additional resources to improve fire department response to wildfire	42.9%	3
Public education about special precautions during periods of high fire risk	28.6%	2
Remove abandoned or collapsed structures	14.3%	1
Routinely inspecting and repairing fire hydrants	0.0%	0
Other (please specify)		0
	answered question	7

11. Are there mitigation projects for other hazards that the County should pursue? If "Yes," please list the projects.

Answer Options	Response Percent	Response Count
No	100.0%	4
Yes		2
	answered question	4

Reviewed Documents

Documents reviewed and incorporated into this plan include:

- 2009 Williams County Multi-Hazard Mitigation Plan
- Williams County Zoning Ordinance (capability assessment)
- Williston Zoning Ordinance (capability assessment)
- Tioga Zoning Ordinance (capability assessment)
- Williston Comprehensive Plan (capability assessment)
- Williams County Comprehensive Plan (capability assessment)
- Ray Comprehensive Plan (capability assessment)
- Williams County Strategic Plan (capability assessment)
- Williams County Flood Insurance Study (risk assessment)
- 2014-2019 Oil and Gas Industry Impacts Study (risk assessment)
- Williams County Local Emergency Operations Plan (capability assessment)
- Fort Peck Dam Emergency Action Plan (risk assessment)
- Tioga Dam Emergency Action Plan (risk assessment)
- 2014 North Dakota Multi-Hazard Mitigation Plan (risk assessment and mitigation ideas)

Neighboring Jurisdictions and Regional Agencies

Regional agencies that attended at least one project meeting include the Red Cross, EPA and North Dakota DES.

Attendance

City councils/commissions served as the official representatives for each jurisdiction. Representatives from the consulting team visited each jurisdiction on the following dates.

Alamo, July 13
Epping, August 12
Grenora, June 8
Ray, May 11
Tioga, May 5
Wildrose, May 4
Williston, May 12
Williams County, May 5 & June 15

In addition the following representatives attended at least one LEPC meeting.

Wally Barker	Williams Fire
Amber Wanner	UMDHU
Laurie Kok	UMDHU
Marcia Ainsold	Trinity-Western Dakota
Fran Bosch	Vector Control
Nicole Daniels	Crestwood Crude
Jim McGinnity	Tioga Fire
Jason Catrambone - Williston Fire	
Tate Cybakcyk	Williston Fire
Mike Weyrauch	Ray Fire
William Brenny	Williston Airport
Dave Bell	Williston Public Works
Darwin Stevens	Oasis Petroleum
Andrew Kindle	Trenton Fire
R J Benth	Williston Fire
Rhonda Thompson - Independence, Inc	
Joe Wanner	SWDHU
James Anderson	Red Cross
Andrea Cross	Williams Emergency Management
Jeff Bryson	Williston Water Treatment
Laura Winje	Vector Control
Kira Nauner	Red Cross
Lori Reed	EPA
Al Hanson	NDDES
Daphne Clark	UMDHU
Amber Nelson	Tioga Medical
Ann Elson	Tioga Medical
Matt Diepenhorst - KinderMorgan	
Trish Arnold	Mercy Hospital
David Inman	Mercy Medical

Advertisements

The community survey and public meeting were advertised in the *Williston Herald* and flyers were distributed at various locations throughout the county. Some communities also elected to post flyers for the hazard mitigation presentation at the city council/commission.

Posted at Wildrose City Hall/Fire Hall

Posted at Williams County Courthouse

Posted at Grenora City Hall

Posted at Williston City Hall and Williams County Courthouse

Posted at Epping City Hall

Posted at Alamo City Hall

***Williston Herald*, June 9**

YOUR INPUT IS NEEDED

HELP REDUCE THE IMPACT OF LOCAL HAZARDS

What are the biggest hazards facing your community?

What should the community do to address these hazards?

The Williams County Local Emergency Planning Committee (LEPC) is preparing an update to the county's 2009 Multi-Hazard Mitigation Plan. The plan presents a strategy for reducing the impacts of natural and man-made hazards in the county.

Public Meeting

Broadway Commons (302 E. Broadway), Williston
Monday, June 15, 6:00 pm -7:00 pm
KLJ, the plan consultant, will provide an overview of the project and collect input on hazards and potential mitigation solutions.

Online Survey

Available through June 30, this 5-minute survey will collect your input on local hazards and potential solutions. The survey can be found on the project website. Paper copies are available by request to the Williams County Emergency Services Department.

www.williamshazardplan.com

Project Website

The project website provided general information about the project, public meeting notices, contact information, the online survey and the draft plan during the review period.

www.williamshazardplan.com

Meeting Notes

LEPC Meeting
March 16, 12:00 pm

- An overview of the planning process was presented. The LEPC provided direction about who the consultant should talk to for information.

Grenora
June 8, 8:00 pm

- Power outage during the winter is an issue
- The city has purchased a generator and is installing it at the church so it can be utilized as a shelter
- An enlarged culvert could be used across Main Street
- The water system could use a backup generator in a few years
  - If the power went out the water tower has enough supply for approximately 24 hours

Wildrose
May 4, 8:00 pm

- A wetland area is flooding the lagoon
  - They are in the process of assembling funding for a new lagoon
- 80% of the culverts in town don't work at all
  - Many are filled with silt, and some are completely degraded and need replaced/enlarged
- Drainage ditches in town also need enlarged
- Poor drainage in town
- A couple of homes have water in their basement after heavy rains
- Also sometimes there is standing water over roads
- There's no potential summer storm shelter
- About 15-20 campers with residents, the number is going down
- City has no zoning or permitting process
- Could use several generators
  - New lift station
  - Fire hall
  - Water tower
- Getting a new siren this summer

Tioga
May 5, 11:00 am

- Water draining from northwest of town is the issue
- New Hess Rail Facility has created flooding issues as water drains from the site
  - Upgrade drainage ditch along 67th street to direct flows away from structures
- There is an old concrete dam on 67th street on the east side of town that is causing water to back up in town. The state is redoing the street and the dam will be removed.
- New housing subdivision on the north side of town is also creating drainage issues. Construction of the homes has resulted in increased drainage into the city because the site formerly functioned as a water storage area.
- Gilbertson Street South could use a new culvert.
- Other potential projects include better mapping and ordinance upgrades.
  - The zoning ordinance requires special provisions for building within a floodplain area, but it appears that floodplains are not accurately represented in the city.

Ray
May 11, 7:00 pm

- The city recently completed a study to map flooding issues on the east side of town.
- Culvert enlargement, new culverts, and road elevation is needed for areas on the east side of town.
- The senior citizens center is an emergency shelter and it needs a new generator (this was in the last plan). The center currently uses a WWII-era generator. They have cots, bathroom and kitchen,

but no food supply. The center also has a basement.

- The city is getting a new siren installed.
- The school gym might also need a generator. It could function as an alternate larger shelter.
- The lagoons have had some minor flooding issues.

Williams County
Commission Meeting
May 5, 8:00 am

- The commissioners provided direction about which staff members to consult.

Mike Sizemore, Williams County Community Development Director
May 5, 1:00 pm

- He is the floodplain administrator
- FEMA is funding the floodplain update
- Stormwater management plans are required for all non-single family residential over one acre (this has recently been implemented over the past 2-3 years)
- Williams County WRB reviews all stormwater management plans
- County recently updated their zoning ordinances and they are online
- New ordinances prevent people from living in RVs
- New ordinances require shelter for mobile home/RV parks (maybe)
- They are no longer permitting new crew camps
- County has had zoning since 1987
- Don't participate in Firewise program
- New 1% sales tax will go to rural fire departments
- Building code requires designed snow loads of 30 psf
- Added extra design standards to mitigate roof collapse

Williston
City Council Meeting
May 12, 6:00 pm

- The council members provided direction about which staff members to consult.

Donald Kress, Williston Principal Planner
May 12, 1:00 pm

- Bill Tracy is the building official and floodplain administrator
- Sheltering plan or shelter is not required in the zoning ordinance, but it might be required to get a building permit
- Within industrial zones, the storage of hazardous materials is conditionally permitted
- Oil wells get a conditional use permit. The state works with the city on land use for well siting.

Bob Hansen, Williston City Engineer

- City doesn't have big flooding issues
- Storm shelters are badly needed

Public Meeting
June 15, 7:00 pm

- Overviews of the risk assessment and potential mitigation projects were presented. There were no comments or questions.

Alamo
City Council Meeting
July 13, 7:00 pm

- A culvert could be used on Main Street. The existing culverts are collapsed. Results in some localized flooding during heavy rains. Main Street is a county road.
- The fire hall needs a generator.
- Highway 50 has severe problems with drifting snow during the winter. The drifting is caused by an elevated berm next to the road that used to have railroad tracks. The road either needs to be elevated or moved in some way, or the berm in the old railroad right of way needs to be removed. This is south of town.

LEPC Meeting
March 16, 12:00 pm

- A review of each community's identified mitigation actions was presented (with the exception of Epping).
- Tornado sirens do not be included because the county recently received a grant and will be building/repairing sirens throughout the county this year.

Epping
City Council Meeting
August 12, 7:00 pm

- The Fire Hall/City Hall/Senior Citizens Center is the city's designated shelter. It needs a back-up generator.
- The church is the secondary shelter, so it could also use a back-up generator. This facility is a lower priority.
- A snow fence along Highway 42 on the east side of the road is needed to prevent blowing snow.
- A new culvert and road elevation is needed to prevent ponding on the intersection of School Ave and 1st Street.
- 1st and Main also has a flooding issue and needs improved drainage.
- Tin blows off the old elevator during wind events and creates a hazard for nearby residents and buildings.
- A new siren is needed. The old one is reaching the end of its functional life.

School Districts and
Williston Department Heads Meetings
October through December 2016

- Mike Smith is the new Emergency Manager for Williams County and filled a position that had been vacant since the MHMP process got underway. He arrived in Williams County when the draft plan was nearly completed.
- Mike wanted the schools in Williams County to be included in the MHMP as well as giving other jurisdictions a chance to add action items to the list of action items included in the draft MHMP.
- Starting in October Mike met with each of the County's School District Superintendents to explain hazard mitigation planning, and to ask them if they wanted to participate. Each of the Superintendent's indicated they did want to participate. As a result of these discussions, all action items pertaining to public schools were added to the draft MHMP.
- In December Mike met with the Williston Public Works Director and several other department heads to discuss hazard mitigation and the processes involved. As a result of these discussions, several additional action items were added to the draft MHMP.

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.

Williams County Event Summary, 1996-2014	
Number of Days with Event	205
Number of Days with Event and Death	4
Number of Event Days with Death or Injury	8
Number of Event Days with Property Damage	36
Number of Event Days with Crop Damage	8

Williams County Hazard Events, 1996-2014							
Location	**Date**	**Type**	**Magnitude**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**
Williams (zone)	1/17/1996	Blizzard		0	0	0.00K	0.00K
Williams (zone)	2/1/1996	Cold/wind Chill		0	0	0.00K	0.00K
Williams (zone)	2/22/1996	Ice Storm		0	0	0.00K	0.00K
Williams (zone)	3/23/1996	Winter Storm		0	0	0.00K	0.00K
Williston	9/4/1996	Hail	0.75 in.	0	0	0.00K	0.00K
Williston	9/4/1996	Hail	1.00 in.	0	0	0.00K	0.00K
Williams (zone)	10/20/1996	Winter Storm		0	2	0.00K	0.00K
Williams (zone)	11/19/1996	Winter Storm		0	0	0.00K	0.00K
Williams (zone)	11/21/1996	Cold/wind Chill		1	0	0.00K	0.00K
Williams (zone)	11/23/1996	Cold/wind Chill		0	0	0.00K	0.00K
Williams (zone)	11/23/1996	Winter Storm		0	0	0.00K	0.00K
Williams (zone)	12/16/1996	Blizzard		0	0	0.00K	0.00K
Williams (zone)	12/24/1996	Cold/wind Chill		1	0	0.00K	0.00K
Williams (zone)	12/25/1996	Cold/wind Chill		0	0	0.00K	0.00K
Williams (zone)	1/4/1997	Blizzard		0	0	0.00K	0.00K
Williams (zone)	1/9/1997	Blizzard		0	6	1.530M	0.00K
Williams (zone)	3/12/1997	Winter Storm		0	0	0.00K	0.00K
Grenora	8/4/1997	Thunderstorm Wind	60 kts.	0	0	0.00K	0.00K
Williston	8/27/1997	Thunderstorm Wind	60 kts.	0	0	5.00K	0.00K
Corinth	8/27/1997	Hail	0.75 in.	0	0	0.00K	0.00K
Tioga	8/29/1997	Lightning		0	0	20.00K	0.00K
Williams (zone)	2/25/1998	Blizzard		0	1	25.00K	0.00K
Bonetraill	6/23/1998	Hail	0.75 in.	0	0	0.00K	0.00K
Williston	7/4/1998	Thunderstorm Wind	54 kts.	0	0	0.00K	0.00K
Williams (zone)	7/5/1998	Flood		0	0	0.00K	0.00K
Grenora	7/5/1998	Hail	0.75 in.	0	0	0.00K	0.00K
Williston	7/5/1998	Hail	1.75 in.	0	0	0.00K	0.00K
Williston	7/5/1998	Thunderstorm Wind	70 kts.	0	0	0.00K	0.00K
Epping	7/5/1998	Thunderstorm Wind	98 kts.	0	0	0.00K	0.00K
Trenton	8/1/1998	Hail	1.75 in.	0	0	0.00K	0.00K
Williams (zone)	12/4/1998	Heavy Snow		0	0	0.00K	0.00K
Williams (zone)	1/1/1999	Winter Storm		2	0	0.00K	0.00K
Williams (zone)	1/21/1999	Heavy Snow		0	0	0.00K	0.00K
Williams (zone)	3/26/1999	High Wind	63 kts.	0	0	0.00K	0.00K
Williams (zone)	4/1/1999	Blizzard		0	0	0.00K	0.00K
Williston	7/21/1999	Thunderstorm Wind	69 kts.	0	0	40.00K	0.00K
Williston	7/21/1999	Hail	1.00 in.	0	0	0.00K	0.00K
Williston arpt	7/21/1999	Hail	1.00 in.	0	0	0.00K	0.00K
Williston	7/21/1999	Thunderstorm Wind	52 kts.	0	0	0.00K	0.00K

Williston arpt	7/21/1999	Thunderstorm Wind	69 kts.	0	0	0.00K	0.00K
Williston arpt	7/22/1999	Hail	0.75 in.	0	0	0.00K	0.00K
Williston	7/22/1999	Hail	1.75 in.	0	0	0.00K	0.00K
Williston arpt	7/22/1999	Thunderstorm Wind	51 kts.	0	0	0.00K	0.00K
Ray	7/22/1999	Thunderstorm Wind	52 kts.	0	0	0.00K	0.00K
Williston	7/22/1999	Thunderstorm Wind	87 kts.	0	0	0.00K	0.00K
Ray	8/8/1999	Hail	1.50 in.	0	0	600.00K	0.00K
Tioga	8/8/1999	Hail	1.00 in.	0	0	0.00K	0.00K
Ray	8/8/1999	Hail	1.75 in.	0	0	0.00K	0.00K
Williams (zone)	10/31/1999	High Wind	58 kts.	0	0	0.00K	0.00K
Williams (zone)	2/25/2000	Winter Storm		0	0	0.00K	0.00K
Williams (zone)	2/26/2000	Winter Storm		0	0	0.00K	0.00K
Williams (zone)	4/5/2000	High Wind	57 kts. M	0	0	0.00K	0.00K
Williams (zone)	4/13/2000	Winter Storm		0	0	0.00K	0.00K
Williams (zone)	4/14/2000	Winter Storm		0	0	0.00K	0.00K
Williston arpt	7/6/2000	Thunderstorm Wind	60 kts. E	0	0	0.00K	0.00K
Appam	7/10/2000	Hail	0.75 in.	0	0	0.00K	0.00K
Williston	8/2/2000	Lightning		0	0	0.00K	0.00K
Bonetraill	8/4/2000	Hail	0.75 in.	0	0	0.00K	0.00K
Williams (zone)	11/2/2000	Winter Storm		0	0	0.00K	0.00K
Williams (zone)	11/7/2000	Winter Storm		0	0	0.00K	0.00K
Williams (zone)	12/15/2000	Blizzard		0	0	0.00K	0.00K
Williams (zone)	12/28/2000	High Wind	45 kts. M	0	0	0.00K	0.00K
Williams (zone)	4/2/2001	Winter Storm		0	0	0.00K	0.00K
Williams (zone)	5/7/2001	High Wind	44 kts. M	0	0	0.00K	0.00K
Williams (zone)	5/22/2001	High Wind	39 kts. M	0	0	0.00K	0.00K
(ISN) Sloulin fld	7/5/2001	Hail	0.75 in.	0	0	0.00K	0.00K
(ISN) Sloulin fld	7/5/2001	Thunderstorm Wind	57 kts. M	0	0	0.00K	0.00K
Williston	7/5/2001	Tornado	F0	0	0	0.00K	0.00K
Tioga	7/18/2001	Thunderstorm Wind	50 kts. M	0	0	0.00K	0.00K
(ISN) Sloulin fld	7/20/2001	Hail	0.75 in.	0	0	0.00K	0.00K
(ISN) Sloulin fld	7/20/2001	Hail	0.88 in.	0	0	0.00K	0.00K
(ISN) Sloulin fld	7/20/2001	Thunderstorm Wind	59 kts. M	0	0	0.00K	0.00K
Buford	7/20/2001	Thunderstorm Wind	61 kts. E	0	0	0.00K	0.00K
(ISN) Sloulin fld	7/20/2001	Thunderstorm Wind	61 kts. E	0	0	0.00K	0.00K
Ray	8/21/2001	Hail	1.00 in.	0	0	0.00K	0.00K
Williams (zone)	11/1/2001	High Wind	34 kts. M	0	0	0.00K	0.00K
Williams (zone)	2/11/2002	High Wind	50 kts. M	0	0	0.00K	0.00K
Williams (zone)	5/7/2002	Winter Storm		0	0	0.00K	0.00K
Zahl	6/29/2002	Hail	1.75 in.	0	0	0.00K	0.00K
Trenton	6/29/2002	Thunderstorm Wind	52 kts. E	0	0	0.00K	0.00K

Tioga	7/5/2002	Thunderstorm Wind	50 kts. E	0	0	0.00K	0.00K
(ISN) Sloulin fld	7/5/2002	Thunderstorm Wind	50 kts. M	0	0	0.00K	0.00K
Williams (zone)	11/29/2002	High Wind	44 kts. M	0	0	0.00K	0.00K
Williams (zone)	12/17/2002	Winter Storm		0	0	0.00K	0.00K
Williams (zone)	3/17/2003	Flood		0	0	300.00K	0.00K
Williams (zone)	3/17/2003	Winter Storm		0	0	0.00K	0.00K
(ISN) Sloulin fld	5/6/2003	Tornado	F0	0	0	0.00K	0.00K
(ISN) Sloulin fld	5/26/2003	Hail	0.75 in.	0	0	0.00K	0.00K
Epping	5/26/2003	Hail	0.75 in.	0	0	0.00K	0.00K
Williston	5/26/2003	Hail	0.88 in.	0	0	0.00K	0.00K
Williston	7/2/2003	Hail	0.75 in.	0	0	0.00K	0.00K
Epping	7/3/2003	Hail	1.75 in.	0	0	0.00K	0.00K
Tioga	7/18/2003	Hail	0.75 in.	0	0	0.00K	0.00K
Williams (zone)	12/26/2003	Winter Storm		0	0	0.00K	0.00K
Williams (zone)	12/27/2003	Blizzard		0	0	0.00K	0.00K
Williams (zone)	1/4/2004	Cold/wind Chill		0	0	0.00K	0.00K
Williams (zone)	1/24/2004	Winter Storm		0	0	0.00K	0.00K
Williams (zone)	1/27/2004	Cold/wind Chill		0	0	0.00K	0.00K
Williams (zone)	1/30/2004	Winter Storm		0	0	0.00K	0.00K
Williams (zone)	2/10/2004	Blizzard		0	0	0.00K	0.00K
Williams (zone)	2/10/2004	Winter Storm		0	0	0.00K	0.00K
Williams (zone)	3/10/2004	High Wind	52 kts. MS	0	0	0.00K	0.00K
Williams (zone)	3/13/2004	High Wind	38 kts. MS	0	0	0.00K	0.00K
Tioga	6/6/2004	Hail	0.88 in.	0	0	0.00K	0.00K
Ray	7/11/2004	Funnel Cloud		0	0	0.00K	0.00K
Grenora	7/11/2004	Hail	0.75 in.	0	0	0.00K	0.00K
Wildrose	7/11/2004	Hail	0.75 in.	0	0	0.00K	0.00K
Zahl	7/11/2004	Hail	1.00 in.	0	0	0.00K	0.00K
McGregor	7/11/2004	Thunderstorm Wind	61 kts. EG	0	0	0.00K	0.00K
Williams (zone)	12/11/2004	High Wind	42 kts. ES	0	0	0.00K	0.00K
Williams (zone)	1/1/2005	Winter Storm		0	0	0.00K	0.00K
Williams (zone)	1/13/2005	Cold/wind Chill		0	0	0.00K	0.00K
Williams (zone)	5/21/2005	High Wind	52 kts. MG	0	0	0.00K	0.00K
Tioga	6/6/2005	Hail	1.75 in.	0	0	0.00K	0.00K
Williston	6/21/2005	Hail	1.00 in.	0	0	0.00K	0.00K
Williston	6/21/2005	Thunderstorm Wind	60 kts. MG	0	0	0.00K	0.00K
Trenton	6/21/2005	Thunderstorm Wind	70 kts. EG	0	0	0.00K	0.00K
(ISN) Sloulin fld	7/13/2005	Thunderstorm Wind	57 kts. MG	0	0	0.00K	0.00K
Williston	7/21/2005	Hail	0.75 in.	0	0	0.00K	0.00K
Williston	7/21/2005	Hail	1.00 in.	0	0	0.00K	0.00K
Williston	7/21/2005	Hail	1.00 in.	0	0	0.00K	0.00K

Williston	7/21/2005	Hail	1.00 in.	0	0	0.00K	0.00K
Hanks	8/23/2005	Hail	0.88 in.	0	0	0.00K	0.00K
Alamo	8/23/2005	Hail	0.88 in.	0	0	0.00K	0.00K
Williston	8/23/2005	Hail	1.00 in.	0	0	0.00K	0.00K
Williams (zone)	10/5/2005	Blizzard		0	0	30.00K	0.00K
Williams (zone)	2/16/2006	Cold/wind Chill		0	0	0.00K	0.00K
Williams (zone)	4/18/2006	Winter Storm		0	0	600.00K	0.00K
Williams (zone)	4/18/2006	High Wind	35 kts. MS	0	0	0.00K	0.00K
Trenton	5/7/2006	Dust Devil		0	1	0.00K	0.00K
Grenora	6/30/2006	Hail	0.75 in.	0	0	0.00K	0.00K
Ray	7/31/2006	Hail	1.75 in.	0	0	20.00K	30.00K
Trenton	8/11/2006	Hail	1.50 in.	0	0	0.00K	5.00K
Williams (zone)	11/27/2006	Winter Storm		0	0	0.00K	0.00K
Williams (zone)	2/28/2007	Winter Storm		0	0	0.00K	0.00K
Tioga	6/21/2007	Hail	1.00 in.	0	0	0.00K	0.00K
Williston	6/25/2007	Thunderstorm Wind	55 kts. EG	0	0	4.00K	0.00K
Williston	6/25/2007	Hail	0.75 in.	0	0	0.00K	0.00K
Spring Brook	7/2/2007	Hail	0.88 in.	0	0	0.00K	0.00K
Grenora	7/2/2007	Hail	1.00 in.	0	0	0.00K	0.00K
Williston arpt	7/23/2007	Thunderstorm Wind	82 kts. EG	0	0	450.00K	0.00K
McGregor	8/10/2007	Thunderstorm Wind	56 kts. EG	0	0	2.00K	0.00K
Ray	8/10/2007	Hail	1.75 in.	0	0	0.00K	0.00K
Tioga	8/10/2007	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
Alamo	8/10/2007	Tornado	EF0	0	0	0.00K	0.00K
Williams (zone)	11/13/2007	High Wind	36 kts. MS	0	0	0.00K	0.00K
Williams (zone)	1/28/2008	Extreme Cold/wind Chill		0	0	0.00K	0.00K
Williams (zone)	2/9/2008	Extreme Cold/wind Chill		0	0	0.00K	0.00K
Williams (zone)	3/24/2008	High Wind	52 kts. MG	0	0	0.00K	0.00K
Corinth	5/29/2008	Hail	0.75 in.	0	0	0.00K	0.00K
Tioga sagaser	5/29/2008	Hail	0.88 in.	0	0	0.00K	0.00K
Williston	5/29/2008	Hail	1.00 in.	0	0	0.00K	0.00K
Wildrose	6/17/2008	Hail	0.75 in.	0	0	0.00K	0.00K
Ray	6/17/2008	Hail	0.75 in.	0	0	0.00K	0.00K
Ray	6/17/2008	Hail	0.88 in.	0	0	0.00K	0.00K
Corinth	6/17/2008	Hail	1.75 in.	0	0	0.00K	0.00K
Buford	6/26/2008	Hail	1.75 in.	0	0	4.00K	0.00K
Bonetraill	7/19/2008	Hail	0.75 in.	0	0	0.00K	0.00K
Williston	7/19/2008	Hail	0.88 in.	0	0	0.00K	0.00K
Bonetraill	7/19/2008	Hail	1.00 in.	0	0	0.00K	0.00K
Bonetraill	7/19/2008	Hail	1.75 in.	0	0	0.00K	0.00K

Williston	7/28/2008	Thunderstorm Wind	57 kts. MG	0	0	0.00K	0.00K
Williams (zone)	10/11/2008	Heavy Snow		0	0	55.00K	0.00K
Williams (zone)	10/26/2008	High Wind	35 kts. ES	0	0	0.00K	0.00K
Williams (zone)	12/13/2008	Blizzard		0	0	0.00K	0.00K
Williams (zone)	12/14/2008	Extreme Cold/wind Chill		0	0	0.00K	0.00K
Williams (zone)	12/20/2008	Extreme Cold/wind Chill		0	0	0.00K	0.00K
Williams (zone)	12/29/2008	Heavy Snow		0	0	0.00K	0.00K
Williams (zone)	1/8/2009	Heavy Snow		0	0	0.00K	0.00K
Williams (zone)	1/11/2009	Blizzard		0	0	0.00K	0.00K
Williams (zone)	1/16/2009	Winter Weather		0	0	0.00K	0.00K
Williams (zone)	1/31/2009	High Wind	35 kts. ES	0	0	0.00K	0.00K
Williams (zone)	2/9/2009	Heavy Snow		0	0	50.00K	0.00K
Ray	6/21/2009	Hail	0.88 in.	0	0	0.00K	0.00K
Ray	6/21/2009	Hail	0.88 in.	0	0	0.00K	0.00K
Wheelock	6/26/2009	Hail	0.88 in.	0	0	0.00K	0.00K
Spring Brook	7/3/2009	Thunderstorm Wind	56 kts. EG	0	0	5.00K	0.00K
(ISN) Sloulin fld	7/3/2009	Thunderstorm Wind	52 kts. EG	0	0	2.00K	0.00K
Williston	7/8/2009	Thunderstorm Wind	56 kts. EG	0	0	10.00K	0.00K
(ISN) Sloulin fld	8/23/2009	Hail	1.00 in.	0	0	10.00K	25.00K
Williston	8/23/2009	Hail	0.88 in.	0	0	0.00K	0.00K
Trenton	8/23/2009	Hail	1.00 in.	0	0	0.00K	25.00K
Spring Brook	8/23/2009	Hail	1.00 in.	0	0	0.00K	0.00K
Williams (zone)	12/12/2009	Extreme Cold/wind Chill		0	0	0.00K	0.00K
Williams (zone)	1/5/2010	Winter Weather		0	0	0.00K	0.00K
Williams (zone)	1/6/2010	Extreme Cold/wind Chill		0	0	0.00K	0.00K
Williams (zone)	1/19/2010	Winter Weather		0	0	0.00K	0.00K
Williams (zone)	1/22/2010	Winter Storm		0	0	0.00K	0.00K
Williams (zone)	1/24/2010	Blizzard		0	0	0.00K	0.00K
Williams (zone)	5/24/2010	High Wind	54 kts. MG	0	0	20.00K	0.00K
Williams (zone)	5/25/2010	High Wind	52 kts. MG	0	0	0.00K	0.00K
Grenora	5/29/2010	Flash Flood		0	0	45.00K	0.00K
Alamo	5/29/2010	Flash Flood		0	0	20.00K	0.00K
Williston	5/29/2010	Hail	0.75 in.	0	0	0.00K	0.00K
Tioga	5/29/2010	Thunderstorm Wind	58 kts. MG	0	0	0.00K	0.00K
Alamo	6/7/2010	Funnel Cloud		0	0	0.00K	0.00K
Trenton	6/24/2010	Hail	1.00 in.	0	0	0.00K	0.00K
Williston	7/2/2010	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
Grenora	7/2/2010	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
Zahl	7/2/2010	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K

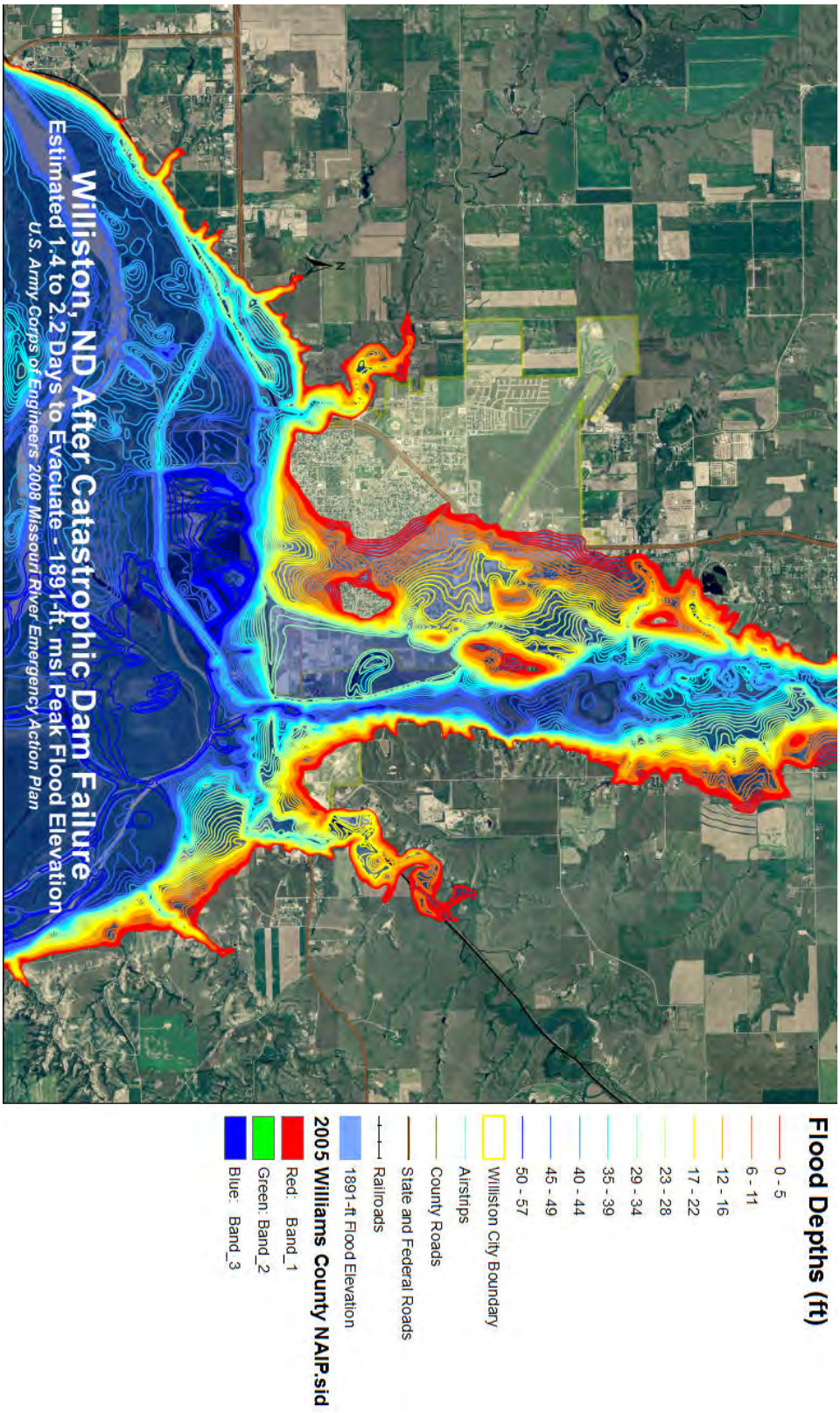
Spring Brook	7/3/2010	Hail	1.00 in.	0	0	0.00K	0.00K
Bonetraill	7/3/2010	Hail	1.75 in.	0	0	0.00K	0.00K
Epping	7/3/2010	Hail	1.75 in.	0	0	0.00K	0.00K
Williston	7/3/2010	Hail	1.75 in.	0	0	0.00K	0.00K
(ISN) Sloulin fld	7/12/2010	Hail	0.88 in.	0	0	0.00K	0.00K
Williston	7/12/2010	Thunderstorm Wind	55 kts. MG	0	0	0.00K	0.00K
Alamo	7/13/2010	Thunderstorm Wind	56 kts. EG	0	0	2.00K	0.00K
Spring Brook	7/26/2010	Hail	1.00 in.	0	0	0.00K	0.00K
Epping	7/29/2010	Hail	2.50 in.	0	0	50.00K	0.00K
Williston	7/29/2010	Lightning		0	0	25.00K	0.00K
Williston	7/29/2010	Hail	1.00 in.	0	0	0.00K	0.00K
Williston	7/29/2010	Thunderstorm Wind	53 kts. MG	0	0	0.00K	0.00K
Williston	8/1/2010	Hail	1.75 in.	0	0	40.00K	0.00K
Williston	8/1/2010	Hail	1.50 in.	0	0	35.00K	0.00K
Williston	8/1/2010	Hail	1.75 in.	0	0	35.00K	0.00K
Trenton	8/1/2010	Hail	1.00 in.	0	0	15.00K	0.00K
Williston	8/1/2010	Hail	1.75 in.	0	0	12.00K	0.00K
Trenton	8/1/2010	Hail	1.00 in.	0	0	0.00K	0.00K
Williston	8/1/2010	Hail	1.00 in.	0	0	0.00K	0.00K
Williams (zone)	10/26/2010	Blizzard		0	0	0.00K	0.00K
Williams (zone)	12/10/2010	Heavy Snow		0	0	0.00K	0.00K
Williams (zone)	12/20/2010	Heavy Snow		0	0	0.00K	0.00K
Williams (zone)	12/29/2010	Heavy Snow		0	0	0.00K	0.00K
Williams (zone)	1/31/2011	Extreme Cold/wind Chill		0	0	0.00K	0.00K
Williams (zone)	2/1/2011	Extreme Cold/wind Chill		0	0	0.00K	0.00K
Williams (zone)	2/1/2011	Extreme Cold/wind Chill		1	0	0.00K	0.00K
Williams (zone)	2/8/2011	Extreme Cold/wind Chill		0	0	0.00K	0.00K
Williams (zone)	2/13/2011	High Wind	35 kts. MS	0	0	20.00K	0.00K
Williams (zone)	2/17/2011	Blizzard		0	0	0.00K	0.00K
Williams (zone)	3/11/2011	Blizzard		0	0	0.00K	0.00K
Williams (zone)	3/22/2011	Blizzard		0	0	0.00K	0.00K
Williams (zone)	3/22/2011	Winter Storm		0	0	0.00K	0.00K
Williams (zone)	4/30/2011	Blizzard		0	0	500.00K	0.00K
Buford	5/11/2011	Flood		0	0	250.00K	0.00K
Williams (zone)	5/31/2011	High Wind	35 kts. ES	0	0	0.00K	0.00K
Williams (zone)	6/17/2011	High Wind	52 kts. EG	0	0	0.00K	0.00K
Buford	7/1/2011	Flood		0	0	0.00K	0.00K
Williams (zone)	7/16/2011	Excessive Heat		0	0	0.00K	0.00K
Williams (zone)	7/22/2011	High Wind	35 kts. ES	0	0	0.00K	0.00K

Epping	7/26/2011	Hail	0.88 in.	0	0	0.00K	0.00K
(ISN) Sloulin fld	7/26/2011	Hail	1.00 in.	0	0	0.00K	0.00K
Buford	8/1/2011	Flood		0	0	0.00K	0.00K
Bonetraill	8/2/2011	Hail	1.00 in.	0	0	0.00K	0.00K
(ISN) Sloulin fld	8/2/2011	Thunderstorm Wind	56 kts. EG	0	0	0.00K	0.00K
Williston	8/31/2011	Thunderstorm Wind	53 kts. MG	0	0	45.00K	0.00K
Williams (zone)	1/18/2012	Extreme Cold/wind Chill		0	0	0.00K	0.00K
Williams (zone)	3/13/2012	High Wind	50 kts. EG	0	0	0.00K	0.00K
Williams (zone)	3/19/2012	Wildfire		0	0	85.00K	0.00K
Ray	6/13/2012	Hail	0.88 in.	0	0	0.00K	0.00K
Alamo	6/13/2012	Hail	1.00 in.	0	0	0.00K	0.00K
Williston	6/18/2012	Hail	0.75 in.	0	0	0.00K	0.00K
Williston	6/18/2012	Hail	0.88 in.	0	0	0.00K	0.00K
(ISN) Sloulin fld	6/18/2012	Hail	1.00 in.	0	0	0.00K	0.00K
Wheelock	6/18/2012	Hail	1.75 in.	0	0	0.00K	0.00K
Williston	6/18/2012	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
Williston	6/18/2012	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
(ISN) Sloulin fld	6/18/2012	Thunderstorm Wind	52 kts. MG	0	0	0.00K	0.00K
Epping	6/26/2012	Hail	1.00 in.	0	0	0.00K	0.00K
(ISN) Sloulin fld wil	6/26/2012	Thunderstorm Wind	56 kts. MG	0	0	0.00K	0.00K
Williston	6/30/2012	Hail	1.00 in.	0	0	0.00K	0.00K
Williston	6/30/2012	Hail	1.50 in.	0	0	0.00K	0.00K
Williston	6/30/2012	Hail	1.75 in.	0	0	0.00K	0.00K
Grenora	7/3/2012	Thunderstorm Wind	61 kts. EG	0	0	8.00K	0.00K
Grenora	7/3/2012	Thunderstorm Wind	61 kts. EG	0	0	15.00K	0.00K
Bonetraill	7/3/2012	Thunderstorm Wind	61 kts. EG	0	0	10.00K	0.00K
(ISN) Sloulin fld wil	7/3/2012	Hail	0.75 in.	0	0	0.00K	0.00K
Grenora	7/3/2012	Hail	1.00 in.	0	0	0.00K	0.00K
Alamo	7/3/2012	Hail	1.00 in.	0	0	0.00K	0.00K
Grenora	7/3/2012	Hail	1.00 in.	0	0	0.00K	0.00K
Alamo	7/21/2012	Hail	1.00 in.	0	0	0.00K	0.00K
(ISN) Sloulin fld	7/21/2012	Hail	1.75 in.	0	0	0.00K	0.00K
(ISN) Sloulin fld	7/21/2012	Hail	2.00 in.	0	0	0.00K	0.00K
Trenton	7/21/2012	Hail	2.75 in.	0	0	0.00K	0.00K
Wildrose	7/28/2012	Hail	0.75 in.	0	0	0.00K	0.00K
Tioga	7/28/2012	Hail	1.00 in.	0	0	0.00K	0.00K
Tioga	7/28/2012	Hail	1.00 in.	0	0	0.00K	0.00K
Tioga	7/28/2012	Thunderstorm Wind	56 kts. EG	0	0	0.00K	0.00K
Williams (zone)	10/17/2012	High Wind	50 kts. MG	0	0	0.00K	0.00K
Williams (zone)	11/9/2012	Heavy Snow		0	0	0.00K	0.00K

Williams (zone)	1/11/2013	Blizzard		0	0	0.00K	0.00K
Williams (zone)	1/20/2013	Extreme Cold/wind Chill		0	0	0.00K	0.00K
Williams (zone)	1/30/2013	Extreme Cold/wind Chill		0	0	0.00K	0.00K
Williams (zone)	2/2/2013	Blizzard		0	0	0.00K	0.00K
Williams (zone)	3/3/2013	Heavy Snow		0	0	0.00K	0.00K
Williams (zone)	3/4/2013	Blizzard		0	0	0.00K	0.00K
Williams (zone)	4/14/2013	Winter Storm		0	0	0.00K	0.00K
Tioga	5/13/2013	Thunderstorm Wind	59 kts. MG	0	0	0.00K	0.00K
Williston	6/14/2013	Thunderstorm Wind	51 kts. MG	0	0	0.00K	0.00K
Williston	6/14/2013	Thunderstorm Wind	51 kts. MG	0	0	0.00K	0.00K
Ray	7/11/2013	Hail	1.75 in.	0	0	0.00K	0.00K
Williston	7/13/2013	Funnel Cloud		0	0	0.00K	0.00K
(ISN) Sloulin fld	7/13/2013	Hail	0.75 in.	0	0	0.00K	0.00K
Trenton	7/13/2013	Hail	1.00 in.	0	0	0.00K	0.00K
(ISN) Sloulin fld	7/13/2013	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
Ray	7/21/2013	Hail	0.75 in.	0	0	0.00K	0.00K
Tioga	7/21/2013	Hail	1.75 in.	0	0	0.00K	0.00K
Williston	8/6/2013	Hail	0.75 in.	0	0	0.00K	0.00K
(ISN) Sloulin fld	8/6/2013	Hail	0.75 in.	0	0	0.00K	0.00K
Williston	8/29/2013	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
Williams (zone)	12/6/2013	Extreme Cold/wind Chill		0	0	0.00K	0.00K
Williams (zone)	12/22/2013	Extreme Cold/wind Chill		0	0	0.00K	0.00K
Williams (zone)	1/4/2014	Extreme Cold/wind Chill		0	0	0.00K	0.00K
Williams (zone)	1/15/2014	High Wind	55 kts. MG	0	0	0.00K	0.00K
Williams (zone)	1/26/2014	Blizzard		0	0	0.00K	0.00K
Williams (zone)	2/28/2014	Extreme Cold/wind Chill		0	0	0.00K	0.00K
Williams (zone)	3/1/2014	Extreme Cold/wind Chill		0	0	0.00K	0.00K
Buford	5/26/2014	Hail	2.50 in.	0	0	50.00K	25.00K
Zahl	5/26/2014	Hail	0.88 in.	0	0	0.00K	0.00K
Buford	5/26/2014	Hail	1.00 in.	0	0	0.00K	0.00K
Trenton	5/26/2014	Hail	1.00 in.	0	0	0.00K	0.00K
Buford	5/26/2014	Hail	1.00 in.	0	0	0.00K	0.00K
Zahl	5/26/2014	Hail	1.00 in.	0	0	0.00K	0.00K
Trenton	5/26/2014	Hail	1.50 in.	0	0	0.00K	0.00K
Alamo	5/26/2014	Hail	1.75 in.	0	0	0.00K	0.00K
Bonetraill	5/31/2014	Hail	1.00 in.	0	0	0.00K	0.00K
Grenora	6/1/2014	Flood		0	0	100.00K	30.00K
Ray	6/13/2014	Hail	1.25 in.	0	0	10.00K	0.00K

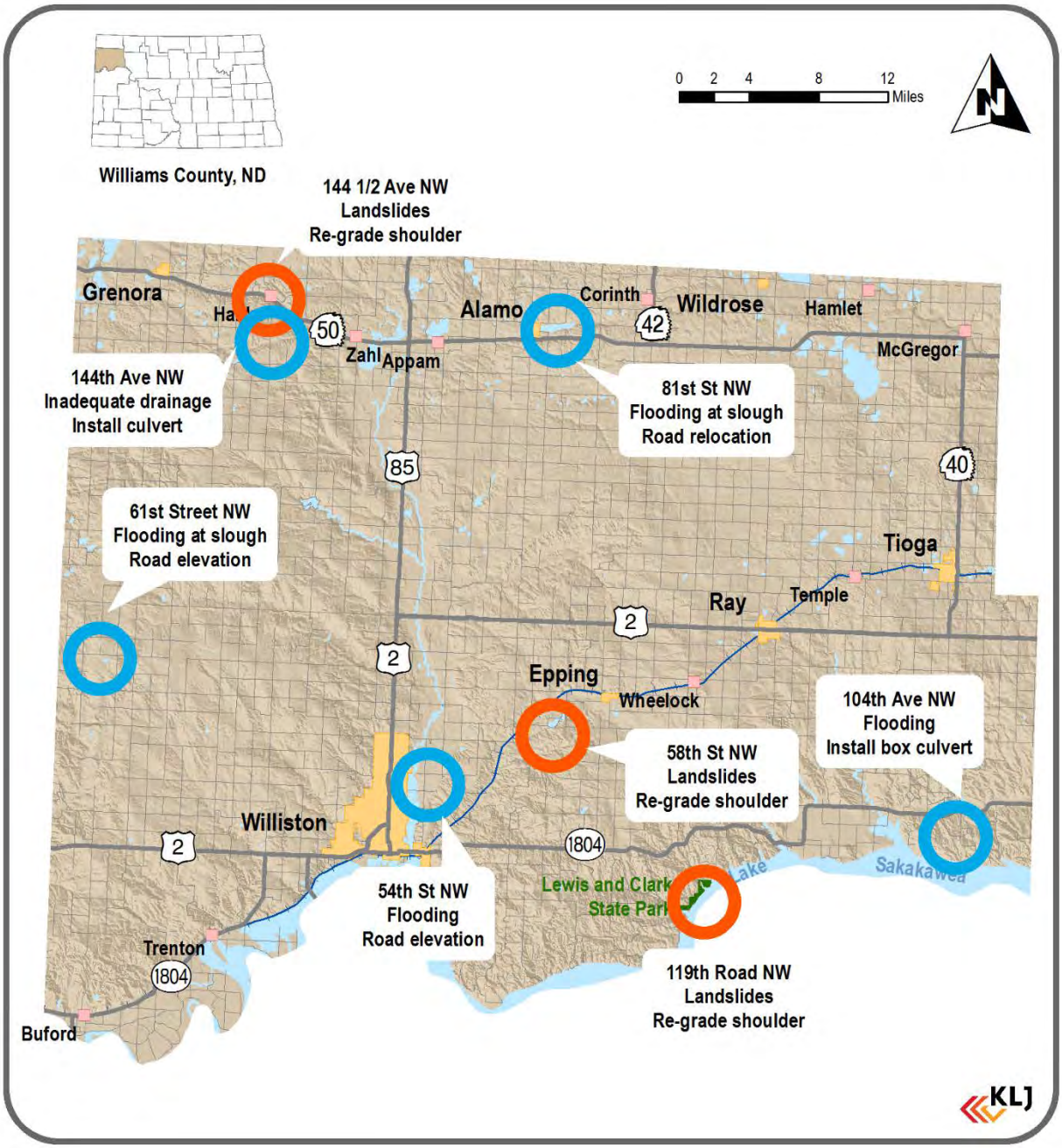
Epping	6/13/2014	Funnel Cloud		0	0	0.00K	0.00K
Bonetraill	6/13/2014	Hail	0.88 in.	0	0	0.00K	0.00K
Ray	6/13/2014	Hail	1.00 in.	0	0	0.00K	0.00K
Corinth	6/28/2014	Flood		0	0	25.00K	25.00K
Ray	7/6/2014	Hail	1.25 in.	0	0	75.00K	0.00K
Ray	7/6/2014	Thunderstorm Wind	61 kts. EG	0	0	65.00K	0.00K
Alamo	7/6/2014	Hail	2.00 in.	0	0	125.00K	75.00K
Spring Brook	7/6/2014	Funnel Cloud		0	0	0.00K	0.00K
Grenora	7/6/2014	Hail	1.00 in.	0	0	0.00K	0.00K
Alamo	7/6/2014	Hail	1.00 in.	0	0	0.00K	0.00K
Ray	7/6/2014	Hail	1.75 in.	0	0	0.00K	0.00K
Ray	7/6/2014	Thunderstorm Wind	61 kts. EG	0	0	0.00K	0.00K
Trenton	8/31/2014	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
Williston	9/3/2014	Thunderstorm Wind	70 kts. EG	0	0	1.000M	500.00K
Williston	9/3/2014	Funnel Cloud		0	0	0.00K	0.00K
Epping	9/3/2014	Hail	0.75 in.	0	0	0.00K	0.00K
Alamo	9/3/2014	Hail	1.00 in.	0	0	0.00K	0.00K
(ISN) Sloulin fld	9/3/2014	Hail	1.00 in.	0	0	0.00K	0.00K
Wheelock	9/3/2014	Hail	1.00 in.	0	0	0.00K	0.00K
Williston	9/3/2014	Hail	1.75 in.	0	0	0.00K	0.00K

Fort Peck Dam Inundation Area



Wildrose Lagoon

Potential Rural Road Projects



Potential Rural Road Projects
Williams County

For Planning Purposes Only

Incorporated Cities

Unincorporated Communities

Appendix D: Critical Facilities

The critical facilities list presented below is based off the previous plan update. Facilities are shown on applicable hazard maps in Chapter 3.

Rural County

McGregor Post Office
Trenton Community Clinic
Trenton Fire and Ambulance
Trenton Grain Elevator
Trenton Post Office
Trenton Township Hall
Two public schools

Alamo

City Hall
Fire Hall
Lutheran Church
Post Office
Senior Citizens Center

Epping

Bridge over BNSF Railroad
City Hall
Fire Hall
Post office
Prairie States Coop Terminal
Senior Citizens Center
Wastewater Treatment Lagoons

Grenora

Ambulance Department
Church
City Hall
Farmers Union Elevator
Fire Department
Grocery Store
Post Office
School
Senior Citizens Center
Wastewater Treatment Lagoons
Water Tower

Ray

Bank
Catholic Church
City Hall
Fire Hall
Grain Elevator
Lutheran Church
Mall
Post Office
School
Senior Citizens Center
Telephone Company
Wastewater Treatment Lagoons
Water Tower

Tioga

City Hall
Fire/EMS
Five Churches
Gas Plant
Hess Rail Facility
Medical Center
Post Office
School
Senior Citizens Center
Wastewater Treatment Lagoons
Water Tower

Wildrose

City Hall
Clinic
Fire Department
Post Office
School
Senior Citizens Center
Two Churches
Wastewater Treatment Lagoons
Water Tower

Williston

Airport
Amtrak Station
Eight Public Schools
Fire/EMS
Hospital
Law Enforcement Center
Library
Public Works
Senior Citizens Center
Wastewater Treatment Lagoons
Water Tower
Williston State College

Appendix E: Mitigation Action Determination

Mitigation activities were discussed at a public meeting and Planning Team meeting. The public was also able to provide input on mitigation actions with the online survey. Activity selection included multiple steps. For the first step, goals were determined to help guide strategy selection. Following goal selection, the mitigation actions from the county's 2009 plan were reviewed. The result of the review is shown below.

Status of Williams County Mitigation Actions, 2009 Hazard Mitigation Plan		
Project	**Hazard Mitigated**	**Status**
(2003 & 2008) - Drainage areas west of Williston is inadequate and results in flooding	Flooding	Complete
2003 - Storm Water Drainage North/West Williston	Flooding	Complete
(2003 & 2008) - Road Modification and culvert sizing	Flooding, summer & winter weather	Ongoing, included in plan
2003 - Retain Community Shelters identified for the public	Severe summer/winter weather, hazmat and flooding	Complete
(2003 & 2008) Purchase public warning systems in five un-incorporated communities for event warning.	Severe summer and winter weather	In-progress
(2008) - Snow Drifting on Highways and blocked roads	Review road designs and public education	Ongoing, included in plan
WMD training/exercises for local emergency responders and officials	Civil disorder/Terrorism; HazMat events	Ongoing, included in plan
(2003) Public awareness training for an event occurrence	National security	Ongoing, included in plan
(2003 & 2008) - Carolville	Construct a covered drainage system	Complete
(2008) Expand the storm spotter services to all communities in Williams County	Severe summer & winter weather	Complete
(2003 & 2008) -Provide 2 portable (mobile) generators for emergency electrical power	All hazards	Complete
(2003 & 2008) - Emergency Notification	All hazards	Complete
(2003 & 2008) - Public Education on Drought Mitigation	Drought	Ongoing, included in plan
(2003, 2008) Fire prevent ion & Education (Firewise program)	Urban and Rural fire/Drought	Ongoing, included in plan
(2003 & 2008) - Write Emergency Response Plans	Dam Breach	Not complete, included in plan
2003 – Mass Casualty Plan	Mass Casualty Incident	Complete
(2003 & 2008) - Personnel Protective Equipment	Fires Depts./HazMat	Complete
(2003 & 2008) - Secondary 9-1-1 Center	All Hazardous	Complete
(2003 & 2008) - Public Notification	HazMat	Complete
(2008) Portable Generators for lift stations	Floods	Not complete, included in plan
(2008) Generator - replacement	All Hazards	Not complete, included in plan
(2008) NFIP Compliance	Flooding	Ongoing, included in plan

In addition to the list of previously uncompleted actions, the consultant provided a list of recommendations for new action items. A refined list was developed using the preliminary list and other projects brought up during the meeting. The refined list was then developed into a priority action plan by discussing each item. The consultant provided assistance with ranking each project based on discussions at the Planning Team and public meetings. Items were scored based on 10 criteria that help to determine their future feasibility and effectiveness. The prioritization criteria are:

Life Safety – Does the item protect the life of residents?

Property Protection – Does the item protect public and personal property in the county?

Technical – Is the item technically feasible to implement?

Political – Is the item politically acceptable in the community?

Legal – Is the item legal to implement?

Environmental – Does the item have an impact on the environment?

Social – Is the item socially acceptable in the community?

Administrative – Does the jurisdiction have the administrative capacity to implement the item?

Local Champion – Does the item have a committed local champion?

Cost/Benefit – Does the benefit justify the cost?

A prioritization hierarchy was developed based on each item's total score. The action item prioritization scores are presented in the following table. Priorities were adjusted further based on comments received during the final public review period.

Note: Items in the following tables are ranked 0 to 3 (low to high)

Low: 20 or below
Moderate: 21 to 25
High: 26 or above

Action Item Prioritization Scores												
Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Cost/Benefit	Total	Priority
Road flood mitigation	2	1	3	3	3	3	3	3	3	3	27	High
Road landslide mitigation	2	1	3	3	3	2	3	3	3	3	26	High
Conduct NFIP workshop	0	2	3	2	3	3	2	3	2	2	22	Moderate
Floodplain mapping upgrades	0	3	3	2	3	3	2	3	2	3	24	Moderate
Public education	1	1	2	2	3	3	1	2	1	1	17	Low
Participate in NFIP training	0	2	2	2	3	3	2	1	1	2	18	Low
Administer Firewise Program and implement best practices during wildfire season	1	1	2	2	3	3	2	1	1	2	18	Low
Generator at Fire Hall in Alamo	3	1	3	3	3	3	3	3	3	2	27	High
New culvert on Main Street in Alamo	1	2	3	3	3	3	3	3	3	2	26	High
Winter storm mitigation along ND Highway 50	2	1	1	1	1	2	3	1	1	1	14	Low
Generator at Fire Hall/City Hall/Senior Citizens Center/Shelter in Epping	3	1	3	3	3	3	3	3	3	2	27	High
New culvert and road elevation at intersection of School Avenue and 1st Street in Epping	1	2	3	3	3	3	3	3	3	2	26	High
Improved drainage at 1st and Main in Epping	1	2	3	3	3	3	3	3	3	2	26	High
New emergency siren in Epping	2	0	3	3	3	3	3	3	3	2	25	Moderate
Remove former grain elevator in Epping	2	2	2	2	1	3	2	2	3	2	21	Moderate
Generator at church/secondary shelter in Epping	1	0	3	1	3	3	3	3	1	1	19	Low
Snow fence along Highway 42	2	1	3	3	2	2	3	3	3	2	24	Moderate

Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Cost/Benefit	Total	Priority
New culvert on Main Street in Grenora	1	2	3	3	3	3	3	3	3	2	26	High
Generator for water tower in Grenora	3	1	3	3	3	3	3	3	3	2	27	High
Flood mitigation on east side of Ray	1	2	3	3	3	3	3	3	3	2	26	High
Generators at designated shelters in Ray: senior citizens center and school gym	3	1	3	3	3	3	3	3	3	2	27	High
New culvert at Gilbertson Street South in Tioga	1	2	3	3	3	3	3	3	3	2	26	High
New drainage ditch along 67th Street in Tioga	1	2	3	3	3	3	3	3	3	2	26	High
Wastewater treatment lagoon mitigation in Wildrose	2	2	3	2	2	3	3	3	3	2	25	High
Drainage ditch enlargement in Wildrose	1	2	2	2	3	3	3	3	3	2	24	Moderate
Generators at lift station, Fire Hall and water tower in Wildrose	3	1	3	3	3	3	3	3	1	2	25	Moderate
New culverts throughout Wildrose	1	2	2	2	3	3	3	3	3	2	24	Moderate
Construct and/or identify community storm shelters in Williston	3	0	3	3	3	3	3	3	3	2	26	High

Appendix F: Monitoring Forms

Worksheet 7.1
Mitigation Action Progress Report Form

Mitigation Action Progress Report Form

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

Summary of Project Progress for this Report Period

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

_____

_____

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

_____

_____

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

_____

_____

4. Other comments

_____

_____

Worksheet 7.2
Plan Update Evaluation Worksheet

Plan Update Evaluation Worksheet

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

Worksheet 7.2
Plan Update Evaluation Worksheet

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

Final Plan – November 2017

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